

# Alaska Clean Seas Technical Manual

## Volume 1 Tactics Descriptions

Revised September 2001





# ALASKA CLEAN SEAS TECHNICAL MANUAL

## VOLUME 1

### TACTICS DESCRIPTIONS

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## DISCLAIMER

In producing this manual, Alaska Clean Seas has endeavored to provide the best available information based on the latest technological and engineering advancements. ACS believes that the information and procedures contained herein are well founded, and utilize information obtained from actual experiences in the environments where these procedures are intended to apply. Nonetheless, ACS and its members expressly disclaim that the procedures provided in this manual, even if followed correctly and competently, will necessarily produce any specific results. Implementation of the recommendations and procedures contained herein is at the sole risk of the user.

The *Alaska Clean Seas Technical Manual* provides a detailed source of information pertaining to spill response variables on the North Slope of Alaska. This information includes:

- Spill response tactics in a variety of conditions and seasonal variations.
- Maps of resources at risk from a spill.
- Information on the Incident Management System used in a spill event.

The *Technical Manual* is generally applicable to all operators on the North Slope. Facility-specific information is provided in operator oil discharge prevention and contingency plans. The information provided in this manual, in conjunction with the individual operator contingency plans, is intended to meet the requirements of Alaska Department of Environmental Conservation spill planning regulations (18 AAC 75).

There are always variables beyond the control of any response organization that affect response performance. These variables include personnel safety considerations, weather, visibility, sea conditions, location of spill, type of oil spilled, rate of discharge, condition of the equipment or facility causing the spill, and for a vessel, position of discharging vessel and condition of remaining cargo. In addition, site-specific conditions such as the amount and type of wildlife and sea mammals in or around the site, or the amount and nature of debris present, could interfere with response performance. Accordingly, it is not possible to guarantee response performance in exact accordance with the estimates, strategies or scenarios presented in this *Technical Manual* for planning purposes. For example, the safety of employees, contractor personnel, government representatives, and the public is of paramount importance and will override all other considerations in response operations.

## FOREWORD

This tactics manual is the first volume of three manuals that make up the *Alaska Clean Seas Technical Manual* providing ACS member companies with a unified response plan for spills in the North Slope oil fields, both onshore and offshore, and from Pump Station 1 to Pump Station 4 (Milepost 167) of the Trans-Alaska Pipeline System:

Volume 1: *Tactics Descriptions*

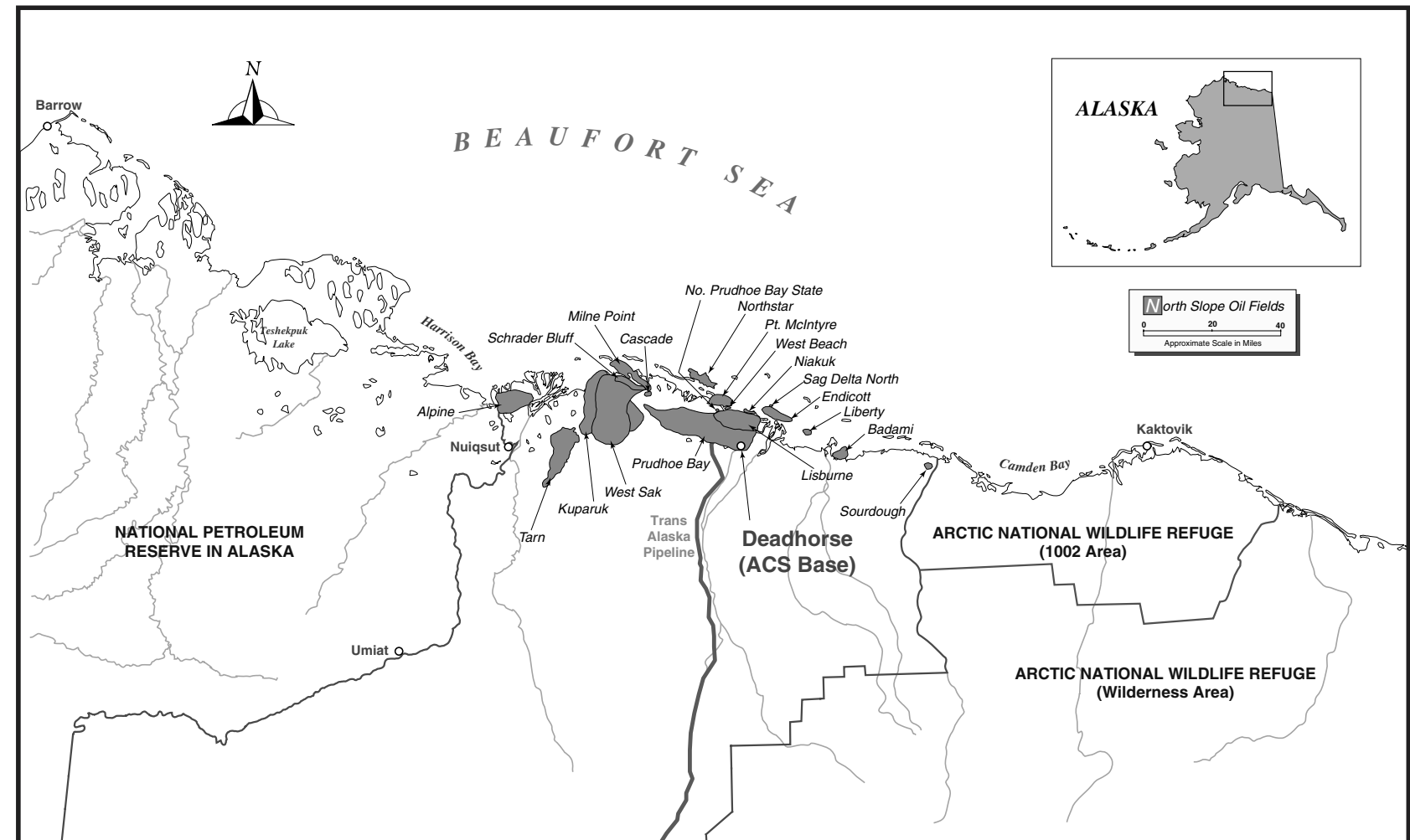
Volume 2: *Map Atlas*

Volume 3: *North Slope Incident Management System*

The *Technical Manual* grew out of the work of the Industry/Agency North Slope Spill Response Project Team, which consists of government and industry personnel representing the following organizations: Alaska Clean Seas, Alaska Department of Environmental Conservation, Alyeska Pipeline Service Company, ARCO Alaska, Inc., BP Exploration (Alaska) Inc., North Slope Borough, U.S. Coast Guard, U.S. Environmental Protection Agency, and U.S. Minerals Management Service. This team was formed in the spring of 1997 in response to the concerns of both agencies and industry that spill response capability for the North Slope needed to be re-evaluated in light of proposed new offshore development such as Northstar and Liberty. Also, both agency and industry felt that industry should develop a unified North Slope response plan under the auspices of Alaska Clean Seas. The Project Team was supported by the Tactics Team, consisting of technical representatives from agencies and industry. The Project Team developed nine scenarios covering a variety of spill situations, conditions, and seasons. The Tactics Team used the scenarios to develop tactics, which became the basis for the tactics descriptions in the *Technical Manual*.

This manual contains descriptions of the tactics that Alaska Clean Seas can use to respond to a spill. This manual is not intended to present all possible tactics for spill response. The tactics presented have been developed by ACS operations personnel and are the tactics they are prepared to use. Other tactics may be added, and these tactics revised as appropriate based on operational experience.

The tactics are designed to be used as building blocks for ACS member companies to develop facility-specific response scenarios in their contingency plans and for responders to develop response strategies for training and for spills. The technical information can be used to prepare a scenario that demonstrates the ability to recover the facility's response planning standard (RPS) volume in 72 hours — the key requirement of Alaska Department of Environmental Conservation contingency plan regulations.





# Alaska Clean Seas Technical Manual

## Volume 1, Tactics Descriptions

### REVISION FORM

Alaska Clean Seas requests that users of this manual provide notification of any errors or suggested revisions for use in future updates. If you would like to submit information, please photocopy this form and fill it out. The form is designed to copy easily onto an 8.5" x 11" sheet. Please send the completed form to:

Alaska Clean Seas  
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Phone: 907-659-3207  
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**Tactic:** \_\_\_\_\_

**Change:** \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Source of Information for Change:** \_\_\_\_\_

\_\_\_\_\_

**Name of Person Submitting Change:** \_\_\_\_\_

**Organization:** \_\_\_\_\_ **Telephone:** \_\_\_\_\_

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

**Thank you for helping ACS maintain its Technical Manual up-to-date!**





DIAGRAM

DESCRIPTION



NOTE: "Base Location" is storage location (may change seasonally); "Mobe Time" is time to get it out of storage, prepare it for operation, and make it ready to travel (concurrent for all equipment); "Deploy Time" is time to make it operational for its intended use at the spill site. These times do not include travel time from base to spill site, which may have multiple components (see Tactic L-3).

EQUIPMENT AND PERSONNEL

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME

SUPPORT

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME

CAPACITIES FOR PLANNING

DEPLOYMENT CONSIDERATIONS AND LIMITATIONS

## HOW TO USE THE ACS *TECHNICAL MANUAL* VOLUME 1, TACTICS DESCRIPTIONS

The purpose of the ACS *Technical Manual* is to provide a comprehensive set of response tactics in a user-friendly format that is accessible both to plan reviewers and operations personnel. The tactics were designed to provide the building blocks for facility-specific plans so that scenarios in those plans could simply and thoroughly identify the resources and personnel needed to respond to site-specific spills. At the same time, the technical details on how each tactic is implemented can be eliminated from the facility plans of ACS member companies.

*Volume 1, Tactics Descriptions*, contains tactics arranged by subject as follows:

- Safety
- Containment
- Recovery and Storage
- Tracking and Surveillance
- Burning
- Shoreline Cleanup
- Wildlife and Sensitive Areas
- Disposal
- Logistics and Equipment
- Administration

Each tactic is numbered with a key letter to identify the subject: e.g., Tactic S-1 (Site Entry Procedures) is the first tactic in the safety section, while C-1 (Containment Using Snow Berm) is the first in the containment section. These numbers are useful for referencing in member-company response plans.

The figure on the following page shows a sample tactic and illustrates that each tactic consists of the following elements: a simplified diagram, a brief narrative description, an equipment and personnel table, a support equipment table, capacities for planning, and deployment considerations and limitations. Sufficient information is provided to allow the user to quickly see how the tactic is deployed and to identify the equipment and personnel needed to implement the tactic. The resource tables also provide storage locations for the equipment and estimated mobilization times and deployment times. These tables can be used to determine equipment needs and to develop response times for individual facilities.

“Base Location” is the location where the equipment is stored. “Mobe Time” is how long it takes to get the equipment out of storage at its base location, prepare it for operation, and make it ready to travel to the spill site. “Deploy Time” is how long it takes to make the equipment operational for its intended use once it arrives at the spill site. Deploy times are concurrent for equipment. Travel time is not included in the mobe and deploy times indicated in the “Equipment and Personnel” and “Support” tables, since travel times depends on the location of the spill and the mode of transportation. “Travel time” is how long it takes to transport equipment from the base location (after mobe) to the spill site (for deployment). For a given spill, this time may have multiple components (e.g., land and air transit), and it may be necessary to factor in additional

time for transition between transport modes. Tactic L-3 contains tables of travel times.

The “Capacities for Planning” section of each tactic provides the values that can be used to calculate the volume recovered by various pieces of equipment. The values presented are derated according to the Industry/Agency North Slope Spill Response Project Team (see “Assumptions” at the end of this section of this *Technical Manual*).

*Volume 2, Map Atlas*, contains 11" x 17" maps (scale 1:26000) and legend pages covering the developed areas of the North Slope and providing detailed geographic, biological, and civil information on the region. Each color map contains the following information: facilities, roads, and pipelines; culvert locations; prestaged response equipment locations; priority protection sites; topographic information; hydrographic information, including drainage divides and flow direction; and shoreline types. For each map there is a corresponding legend page that provides written data on the information shown on the maps, including priority protection sites, general sensitivity data, cultural sites, air access, vessel access, hydrographic conditions, countermeasures considerations, staging areas, and prestaged equipment.

As with the tactics volume, the key consideration in developing the map atlas was providing operationally useful data. For instance, ACS member company biologists identified the priority protection sites based on environmental sensitivity information from both industry and agencies, with the criterion that a site would be shown on the map only if it was defensible with spill response equipment. Many areas on the North Slope are sensitive during the summer, because of the numerous migratory birds and mammals in the region. However, showing such information on the maps would in many cases require shading the entire map, and the entire map area cannot be protected from a spill. Therefore, this information is noted on the legend pages, since it is useful for the responders to know, for example, that migratory birds may be nesting in the area in the summer so that bird hazing equipment can be deployed.

Note that the priority protection sites shown on these maps are discrete locations along the coast that can be defended from a spill by means of mechanical containment and recovery equipment. Industry biologists identified these sites from available data. They may be superseded at the time of a spill by decision of the Unified Command. Furthermore, these sites do not represent all sensitive areas that exist in the region. Environmental sensitivity information provided by the Alaska Regional Response Team Sensitive Areas Working Group is included on the map legend pages under “General Sensitivities.” The purpose of this information is to alert responders that certain animals may be present at certain times of the year and that some regions are more sensitive than others.

*Volume 3, Incident Management System*, provides a unified organization for ACS member companies to respond to spills and other incidents and crises on the North Slope. The organization consists of three levels of teams (Tactical Response Teams, Incident Management Teams, and Crisis Management Teams) and is based on the Incident Command System (ICS). The manual describes the organization of the teams and includes a full complement of ICS forms and status boards, as well as job checklists for ICS positions.



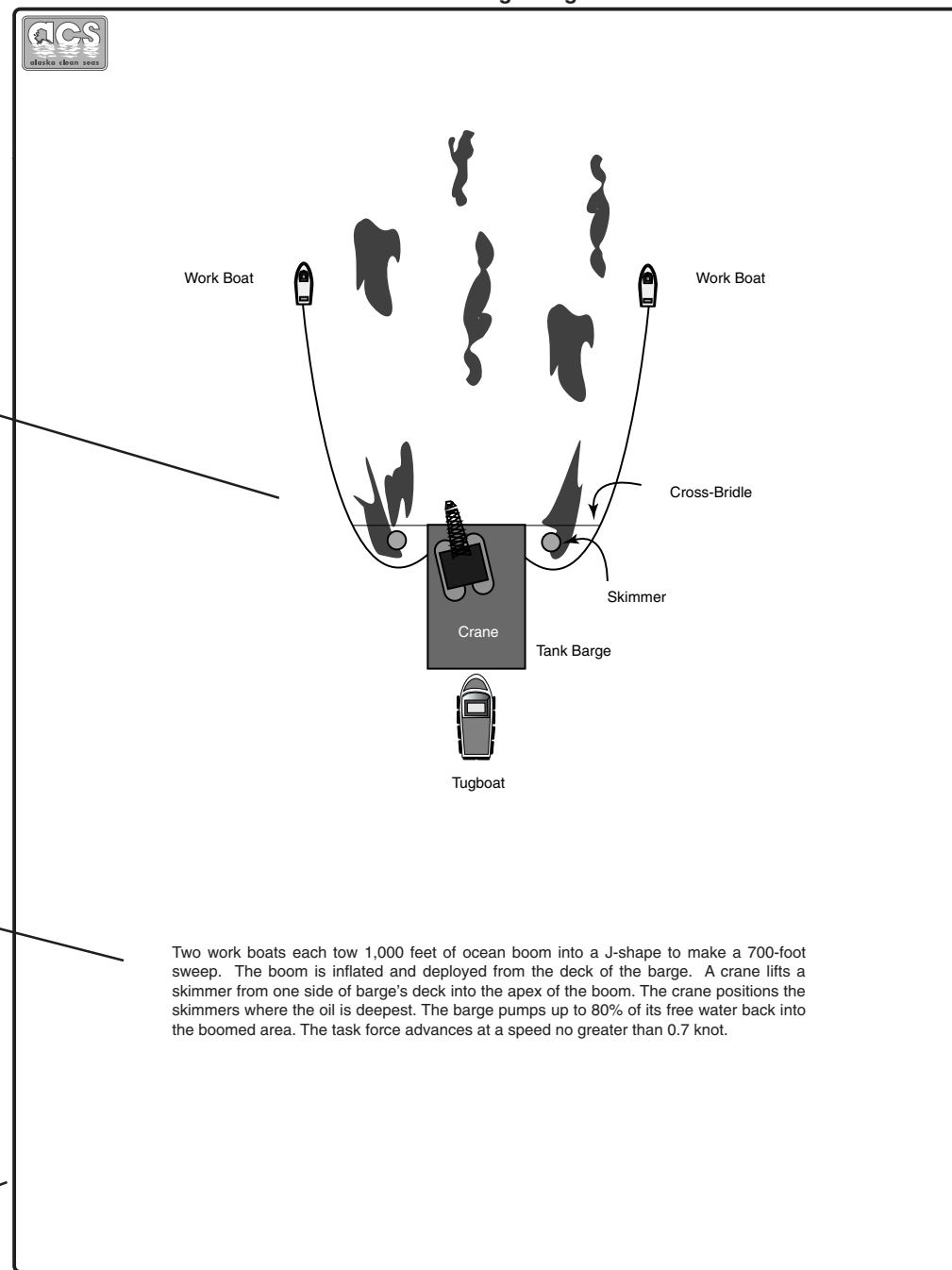
# SAMPLE TACTICS DESCRIPTION

Tactics are numbered in series designated by a letter. This is the nineteenth tactic in the Recovery/Storage section.

Note that travel time is not included in the move and deploy times indicated in the "Equipment and Personnel" and "Support" tables, since travel time depends on the location of the spill and the mode of transportation. "Travel time" is how long it takes to transport equipment from the base location (after move) to the spill site (for deployment). For a given spill, this time may have multiple components (e.g., land and air transit), and it may be necessary to factor in additional time for transition between transport modes. Tactic L-3 contains tables of travel times.

Tactics are numbered in series designated by a letter. This is the nineteenth tactic in the Recovery/Storage section.

## TACTIC R-19 J-Boom to Transrec 250 and Large Barge



The illustration depicts a typical deployment configuration for the tactic. Sometimes, more than one option is provided.

A concise description of how the tactic is deployed is provided to explain the illustration.

The 11" x 17" format is designed so that the page can be copied as two 8.5" x 11" pages.

Two work boats each tow 1,000 feet of ocean boom into a J-shape to make a 700-foot sweep. The boom is inflated and deployed from the deck of the barge. A crane lifts a skimmer from one side of barge's deck into the apex of the boom. The barge pumps up to 80% of its free water back into the boomed area. The task force advances at a speed no greater than 0.7 knot.

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NOTE: All values given on these pages are for planning purposes only.

## J-Boom to Transrec 250 and Large Barge TACTIC R-19

NOTE: "Base Location" is storage location (may change seasonally); "Move Time" is time to get it out of storage, prepare it for operation, and make it ready to travel (concurrent for all equipment); "Deploy Time" is time to make it operational for its intended use at the spill site. These times do not include travel time from base to spill site, which may have multiple components (see Tactic L-3).

### EQUIPMENT AND PERSONNEL

- Select vessels, booms, and skimmers according to area, water depth restrictions, and function (see Tactic L-6).

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Transrec 250 Skimmer* (w/ power pack)	West Dock	On-water recovery	1	—	2 hr	3 hr
Walosep W4 Skimmer* (w/ power pack)	West Dock	On-water recovery	1	—	2 hr	
LORI LFS Skimmers*	West Dock	On-water recovery	2	—	1 hr	
Work Boat (ACS Bay Class or equivalent**)	West Dock, Northstar, Oliktok	Tow boom	2	6	1 hr	
Tug	West Dock	Tow barge	1	4	2 hr	
Tank Barge	West Dock	Skimmer mount	1	14	4 hr	
Boom	West Dock, Oliktok	On-water collection	Variable	4	1 hr	
Mobile Crane (minimum 90-ton)	EOA, WOA, KRU, Peak	Skimmer deployment	1	1	2 hr	
DOP 250 Pump (w/power pack)	ACS, KRU	Decant	1	—	1 hr	
Discharge Hose (4-inch w/ 6-inch to 4-inch reducer)	ACS, WOA, KRU	Decant	≥50 ft	—	1 hr	

TOTAL STAFF 25

\*Two LORI LFS skimmers are interchangeable with the Transrec 250 and Walosep W-4 skimmers, depending on ice conditions.

\*\*200 hp minimum.

### SUPPORT

- An aircraft tracks the oil from above and coordinates the on-water task forces (preferably twin-engined aircraft or single-engined aircraft on floats).

### CAPACITIES FOR PLANNING

- Equipment operates 10 hr per 12-hr shift, 2 shifts per day. DOP 250 pump = 628 bbl/hr nameplate capacity.

SKIMMER CATEGORY	EFFICIENCY MULTIPLIER	MANUFACTURER'S NAMEPLATE PUMP CAPACITY (BBL/HR)	DERATED OIL RECOVERY RATE (BBL/HR)	EMULSIFICATION FACTOR	OIL/EMULSION STORED (BBL/HR)	FREE WATER RETAINED AFTER DECANTING (BBL/HR)	NET STORED LIQUIDS (BBL/HR)
Transrec 250 Weir Skimmer	0.2	1,570	314	1.67	524	209	734
Walosep W4 Weir Skimmer	0.2	566	113	1.67	189	75	264
LORI LFS Oleophilic Skimmer	0.8	271	217	1.67	362	n/a	362

### DEPLOYMENT CONSIDERATIONS AND LIMITATIONS

- The Transrec 250 and Walosep W4 are deployed from the barge's deck into the apex of the boom where oil is in thick layers. DOP 250 pumps decant up to 80% of the free water back into the boomed area.
- If less swath width is required, shorter booms and smaller boats could be used.
- Approval to decant is needed from the State On-Scene Coordinator. Appropriate agencies will be consulted to determine site-specific stipulations.
- The amount of oil recovered will be estimated based on gauging by appropriate means (e.g., ullage tape). Emulsion samples will be collected and analyzed for oil content.

NOTE: All values given on these pages are for planning purposes only.

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"Base Location" is the location where the equipment is stored. "Move Time" is how long it takes to get the equipment out of storage at its base location, prepare it for operation, and make it ready to travel to the spill site. "Deploy Time" is how long it takes to make the equipment operational for its intended use once it arrives at the spill site. Deploy times are concurrent for equipment.

The equipment and support tables can be used to determine equipment needs and to develop response times for individual facilities.

The "Capacities for Planning" section provides the values that can be used to calculate the volume recovered by various pieces of equipment. The values presented are derated according to the Industry/Agency North Slope Spill Response Project Team (see "Assumptions" at the end of this section of the Technical Manual).

Various operational and environmental considerations are presented here.

The 11" x 17" format is designed so that the page can be copied as two 8.5" x 11" pages.



## SUGGESTIONS FOR PREPARING RESPONSE SCENARIOS BASED ON THIS MANUAL

**TABLE 1  
SCENARIO CONDITIONS**

PARAMETER	PARAMETER CONDITIONS	PROJECT TEAM ASSUMPTION?
Spill Location:		
Spill Time:		
Source of Spill:		
Cause of Spill:		
Quantity of Spill:		
Type of Spilled Oil:		
Wind Speed:		
Wind Direction:		
Surface Current:		
Air Temperature:		
Visibility:		
Surface:		
Spill Trajectory:		

**TABLE 2  
RESPONSE STRATEGY**

ADEC REQUIREMENT	RESPONSE STRATEGY	ACS TECHNICAL MANUAL TACTIC
(i) Stopping Discharge at Source		
(ii) Preventing or Controlling Fire Hazards		
(iii) Well Control Plan		
(iv) Surveillance and Tracking of Oil; Forecasting Shoreline Contact Points		
(v) Exclusion Procedures; Protection of Sensitive Resources		
(vi) Spill Containment and Control Actions		
(vii) Spill Recovery Procedures		
(viii) Lightering Procedures		
(ix) Transfer and Storage of Recovered Oil/Water; Volume Estimating Procedure		
(x) Plans, Procedures, and Locations for Temporary Storage and Disposal		
(xi) Wildlife Protection Plan		
(xii) Shoreline Cleanup Plan		

The tactics in this manual have been designed to serve as building blocks for operators to prepare facility-specific response scenarios in their oil discharge prevention and contingency plans. These scenarios can be written in a tabular format addressing the 12 items required in the ADEC regulations [18 AAC 75.425(1)(F)]. Table 1 provides the conditions for the scenario. As shown in Table 2, the scenario should provide the overall strategy for each step in the response and reference the appropriate ACS tactics that are used to build the response. The strategy descriptions in the second column should be brief and to the point.

Table 3 provides a suggested format for demonstrating that the chosen response strategy is capable of removing from water within 72 hours the facility's response planning standard volume. The data for these calculations can be found under each individual tactic in this tactics manual. Table 4 shows the liquid handling capacity of the tactics used in the scenario. Other tables may be appropriate based on the given scenario.

In addition to these strategy and calculation tables, the scenario should contain a description of the scenario conditions and at least one map showing how the tactics will be deployed.

The assumptions at the end of this section of the *Technical Manual* provide guidance from the North Slope Spill Response Project Team on the variables affecting spill response and should be used in developing response scenarios.

**TABLE 3  
OIL RECOVERY CAPACITY**

A	B	C	D	E	F	G
SPILL RECOVERY TACTIC	NUMBER OF SYSTEMS	RECOVERY SYSTEM	DERATED OIL RECOVERY RATE (boph)	MOBILIZATION, DEPLOYMENT AND TRANSIT TIME TO SITE (hours)	OPERATING TIME (hours in a 24-hour shift)	DAILY DERATED OIL RECOVERY CAPACITY (bpd) B X D X F

**TABLE 4  
LIQUID HANDLING CAPABILITY**

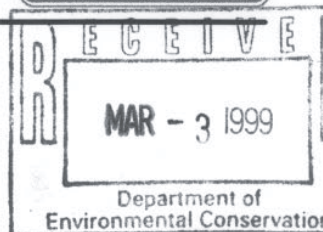
A	B	H	I	J	K	L	M	N	O	P
SPILL RECOVERY TACTIC	NUMBER OF STORAGE SYSTEMS	STORAGE CAPACITY DESCRIPTION	DERATED STORAGE CAPACITY VOLUME PER UNIT (bb)	OIL & EMULSION AVAILABLE (bph)	TIME ON LOCATION BEFORE OFFLOAD NEEDED (hrs) I/J	OFF-LOADING MECHANISM	OFF-LOADING RATE (boph)	TRANSIT TIME - BOTH WAYS (hrs)	OFFLOADING TIME (hrs) I/M	OFFLOAD AND TRANSIT TIME (hrs) N+O

NOTE: All values given on these pages are for planning purposes only.





# INDUSTRY/AGENCY NORTH SLOPE OIL SPILL RESPONSE



## Guidance for Preparing Marine Response Scenarios (Page 1 of 4)

In an effort to provide comprehensive spill response and planning, the following guidance chart was developed by the North Slope Spill Response Project Team. The scope of this guidance is to provide direction and consistency for a variety of oil spill response and planning parameters for North Slope operations. The variables and values depicted were agreed to by both Industry and Agency Representatives.

The purpose of this document is to set forth certain key oil spill response planning parameters for a variety of the climatic and environmental conditions which may be encountered. It is also intended to provide direction and consistency in developing North Slope generic scenarios in a variety of receiving environments. It should be recognized that use of these variables and values is for planning only. In an actual spill event, depending on circumstances, the variables shown here may be different and possibly not applicable.

VARIABLE	VALUE TO BE USED FOR SPILL RESPONSE PLANNING
1. Blowout oil lost to evaporation from wells producing more than 5,500 bbl per day	<ul style="list-style-type: none"> <li>20% applied to atomized well blowout where evaporation occurs before impact to land or water.</li> <li>Adjusted RPS volume is not to decline below 5,500 bbl/day.</li> </ul>
2. Blowout discharge rate from existing production wells	<ul style="list-style-type: none"> <li>Annual average daily oil production for the maximum producing well (rounded to nearest thousand barrels) as reported by the Alaska Oil and Gas Conservation Commission (AOGCC).</li> </ul>
3. Blowout discharge from new reservoirs	<ul style="list-style-type: none"> <li>16,500 bbl for first 72 hours.</li> <li>If rate is higher after initial production, use AOGCC data and submit c-plan amendment. ADEC condition of c-plan approval will specify timing of submission of production data.</li> </ul>
4. Duration of planning period for a blowout	<ul style="list-style-type: none"> <li>15 days based on consideration of historical duration of blowouts.</li> <li>This does not mean response to a blowout ends after 15 days. C-plan will include ability to sustain response indefinitely.</li> </ul>
5. Out-of-region resources	<ul style="list-style-type: none"> <li>ADEC will consider use of limited out-of-region resources, including off-shift in-state specialists and specialists from other response organizations, to meet 72-hour adjusted RPS based on verifiable contracts and sharing agreements.</li> <li>Out-of-region supplement beyond RPS demonstration is to be fully described. The c-plan will include mobilization plan, equipment list, and phone numbers. (Reference Prince William Sound Regional Citizens Advisory Council out-of-region report).</li> </ul>



# INDUSTRY/AGENCY NORTH SLOPE OIL SPILL RESPONSE



## Guidance for Preparing Marine Response Scenarios (Page 2 of 4)

VARIABLE	VALUE TO BE USED FOR SPILL RESPONSE PLANNING
6. Maximum wind speed	<p>A. Open water: 20 kt (based on 95th percentile of wind speed for season).</p> <p>B. Broken ice: Historical mean wind speed for broken ice periods, i.e., 10 kt in break-up and 13 kt in freeze-up.</p>
7. Directional persistence of wind	<ul style="list-style-type: none"> <li>First 24 hours: wind from southwest (based on historical data).</li> <li>Next 48 hours: wind from northeast (based on historical data).</li> </ul>
8. Maximum wave height in mature fetch	<p>A. Open water: 1.5 meters (based on historical data for Northstar, NOAA atlas, and assumed 4-mile fetch for wave height).</p> <p>B. Broken ice: Wave height as predicted from ice dampening: less than or equal to 1 meter.</p>
9. Ice coverage during broken ice periods	<ul style="list-style-type: none"> <li>Simulate ice movement and changes in ice percentage cover rather than constant percentage ice coverage.</li> </ul>
10. Oil-to-water ratio of emulsion for storage purposes	<ul style="list-style-type: none"> <li>60 parts oil to 40 parts water (i.e., oil volume x 1.67).</li> <li>Based on Prince William Sound c-plan and S.L. Ross et al. (1998).</li> </ul>
11. Portion of oil entering open water	<ul style="list-style-type: none"> <li>S.L. Ross July 1997 blowout model's prediction of oil falling to water on site map <i>plus</i> oil falling to other surfaces in quantities greater than 0.5 gallon per square foot.</li> <li>Existing on-site containment such as gravel berms can reduce the volume entering open water.</li> </ul>
12. Slick size	<p>A. Open water:</p> <ul style="list-style-type: none"> <li>Fallout footprint based on S.L. Ross July 1997 blowout model using a blowout well with an open orifice.</li> <li>Width of downwind zone of scattered oil = 0.25 x length.</li> <li>Farfield zone contains windrows of oil.</li> </ul> <p>B. Broken ice:</p> <ul style="list-style-type: none"> <li>Oil slick takes form of windrows with ice less than 30% coverage; no windrows in ice coverage 30% or greater. Oil spreads less in ice.</li> <li>Oil slick thickness and width as listed in Tables 6-2 and 6-3 of S.L. Ross et al. (1998).</li> </ul>
13. On-water trajectory	<ul style="list-style-type: none"> <li>Vector sum of local current (speed and direction) and wind (direction and 3 percent of speed).</li> </ul>
14. Safety zone boundary (permissible exposure limit, PEL)	<ul style="list-style-type: none"> <li>5 milligrams of oil particulate per cubic meter of air.</li> </ul>





# INDUSTRY/AGENCY NORTH SLOPE OIL SPILL RESPONSE



## Guidance for Preparing Marine Response Scenarios (Page 3 of 4)

VARIABLE	VALUE TO BE USED FOR SPILL RESPONSE PLANNING
15. Encounter rate	<p><b>A. Open water:</b> Use the Anvil model in lieu of the MEC model.</p> <p><b>B. Broken ice:</b> The skimmer system's oil encounter rate adjusted for ice concentrations and the containment effect of broken ice. Use the following formula:</p> <p style="padding-left: 40px;">[(oil thickness) x (the lesser of the width of collection boom swath or oil width) x (oil's speed)] x [1 - ice concentration] x [containment effect].</p> <p>Based on Appendix E in S.L. Ross et al. (1998) and on Attachment 3 of D. Dickins (1998).</p> <p>The "containment effect" is 0 at 90% cover, 0.1 at 80% cover, 0.2 at 70% cover, 0.3 at 60% cover, 0.4 at 50% cover, 0.5 at 40% cover, 0.7 at 30% cover, 0.8 at 20% cover, and 0.9 at 10% cover.</p>
16. Derated oil recovery rate for skimmers	<ul style="list-style-type: none"> <li>20% of pump's nameplate capacity based on ADEC guidelines, except for rates specified below.</li> <li>Skimmer-specific rates:                             <ul style="list-style-type: none"> <li>- LORI SCS-3: 80% x 271 bbl/hr = 217 bbl/hr</li> <li>- Foxtail: 30% x nameplate pump capacity (based on CISPRI test)</li> <li>- Vikoma 30K and MI-30: 10 bbl/hr</li> </ul> </li> </ul>
17. Throughput efficiency (boom containment)	<ul style="list-style-type: none"> <li>Marine open water: 100%.</li> <li>River system: minimum of 3 control sites with open-water marine backup.</li> </ul>
18. Advancing skimmer speed	<ul style="list-style-type: none"> <li>0.7 kt.</li> </ul>
19. Barge storage capacity	<ul style="list-style-type: none"> <li>95% of rated capacity.</li> </ul>
20. Utilization time of recovery systems	<ul style="list-style-type: none"> <li>10 hours in each 12-hour shift; 2 shifts per day.</li> <li>Utilization time in first 72 hours = 60 hours minus time to deploy.</li> </ul>
21. Mini-barge fill time (with weir skimmer and 2 decants)	<ul style="list-style-type: none"> <li>1 hour (based on ACS field tests with DOP 250 pump and 249-bbl barge, Prince William Sound c-plan, and S.L. Ross et al. [1998]).</li> </ul>
22. Vessel and barge transit time	<ul style="list-style-type: none"> <li>5 kt laden and unladen (based on USCG and ACS field tests).</li> </ul>
23. Mini-barge offload time	<ul style="list-style-type: none"> <li>1.5 hours to hook, pump, and unhook (based on ACS field tests).</li> </ul>



# INDUSTRY/AGENCY NORTH SLOPE OIL SPILL RESPONSE



## Guidance for Preparing Marine Response Scenarios (Page 4 of 4)

VARIABLE	VALUE TO BE USED FOR SPILL RESPONSE PLANNING
24. Decant from barges	<ul style="list-style-type: none"> <li>Large recovery and storage barges: 80% of free water.</li> <li>Mini-barges: 60% of free water.</li> <li>Based on Prince William Sound c-plan and ADEC guidelines.</li> </ul>
25. Delivery mixture from 249-bbl mini-barge coupled with weir skimmer	<ul style="list-style-type: none"> <li>79 bbl oil, 53 bbl water-in-oil emulsion, and 104 bbl free water (2 decants required).</li> <li>Based on Prince William Sound c-plan.</li> </ul>

**Procedure for Proposed Changes:** From time to time, it may be necessary to revise one or more of the above assumptions based on new information. Proposed changes may be submitted to the Project Team co-chairs, who will convene the Project Team and Tactics Team as necessary to evaluate the proposal. If a change is made, approval of the Project Team co-chairs is required, and the copy of this guidance in the *Alaska Clean Seas Technical Manual* will be revised and distributed to holders of controlled copies of the *Technical Manual*.

AGREEMENT SIGNED:

DATE:

*Tom Chapple*  
Tom Chapple, Alaska Department of Environmental Conservation  
Co-Chair North Slope Spill Response Project Team

3/2/99

*Jim McHale*  
Jim McHale, Alaska Clean Seas  
Co-Chair North Slope Spill Response Project Team

2/26/99

REPRESENTING:

Alaska Clean Seas  
Alaska Department of Environmental Conservation  
Alyeska Pipeline Service Company  
ARCO Alaska, Inc.  
BP Exploration (Alaska) Inc.

North Slope Borough  
U.S. Coast Guard  
U.S. Environmental Protection Agency  
U.S. Minerals Management Service

REFERENCES

S.L. Ross Environmental Research Ltd., D. F. Dickins and Associates Ltd., and Vaudrey and Associates, Inc. 1998. "Evaluation of Cleanup Capabilities for Large Blowout Spills in the Alaskan Beaufort Sea During Periods of Broken Ice." Prepared for Alaska Clean Seas and Minerals Management Service on behalf of the North Slope Spill Response Project Team.

Dickins, D. 1998. "Realistic Broken Ice Scenarios for Break-up and Freeze-up at Northstar." Prepared for North Slope Spill Response Project Team.



AC	Alternating current
ACS	Alaska Clean Seas
ADEC	Alaska Department of Environmental Conservation
ADF&G	Alaska Department of Fish and Game
ADNR	Alaska Department of Natural Resources
AIC	Alaska Interstate Construction
APC	Alaska Petroleum Contractors
APR	Air-purifying respirator
ARRT	Alaska Regional Response Team
ATV	All-terrain vehicle
BETRS	Basic exchange telephone radio system
BOC	Base Operations Center
bbl	Barrels
bopd	Barrels of oil per day
bpd	Barrels per day
BPXA	BP Exploration (Alaska) Inc.
CATCO	Crowley All-Terrain Company
CO	Carbon monoxide
CPC	Chemical protective clothing
CTES	C-band transportable earth station
DC	Direct current
DOSH	Department of Occupational Safety and Health (State of Alaska)
EmOC	Emergency operations center
EOA	Eastern Operating Area (Prudhoe Bay Field)
EOR	Enhanced oil recovery
EPA	U.S. Environmental Protection Agency
FAA	Federal Aviation Administration
FAR	Federal aviation regulations
FLIR	Forward-looking infrared
FOSC	Federal On-Scene Coordinator
GC	Gas chromatograph
GIS	Geographic information system
GOR	Gas-to-oil ratio
gpm	Gallons per minute
GPS	Global positioning system
H <sub>2</sub> S	Hydrogen sulfide
HAZMAT	Hazardous materials
HF	High frequency
HSE	Health, safety, and environment
ICP	Incident command post
ICS	Incident Command System
IDLH	Immediately dangerous to life or health
IMT	Incident management team
ISB	In-situ burning
KRU	Kuparuk River Unit
LEL	Lower explosive limit
MEL	Master equipment list
mmscfd	Million standard cubic feet per day
MRC	Mobile response center
MPU	Milne Point Unit



MSDS	Material safety data sheet
NFPA	National Fire Protection Association
NOAA	National Oceanic and Atmospheric Administration
NSB	North Slope Borough
NSSRT	North Slope Spill Response Team
OSC	On-Scene Coordinator
OSHA	Occupational Safety and Health Administration (federal)
PABX	Private Automatic Branch Exchange
PBOC	Prudhoe Bay Operations Center
PBU	Prudhoe Bay Unit
PEL	Permissible exposure limit
PID	Photoionization detector
PPE	Personal protective equipment
psi	Pounds per square inch
RCRA	Resource Conservation and Recovery Act
RMOL	Realistic maximum operating limitations
RRT	Regional Response Team
SCAT	Shoreline cleanup assessment team
SCBA	Self-contained breathing apparatus
scf	Standard cubic feet
SOSC	State On-Scene Coordinator
SRT	Spill Response Team
SSB	Single side band
UHF	Ultra high frequency
USCG	United States Coast Guard
USFWS	United States Fish and Wildlife Service
VHF	Very high frequency
WOA	Western Operating Area (Prudhoe Bay Field)





Tactic	Rev. Date
<b>SAFETY</b>	
S-1 Site Entry Procedures	Revised 9/01
S-2 Site Safety Plan Form	Original 3/1/99
S-3 Identifying Required Personal Protection	Original 3/1/99
S-4 Site Layout	Revised 9/01
S-5 Air Monitoring for Personal Protection	Revised 9/01
S-6 Decontamination	Revised 9/01
<b>CONTAINMENT</b>	
C-1 Containment Using Snow Berm	Revised 9/01
C-2 Deflection Booming at a Culvert	Revised 9/01
C-3 Culvert Blocking	Revised 9/01
C-4 Barriers on Land	Revised 9/01
C-5 Deflection or Exclusion Booming on Lake or Tundra	Revised 9/01
C-6 Underflow Dam	Revised 9/01
C-7 Deadarm Trench on River Bank	Revised 9/01
C-8 Deflection Booming in Stream	Revised 9/01
C-9 Exclusion Booming on River	Revised 9/01
C-10 Containment Using Ice-Road Ring	Revised 9/01
C-11 Containment on Ice with Trenches and Sumps	Revised 9/01
C-12 Trenching Ice to Direct Flow to a Containment Point	Revised 9/01
C-13 Deflection Booming in Open Water	Revised 9/01
C-14 Exclusion Booming in Open Water	Revised 9/01
C-15 Intertidal Booming	Revised 9/01
C-16 Anchored W Deflection Boom	Revised 9/01
C-17 Containment Using U-Boom	Original 9/01
<b>RECOVERY AND STORAGE</b>	
R-1 Mechanical Recovery of Lightly Oiled Snow	Revised 9/01
R-1A Use of Snow Blower to Remove Lightly Misted Snow	Original 9/01
R-2 Manual Recovery of Lightly Oiled Snow	Revised 9/01
R-3 Recovery of Oil-Saturated Snow	Revised 9/01
R-4 Flushing of Oil on Tundra Surface	Revised 9/01
R-5 Recovery of Embedded Oil	Revised 9/01
R-6 Recovery by Direct Suction	Revised 9/01
R-7 Recovery from Pit or Trench	Revised 9/01
R-8 Use of Portable Skimmers with Pumps (River and Lake)	Revised 9/01
R-9 Use of Sorbents	Revised 9/01
R-10 Fairchild Gate Weir Collection System	Revised 9/01
R-11 Decanting Separated Water in River	Revised 9/01
R-12 Aggressive Breakup in River	Revised 9/01
R-13 Cutting Ice Slots for Recovery	Revised 9/01



Tactic	Rev. Date
<b>RECOVERY AND STORAGE (CONT'D)</b>	
R-14 Recovery of Oil under Ice	Revised 9/01
R-15 Anchored V-Boom to Skimmer	Revised 9/01
R-16 Hook Boom to Skimmer and Storage	Revised 9/01
R-17 J-Boom to Skimmer and Mini-Barge	Revised 9/01
R-18 U-Boom to Skimmer and Mini-Barge	Revised 9/01
R-19 J-Boom to Transrec 250 and Large Barge	Revised 9/01
R-19A Use of J-Booms in Broken Ice (<70%)	Revised 9/01
R-20 U-Boom with Open Apex to Skimmer and Mini-Barge	Revised 9/01
R-21 Hot-Water, High-Pressure Washing of Solid Surfaces	Revised 9/01
R-22 Temporary Storage Onshore	Revised 9/01
R-23 Tank on Trailer (CATCO Fuel Tanker)	Revised 9/01
R-24 Hoses and Pumps in Series	Revised 9/01
R-25 Freighter Boat with Tank	Revised 9/01
R-26 Excavation and Storage of Oiled Gravel	Revised 9/01
R-27 Damaged Tank Transfer Procedures	Revised 9/01
R-28 Lightering	Revised 9/01
R-29 Ice Mining	Revised 9/01
R-30 Recovery Using Diamond Boom for Subsea Pipeline Break	Original 9/01
R-31 Recovery Using Free Skimming	Original 9/01
<b>TRACKING AND SURVEILLANCE</b>	
T-1 Delineation of Oiled Snow or Tundra	Revised 9/01
T-2 Mapping and Surveillance of Spill on Land	Revised 9/01
T-3 Detection and Delineation of Under-Ice Oil	Revised 9/01
T-4 Discharge Tracking in Open Water	Original 3/1/99
T-4A Discharge Tracking in Ice	Original 9/01
T-5 Trajectory Calculations	Original 3/1/99
T-6 Blowout Modeling	Revised 9/01
T-7 Spill Volume Estimation	Original 3/1/99
<b>BURNING</b>	
B-1 In-Situ Burning Plan	Original 3/1/99
B-1A RRT In-Situ Burn Application Form	Original 3/1/99
B-2 Burning Oily Vegetation	Revised 9/01
B-3 In-Situ Burning with Heli-torch and Other Igniters	Revised 9/01
B-4 Deployment and Use of Fire Containment Boom	Revised 9/01
B-5 Burning Oil Pools on Any Solid Surface	Revised 9/01
B-6 Burn Residue Recovery	Revised 9/01
B-7 Burn Extinguishment on Water	Original 3/1/99





Tactic		Rev. Date
<b>SHORELINE CLEANUP</b>		
SH-1	Shoreline Assessment	Original 3/1/99
SH-2	Natural Recovery of an Oiled Shoreline	Original 3/1/99
SH-3	Shoreline Cleanup Using Flooding and Flushing	Revised 9/01
SH-4	Shoreline Cleanup Using Steam Cleaning or Sand Blasting	Revised 9/01
SH-5	Shoreline Cleanup Using Manual Removal and Vacuum Methods	Revised 9/01
SH-6	Shoreline Cleanup Using Mechanical Removal	Revised 9/01
SH-7	Shoreline Cleanup Using Sorbents and Vegetation Cutting	Revised 9/01
SH-8	Shoreline Cleanup Using Mechanical Tilling/Aeration	Revised 9/01
SH-9	Shoreline Cleanup Using Sediment Reworking and Surf Washing	Revised 9/01
SH-10	Shoreline Cleanup Using Burning	Revised 9/01
SH-11	Biological/Chemical Shoreline Response Tactics	Revised 9/01
SH-12	Summary of Potential Impact of Shoreline Cleanup Techniques	Original 3/1/99
<b>WILDLIFE AND SENSITIVE AREAS</b>		
W-1	Wildlife Protection Strategy and Permits	Revised 9/01
W-1A	RRT Hazing Checklist	Original 3/1/99
W-1B	RRT Capture/Transportation/Stabilization/Treatment Checklist	Original 3/1/99
W-2	Wildlife Hazing Equipment	Revised 9/01
W-2A	Mammal Hazing	Original 3/1/99
W-2B	Bird Hazing	Revised 9/01
W-3	Wildlife Capture and Rehabilitation	Original 3/1/99
W-4	Salvage of Dead Wildlife	Revised 9/01
W-5	Deployment of ACS Mobile Wildlife Stabilization Center	Revised 9/01
W-6	Identifying and Protecting Sensitive Areas	Original 3/1/99
<b>DISPOSAL</b>		
D-1	Processing Recovered Liquids	Revised 9/01
D-2	Storage and Disposal of Non-Liquid Oily Wastes	Revised 9/01
D-3	Disposal of Non-Oily Wastes	Revised 9/01
D-4	Stockpiling Oiled Gravel	Revised 9/01
D-5	Processing of Contaminated Snow/Ice	Revised 9/01

NOTE: All values given on these pages are for planning purposes only.



Tactic		Rev. Date
<b>LOGISTICS AND EQUIPMENT</b>		
L-1	Ice Road Construction for Access to Winter Tundra Spill	Revised 9/01
L-2	Staging Areas	Revised 9/01
L-3	Deployment Strategies	Revised 9/01
L-4	Logistical Support	Revised 9/01
L-5	Communications	Revised 9/01
L-6	ACS Response Equipment Specifications	Revised 9/01
L-7	Realistic Maximum Operating Limitations	Revised 9/01
L-8	North Slope Mutual Aid	Revised 9/01
L-9	Accessing Contract Resources	Revised 9/01
L-10	Accessing Non-Obligated Resources	Revised 9/01
L-11	Best Available Technology Analysis	Original 3/1/99
L-11A	BAT Analysis: ACS Communications	Original 3/1/99
L-11B	BAT Analysis: Trajectory Analyses	Revised 9/01
L-11C	BAT Analysis: Wildlife Protection	Original 3/1/99
L-12	Logistical Support for On-Water Operations	Original 3/1/99
<b>ADMINISTRATION</b>		
A-1	Emergency Action Checklist	Original 3/1/99
A-2	Spill Reporting Procedures	Revised 9/01
A-3	ACS Pre-Approved Permits	Revised 9/01
A-4	Training Requirements for Response Personnel	Revised 9/01
A-5	ACS Certifications	Revised 9/01

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## SAFETY IS THE FIRST PRIORITY IN THE RESPONSE TO ANY TYPE OF SPILL.

Remember, it's not worth risking injury to anyone to clean up a spill. Safety protocols and procedures must be followed for any spill. **Proper hazard identification, hazard assessment, selection of appropriate personal protective equipment (PPE), personnel decontamination, and determination of appropriate safety and health practices take priority over all other spill response activities.**

Key safety issues to consider in mobilizing a response effort are:

- Fire and explosion risk
- Chemical exposure potential
- Temperature extremes
- Safety of on-water or on-ice operations
- Other physical hazards

Not all hazards at an oil spill site are immediately apparent. A number of factors can be dangerous in the presence of an oil spill. Beware of the following:

- Potential ignition ("hot") sources for fire/explosion
- Smoking in the area
- Static electricity
- Escaping gas
- Unauthorized visitors (e.g., media)
- Undetected mechanical failures
- Spontaneous combustion
- Physical hazards (e.g., structural damage to pipeline or facilities)
- Chemical hazards (e.g., components in the oil, either naturally occurring or added, that are toxic to humans)

**Effective spill response depends upon correct identification of the materials released.** The Safety Officer will use his/her professional judgment to determine the following:

- Type of product or material released
- Physical state of material released (liquid, spray, solid, emulsified, mist, vapor, gas)
- Air concentration of material as compared to: 1) flammability range, 2) whether immediately dangerous to life or health (IDLH), 3) permissible exposure limit (PEL)\*
- Hazards associated with material (e.g., flammability, toxicity, reactivity, corrosivity, health hazards)
- Weather conditions (e.g., prevailing winds, ambient temperatures, wind chill, relative humidity)
- Threat to human health and environmentally sensitive areas

In cases of release of an unknown material, the Safety Officer will assist with identification:

- Use available information such as labels, transport placards, NFPA, DOT Emergency Response Handbook, or bill of lading.
- Take sample, using accepted EPA protocol.
- If identified, consult material safety data sheet (MSDS) or operator's safety department.
- If no MSDS available, call CHEMTREC (1-800-424-9300 or 1-703-527-3887).

### PRE-ENTRY SAFETY

Steps to follow during the pre-entry phase to provide maximum safety to workers, the environment, and facilities:

- Before any site activity, all known facts about the incident are discussed in a pre-entry briefing.
- Known site hazards are identified.
- A Safety Officer makes a preliminary evaluation of a site's characteristics (hazards) before site entry.

The Safety Officer performing the initial assessment will:

- Determine if people are injured or trapped. If so, contact help as soon as possible.
- Delineate affected area (Hot and Warm Zones).
- Designate site as "Dangerous - No Smoking."

\*The PEL is 5 mg/m<sup>3</sup> for particulate oil in air (e.g., from a high-pressure release of oil), and the PEL is 0.6 ppm for benzene in oil. In addition, oil may contain methanol and xylene from injection at the wellbore.

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- Stay upwind from spill.
- Restrict access to spill area to those involved in initial containment.
- Note any geographic hazards (cliffs, fast-moving water, ditches, etc.).
- Consider the need for the following: protective gear, decontamination, site control, and safety equipment.
- Gather any and all pertinent data (begin evaluation).

The Safety Officer must follow the site entry procedures below.

### SITE ENTRY

The entry team must consist of at least two people. Backup personnel must be standing by with equipment for rescue and advanced first-aid support (at a minimum). The initial entry team performs the initial assessment wearing SCBAs. The initial assessment criteria for entry into oil spill area by response teams follow (other criteria will apply to hazmat spills):

- **No entry** if the oxygen level is 23.5% or higher.
- **No entry** at 10% or more of lower explosive limit (LEL), or if fire/explosion occurred.
- SCBA required for response personnel if the H<sub>2</sub>S level is 10 ppm or higher, if the CO level is 35 ppm or higher, if the benzene level is 30 ppm or higher, if the total hydrocarbons level is 500 ppm or higher, or if the oxygen level is less than 19.5%.
- An air-purifying respirator (APR) is required if the benzene concentration is greater than 0.5 ppm.
- An APR is required if total hydrocarbon concentration is 50 ppm or higher.

Immediately after the initial site entry, a more detailed evaluation of the site's specific characteristics is completed in order to further identify existing hazards and aid in the selection of appropriate PPE.

### DOCUMENTATION

Careful and complete documentation of planning, procedures, and implementation of spill response activities is critical for two main reasons. Federal OSHA and State of Alaska DOSH regulations require certain record-keeping. Also, knowing what's been done in the past can help prevent problems and increase cleanup and safety effectiveness in the future. The following records should be available either on site or in personnel files:

- Initial site assessment information
- Site safety plan
- Personnel training records
- Site safety briefings
- Paperwork for exposure badges and air monitoring logs
- Accident reports
- Medical monitoring records

### DEPLOYMENT CONSIDERATIONS AND LIMITATIONS

**CONSIDER ALL SPILLS TO BE HAZARDOUS:**

- Always approach a spill from an upwind direction.
- Avoid direct or indirect body contact with the spilled material.
- Remove all potential ignition sources from immediate area.
- Shut down all powered equipment until Safety Officer approves operation.
- Restrict access to spill area to those involved in initial containment and cleanup activity.
- Do not approach materials producing gases or vapors until identification is possible and hazards are known.
- Maintain constant observation of personnel for indications of hypothermia and/or frostbite.
- Follow procedures to avoid slips, trips, and falls, especially in ice and snow conditions.

**PERSONAL PROTECTIVE EQUIPMENT (PPE) REQUIRED FOR RESPONDERS TO A CRUDE OIL RELEASE:**

- Appropriate respiratory equipment (see above)
- Appropriate gloves (nitrile, butyl rubber, or Viton), boots, and full-body-covering suits (Level A, B, C)
- Safety glasses or goggles
- Hard hat
- Appropriate dress for cold weather, as necessary
- Steel-toed footwear or arctic boots in cold weather; ice cleats as necessary
- Fire-retardant clothing if within 50 feet of a process area
- Personal flotation devices, as necessary

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NORTH SLOPE SITE HEALTH & SAFETY PLAN																																																																											
Incident Name:		Date Prepared:																																																																									
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Site Safety Officer:		On-Scene Commander:																																																																									
<b>(1) TYPE OF INCIDENT</b> <input type="checkbox"/> Personal Injury/Medical <input type="checkbox"/> Fire <input type="checkbox"/> Explosion <input type="checkbox"/> Gas Release <input type="checkbox"/> Spill <input type="checkbox"/> Well Control <input type="checkbox"/> Collision <input type="checkbox"/> Terrorism <input type="checkbox"/> Other <input type="checkbox"/> Planned Event		<b>(2) ENTRY OBJECTIVES</b> (Refer To ICS-201, 202) <input type="checkbox"/> Isolate and Control Entry <input type="checkbox"/> Reconnaissance <input type="checkbox"/> Rescue Victims/Evacuation or Shelter in Place <input type="checkbox"/> Fire Suppression <input type="checkbox"/> Spill Cleanup <input type="checkbox"/> Special Procedures <input type="checkbox"/> Account for Personnel <input type="checkbox"/> Source Control																																																																									
<b>(3) HAZARD IDENTIFICATION/EVALUATION</b> (Refer to ICS-204S) <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th style="width:25%;">Chemical Properties</th> <th style="width:25%;">Hazards</th> <th style="width:25%;">Physical (Energy Sources Involved)</th> <th style="width:25%;">Biological</th> </tr> <tr> <td>Name:</td> <td><input type="checkbox"/> Flammable? FP: _____ LEL Range: _____ %</td> <td><input type="checkbox"/> Electrical</td> <td><input type="checkbox"/> Blood Borne Pathogen</td> </tr> <tr> <td>Est. Amount:</td> <td><input type="checkbox"/> Explosive?</td> <td><input type="checkbox"/> Pressure</td> <td><input type="checkbox"/> Prevention Plan Implemented?</td> </tr> <tr> <td>State (Liquid, Gas, Solid)</td> <td><input type="checkbox"/> Toxic? IDLH: _____ PEL: _____</td> <td><input type="checkbox"/> Momentum/Gravity</td> <td><input type="checkbox"/> Wildlife Control Implemented?</td> </tr> <tr> <td>Spec. Gravity/Vapor/Density</td> <td><input type="checkbox"/> Corrosive? DOT/UN# _____</td> <td><input type="checkbox"/> Residual/Stored Energy</td> <td><input type="checkbox"/> Special Health/Medical Issues?</td> </tr> <tr> <td>Water Soluble?</td> <td><input type="checkbox"/> Reactive? DOT Hazard Guide # _____</td> <td><input type="checkbox"/> Special</td> <td></td> </tr> <tr> <td>MSDS on Hand?</td> <td><input type="checkbox"/> Carcinogen?</td> <td><input type="checkbox"/> High Temperature</td> <td></td> </tr> <tr> <td></td> <td><input type="checkbox"/> Threat To: _____</td> <td><input type="checkbox"/> Energy Isolation and Control</td> <td></td> </tr> <tr> <td></td> <td><input type="checkbox"/> Human Health at Risk?</td> <td><input type="checkbox"/> Verified? YES/NO</td> <td></td> </tr> <tr> <td></td> <td><input type="checkbox"/> Environmental Sensitive Areas at Risk?</td> <td><input type="checkbox"/> Vibration</td> <td></td> </tr> <tr> <td></td> <td></td> <td><input type="checkbox"/> Noise</td> <td></td> </tr> <tr> <td></td> <td></td> <td><input type="checkbox"/> Heat or Cold Stress</td> <td></td> </tr> <tr> <td></td> <td></td> <td><input type="checkbox"/> Confined Space Entry</td> <td></td> </tr> <tr> <td></td> <td></td> <td><input type="checkbox"/> Elevated Area</td> <td></td> </tr> <tr> <td></td> <td></td> <td><input type="checkbox"/> Limited Access</td> <td></td> </tr> <tr> <td></td> <td></td> <td><input type="checkbox"/> Below Grade (pit, trench)</td> <td></td> </tr> <tr> <td></td> <td></td> <td><input type="checkbox"/> Offshore Structure</td> <td></td> </tr> <tr> <td></td> <td></td> <td><input type="checkbox"/> Land Structure</td> <td></td> </tr> </table>				Chemical Properties	Hazards	Physical (Energy Sources Involved)	Biological	Name:	<input type="checkbox"/> Flammable? FP: _____ LEL Range: _____ %	<input type="checkbox"/> Electrical	<input type="checkbox"/> Blood Borne Pathogen	Est. Amount:	<input type="checkbox"/> Explosive?	<input type="checkbox"/> Pressure	<input type="checkbox"/> Prevention Plan Implemented?	State (Liquid, Gas, Solid)	<input type="checkbox"/> Toxic? IDLH: _____ PEL: _____	<input type="checkbox"/> Momentum/Gravity	<input type="checkbox"/> Wildlife Control Implemented?	Spec. Gravity/Vapor/Density	<input type="checkbox"/> Corrosive? DOT/UN# _____	<input type="checkbox"/> Residual/Stored Energy	<input type="checkbox"/> Special Health/Medical Issues?	Water Soluble?	<input type="checkbox"/> Reactive? DOT Hazard Guide # _____	<input type="checkbox"/> Special		MSDS on Hand?	<input type="checkbox"/> Carcinogen?	<input type="checkbox"/> High Temperature			<input type="checkbox"/> Threat To: _____	<input type="checkbox"/> Energy Isolation and Control			<input type="checkbox"/> Human Health at Risk?	<input type="checkbox"/> Verified? YES/NO			<input type="checkbox"/> Environmental Sensitive Areas at Risk?	<input type="checkbox"/> Vibration				<input type="checkbox"/> Noise				<input type="checkbox"/> Heat or Cold Stress				<input type="checkbox"/> Confined Space Entry				<input type="checkbox"/> Elevated Area				<input type="checkbox"/> Limited Access				<input type="checkbox"/> Below Grade (pit, trench)				<input type="checkbox"/> Offshore Structure				<input type="checkbox"/> Land Structure	
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<b>(4) SITE INFORMATION</b> (Refer to ICS-201-5) <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td>Safe Access Route to the Site:</td> <td>Site Control Zones Established on ICS-201 Site Map.</td> </tr> <tr> <td>Command Post Location:</td> <td>Exclusion Zone Line:</td> </tr> <tr> <td>Medical Located:</td> <td>Contamination Reduction Zone Line:</td> </tr> <tr> <td>Site Control:</td> <td>Support Zone Line:</td> </tr> <tr> <td>Site Org. Level: (ICS-204)</td> <td>Traffic Pattern Established?</td> </tr> <tr> <td>YES/NO</td> <td>YES/NO</td> </tr> </table>		Safe Access Route to the Site:	Site Control Zones Established on ICS-201 Site Map.	Command Post Location:	Exclusion Zone Line:	Medical Located:	Contamination Reduction Zone Line:	Site Control:	Support Zone Line:	Site Org. Level: (ICS-204)	Traffic Pattern Established?	YES/NO	YES/NO	<b>(5) WEATHER/ENVIRONMENTAL</b> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td colspan="4"><b>Current</b></td> </tr> <tr> <td>Air Temp:</td> <td>Wind Speed:</td> <td>/mph</td> <td>Humidity:</td> </tr> <tr> <td>Precipitation:</td> <td>Wind Direction:</td> <td></td> <td></td> </tr> <tr> <td colspan="4"><b>Forecast</b></td> </tr> <tr> <td>Air Temp:</td> <td>Wind Speed:</td> <td>/mph</td> <td>Humidity:</td> </tr> <tr> <td>Precipitation:</td> <td>Wind Direction:</td> <td></td> <td></td> </tr> <tr> <td colspan="4"><b>Sea/Water Conditions</b></td> </tr> <tr> <td>Sea State 1-2-3-4-5-6 Feet.</td> <td>Maximum</td> <td>Average Wave Height:</td> <td>Feet.</td> </tr> <tr> <td>Currents: Y - N</td> <td>Current Speed:</td> <td>knots</td> <td>Current Direction:</td> </tr> <tr> <td colspan="4">Forecast:</td> </tr> </table>		<b>Current</b>				Air Temp:	Wind Speed:	/mph	Humidity:	Precipitation:	Wind Direction:			<b>Forecast</b>				Air Temp:	Wind Speed:	/mph	Humidity:	Precipitation:	Wind Direction:			<b>Sea/Water Conditions</b>				Sea State 1-2-3-4-5-6 Feet.	Maximum	Average Wave Height:	Feet.	Currents: Y - N	Current Speed:	knots	Current Direction:	Forecast:																							
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<b>(9) TRAINING</b> <input type="checkbox"/> Response Training Requirements Have Been Identified? Comments:		<b>(10) PERSONAL PROTECTIVE EQUIPMENT (PPE)</b> Exclusion Zone (Hot) <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>Head/Eye</th> <th>Respiratory</th> <th>Body</th> <th>Gloves</th> <th>Foot</th> <th>PFD</th> </tr> <tr> <td><input type="checkbox"/> A _____</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><input type="checkbox"/> B _____</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><input type="checkbox"/> C _____</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><input type="checkbox"/> D _____</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table> Contamination Reduction Zone (WARM) (See Section 19, Decon)		Head/Eye	Respiratory	Body	Gloves	Foot	PFD	<input type="checkbox"/> A _____						<input type="checkbox"/> B _____						<input type="checkbox"/> C _____						<input type="checkbox"/> D _____																																															
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Prepared By: _____ Date/Time _____ Approved By: _____ Date/Time _____ Site Safety Officer On-Scene Commander																																																																											

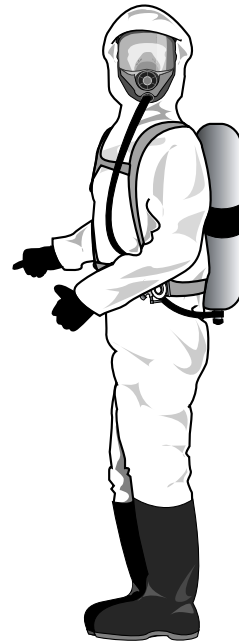
<b>(11) COMMUNICATIONS RADIO</b> <input type="checkbox"/> Radio Communication Plan Implemented? Command Channel: _____ Tactical Channel(s): _____ <input type="checkbox"/> Emergency Call: (Band Aid - Band Aid - Band Aid) <input type="checkbox"/> Bull Horns <input type="checkbox"/> SCBA Communication <input type="checkbox"/> In-Suit Communication		<b>(12) VISUAL/SIGNS</b> <input type="checkbox"/> Entry Team Briefing Conducted <input type="checkbox"/> Buddy System <input type="checkbox"/> Leader/Team Site Rules Established <input type="checkbox"/> Emergency Signals Verified with All Team Members <input type="checkbox"/> Other:		<b>(13) HAND SIGNALS</b> 																																					
<b>(14) SITE EMERGENCY EQUIPMENT</b> List special equipment required <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>Equipment</th> <th>Location</th> </tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </table>		Equipment	Location																	<b>(15) RESCUE/MEDICAL</b> List Special Rescue or Medical Equipment/Unit <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>Equipment/Unit</th> <th>Location</th> </tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </table>		Equipment/Unit	Location																	<b>(16) ESCAPE/EVACUATION</b> <input type="checkbox"/> Safe Refuge Area Established for Exclusion Zone & for Location: <input type="checkbox"/> Escape/ Evacuation Alarm/Signal: <input type="checkbox"/> Entry Team Escape Route: <input type="checkbox"/> Criteria for Required Evacuation Established? (wind change, IDLH conditions, etc.)	
Equipment	Location																																								
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<b>(17) DECONTAMINATION (CORRIDOR)</b> <input type="checkbox"/> Decontamination Plan Established? <input type="checkbox"/> Decon Solution _____ <input type="checkbox"/> Decontamination Control Marked on ICS-201 Site Map? Standard Decontamination Layout? Y/N _____ <input type="checkbox"/> Emergency Decon Procedure (Gross Flushing)		<b>(18) DECON WORKER PPE LEVEL</b> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>Head/Eye</th> <th>Respiratory</th> <th>Body</th> <th>Gloves</th> <th>Foot</th> <th>PFD</th> </tr> <tr> <td><input type="checkbox"/> A _____</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><input type="checkbox"/> B _____</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><input type="checkbox"/> C _____</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td><input type="checkbox"/> D _____</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table> NOTE: Decon personnel to be protected at the same level or one level below Exclusion Zone entry personnel.				Head/Eye	Respiratory	Body	Gloves	Foot	PFD	<input type="checkbox"/> A _____						<input type="checkbox"/> B _____						<input type="checkbox"/> C _____						<input type="checkbox"/> D _____											
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<b>(19) ORGANIZATIONAL PLAN &amp; INITIAL BRIEFING</b> <input type="checkbox"/> Organizational Plan/Position Designations Complete? (Refer to ICS-201, 203, 204) <input type="checkbox"/> Incident Action Plan Established? (Refer to ICS-Forms, I.A.P.) <input type="checkbox"/> All Positions Track and Record Actions (Refer to ICS-214) Unit Log		<b>(20) ATTACHMENTS</b> (ICS Forms, Maps, Photos, etc.) <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____																																							
<b>(21) DEMOBILIZATION</b> <input type="checkbox"/> Demobilization Safety Procedures Established?		<b>(22) ADDITIONAL COMMENTS:</b> _____ _____ _____																																							
Prepared By: _____ Date/Time _____ Approved By: _____ Date/Time _____ Site Safety Officer On-Scene Commander																																									



LEVEL A



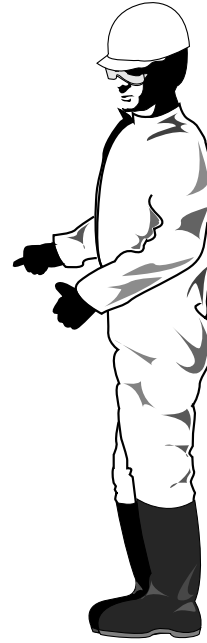
LEVEL B



LEVEL C



LEVEL D



Personal protective equipment (PPE) is designed to protect workers from safety and health hazards and prevent injury resulting from incorrect use and/or malfunction of equipment. In general, the greater the level of risk, the greater the level of PPE required. PPE includes:

- Respirators: SCBA, air-purifying respirator
- Full body covering including nitrile, butyl rubber, or Viton gloves and boots
- Safety glasses or goggles
- Hard hat
- Cold weather gear, including steel-toed footwear or arctic boots
- Hearing protection

PPE is divided into four categories based on the level of personal protection afforded.

- **Level A** provides the greatest level of skin, respiratory and eye protection.
- **Level B** offers the highest level of respiratory protection but lesser level of skin protection (e.g., skin protection is required for exposure to liquids but not vapor).
- **Level C** is used when concentrations and types of airborne substances are known and the criteria for using air-purifying respirators are met.
- **Level D** consists of work clothing affording minimal protection, used for nuisance contamination only.

Most spill-site workers will use Levels C and D.

EQUIPMENT

LEVEL A

- SCBA, or positive-pressure supplied-air respirator with escape SCBA
- Totally encapsulating chemical-protective suit with vapor barrier
- Coveralls\*
- Long underwear\*
- Gloves, outer, chemical resistant
- Gloves, inner, chemical resistant
- Boots, chemical resistant, steel toe and shank
- Hard hat (under suit)\*
- Disposable protective suit, gloves and boots (may be worn over or under encapsulating suit depending on suit design)

LEVEL B

- SCBA, or positive-pressure supplied-air respirator with escape SCBA
- Hooded chemical-resistant clothing (overalls and long-sleeved jacket coveralls; one- or two-piece chemical splash suit; disposable chemical-resistant overalls). May also be encapsulating.
- Coveralls\*
- Gloves, outer, chemical resistant
- Gloves, inner, chemical resistant
- Boots, chemical resistant, steel toe and shank
- Boot covers, outer, chemical resistant, disposable\*
- Hard hat\*
- Face shield\*

LEVEL C

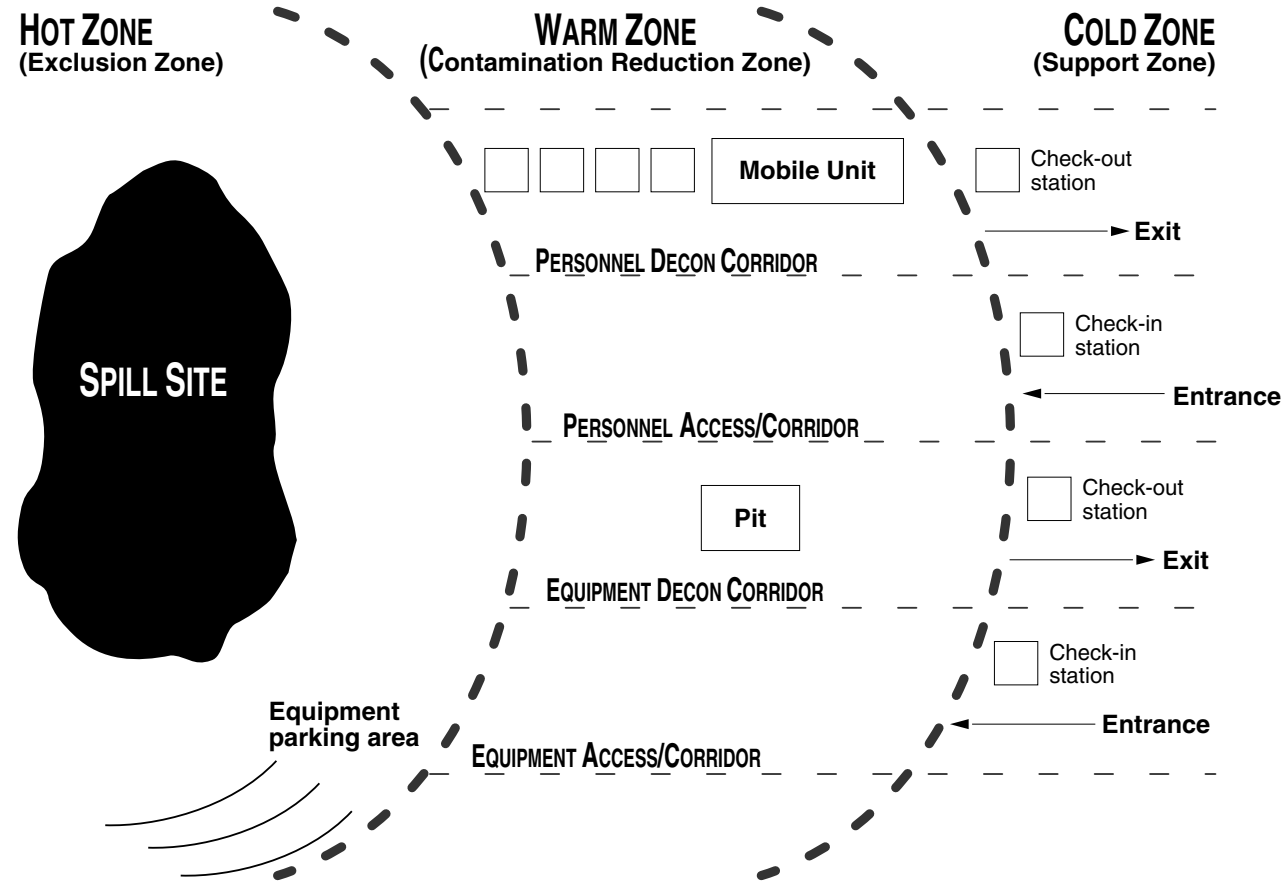
- Full-face or half-mask air-purifying respirators with appropriate cartridges
- Hooded chemical-resistant clothing (overalls; two-piece chemical-splash suit; disposable chemical-resistant overalls.)
- Coveralls\*
- Gloves, outer, chemical resistant
- Gloves, inner, chemical resistant
- Boots, chemical resistant, steel toe and shank
- Boot covers, outer, chemical resistant, disposable\*
- Hard hat\*
- Escape mask\*
- Face shield\*

LEVEL D

- Coveralls
- Gloves\*
- Boots/shoes, chemical resistant, steel toe and shank
- Boots, outer, chemical resistant, disposable\*
- Safety glasses or chemical splash goggles
- Hard hat
- Escape mask\*
- Face shield\*

\* Optional





Control boundaries must be established for any spill site to ensure that people are not exposed to the spilled substance:

- **Exclusion or Hot Zone** — Control zone perimeter established by the Safety Officer where pre-site entry and site entry procedures are applied (see Tactics S-1 and S-2)
- **Contamination Reduction or Warm Zone** — Workers shed contaminated clothing; allows for equipment and personnel decontamination.
- **Support or Cold Zone** — No contamination. Zone has support facilities, staging area, warm-up trailer, and mobile command post.

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**EQUIPMENT AND PERSONNEL**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Dry Decon Unit	All	Decontamination	1	4	1 hr	1 hr
Wet Decon Unit	EOA, KRU, WOA	Decontamination	1	4	1 hr	1 hr
Decon Pits	ACS, KRU	Decontamination	2	3 initial	1 hr	1 hr
Portable Decon Berms	All	Decontamination	≤10	—	1 hr	0.5 hr
Manual Decon Equipment (e.g., scrub brushes, sorbents, sprayers, etc.)	All	Decontamination	—	—	1 hr	0.5 hr

**TOTAL STAFF FOR SETUP** 7

**TOTAL STAFF TO SUSTAIN OPERATIONS** 4

**SUPPORT**

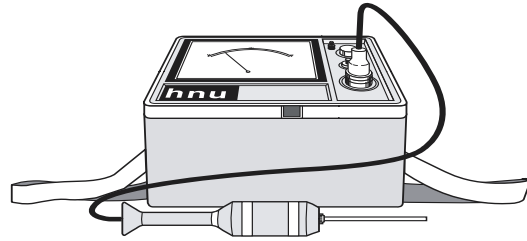
EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Water Truck	All	Water	1	2	2 hr	0.5 hr
Vacuum Truck	All	Wastewater removal	1	2	1 hr	0.5 hr
Light Plant	All	Illumination	≥1	2 for initial setup, and 1 to check and fuel occasionally	1 hr	0.5 hr

See Tactic L-2 for additional support equipment.

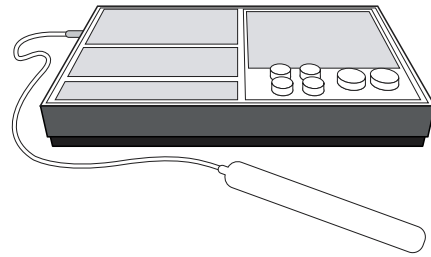
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**PHOTOIONIZATION DETECTOR (PID)**



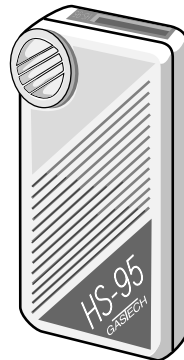
**PORTABLE GAS CHROMATOGRAPH (GC)**



**MULTI-GAS INSTRUMENT**



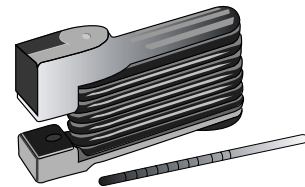
**SINGLE-GAS INSTRUMENT**



**PERSONAL MONITOR BADGE**



**COLORIMETRIC TUBES (DRAEGER)**



It is critical that workers know what substances comprise a spill so they can take appropriate precautions. While the initial assessment and entry are done by a trained Safety Officer, it is important for all workers to be familiar with the process and equipment used to assess and monitor the hazardous materials at a spill site.

When the potential for both known and unknown hazards exists, air monitoring procedures must be followed.

1. Monitor with direct-reading test equipment (i.e., combustible gas meters, flame ionization and photoionization detectors) for IDLH conditions, oxygen deficiency, explosive atmosphere, and toxic substances.
2. Implement on-going air monitoring. Continuous monitoring is important since conditions can change due to spill progression, weather and other factors.

**Gas instruments:** Safety Officer uses these to determine site entry and PPE needed:

1. Multi-gas instrument: “four gas” — Monitors oxygen, LEL, H<sub>2</sub>S and carbon monoxide
2. Single gas instrument — e.g., H<sub>2</sub>S
3. Other equipment

**Photoionization Detector (PID):** Used to detect total hydrocarbons and in some cases, specific chemicals such as benzene. Accuracy ± 5%.

**Portable Gas Chromatograph:** Used to detect specific chemicals such as benzene, xylene and toluene. Accuracy ± 5%.

**Draeger Tubes (colorimetric tubes):** Used to detect specific chemicals and levels of toxicity. Portable. No power needed. Accuracy ± 30%.

**Personal Monitor Badge:** Worn by the individual to check exposure to certain chemicals; record required.

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**EQUIPMENT AND PERSONNEL**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Single-Gas Instrument	All	Testing	1	1	0.5 hr	0.5 hr
Multi-Gas Instrument	All	Testing	1	1	0.5 hr	0.5 hr
Draeger Tubes	All	Testing	1	1	0.5 hr	0.5 hr
Personal Monitor Badge	All	Testing	1	1	0.5 hr	0.5 hr
PID	All	Testing	1	1	0.5 hr	0.5 hr
Portable GC	All	Testing	1	1	1 hr	1 hr

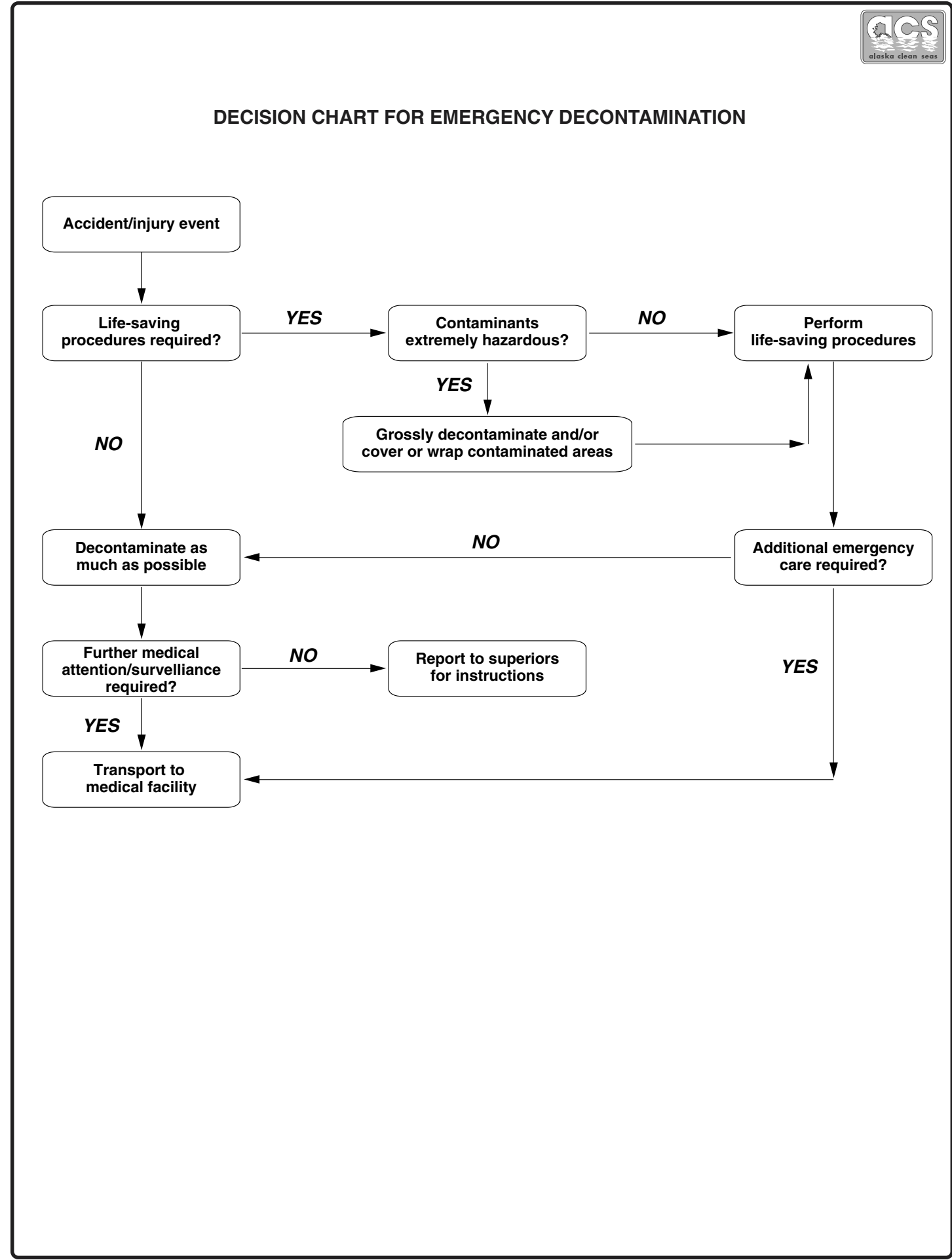
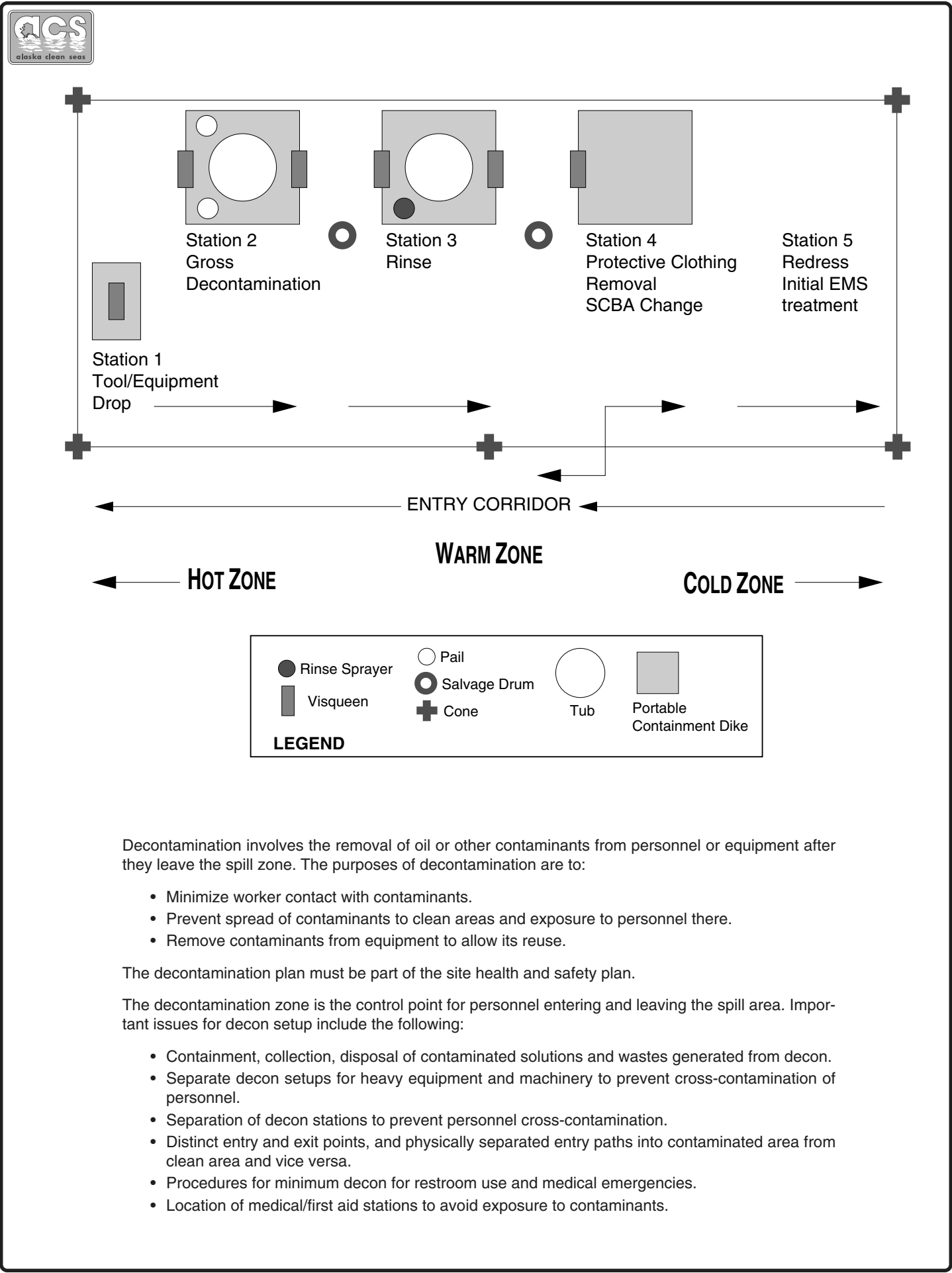
**TOTAL STAFF** ≥1, increasing incrementally with the size of the incident

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

MONITORING EQUIPMENT	HAZARD	LEVEL	ACTION
Oxygen Meter	No O <sub>2</sub> or too much O <sub>2</sub>	<19.5%	Monitor wearing SCBA with escape bottle. NOTE: combustible gas readings not valid in atmospheres <19.5% oxygen.
		19.5-23.5%	Continue monitoring with caution. SCBA not needed based only on oxygen content.
		>23.5%	STOP monitoring. Fire potential! Consult specialist.
Combustible Gas	Explosion	≥10% LEL	Withdraw immediately!!!!
H <sub>2</sub> S Meter	Presence of H <sub>2</sub> S	>10 ppm	Use SCBA and have emergency escape breathing apparatus (5 min. minimum).
PID or Portable GC	Benzene	>30 ppm	SCBA required.
		0.5 to 30 ppm	Full-face air-purifying respirator with organic vapor cartridges.
		<0.5 ppm	Continue monitoring with caution.
PID, Portable GC, or Colorimetric Tubes (Draeger)	Xylene	>100 ppm	Full-face air-purifying respirator with organic vapor cartridges.
		<100 ppm	Continue monitoring with caution.
Colorimetric Tubes (Draeger)	Methanol	>200 ppm	SCBA required.
		<200 ppm	Continue monitoring with caution.
Colorimetric Tubes (Draeger)	Organic, inorganic gases, vapors	Depends on chemical	Consult reference manuals for air concentration vs. toxicity data.

- During monitoring operations, if the instrument operator is uncertain of the significance of a reading, especially if conditions could be unsafe, a technical specialist should be consulted immediately. Consideration should be given to withdrawing personnel from the area until the Safety Officer’s approval is given to continue operations.
- Methanol is present in most of the chemicals used in the oil fields. Examples include scale inhibitor and corrosion inhibitor.

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**EQUIPMENT AND PERSONNEL**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Wash Tubs	All	Decontamination	≥3	6	0.5 hr	0.5 hr
Portable Decon Berm	All	Decontamination	≥4	—	1 hr	0.5 hr
Galvanized Bucket	All	Decontamination	≥2	—	0.5 hr	0.5 hr
Sprayer	All	Decontamination	≥2	—	1 hr	0.5 hr
Salvage Drum	All	Decontamination	≥2	—	0.5 hr	0.5 hr
Traffic Cone	All	Designate decon area	≥4	—	0.5 hr	0.5 hr
Caution Tape	All	Designate decon area	≥2 rolls	—	0.5 hr	0.5 hr
Visqueen	All	Decon area	≥1 roll	—	1 hr	1 hr

**TOTAL STAFF 6**

**SUPPORT**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Oily Waste Dumpster	North Slope Borough	Waste receptacle	1	1 initial	1 hr	0.5 hr
Light Plant	All	Illumination	1	2 for initial setup, and 1 to check and fuel occasionally	1 hr	1 hr

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

Establish decon work practices to minimize contact with hazardous materials:

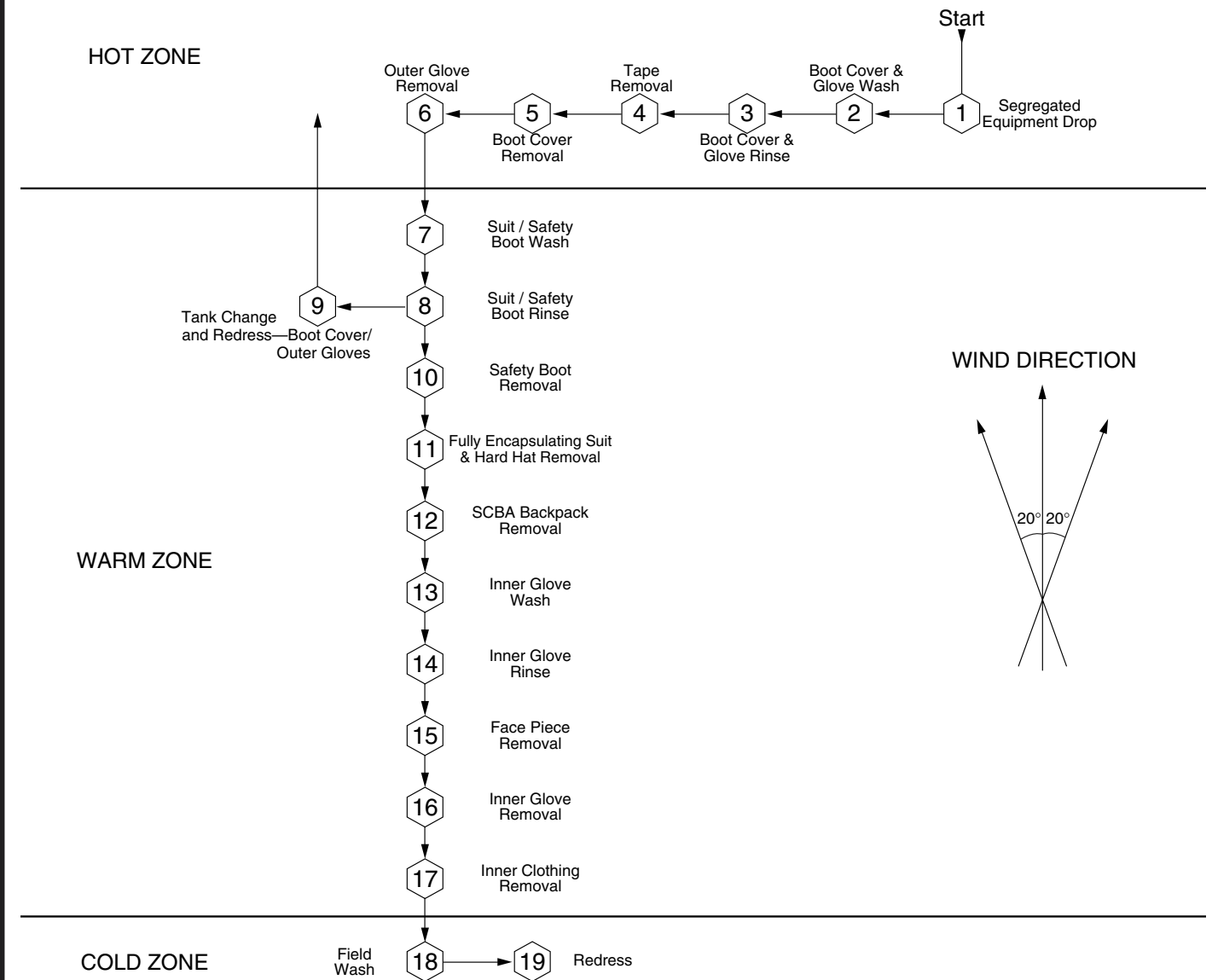
- Stress extra steps to avoid contact with or handling of contaminants.
- Wrap sampling/monitoring equipment in disposable see-through plastic bags.
- Use disposable protective clothing and equipment [personal protective equipment (PPE), chemical-protective clothing (CPC)] where possible.
- Use strippable coatings for equipment where possible.
- Use double containerization of contaminated wastes and recovered materials (e.g., plastic liners in over-pack drums).
- Inspect all CPC for cuts, tears, punctures, abrasions, and other signs of deterioration.
- Assure proper fastening and sealing of CPC and PPE.
- First-stage decon personnel must wear same, or one lower, level of PPE as cleanup workers.

Resources required for decon and decon setup will depend on the following:

- Availability of potable water, electric power, and waste disposal.
- Mobilization time and duration of site activities.
- Level and type of cleanup and response activity expected at site, and site conditions.
- Available space for decon setup and location requirements for decon line.
- Health hazards presented by contaminants at cleanup/response site.
- Need for additional controls (e.g., vapor diffusion/dispersion, movement/transfer of gross waste).



**LEVEL A DECON**



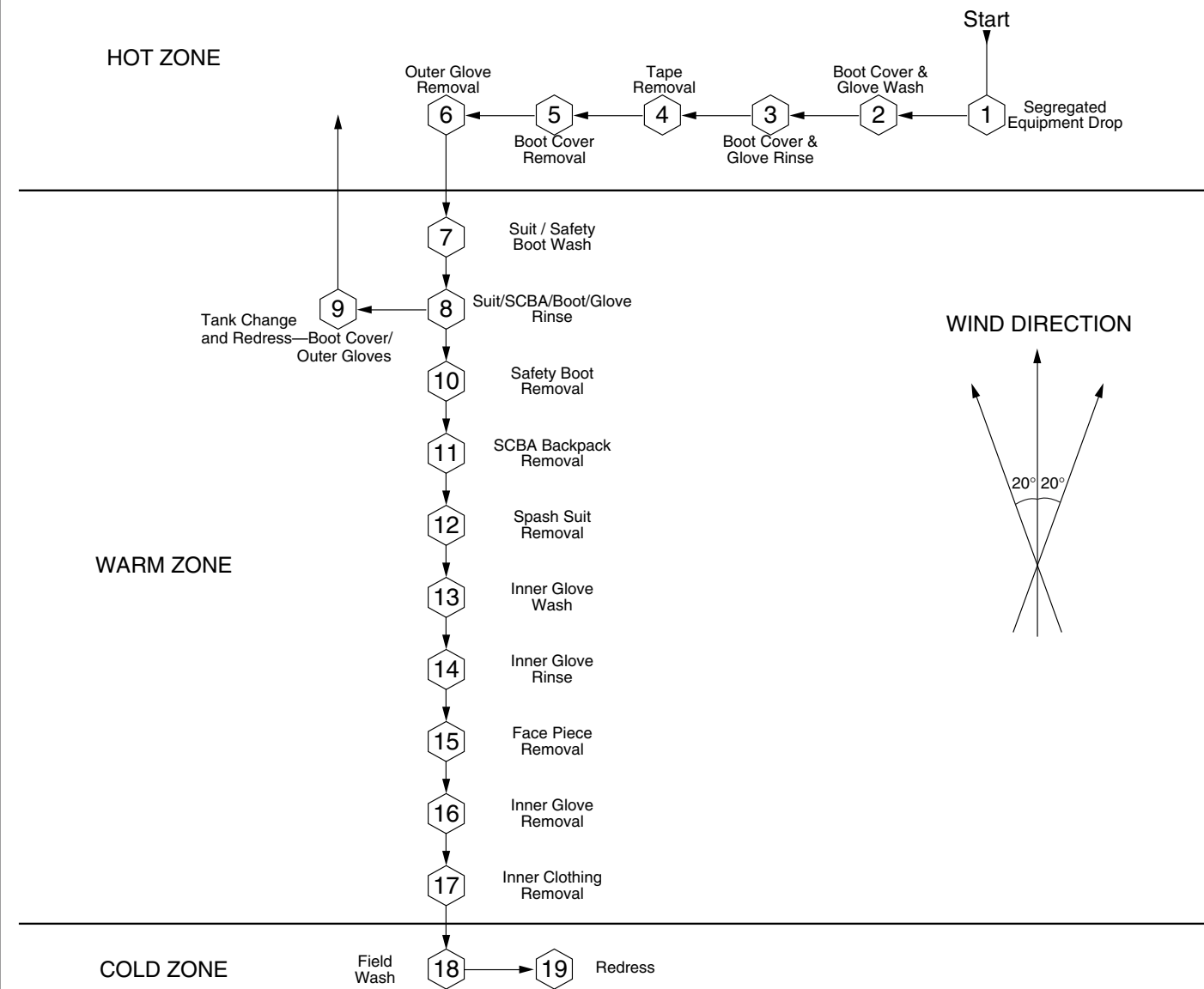
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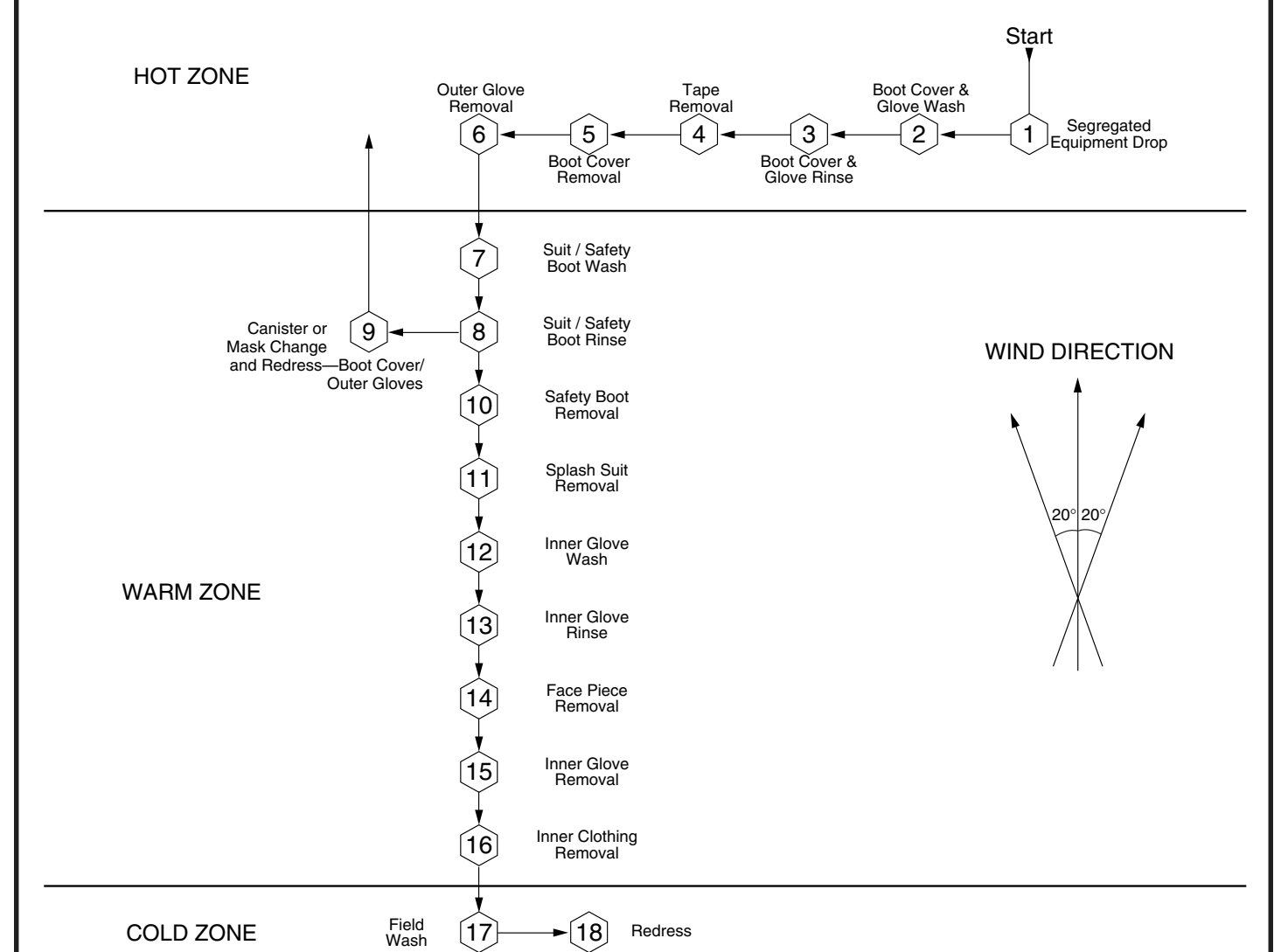


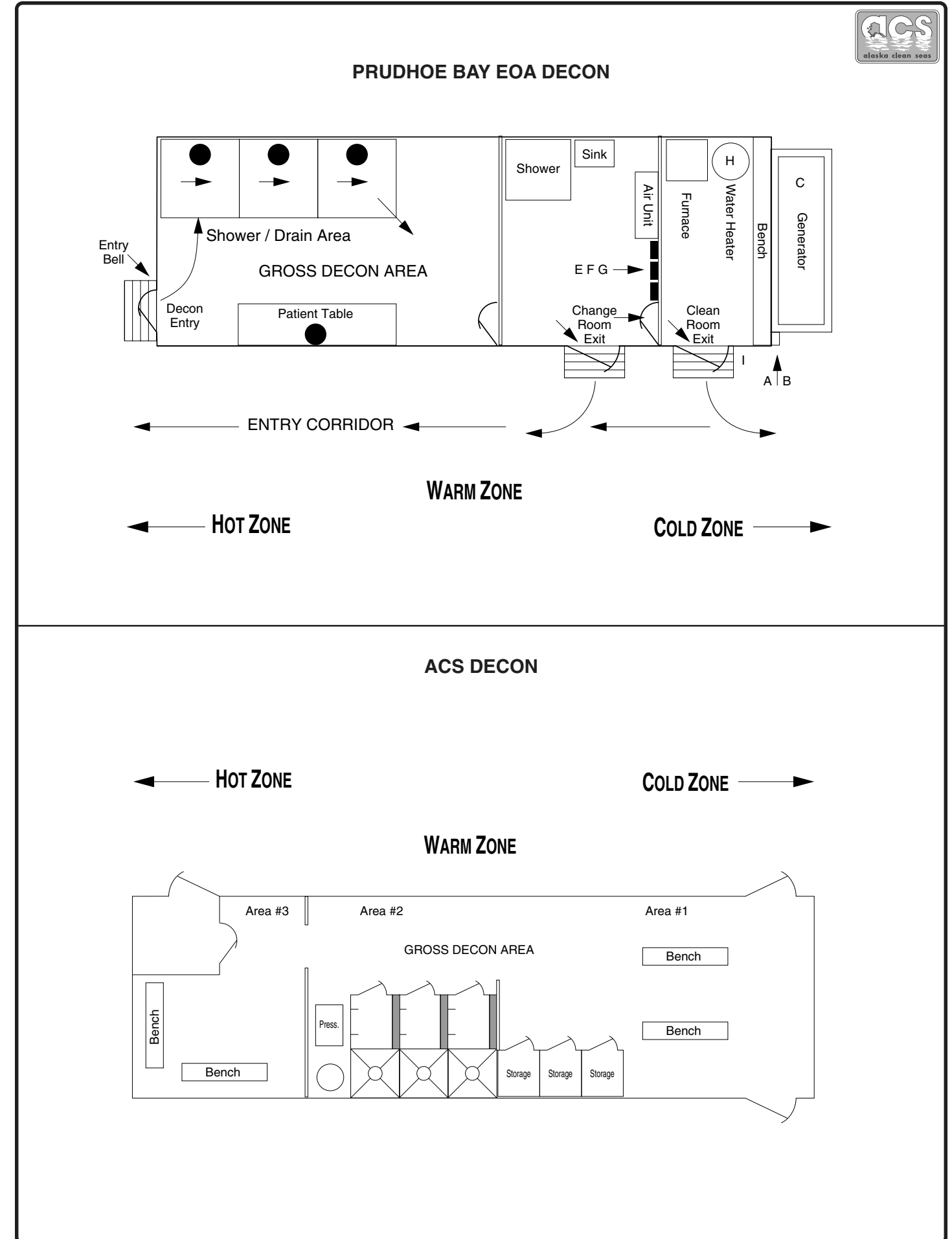
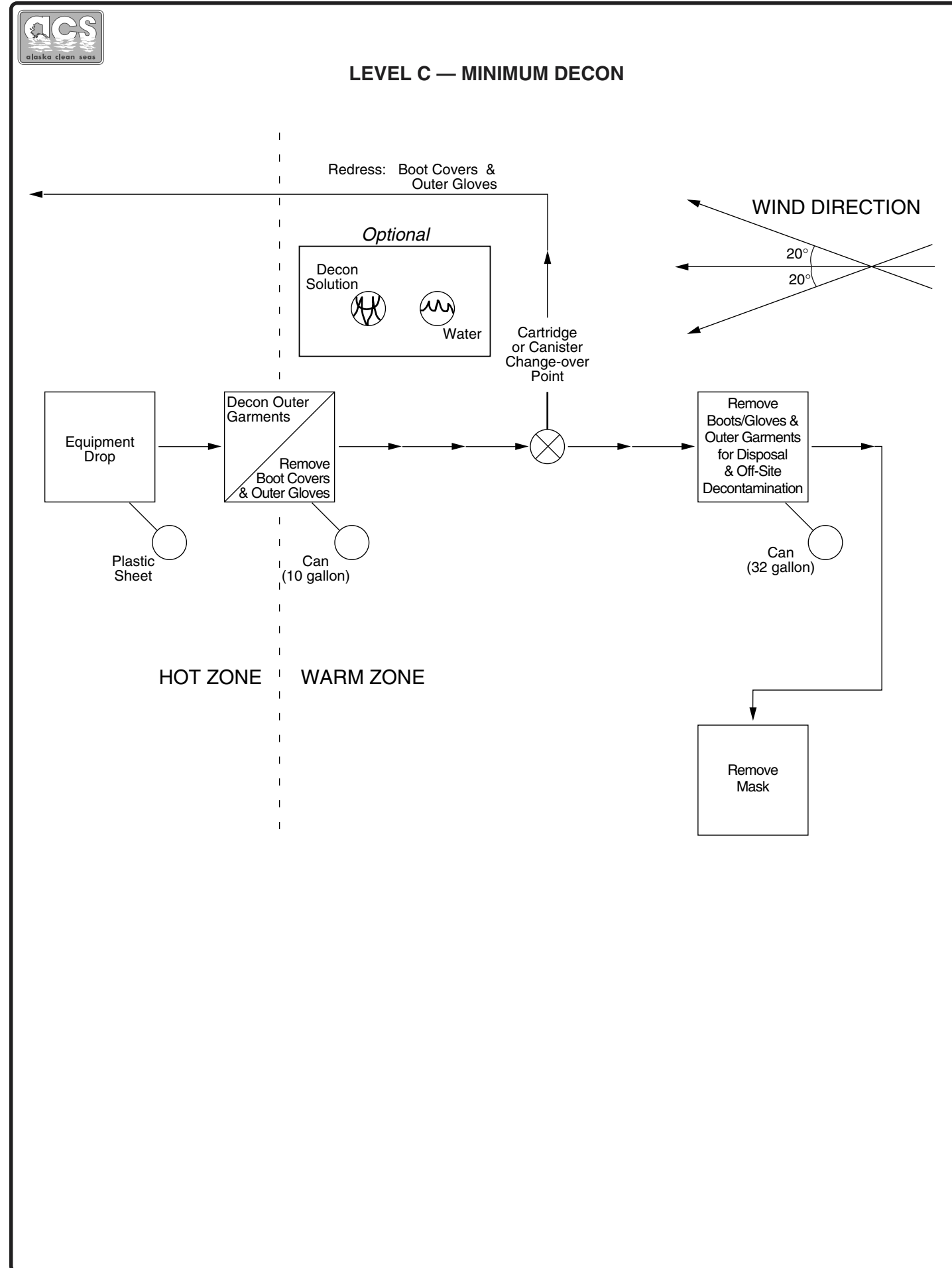


LEVEL B DECON



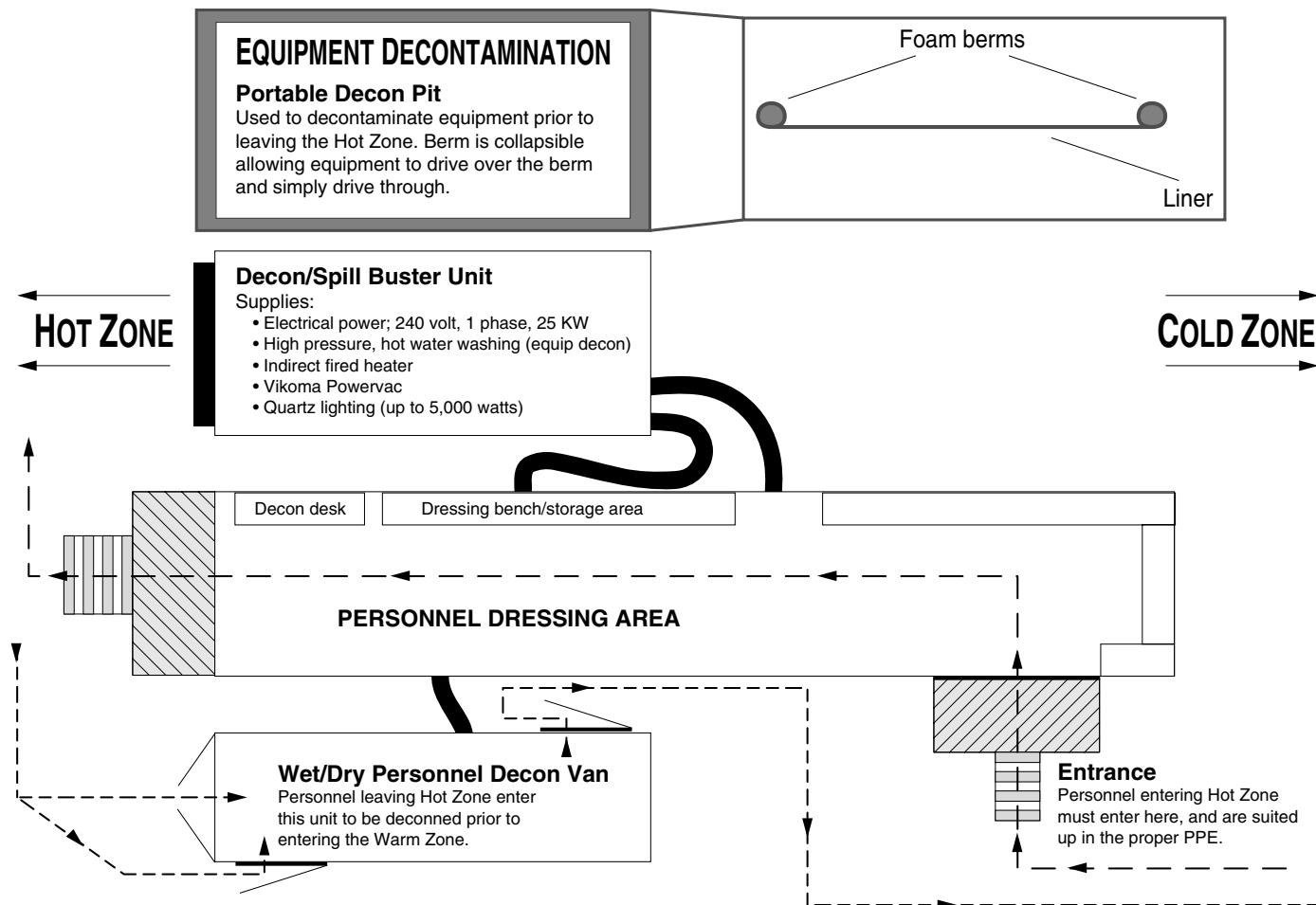
LEVEL C DECON



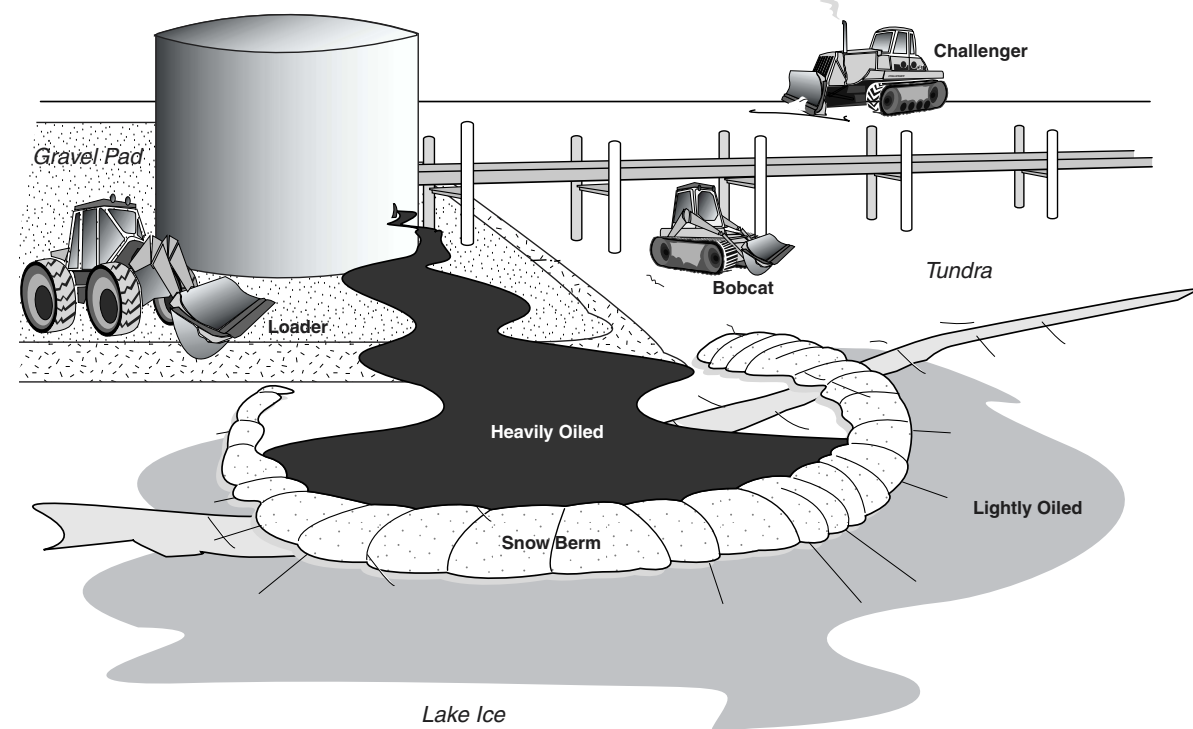




KUPARUK DECON



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A snow berm is built around the areas of heaviest oiling to contain oil or diesel spilled to tundra and/or ice in winter. A Challenger rubber-tracked bulldozer drives around the spill with its blade angled towards the spill, pushing snow into a berm. Once the perimeter has been covered with an initial berm, the dozer shores up areas, as necessary.

A front-end loader could also be used to build a berm, and a Bobcat can be used to access areas the large front-end loader or Challenger cannot reach.

NOTE: All values given on these pages are for planning purposes only.



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**EQUIPMENT AND PERSONNEL**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Challenger Dozer	KRU, EOA, Alpine, Western Geophysical, and Caribou Construction*	Snow berm construction	1	1	1 hr	0.5 hr
or Front-End Loader	All	Snow berm construction	1	1	1 hr	0.5 hr
or Bobcat	EOA, ACS, KRU	As needed	1	1	1 hr	0.5 hr

**TOTAL STAFF 1**

\* Alpine and Western Geophysical have 1 Challenger with blade and Caribou Construction has 6. Western Geo's and Caribou's Challengers are normally out with seismic crews in winter and would not be available for at least 24 hours.

**SUPPORT**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Semi and Trailer	EOA, WOA, KRU	Transport Challenger	1	1 driver	1 hr	0
Tioga Heaters	All	Heat	≥1	1 (initial)	1 hr	0.5 hr
Fuel Truck	All	Fuel heavy equipment	1	Once per shift	1 hr	0.5 hr
Mechanic Truck	All, except Badami	Support equipment	1	1	1 hr	0.5 hr
Lube Truck	All	Provide fluids to heavy equipment	1	Once per shift	1 hr	0.5 hr
Light Plant	All	Illumination	≥1	2 for initial set-up, and 1 to check and fuel occasionally.	1 hr	0.5 hr

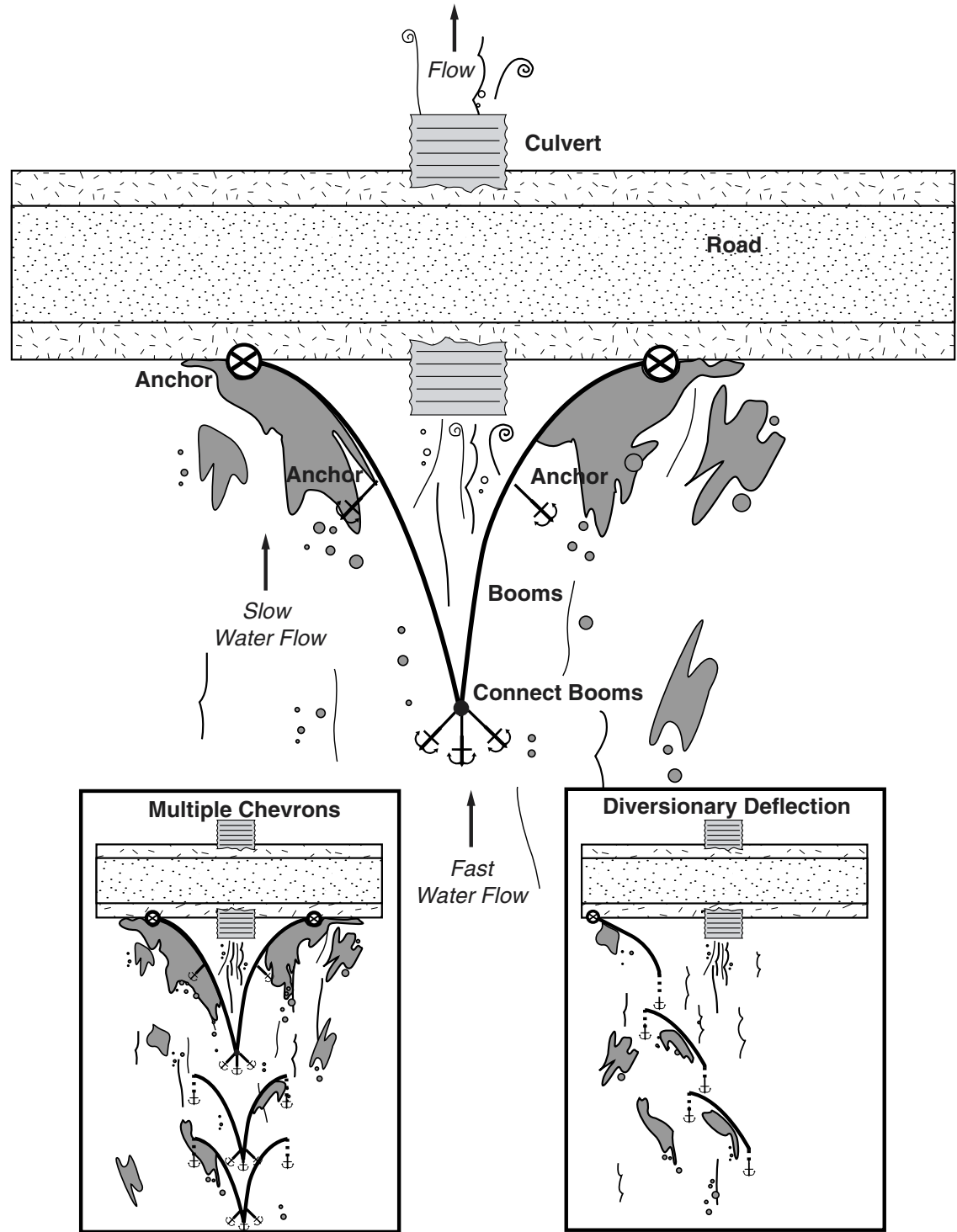
**CAPACITIES FOR PLANNING**

- A Challenger can build an initial snow berm around the largest tank spill within an hour. Any shoring would take 3 hours or less.
- Normally, a front-end loader can build a snow berm on a pad within 1 hour.

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- The Challenger dozer is the most efficient piece of equipment in snow berm construction, and can access tundra and ice-covered lakes. If insufficient snow cover exists, front-end loaders would provide the Challenger with snow.
- When working with equipment around or near flowlines, add a spotter to each front-end loader and Challenger.
- When ice-reinforced, snow berms are useful to contain oil that melts out during breakup.
- A civil work permit from the operator is required for all work on owner-company pads.

NOTE: All values given on these pages are for planning purposes only.



Boom is deployed in either chevron or diversionsary configurations to deflect oil from mouth of culvert to collection sites along the road. This technique is especially useful when there is sheet flow across the frozen tundra. At that time, there is often a violent whirlpool at the upstream opening of a culvert, with lighter currents off to the sides. Blocking the culvert would be inadvisable because of the likelihood of washing out the road. Deadmen are typically used for anchors on the road, and collected oil can be directly pumped to a vacuum truck on the road.

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**EQUIPMENT AND PERSONNEL**

- Select vessels and boom according to area, water depth restrictions, and function (see Tactic L-6). Specific personnel requirements depend on the length and type of boom and the nature of the area.

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Work Boat	All	Containment	2	6	1 hr	3 hr
Ropes & Pulleys	All	Boom positioning	Variable			
Boom	All	Deflection booming	≥ 50'			
Anchor System	All	Anchor booming	≥ 2	3	1 hr	

**TOTAL STAFF FOR SETUP** 6  
**TOTAL STAFF TO MONITOR AND SUSTAIN OPERATIONS** 3

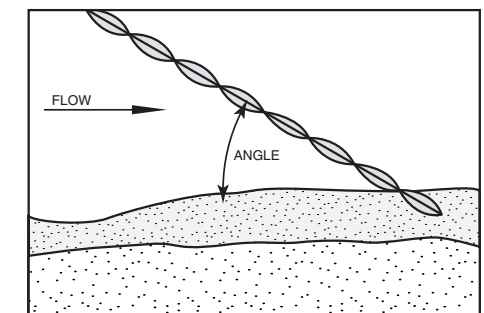
**SUPPORT**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Bed Truck	All	Transport equipment	1	1	1 hr	0
Avgas Trailer	ACS, EOA, KRU, Badami	Airboat fuel	1	1 (initial)	1 hr	0.5 hr

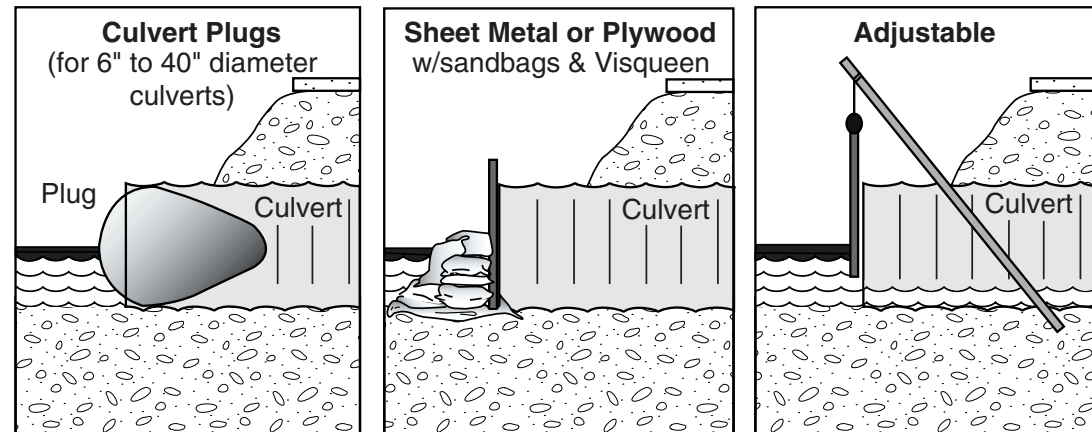
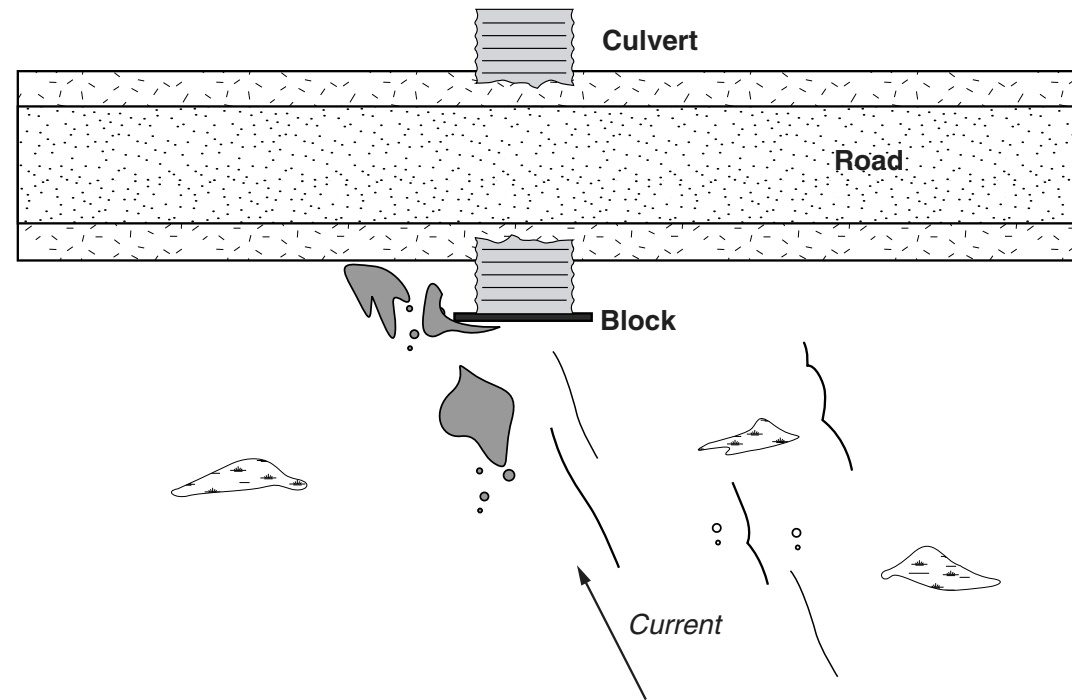
**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- 8x6 Delta boom is most commonly used for this tactic.
- The speed of the current perpendicular to the boom must be maintained at 3/4 knot or less to prevent oil loss.
- Number and configuration of booms depend on flow rate and number of collection sites. With any boom system, do not assume 100% containment with one system.
- An assortment of skimmers can be used alongside the roadway. When selecting a skimmer, consideration must be given to oil viscosity, available capacity, and volume of oil to be recovered.

CURRENT (knots)	CURRENT (ft/second)	BOOM ANGLE RELATIVE TO CURRENT REQUIRED TO KEEP COMPONENT OF CURRENT <3/4 KNOT
1.5	2.5	30° to 42°
1.75	2.9	25° to 35°
2.0	3.4	22° to 30°
2.25	3.8	19° to 26°
2.5	4.2	17° to 24°
2.75	4.6	16° to 21°
3.0	5.0	15° to 19°



NOTE: All values given on these pages are for planning purposes only.



A culvert is blocked using sheet metal, plywood barriers, or inflatable culvert plugs. Use a full block only when the culvert will be blocked for the entire cleanup operation, if the oil floating on the water will not contaminate additional soil or tundra, and if blocking the water flow will not threaten the road. Otherwise, an adjustable weir should be used.

Plywood and/or sandbags can also be used as culvert blocks, but are more labor-intensive and pose a higher potential for injury. A wood block may require a headwall with kickers oriented to support the boards or plywood. Place the blocking materials over the upstream end of the culvert. Plastic sheeting over the outside of the block will prevent oil penetration.

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**EQUIPMENT AND PERSONNEL**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Visqueen	All	Containment	≥10 ft	2	1 hr	1 hr
Inflatable Culvert Plugs	ACS, WOA	Containment	1	2	1 hr	2 hr
or Sheet Metal or Plywood Barriers	All	Containment	1	2	2 hr	2 hr
or Sandbags	ACS, EOA, WOA, KRU	Containment	≥10	≥6*	2 hr	2 hr
or Gravel	—	Containment	—	—	—	—

**TOTAL STAFF FOR SETUP** ≥2\*\*

\*Number of personnel depends on number of sandbags needed.

\*\*The recovery team would conduct monitoring and sustain operations.

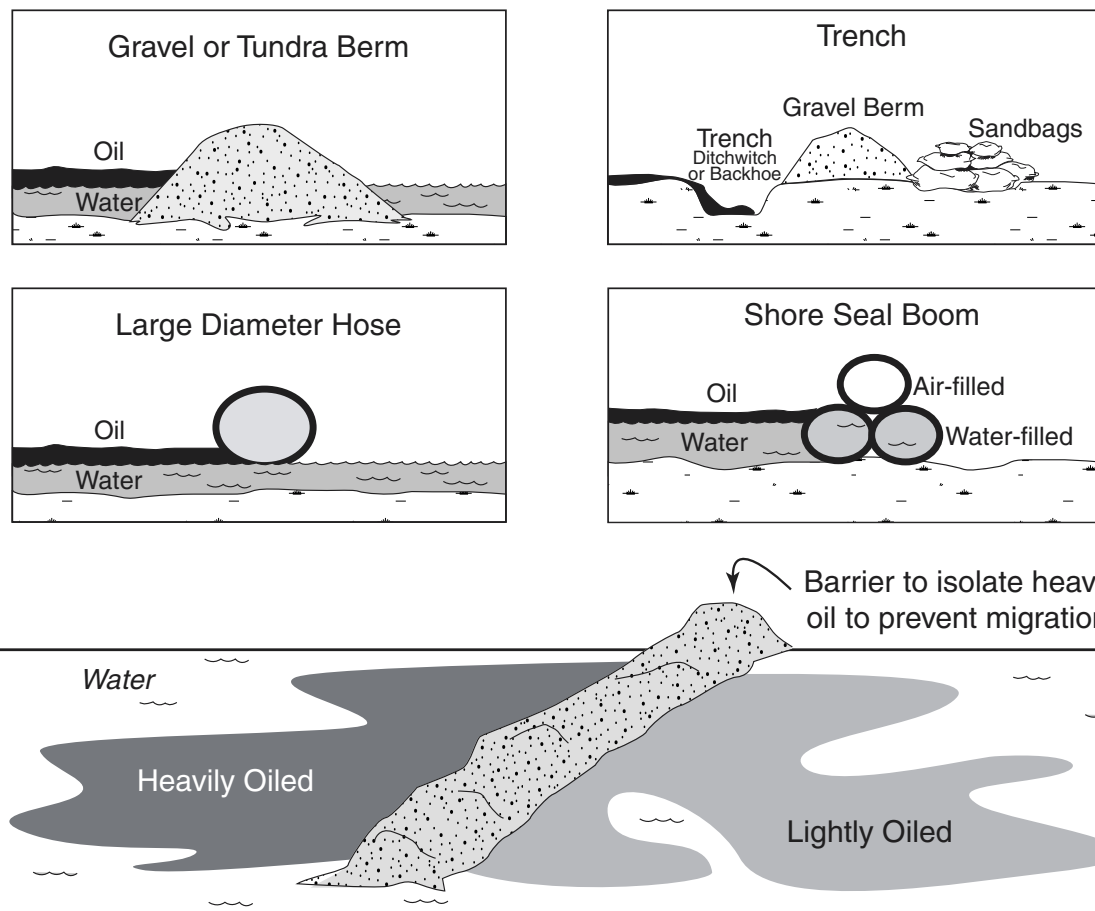
**SUPPORT**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Air Compressor	All	Inflate culvert plugs	1	1	1 hr	0.5 hr
Front-End Loader	All	Unload sandbags	1	1	1 hr	0.5 hr
Flatbed Truck	All	Transport sandbags	1	1	1 hr	0

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- Appropriate during breakup and summer when the flow to the culvert is small enough so that the road won't be washed out.
- Also can be used if high-volume pumps are available to pump water over the road to the other side of the culvert.
- When working with equipment around or near flow lines, a spotter must be added to each front-end loader or Challenger dozer.





A containment berm can be constructed of available materials such as earth, gravel, or snow. Use earth-moving equipment or manual labor to construct the berm. Form the materials into a horseshoe shape ahead of the flow of oil. Use plastic sheeting to line the walls of a soil berm to prevent oil penetration. Because of the sorbent quality of snow, it makes an excellent berm for both containment and recovery. A snow berm can be strengthened by spraying it with a fine water mist that forms an ice layer on top of the snow. Sandbags filled with sand or other heavy material also make excellent containment barriers.

Sorbent boom can be used when overland flows are relatively minor or in wetlands. The sorbent boom should be staked in place with stakes approximately 5 feet apart.

These barriers can serve to:

- Contain and stabilize a contaminated area
- Contain or divert oil on water or oil that has potential to migrate
- Create cells for recovery
- Block natural depressions to act as containment areas for recovery

An excavated trench or a berm on the tundra can also be used to intercept the flow of a spill or divert the flow around a sensitive area. Dig the trench at right angles to the flow of the spill. The trench should be angled slightly downslope (in the direction of surface flow) to avoid excessive pooling in the trench. Place excavated material on the downhill side of the trench. In areas with a low water table, line the sides and bottom of the trench with plastic sheeting or similar impermeable materials. Where the groundwater table is high, line the downhill side of the trench. The trench can be flooded with water to inhibit spill penetration into sediments and to stimulate flow toward the recovery device in the trench or pit.

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**EQUIPMENT AND PERSONNEL**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Visqueen	All	Containment	≥10 ft	2	1 hr	1 hr
Backhoe	EOA, WOA, KRU, Peak, APC, AIC	Trenching	1	1	2 hr	0.5 hr
Bobcat w/Trimmer	ACS, KRU	Trenching	1	1	1 hr	0.5 hr
Front-End Loader w/ Bucket	All	Build Berms	1	1	1 hr	0.5 hr
Hose (5-inch)	KRU	Berm/Contain	≥1 ft	2	2 hr	1 hr
Shore Seal Boom	ACS, KRU, MPU	Berm/Contain	≥50 ft	≥4	1 hr	1 hr
Sandbags	ACS, KRU, EOA, WOA	Berm/Contain	≥10	≥6*	2 hr	2 hr

**TOTAL STAFF FOR SETUP ≥3\*\***

\*Number of personnel depends on number of sandbags needed.

\*\*The recovery team would conduct monitoring and sustain operations.

**SUPPORT**

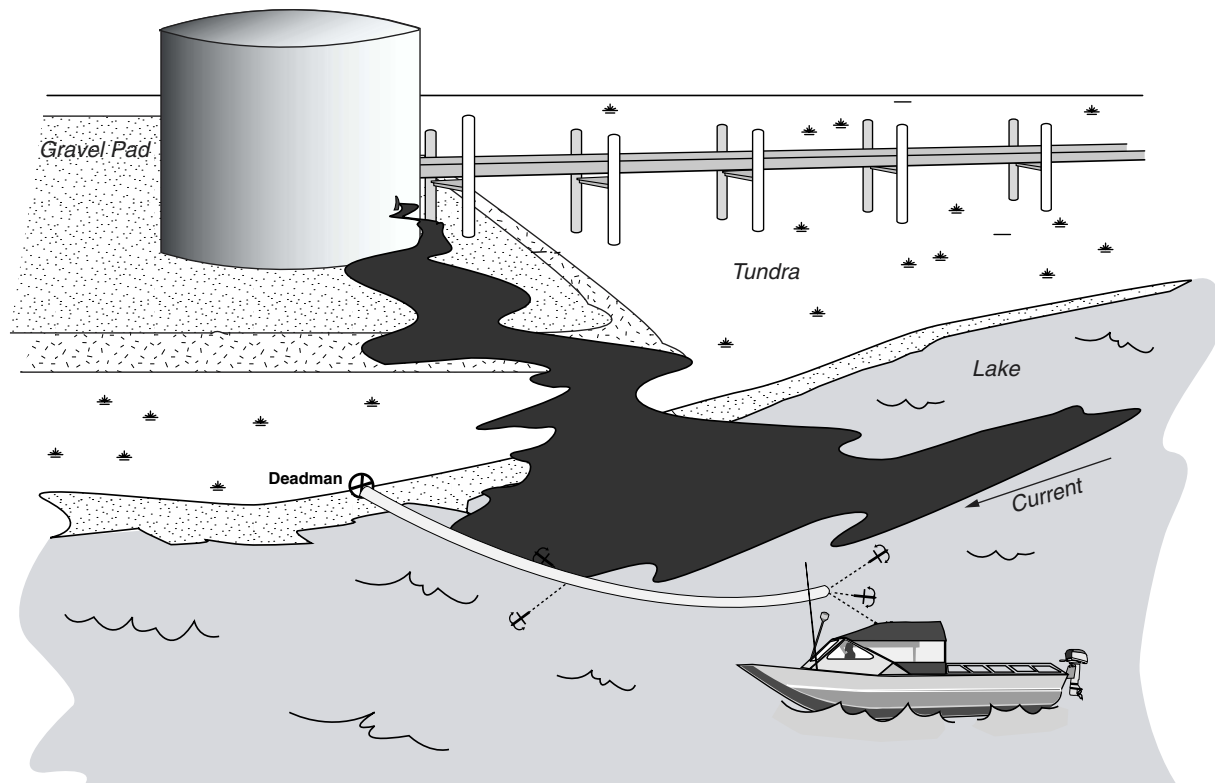
EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Semi and Trailer	EOA, WOA, KRU	Transport backhoe	1	1 driver	1 hr	0
Fuel Truck	All	Fuel equipment	1	Once per shift	1 hr	0.5 hr
Lube Truck	All	Provide fluids to heavy equipment	1	Once per shift	1 hr	0.5 hr
Mechanic Truck	All, except Badami	Support equipment	1	1	1 hr	0.5 hr
Water Truck	All	Spray snow berm	1	2	2 hr	0.5 hr
Floating Pump and Blower	ACS, KRU, MPU	Shore Seal inflation	1	2	1 hr	1 hr
Plywood	All	Walkway	Variable	2	2 hr	2 hr

**CAPACITIES FOR PLANNING**

- During summer, a backhoe can dig a ditch or trench 2 ft deep by 40 ft long in approximately 1 hour.
- During summer, a Bobcat trimmer can cut about 4 inches maximum depth per cut. For depths of more than 8 inches, the trench must be as wide as the Bobcat.

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- Disposal of construction material should be taken into account before using this tactic.
- This tactic is appropriate for use with low flow and shallow water on pad or tundra. The least intrusive methods for building berms are preferred on tundra.
- Do not excavate where excavation will cause more damage than the spill. The Bobcat trimmer is the last option for trenching. A permit may be needed from the landowner.
- Before excavating in tundra, check for the presence of groundwater or permafrost. Do not excavate into frost-laden (cemented) soils, since disruption of the permafrost could accelerate thermal erosion. The depth of the trench is limited by the depth of the permafrost. A plastic liner or sheeting can be used on the walls of the soil or gravel berm to inhibit spill penetration into the soils or gravel.
- Approval from the Operations Section Chief is required for any vehicle tundra travel (off-road or off-pad), which must be in accordance with ACS' emergency tundra travel permit (See Tactic A-3). Any excavations in tundra or any tundra damage must be reported to the Operations Section Chief. All on-tundra activity must be documented and reported to the Planning Section for reporting to ensure permit compliance. Avoid archeological sites and biologically sensitive habitats. Travel across tundra with tracked vehicles, heavy equipment, and even foot traffic can seriously damage the vegetative mat, induce thermokarst, and cause structure disturbance. Using sheets of plywood as a traveling surface and minimizing trips with equipment greatly reduce disturbance of the tundra.
- When working with equipment around or near flow lines, a spotter must be added to each front-end loader.
- A civil work permit from the operator is required for all work on owner-company pads.



During breakup and summer, lengths of conventional boom can be deployed on a lake or flooded tundra once there is enough open water available. The boom deployment techniques are the same as those in open water.

The purpose of deflection booming is to divert oil to a collection point for removal with skimmers. It can also be used as exclusion booming to protect lengths of shoreline.



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**EQUIPMENT AND PERSONNEL**

- Select vessels and boom according to area, water depth restrictions, and function (see Tactic L-6). Specific personnel requirements depend on the length and type of boom and the nature of the area.

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Boom	All	Deflection booming	≥50 ft	3	1 hr	3 hr
Work Boat	ACS, KRU, EOA, Endicott	Booming support	1		1 hr	
Anchor System	All	Anchoring boom	Variable		1 hr	

**TOTAL STAFF 3**

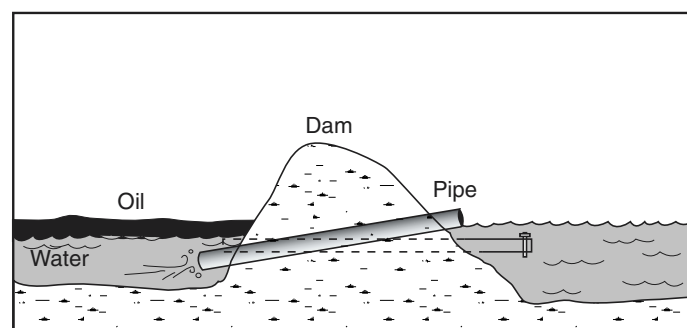
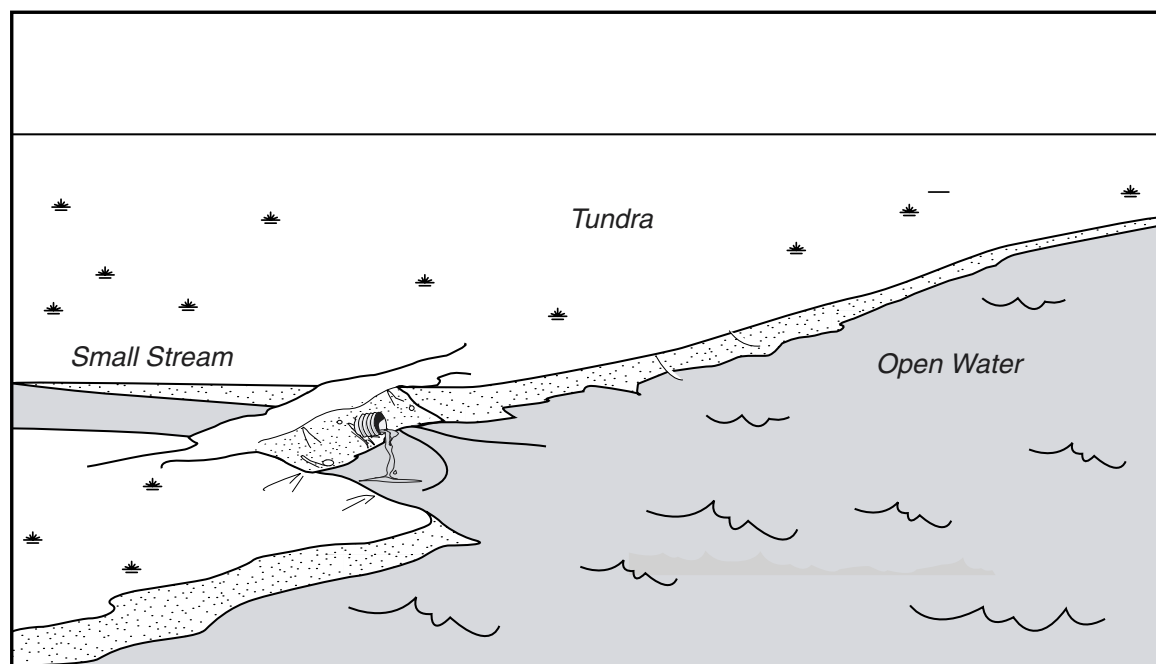
**SUPPORT**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Avgas Trailer	ACS, EOA, KRU Badami	Airboat fuel	1	1 (initial)	1 hr	0.5 hr
Mechanic Truck	All, except Badami	Support equipment	1	1	1 hr	0.5 hr

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- Approval from the Operations Section Chief is required for any vehicle tundra travel (off-road or off-pad), which must be in accordance with ACS' emergency tundra travel permit (See Tactic A-3). Any excavations in tundra or any tundra damage must be reported to the Operations Section Chief. All on-tundra activity must be documented and reported to the Planning Section for reporting to ensure permit compliance. Avoid archeological sites and biologically sensitive habitats. Travel across tundra with tracked vehicles, heavy equipment, and even foot traffic can seriously damage the vegetative mat, induce thermokarst, and cause structure disturbance. Using sheets of plywood as a traveling surface and minimizing trips with equipment greatly reduce disturbance of the tundra.
- When working with equipment around or near flow lines, a spotter must be added to each front-end loader.
- A civil work permit from the operator is required for all work on owner company pads.
- SUMMER CONSIDERATIONS:
  - Equipment is same as for breakup (just make sure you're not tearing up the tundra)
  - Prop boats can be used
  - Can use tundra berm or trench after thaw
- FREEZEUP CONSIDERATIONS:
  - No ice under water in ponds
  - Slush ice possible
  - Consider tundra same as in summer
  - Thin ice
- 8x6 Delta boom is most commonly used for this tactic.





An underflow dam can be used when there is too much water flow to allow for a complete blockage of a drainage channel. The dam is built of earth, gravel, or other barriers such as sandbags or plywood sheets. Wherever possible, line the upstream side of the dam with plastic sheeting to prevent erosion and penetration of oil into the dam material.

Underflow dams use inclined pipes to move water downstream while leaving the spill contained behind the dam. The capacity of the pipe (or pipes) should exceed the stream flow rate. It may be necessary to use pumps.

Pipes must be placed on the upstream side of the dam, with the elevated end on the downstream side. Make sure that the upstream end of the pipe is submerged and below the oil/water interface. The height of the elevated downstream end of the pipe will determine the water level behind the dam.

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**EQUIPMENT AND PERSONNEL**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Challenger Dozer	WOA, EOA, KRU	Dam construction	1 (3 available on Slope)	1	1 hr	0.5 hr
Front-End Loader (with bucket and forks)	All	Dam construction	1	1	1 hr	0.5 hr
Sandbags (bulk bags may be used)	ACS, KRU, WOA, EOA	Dam	Minimum quantity of fill	≥6*	2 hr	2 hr
Plywood	All	Liner	≥1	2	2 hr	
Visqueen (reinforced)	All	Dam	1 roll	—	1 hr	
Pipe, 6-inch or larger	All	Dam	≥20 ft	≥2	1 hr	

**TOTAL STAFF FOR SETUP ≥3\*\***

\*Number of personnel depends on number of sandbags needed.

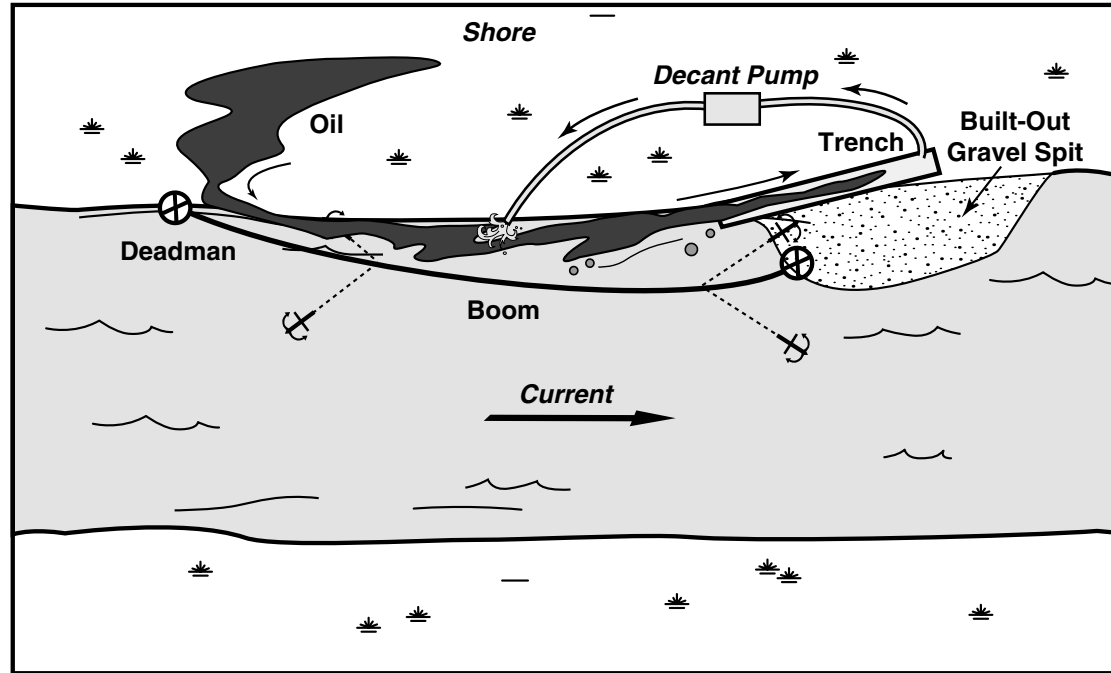
\*\*The recovery team would conduct monitoring and sustain operations.

**SUPPORT**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Semi and Trailer	EOA, WOA, KRU	Transport Challenger	1	1 driver	1 hr	0
Mechanic Truck	All, except Badami	Support equipment	1	1	1 hr	0.5 hr
Fuel Truck	All	Fuel heavy equipment	1	Once per shift	1 hr	0.5 hr
Lube Truck	All	Provide fluids to heavy equipment	1	Once per shift	1 hr	0.5 hr

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- When working with equipment around or near flowlines, add a spotter to each front-end loader and Challenger.
- Check dams periodically for leakage and integrity, replace eroded materials, and continually monitor the water/oil interface. Valved pipes, pumps, or number of siphons may require periodic adjustment to compensate for minor changes in stream flow.
- If sufficient underflow cannot be maintained or if excessive overflow occurs, additional dams downstream may be required.
- Gravel or topping may have to be added continually to the dam if erosion is a problem.
- Approval from the Operations Section Chief is required for any vehicle tundra travel (off-road or off-pad), which must be in accordance with ACS' emergency tundra travel permit (See Tactic A-3). Any excavations in tundra or any tundra damage must be reported to the Operations Section Chief. All on-tundra activity must be documented and reported to the Planning Section for reporting to ensure permit compliance. Avoid archeological sites and biologically sensitive habitats. Travel across tundra with tracked vehicles, heavy equipment, and even foot traffic can seriously damage the vegetative mat, induce thermokarst, and cause structure disturbance. Using sheets of plywood as a traveling surface and minimizing trips with equipment greatly reduce disturbance of the tundra.
- Approval of State On-Scene Coordinator and ADF&G is necessary for civil work in anadromous fish streams, as well as a Title 16 permit from ADF&G.
- Damming of stream mouth may block fish passage. The dam must be removed immediately after it is no longer needed.
- Sandbags are labor-intensive and should be the last consideration.
- In larger streams, consider the use of bulk bags for dam construction.



A natural or man-made deadarm trench can be used along the bank of a river to keep oil from migrating downstream from a spill on land. The deadarm will serve as a control point downstream of where the oil is entering the river. Deflection boom is deployed to help divert the oil into the deadarm, which may be lined with an impermeable liner.

In addition, the entry of oil at the mouth of the deadarm can be controlled with an adjustable weir.

**EQUIPMENT AND PERSONNEL**

- Select vessels and boom according to area, water depth restrictions, and function (see Tactic L-6). Specific personnel requirements depend on the length and type of boom and the nature of the area.

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Boom	All	Diversion	≥50 ft	3	1 hr	3 hr
Work Boat	All	Booming support	1		1 hr	
Backhoe	EOA, WOA, KRU, Peak, AIC, APC	Trenching	1	1	2 hr	
Anchor System	All	Anchoring boom	Variable	3	1 hr	
Trash Pump (3-inch)	All	Decanting from trench	1	1	1 hr	
Suction Hose (3-inch)	All	Decanting from trench	≥20 ft	2 for setup	1 hr	
Discharge Hose (3-inch)	All	Decanting from trench	≥50 ft	—	1 hr	

**TOTAL STAFF FOR SETUP** 7  
**TOTAL STAFF TO MONITOR AND SUSTAIN BOOM CONFIGURATION DURING RECOVERY** 3

**NOTE:** "Base Location" is storage location (may change seasonally); "Mobe Time" is time to get it out of storage, prepare it for operation, and make it ready to travel (concurrent for all equipment); "Deploy Time" is time to make it operational for its intended use at the spill site. These times do not include travel time from base to spill site, which may have multiple components (see Tactic L-3).

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**SUPPORT**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Semi and Trailer	EOA, WOA, KRU	Haul backhoe	1	1	1 hr	0
Avgas Trailer	ACS, EOA, KRU, Badami	Airboat fuel	1	1 (initial)	1 hr	0.5 hr
Fuel Truck	All	Fuel heavy equipment	1	Once per shift	1 hr	0.5 hr
Lube Truck	All	Provides fluids to heavy equipment	1	Once per shift	1 hr	0.5 hr
Mechanic Truck	All, except Badami	Support equipment	1	1	1 hr	0.5 hr

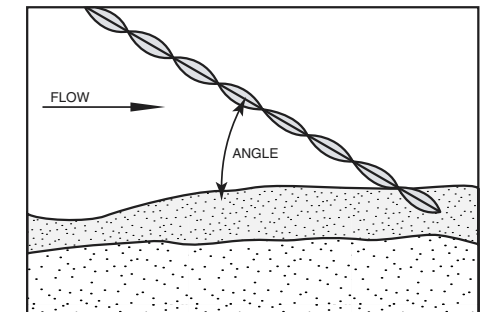
**CAPACITIES FOR PLANNING**

- Nameplate capacity of 3-inch trash pump is 485 bbl/hr.

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

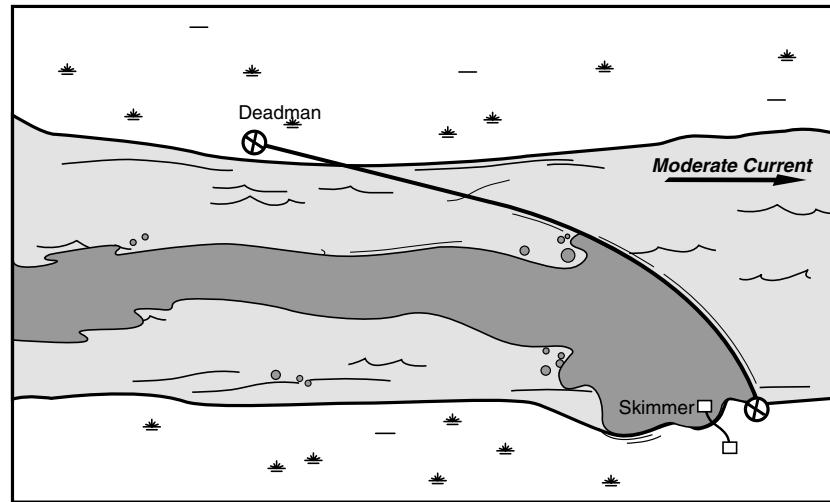
- 8x6 Delta boom is most commonly used for this tactic.
- The angle of the trench to current is important. Keep the current perpendicular to the boom at 3/4 knot or less.
- Oil will follow current along the shore.
- A Title 16 permit from ADF&G is required when digging trenches in river beds and river banks.
- Approval from the Operations Section Chief is required for any vehicle tundra travel (off-road or off-pad), which must be in accordance with ACS' emergency tundra travel permit (See Tactic A-3). Any excavations in tundra or any tundra damage must be reported to the Operations Section Chief. All on-tundra activity must be documented and reported to the Planning Section for reporting to ensure permit compliance. Avoid archeological sites and biologically sensitive habitats. Travel across tundra with tracked vehicles, heavy equipment, and even foot traffic can seriously damage the vegetative mat, induce thermokarst, and cause structure disturbance. Using sheets of plywood as a traveling surface and minimizing trips with equipment greatly reduce disturbance of the tundra.
- Readjust angles and widths between boom sections as current and wind change. Constantly monitor nearshore boom systems to prevent escape of oil.

CURRENT (knots)	CURRENT (ft/second)	BOOM ANGLE RELATIVE TO CURRENT REQUIRED TO KEEP COMPONENT OF CURRENT <3/4 KNOT
1.5	2.5	30° to 42°
1.75	2.9	25° to 35°
2.0	3.4	22° to 30°
2.25	3.8	19° to 26°
2.5	4.2	17° to 24°
2.75	4.6	16° to 21°
3.0	5.0	15° to 19°

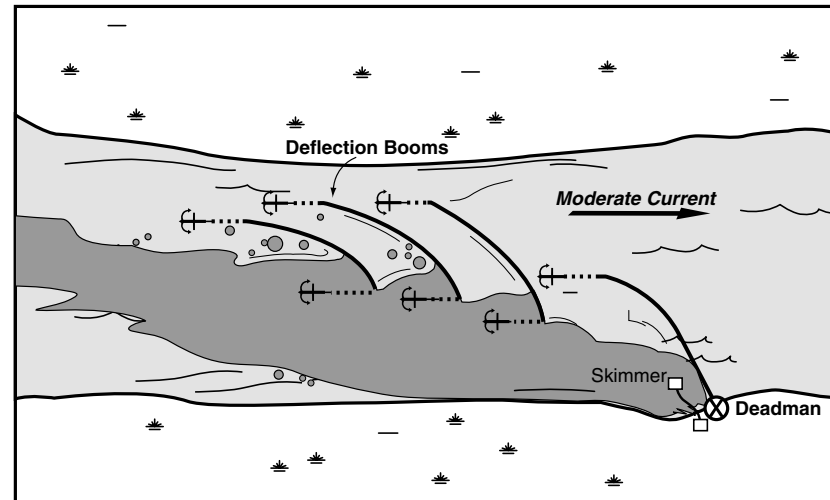




**DEFLECTION/DIVERSIONARY (SINGLE BOOM)**



**DIVERSIONARY (CASCADE)**



The object of stream booming is to remove oil from the fastest water and divert it to slower water. A stream can be boomed by deploying the boom either upstream or downstream. In either case, the boom is first set out on the stream bank. Before the boom is deployed, rig anchor points on the boom. The boom is attached to a shore anchor, and then the boom is either towed upstream to a midstream anchor point, or the boom is allowed to drift downstream with the current. Once the boom is set, intermediate anchors are set as needed to ensure that the boom maintains the proper configuration (remembering that the current perpendicular to the boom should not exceed 3/4 knot). Examples of deployment configurations follow.

**Diversionsary (single boom):** A boom is deployed from one bank at an angle to the current and anchored midstream or on the opposite bank for diverting the oil to an eddy or other quiet-water collection point on the shoreline. Alternatively, a single long boom can be used in a multichannel stream to divert oil so that it stays in one channel.

**Diversionsary (cascade):** Several booms are deployed in a cascade fashion when a single boom can't be used because of a fast current or because it's necessary to leave openings for boats to get through. This configuration can be used in strong currents where it is impossible or difficult to deploy one long boom. Shorter sections of boom used in a cascade deployment are easier to handle in fast water. However, more equipment is needed than when a single boom is used.

NOTE: All values given on these pages are for planning purposes only.



NOTE: "Base Location" is storage location (may change seasonally); "Mobe Time" is time to get it out of storage, prepare it for operation, and make it ready to travel (concurrent for all equipment); "Deploy Time" is time to make it operational for its intended use at the spill site. These times do not include travel time from base to spill site, which may have multiple components (see Tactic L-3).

**EQUIPMENT AND PERSONNEL**

- Select vessels and boom according to area, water depth restrictions, and function (see Tactic L-6). Specific personnel requirements depend on the length and type of boom and the nature of the area.

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Boom	All	Deflection booming	≥50 ft	6 for setup 3 to maintain	1 hr	3 hr
Work Boat	All	Booming support	2		1 hr	
Anchor System	All	Anchoring boom	Variable		1 hr	

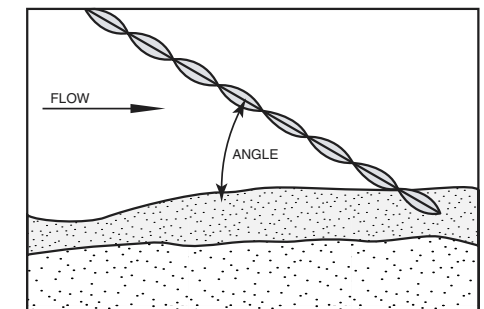
**SUPPORT**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Avgas Trailer	ACS, EOA, KRU, Badami	Airboat fuel	1	1 (initial)	1 hr	0.5 hr
Mechanic Truck	All, except Badami	Support equipment	1	1	1 hr	0.5 hr

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- 8x6 Delta boom is most commonly used for this tactic.
- Since the speed of the current perpendicular to the boom must be maintained at 3/4 kt or less, the length of boom needed to stretch across a stream depends on the current. For a stream 100 ft across with a 1 kt current, a boom approximately 140 ft long is needed. If the current is 2 kt, the same stream would require 320 ft of boom. The speed of the current is not equal across the stream; the fastest water is with the deepest water. Oil moving in a stream will be entrained in the fastest water.
- The shortest length of boom available is 50 ft. Generally, the minimum length required to boom a river such as the Sagavanirktok or Kuparuk is 500 ft.
- Readjust angles and widths between boom sections as current and wind change. Constantly monitor nearshore boom systems to prevent escape of oil.
- Approval from the Operations Section Chief is required for any vehicle tundra travel (off-road or off-pad), which must be in accordance with ACS' emergency tundra travel permit (See Tactic A-3). Any excavations in tundra or any tundra damage must be reported to the Operations Section Chief. All on-tundra activity must be documented and reported to the Planning Section for reporting to ensure permit compliance. Avoid archeological sites and biologically sensitive habitats. Travel across tundra with tracked vehicles, heavy equipment, and even foot traffic can seriously damage the vegetative mat, induce thermokarst, and cause structure disturbance. Using sheets of plywood as a traveling surface and minimizing trips with equipment greatly reduce disturbance of the tundra.

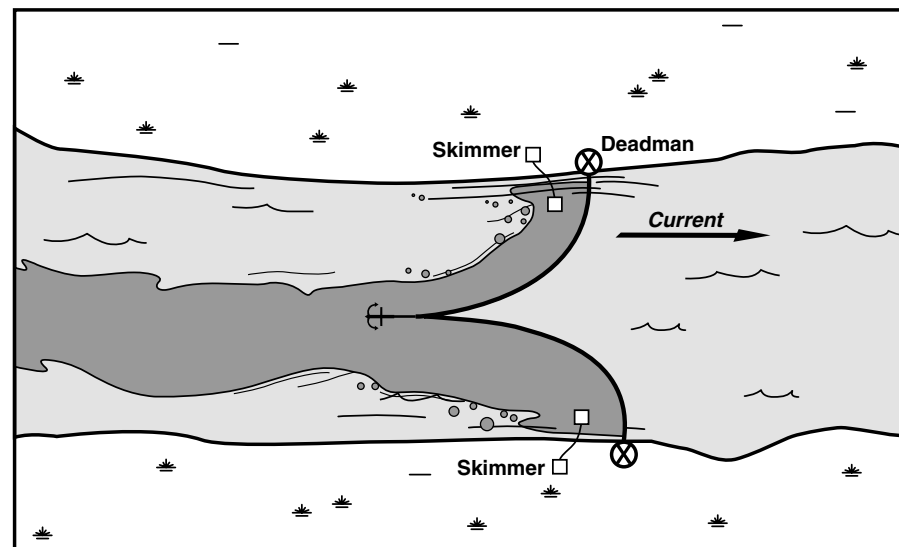
CURRENT (knots)	CURRENT (ft/second)	BOOM ANGLE RELATIVE TO CURRENT REQUIRED TO KEEP COMPONENT OF CURRENT <3/4 KNOT
1.5	2.5	30° to 42°
1.75	2.9	25° to 35°
2.0	3.4	22° to 30°
2.25	3.8	19° to 26°
2.5	4.2	17° to 24°
2.75	4.6	16° to 21°
3.0	5.0	15° to 19°



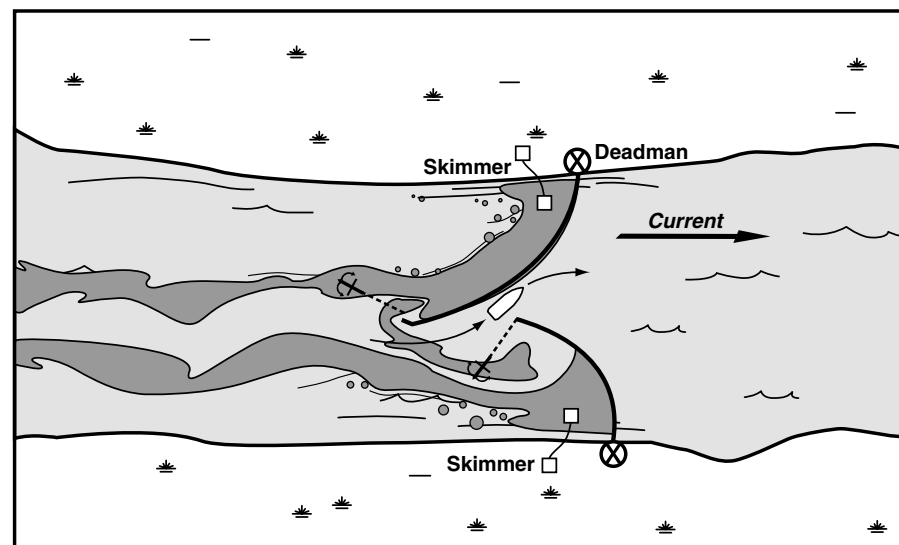
NOTE: All values given on these pages are for planning purposes only.



**CLOSED CHEVRON**



**OPEN CHEVRON**



Chevron boom configurations are also for use in fast water. Two booms are deployed from an anchor in the middle of the stream and attached to each bank. A chevron configuration is used to break a slick for diversion to two or more collection areas. An open chevron can be used where boat traffic must be able to pass. (The two booms are anchored separately midstream, with one anchor point upstream or downstream of the other).



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**EQUIPMENT AND PERSONNEL**

- Select vessels and boom according to area, water depth restrictions, and function (see Tactic L-6). Specific personnel requirements depend on the length and type of boom and the nature of the area.

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Boom	All	Deflection booming	≥50 ft	9 for setup 3 to maintain*	1 hr	3 hr
Work Boat	All	Booming support	3		1 hr	
Anchor System	All	Anchoring boom	Variable		1 hr	

\*Recovery crews can assist with monitoring boom if necessary.

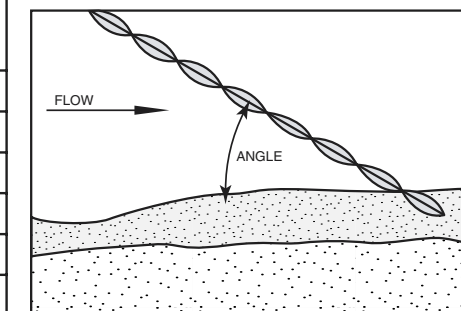
**SUPPORT**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Avgas Trailer	ACS, EOA, KRU, Badami	Airboat fuel	1	1 (initial)	1 hr	0.5 hr
Mechanic Truck	All, except Badami	Support equipment	1	1	1 hr	0.5 hr

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- 8x6 Delta boom is most commonly used for this tactic.
- Since the speed of the current perpendicular to the boom must be maintained at 3/4 kt or less, the length of boom needed to stretch across a stream depends on the current. For a stream 100 ft across with a 1 kt current, a boom approximately 140 ft long is needed. If the current is 2 kt, the same stream would require 320 ft of boom. The speed of the current is not equal across the stream; the fastest water is with the deepest water. Oil moving in a stream will be entrained in the fastest water.
- The shortest length of boom available is 50 ft. Generally, the minimum length required to boom a river such as the Sagavanirktok or Kuparuk is 500 ft.
- Readjust angles and widths between boom sections as current and wind change. Constantly monitor nearshore boom systems to prevent escape of oil.
- Approval from the Operations Section Chief is required for any vehicle tundra travel (off-road or off-pad), which must be in accordance with ACS' emergency tundra travel permit (See Tactic A-3). Any excavations in tundra or any tundra damage must be reported to the Operations Section Chief. All on-tundra activity must be documented and reported to the Planning Section for reporting to ensure permit compliance. Avoid archeological sites and biologically sensitive habitats. Travel across tundra with tracked vehicles, heavy equipment, and even foot traffic can seriously damage the vegetative mat, induce thermokarst, and cause structure disturbance. Using sheets of plywood as a traveling surface and minimizing trips with equipment greatly reduce disturbance of the tundra.

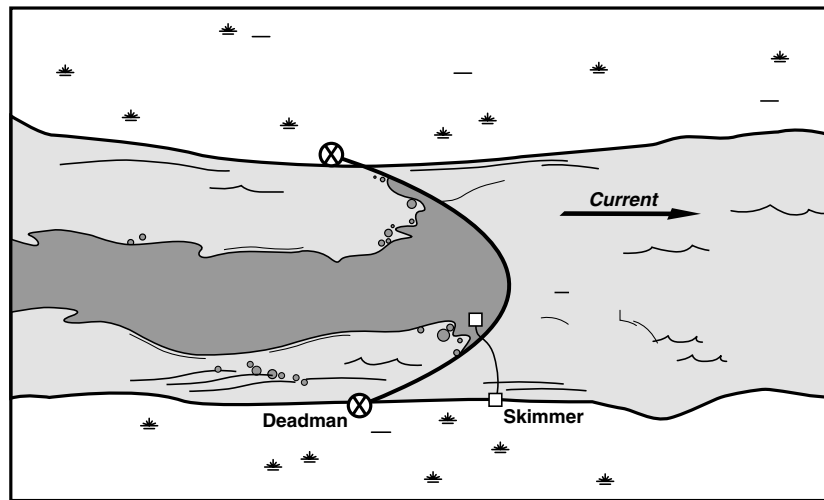
CURRENT (knots)	CURRENT (ft/second)	BOOM ANGLE RELATIVE TO CURRENT REQUIRED TO KEEP COMPONENT OF CURRENT <3/4 KNOT
1.5	2.5	30° to 42°
1.75	2.9	25° to 35°
2.0	3.4	22° to 30°
2.25	3.8	19° to 26°
2.5	4.2	17° to 24°
2.75	4.6	16° to 21°
3.0	5.0	15° to 19°



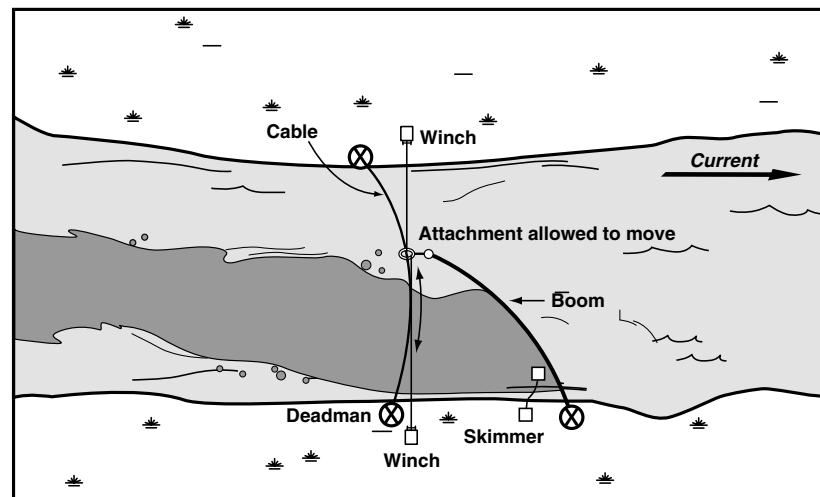




**CATENARY**



**DEFLECTION/TROLLEY**



**Catenary (currents less than 1/4 knot):** The boom is attached to an anchor on one bank, and the other end is towed to the other bank and attached to an anchor there. The current naturally puts the boom in a “U” shape (“catenary”). The deployment and maintenance of a single long boom can be difficult and labor-intensive. It is usually used for recovery operations.

**Trolley (cable-supported diversionary boom):** A cable or line is strung across a river and the boom attached to the trolley line with a pulley.

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**EQUIPMENT AND PERSONNEL**

- Select vessels and boom according to area, water depth restrictions, and function (see Tactic L-6). Specific personnel requirements depend on the length and type of boom and the nature of the area.

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Boom	All	Deflection booming	≥50 ft	6 for setup 3 to maintain	1 hr	3 hr
Work Boat	All	Booming support	2		1 hr	
Chain Saw Winch	KRU, EOA, WOA	Booming support	2	4 for setup*	1 hr	
Anchor System	All	Anchoring boom	Variable		1 hr	
Floating Winch	ACS, EOA, Alyeska	Boom support	2		1 hr	

**TOTAL STAFF FOR SETUP 10**

**TOTAL STAFF TO SUSTAIN OPERATIONS 3**

\*Recovery crews will maintain anchors and winches (see Tactic R-16).

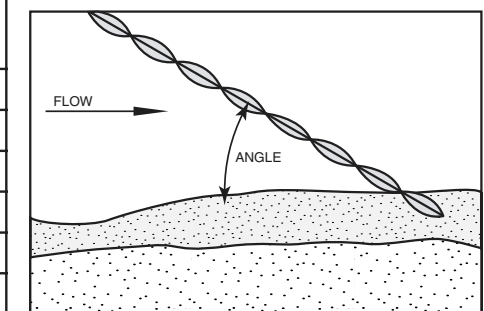
**SUPPORT**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Avgas Trailer	ACS, EOA, KRU, Badami	Airboat fuel	1	1 (initial)	1 hr	0.5 hr
Mechanic Truck	All, except Badami	Support equipment	1	1	1 hr	0.5 hr

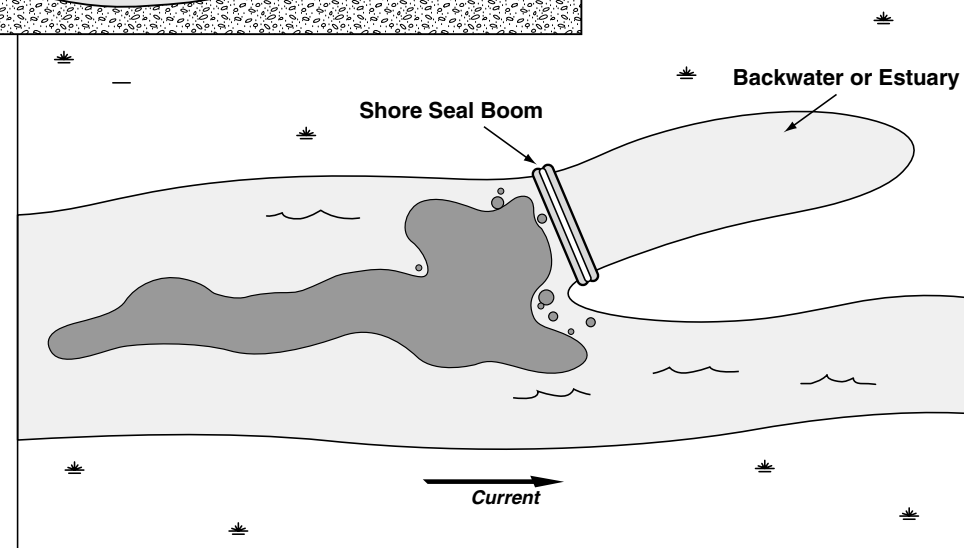
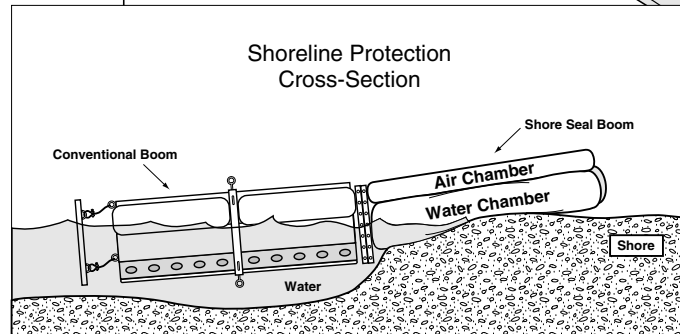
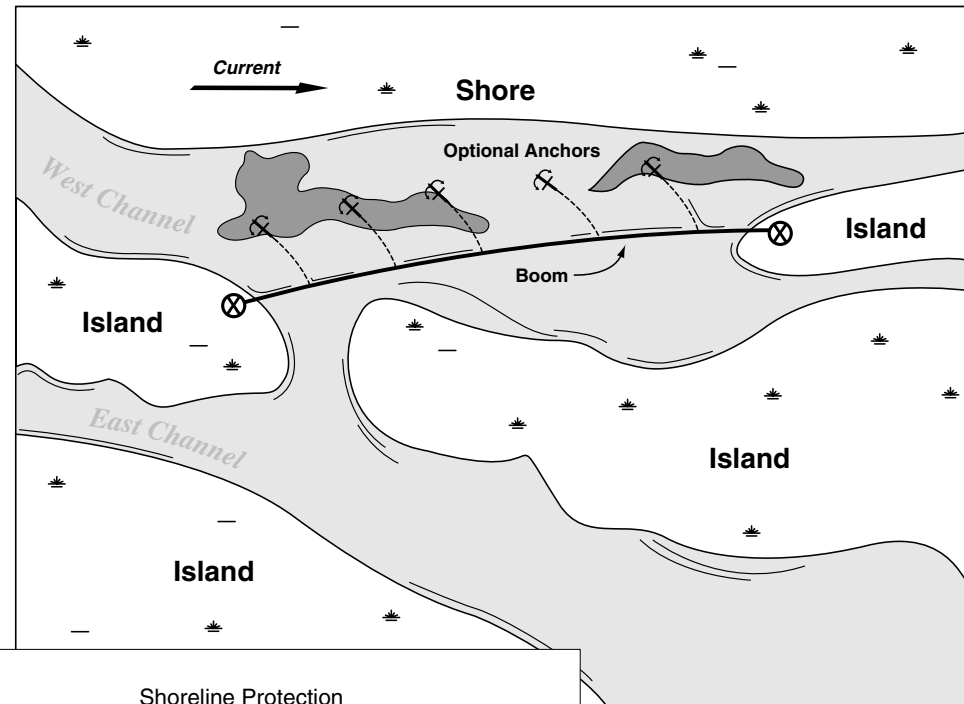
**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- 8x6 Delta boom is most commonly used for this tactic.
- Since the speed of the current perpendicular to the boom must be maintained at 3/4 kt or less, the length of boom needed to stretch across a stream depends on the current. For a stream 100 ft across with a 1 kt current, a boom approximately 140 ft long is needed. If the current is 2 kt, the same stream would require 320 ft of boom. The speed of the current is not equal across the stream; the fastest water is with the deepest water. Oil moving in a stream will be entrained in the fastest water.
- A cable extended across the river can be dangerous. Make sure everyone knows it's there and that any approaching boats are warned. Mark the cable with buoys.
- The shortest length of boom available is 50 ft. Generally, the minimum length required to boom a river such as the Sagavanirktok or Kuparuk is 500 ft.
- Readjust angles and widths between boom sections as current and wind change. Constantly monitor nearshore boom systems to prevent escape of oil.
- Approval from the Operations Section Chief is required for any vehicle tundra travel (off-road or off-pad), which must be in accordance with ACS' emergency tundra travel permit (See Tactic A-3). Any excavations in tundra or any tundra damage must be reported to the Operations Section Chief. All on-tundra activity must be documented and reported to the Planning Section for reporting to ensure permit compliance. Avoid archeological sites and biologically sensitive habitats. Travel across tundra with tracked vehicles, heavy equipment, and even foot traffic can seriously damage the vegetative mat, induce thermokarst, and cause structure disturbance. Using sheets of plywood as a traveling surface and minimizing trips with equipment greatly reduce disturbance of the tundra.

CURRENT (knots)	CURRENT (ft/second)	BOOM ANGLE RELATIVE TO CURRENT REQUIRED TO KEEP COMPONENT OF CURRENT <3/4 KNOT
1.5	2.5	30° to 42°
1.75	2.9	25° to 35°
2.0	3.4	22° to 30°
2.25	3.8	19° to 26°
2.5	4.2	17° to 24°
2.75	4.6	16° to 21°
3.0	5.0	15° to 19°



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Either conventional boom or a Shore Seal boom can be used to exclude oil from a sensitive area. For example, the Shore Seal boom can be used in shallow water to boom off a backwater, or a conventional boom can be placed across the mouth of a side channel to keep oil out. In addition, Shore Seal boom can be connected to conventional boom to protect the shoreline.

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**EQUIPMENT AND PERSONNEL**

- Select vessels and boom according to area, water depth restrictions, and function (see Tactic L-6). Specific personnel requirements depend on the length and type of boom and the nature of the area.

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Boom	ACS, WOA, EOA, KRU, Endicott	Exclusion booming	≥50 ft	3	1 hr	3 hr
Shore Seal Boom	ACS, KRU, MPU	Exclusion booming	≥50 ft	4	1 hr	1.5 hr
Work Boat	All	Booming support	1		1 hr	3 hr
Floating Pump and Blower	ACS, KRU, MPU	Shore Seal inflation	1		1 hr	1.5 hr
Anchor System	All	Anchoring boom	Variable	2	1 hr	3 hr

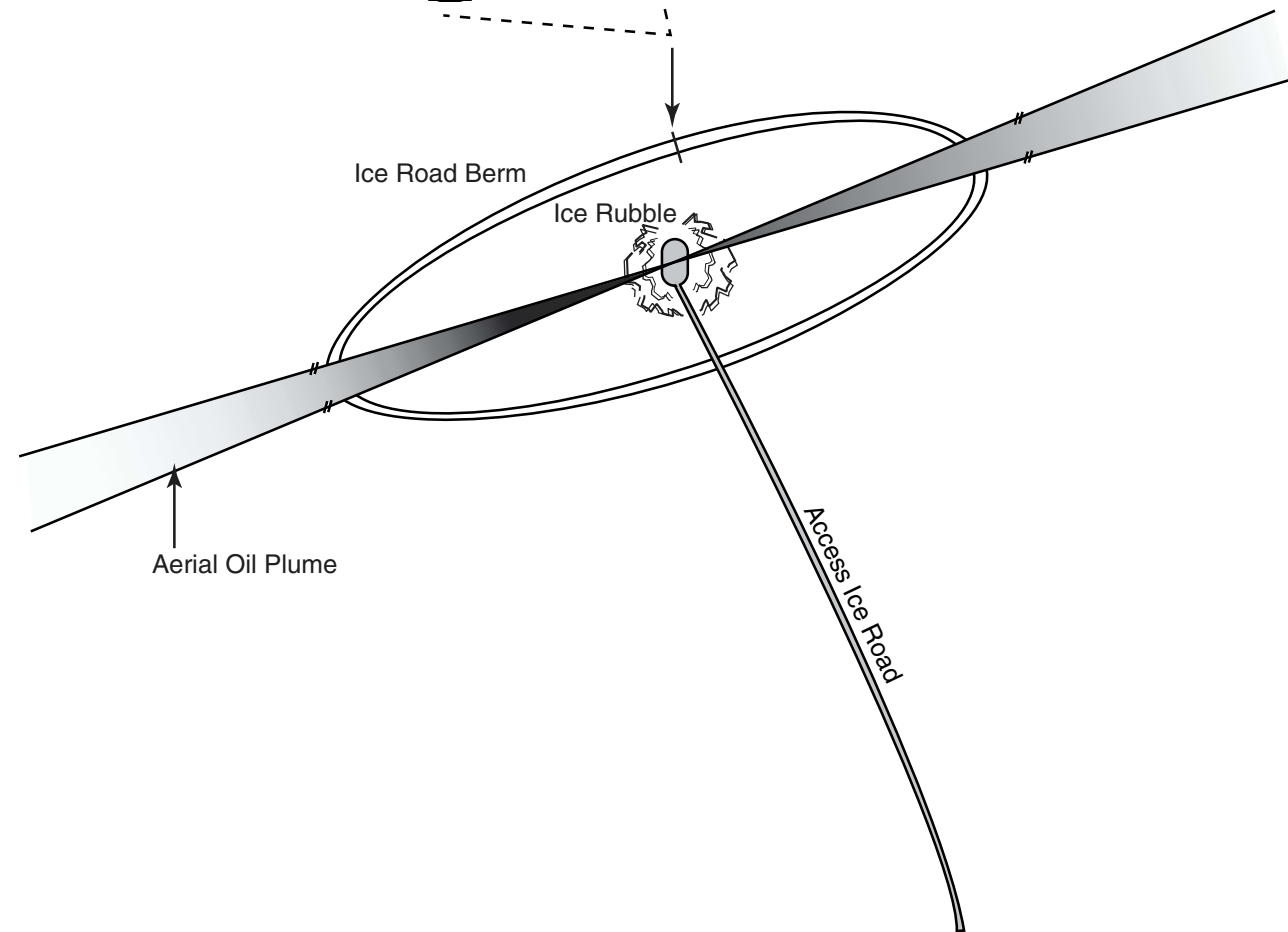
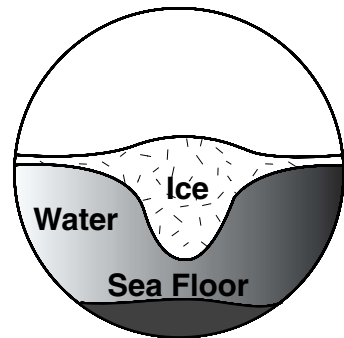
**TOTAL STAFF FOR SETUP ≥5**

**SUPPORT**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Avgas Trailer	ACS, EOA, KRU, Badami	Airboat fuel	1	1 (initial)	1 hr	0.5 hr
Mechanic Truck	All, except Badami	Support equipment	1	1	1 hr	0.5 hr

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- 8x6 Delta boom is most commonly used for this tactic.
- Since the speed of the current perpendicular to the boom must be maintained at 3/4 kt or less, the length of boom needed to stretch across a stream depends on the current. For a stream 100 ft across with a 1 kt current, a boom approximately 140 ft long is needed. If the current is 2 kt, the same stream would require 320 ft of boom.
- The speed of the current is not equal across the stream; the fastest water is with the deepest water. Oil moving in a stream will be entrained in the fastest water.
- Don't assume 100% containment with one boom system.
- Readjust angles and widths between boom sections as current and wind change. Constantly monitor nearshore boom systems to prevent escape of oil.
- Approval from the Operations Section Chief is required for any vehicle tundra travel (off-road or off-pad), which must be in accordance with ACS' emergency tundra travel permit (See Tactic A-3). Any excavations in tundra or any tundra damage must be reported to the Operations Section Chief. All on-tundra activity must be documented and reported to the Planning Section for reporting to ensure permit compliance. Avoid archeological sites and biologically sensitive habitats. Travel across tundra with tracked vehicles, heavy equipment, and even foot traffic can seriously damage the vegetative mat, induce thermokarst, and cause structure disturbance. Using sheets of plywood as a traveling surface and minimizing trips with equipment greatly reduce disturbance of the tundra.



For a blowout that is depositing oil on top of solid sea ice, an ice road can be constructed around the source at a safe distance. Since the ice road causes the sea ice to deflect downward under the road, an under-ice barrier is created to the movement of any oil that may have gotten under the ice. The road also serves as a surface barrier because it is higher than the surrounding ice, and will provide a working platform into the breakup season, when the ice inside the ring decays.

In addition, ice work pads can be created adjacent to contaminated areas to provide working platforms for heavy equipment needed to remove large volumes of oil-contaminated snow.

An alternative method to create an ice ring barrier is to remove the snow from the ice surface. Ice not covered by snow will grow thicker.

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**EQUIPMENT AND PERSONNEL**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Rolligon w/Auger	CATCO, APC	Ice road construction	≥2	≥2	6 hr	1 hr
Water Truck	All	Ice road construction	≥2	≥2	2 hr	
Front-End Loader w/Drag	Peak, AIC	Ice road construction	≥1	≥1	1 hr	
Grader w/Wing Blade	Peak, AIC, EOA, WOA, KRU	Ice road construction	≥1	≥1	2 hr	

**TOTAL STAFF TO SUSTAIN OPERATIONS ≥3**

**SUPPORT**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Fuel Truck	All	Fuel heavy equipment	1	Once per shift	1 hr	0.5 hr
Lube Truck	All	Provide fluids to heavy equipment	1	Once per shift	1 hr	0.5 hr
Mechanic Truck	All, except Balami	Support equipment	1	1	1 hr	0.5 hr
Light Plant	All	Illumination	≥1	2 for initial setup, and 1 to check and fuel occasionally	1 hr	0.5 hr
Tioga Heater	All	Equipment support	1	1 initial setup	1 hr	0.5 hr

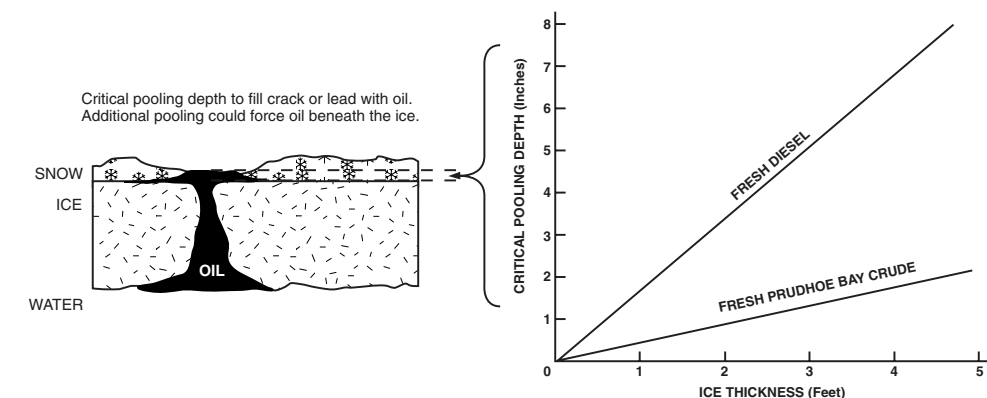
**CAPACITIES FOR PLANNING**

- A loader with a drag and a water truck hauling fresh water can make approximately one-third mile of ice road 6 inches thick in 12 hours. If the ice is already thick enough to support activities, 6-inch lifts would not be necessary, and the length of ice road completed in 12 hours would increase.
- Rolligons with ice augers can build approximately 3,000 ft of road 4 inches thick in 12 hours using sea water.


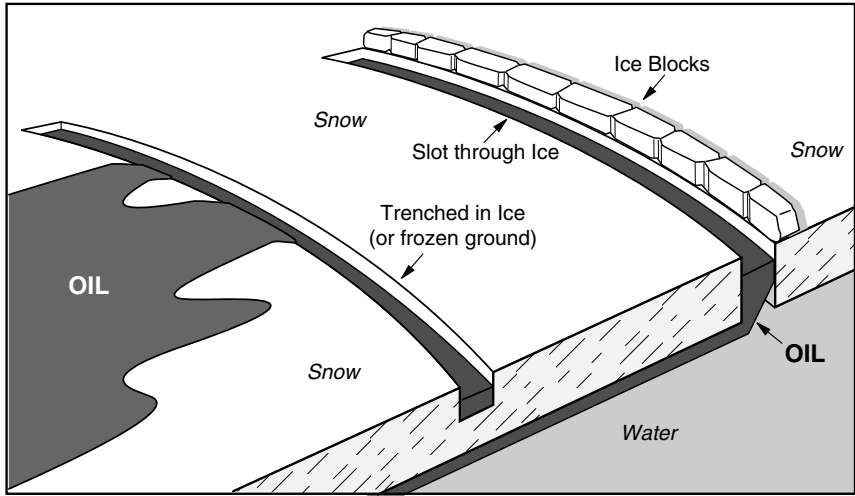
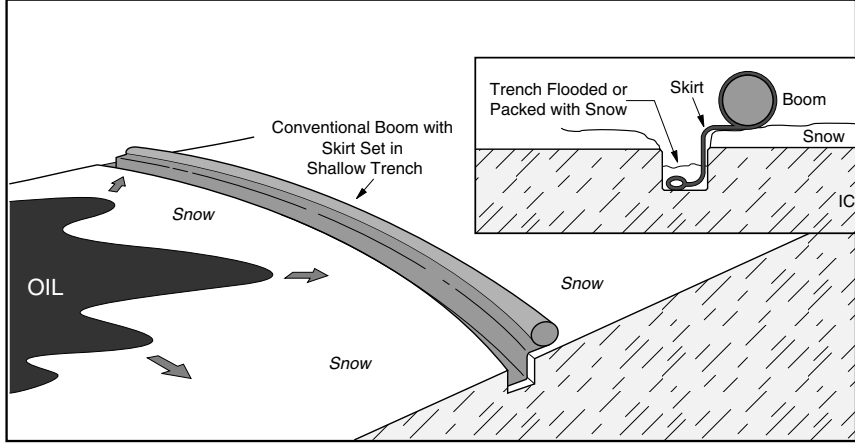
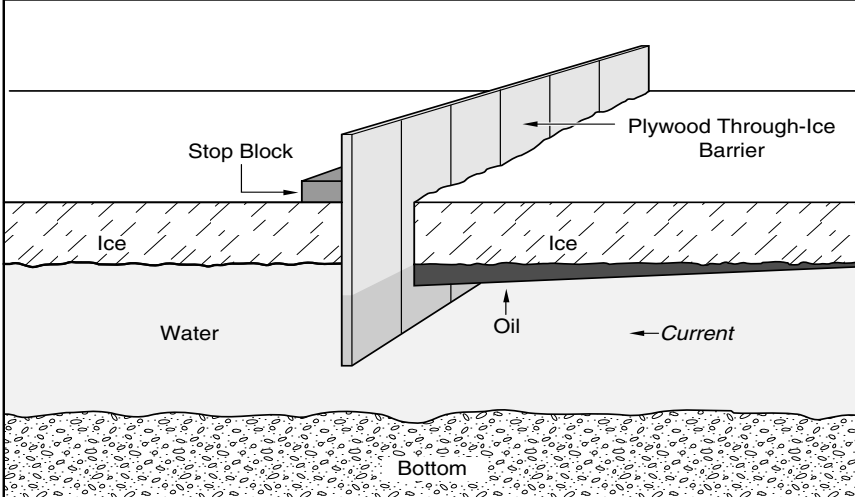
**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- Check ice thickness for safe bearing capacity before working on ice. The ice must be sufficiently strong to support personnel and heavy equipment. See Tactic L-7 for realistic maximum operating limitations (RMOL) for ice thickness and temperature.
- If the ice is not thick enough, a Rolligon may be needed to pull the drag.

**CRITICAL POOLING DEPTH**




NOTE: All values given on these pages are for planning purposes only.

**1** Partial trenches or through-ice slots can be dug in the ice surface with a Ditch Witch to encourage oil flow to a collection point. (2) The skirt of a containment boom can be set in a shallow trench to provide additional containment. (3) Another approach is to insert a plywood or metal barrier in a slot so that the barrier freezes in place. This tactic can be used to divert under-ice oil to a recovery point.

For smaller volumes of oil on ice, small snow berms can be created to contain the oil, but only where ice is thick enough and/or grounded to prevent cracking, pooling, and forced migration of oil below the ice.

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**EQUIPMENT AND PERSONNEL**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Ditch Witch	ACS, APC, Norgasco	Trenching	1	2	3 hr	2 hr
Rube Witch w/Chain Saw	All	Trenching	3	6	1 hr	
Visqueen	All	Liner	≥50 ft	—	1 hr	
Boom	All	Liner	≥50 ft	—	1 hr	
ATVs	ACS, EOA, END, KRU, WOA	Snow berm construction	2	2	1 hr	2 hr
Plywood	All	Through-ice barrier	>1	—	2 hr	

**TOTAL STAFF FOR SETUP ≥4\***

\*The recovery crew will perform maintenance (see Tactic R-13).

**SUPPORT**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Fuel Truck	All	Fuel heavy equipment	1	Once per shift	1 hr	0.5 hr
Lube Truck	All	Provide fluids to heavy equipment	1	Once per shift	1 hr	0.5 hr
Mechanic Truck	All, except Balami	Support equipment	1	1	1 hr	0.5 hr
Light Plant	All	Illumination	≥1	2 for initial setup, and 1 to check and fuel occasionally	1 hr	0.5 hr
Tioga Heater	All	Equipment support	1	1 initial setup	1 hr	0.5 hr

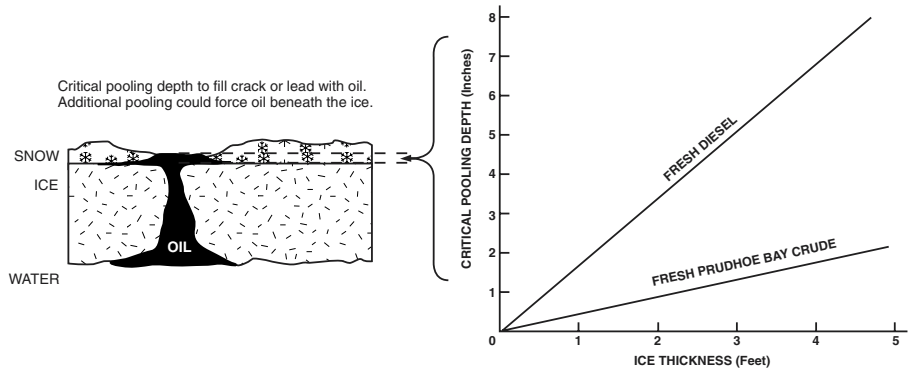
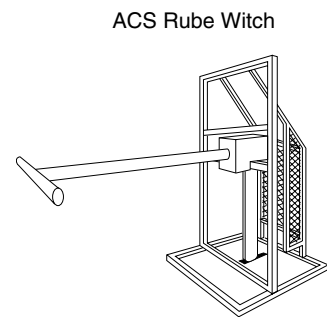
**CAPACITIES FOR PLANNING**

- A Ditch Witch with a 6-ft bar can cut approximately 100 ft of trench per hour through ice 6 ft deep. Cutting in frozen ground is much slower.

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- Check ice thickness for safe bearing capacity before working on ice. The ice must be sufficiently strong to support personnel and heavy equipment. See Tactic L-7 for realistic maximum operating limitations (RMOL) for ice thickness and temperature. Also, ensure ice can withstand extra load of oil and ice on the surface without either breaking the ice or forcing oil to migrate through existing cracks. Extreme care must be taken when positioning or operating any heavy equipment close to trenches or slots in the ice. Stresses in the ice for a given load can double under these situations. Ensure that oil that accumulates in an ice trench is continually removed. If allowed to build up to a thick layer, some oil may escape the ice slot.
- Use of the Rube Witch with chain saw is labor-intensive and therefore slower than a Ditch Witch.

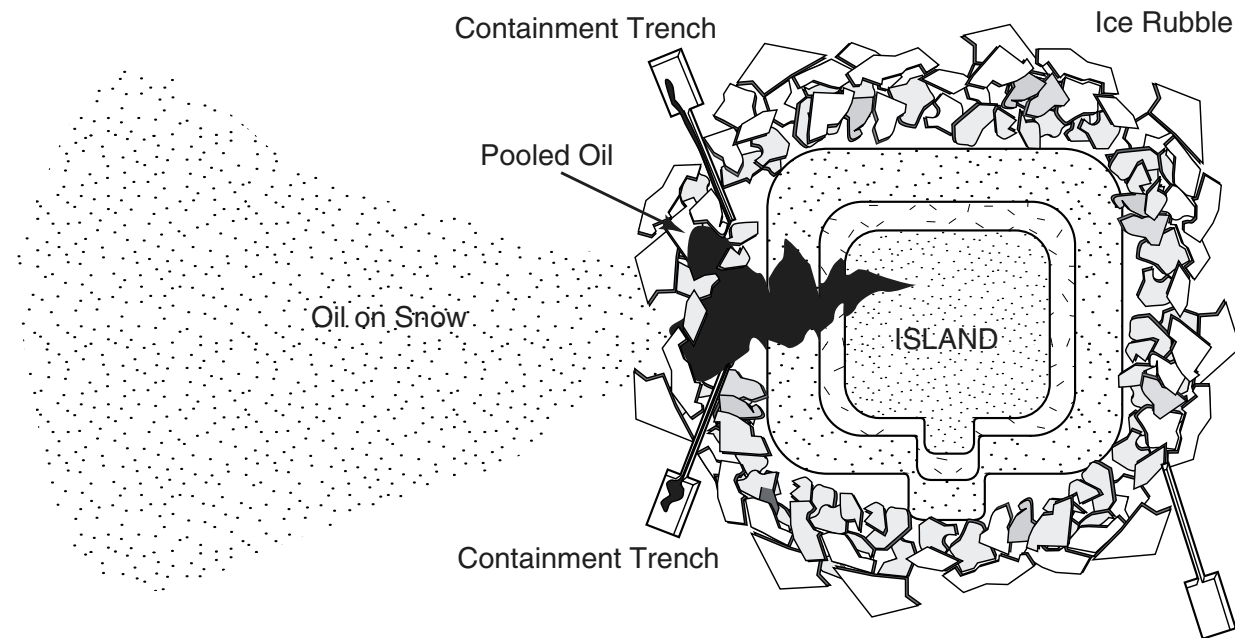
**CRITICAL POOLING DEPTH**

**NOTE:** All values given on these pages are for planning purposes only.

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Trenching can help recover oil from a blowout on an offshore island in winter when the sea ice is solid.

Gravel islands develop ice rubble fields around their perimeter, and a large volume of oil from a well blowout plume would fall either on the island or over the rubble field. Where oil is flowing away from an ice rubble pile adjacent to an island where a well is blowing out, it may be possible to dig an ice trench away from the island to encourage rivulets of oil to flow to a collection sump a safe distance away. Liners can be used in both the trench and sump.

Such an activity is attempted only if it is possible to work safely near the blowout plume.

**EQUIPMENT AND PERSONNEL**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Ditch Witch	APC, Norgasco	Trenching	1	1	3 hr	0.5 hr
or Rube Witch w/Chain Saw	All	Trenching	1	2	1 hr	0.5 hr
Backhoe	EOA, WOA, KRU, Peak, AIC, APC	Clear a trench area	1	1	2 hr	0.5 hr

**TOTAL STAFF** ≥2

**NOTE:** "Base Location" is storage location (may change seasonally); "Mobe Time" is time to get it out of storage, prepare it for operation, and make it ready to travel (concurrent for all equipment); "Deploy Time" is time to make it operational for its intended use at the spill site. These times do not include travel time from base to spill site, which may have multiple components (see Tactic L-3).



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**SUPPORT**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Semi and Trailer	EOA, WOA, KRU	Transport Ditch Witch	1	1 driver	1 hr	0
Light Plant	All	Illumination	≥1	2 for initial setup, and 1 to check and fuel occasionally	1 hr	0.5 hr
Tioga Heater	All	Heat	1	1 initial setup	1 hr	0.5 hr
Mechanic Truck	All, except Badami	Support equipment	1	1	1 hr	0.5 hr
Fuel Truck	All	Fuel heavy equipment	1	Once per shift	1 hr	0.5 hr
Lube Truck	All	Provide fluids to heavy equipment	1	Once per shift	1 hr	0.5 hr

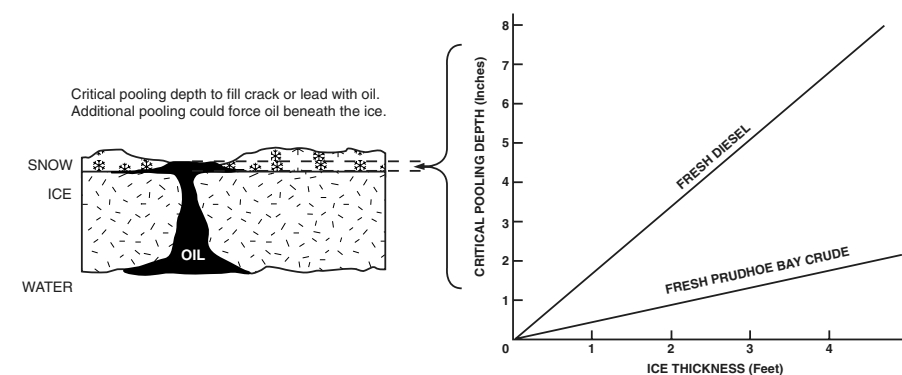
**CAPACITIES FOR PLANNING**

- A Ditch Witch with a 6-ft bar can cut approximately 100 ft of trench per hour through ice 6 ft deep. Cutting in frozen ground is much slower.

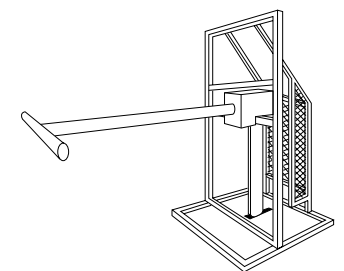
**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- Check ice thickness for safe bearing capacity before working on ice. The ice must be sufficiently strong to support personnel and heavy equipment. See Tactic L-7 for realistic maximum operating limitations (RMOL) for ice thickness and temperature. Also, ensure ice can withstand extra load of oil and ice on the surface without either breaking the ice or forcing oil to migrate through existing cracks. Extreme care must be taken when positioning or operating any heavy equipment close to trenches or slots in the ice. Stresses in the ice for a given load can double under these situations. Ensure that oil that accumulates in an ice trench is continually removed. If allowed to build up to a thick layer, some oil may escape the ice slot.
- Use of the Rube Witch with chain saw is labor-intensive and therefore slower than a Ditch Witch.
- Cut the trench only to a depth that will allow a collection area — not all the way through the ice.
- A backhoe may be required to clear an area for cutting of the containment trench.

**CRITICAL POOLING DEPTH**

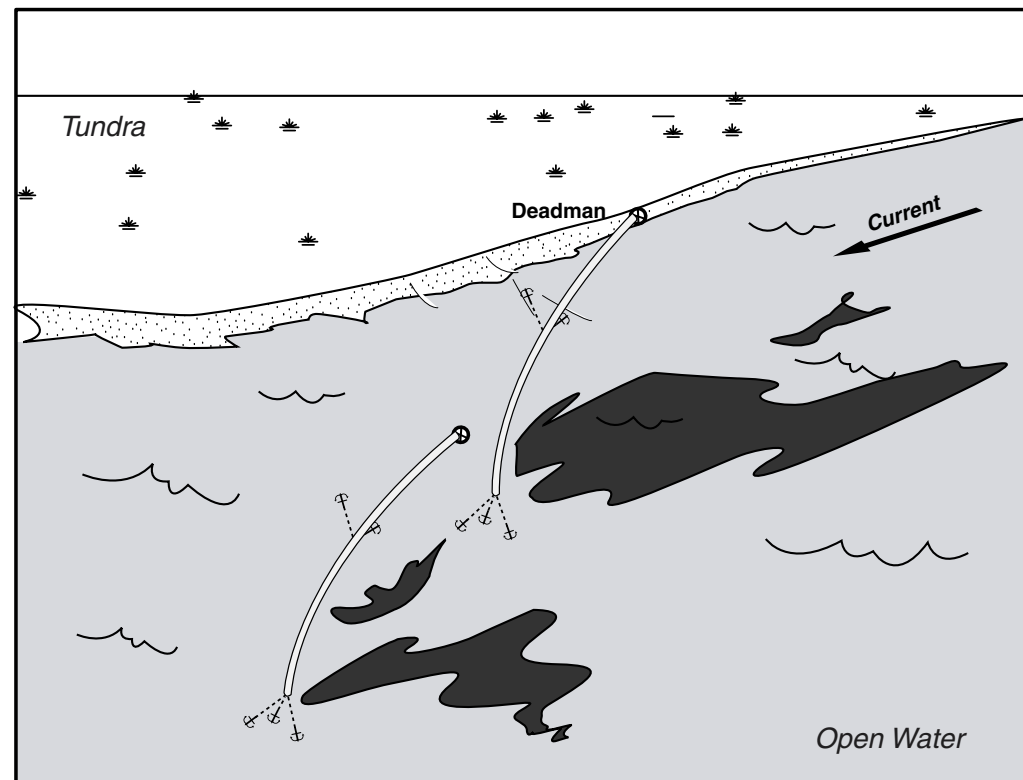


ACS Rube Witch



**NOTE:** All values given on these pages are for planning purposes only.

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Deflection booming is often used where the water current is greater than 1 knot or where exclusion boom does not protect the shoreline. Deflection booming diverts oil to locations that are less sensitive or more suitable for recovery.

Boom is anchored at one end at the shoreline, while the free end is held at an angle by an anchor system. Deflection boom is deployed at an angle to the current to reduce and divert surface flow. This allows the oil to move along the boom and eliminates vortexes and entrainment. Anchoring is usually placed every 50 feet depending on the current. Anchoring distance will vary depending on current.

Cascading deflection boom involves two or more lengths of boom ranging from 100 feet to 500 feet placed in a cascading formation in the water. The lead boom deflects the slick, and subsequent booms placed downstream of the lead boom continue the deflection process until the slick is directed to the desired area.



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**EQUIPMENT AND PERSONNEL**

- To determine the approximate length of boom required, multiply 1.5 times the length of shoreline to be protected. Select vessels and booms according to area, water depth restrictions, and function (see Tactic L-6). Specific personnel requirements depend on the length and type of boom and the nature of the area.

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Work Boat	All	Deploy deflection boom	2	6	1 hr	3 hr
Boom	All	Deflection	Variable		1 hr	
Anchor System	All	Anchor boom	Variable	2	1 hr	
Onshore Anchors (e.g., deadmen)	All	Anchor boom	Variable	—	1 hr	

**TOTAL STAFF FOR SETUP**

**8**

**TOTAL STAFF TO SUSTAIN OPERATIONS**

**3 (AND 1 BOAT)**

**SUPPORT**

- Recovery systems are sometimes used in conjunction with deflection boom.

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Avgas Trailer	ACS, EOA, KRU, Badami	Airboat fuel	1	1 (initial)	1 hr	0.5 hr

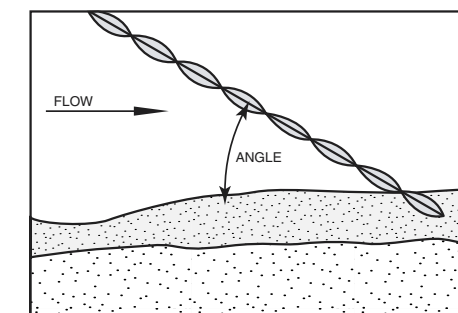
**CAPACITIES FOR PLANNING**

- One tactical unit can deploy and tend up to 8,000 ft of boom in a 12-hour shift along 2 miles of shoreline (assumes 10 working hours in a 12-hour shift).

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

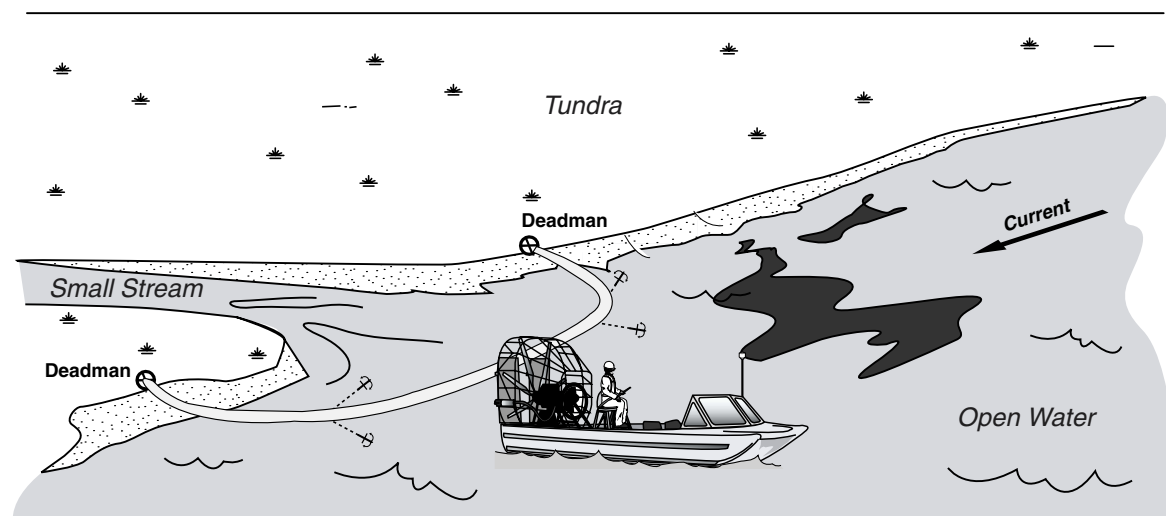
- The optimum angle of boom deployment depends on the current speed and the length and type of boom. The angle is smaller in strong currents than in weak currents and decreases as boom length increases. The more stable the boom is, the larger the optimum deployment angle is for a given current speed. Because deflection booms significantly reduce surface current, successive booms are deployed at increasingly larger angles.
- Don't assume 100% containment with one boom system.
- Readjust angles and widths between boom sections as current and wind change. Constantly monitor nearshore boom systems to prevent escape of oil.
- Approval from the Operations Section Chief is required for any vehicle tundra travel (off-road or off-pad), which must be in accordance with ACS' emergency tundra travel permit (See Tactic A-3). Any excavations in tundra or any tundra damage must be reported to the Operations Section Chief. All on-tundra activity must be documented and reported to the Planning Section for reporting to ensure permit compliance. Avoid archeological sites and biologically sensitive habitats. Travel across tundra with tracked vehicles, heavy equipment, and even foot traffic can seriously damage the vegetative mat, induce thermokarst, and cause structure disturbance. Using sheets of plywood as a traveling surface and minimizing trips with equipment greatly reduce disturbance of the tundra.

CURRENT (knots)	CURRENT (ft/second)	BOOM ANGLE RELATIVE TO CURRENT REQUIRED TO KEEP COMPONENT OF CURRENT <3/4 KNOT
1.5	2.5	30° to 42°
1.75	2.9	25° to 35°
2.0	3.4	22° to 30°
2.25	3.8	19° to 26°
2.5	4.2	17° to 24°
2.75	4.6	16° to 21°
3.0	5.0	15° to 19°

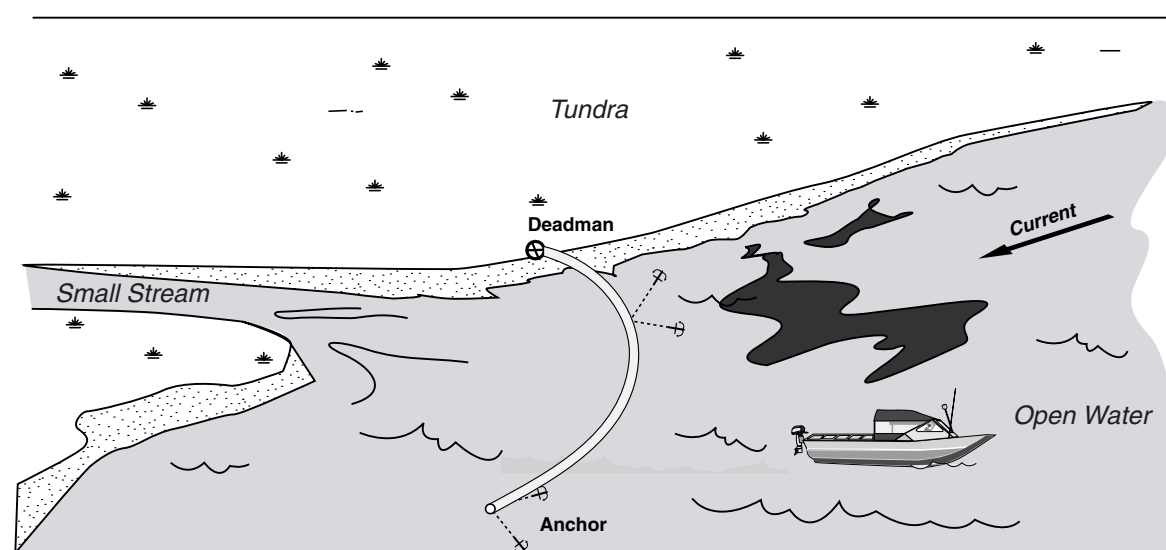




1



2



Boom is placed across small inlets and creek mouths identified as sensitive areas. Exclusion booming is used where currents are less than 3/4 knot and breaking waves are less than 0.5 foot in height. The boom is either (1) anchored from shore to shore across the mouths of streams or (2) at an angle to a shoreline to guide oil past the sensitive area. Crews with work boats deploy and tend boom along the shoreline in marshes and inlets.

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**EQUIPMENT AND PERSONNEL**

- To determine the approximate length of boom required, multiply 1.5 times the length of shoreline to be protected. Select vessels and booms according to area, water depth restrictions, and function (see Tactic L-6). Specific personnel requirements depend on the length and type of boom and the nature of the area.

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Work Boat	All	Deploy and tend boom	2	6	1 hr	3 hr
Boom	All	Deflection	Variable		1 hr	
Anchor System	All	Anchor boom	Variable		1 hr	

**TOTAL STAFF FOR SETUP**

**6**

**TOTAL STAFF TO SUSTAIN OPERATIONS**

**3 (AND 1 BOAT)**

**SUPPORT**

Recovery systems are sometimes used in conjunction with exclusion boom. Sorbent boom may be deployed parallel and inside exclusion boom.

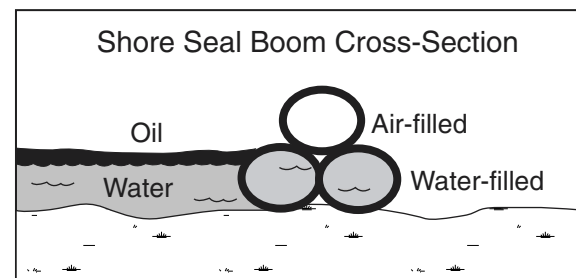
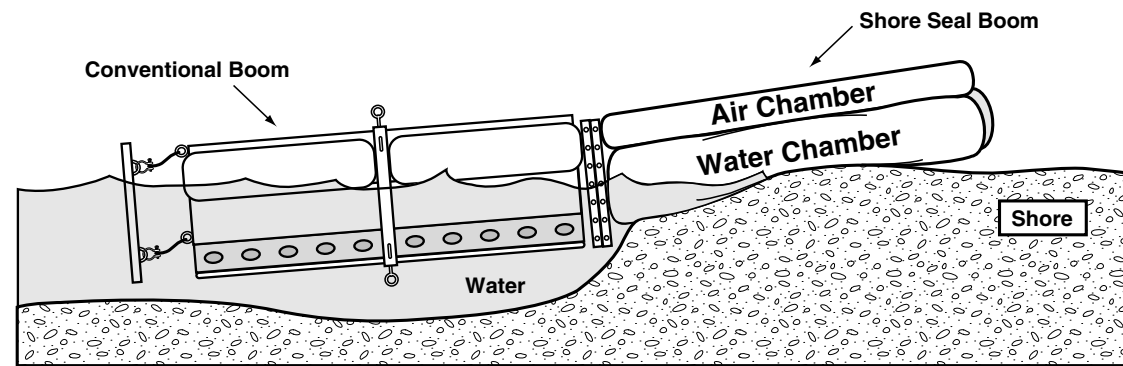
EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Avgas Trailer	ACS, KRU, EOA, Badami (300 gal)	Airboat fuel	1	1 initial	1 hr	0.5 hr

**CAPACITIES FOR PLANNING**

- One tactical unit can deploy and tend up to 4,000 ft of boom in a 12-hour shift along 2 miles of shoreline (assumes 10 working hours in a 12-hour shift).

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- Exclusion booming is effective if the water currents are less than 3/4 kt, breaking waves are less than 0.5 ft, and water depth is at least twice the boom depth in other than intertidal areas.
- A flexible curtain-type boom reacts more favorably to tidal level fluctuation than a rigid fence-type boom.
- Exclusion booming is most effective across small stream mouths or inlets. Other areas may be more sensitive and require protection, but ability to protect efficiently needs to be considered when determining exclusion booming areas.
- Don't assume 100% containment with one boom system.
- Readjust angles and widths between boom sections as current and wind change. Constantly monitor nearshore boom systems to prevent escape of oil.
- Approval from the Operations Section Chief is required for any vehicle tundra travel (off-road or off-pad), which must be in accordance with ACS' emergency tundra travel permit (See Tactic A-3). Any excavations in tundra or any tundra damage must be reported to the Operations Section Chief. All on-tundra activity must be documented and reported to the Planning Section for reporting to ensure permit compliance. Avoid archeological sites and biologically sensitive habitats. Travel across tundra with tracked vehicles, heavy equipment, and even foot traffic can seriously damage the vegetative mat, induce thermokarst, and cause structure disturbance. Using sheets of plywood as a traveling surface and minimizing trips with equipment greatly reduce disturbance of the tundra.



Shore Seal boom is bottom-founded and anchored at tideline and in very shallow water. Sorbent boom would be used at connections to prevent leaching.

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**EQUIPMENT AND PERSONNEL**

To determine the approximate length of Shore Seal boom required, multiply 1.1 times the length of shoreline to be protected. Select vessels and booms according to area, water depth restrictions, and function (see Tactic L-6).

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Shore Seal Boom	ACS, KRU, MPU	Oil exclusion	≥50 ft	4	1 hr	1.5 hr
Floating Pump and Blower	ACS, KRU, MPU	Shore Seal inflation	1		1 hr	
Work Boat	All	Boom placement	1		1 hr	
Anchor System	All	Anchor boom	Variable		1 hr	

**TOTAL STAFF FOR SETUP 4\***

\*Recovery crews will perform maintenance.

**SUPPORT**

Sorbents are used in conjunction with Shore Seal boom. Shovels or light excavating equipment help establish onshore anchors. Floats and chains are used in conjunction with offshore anchors.

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Avgas Trailer	ACS, EOA, KRU, Badami	Airboat fuel	1	1 initial	1 hr	0.5 hr

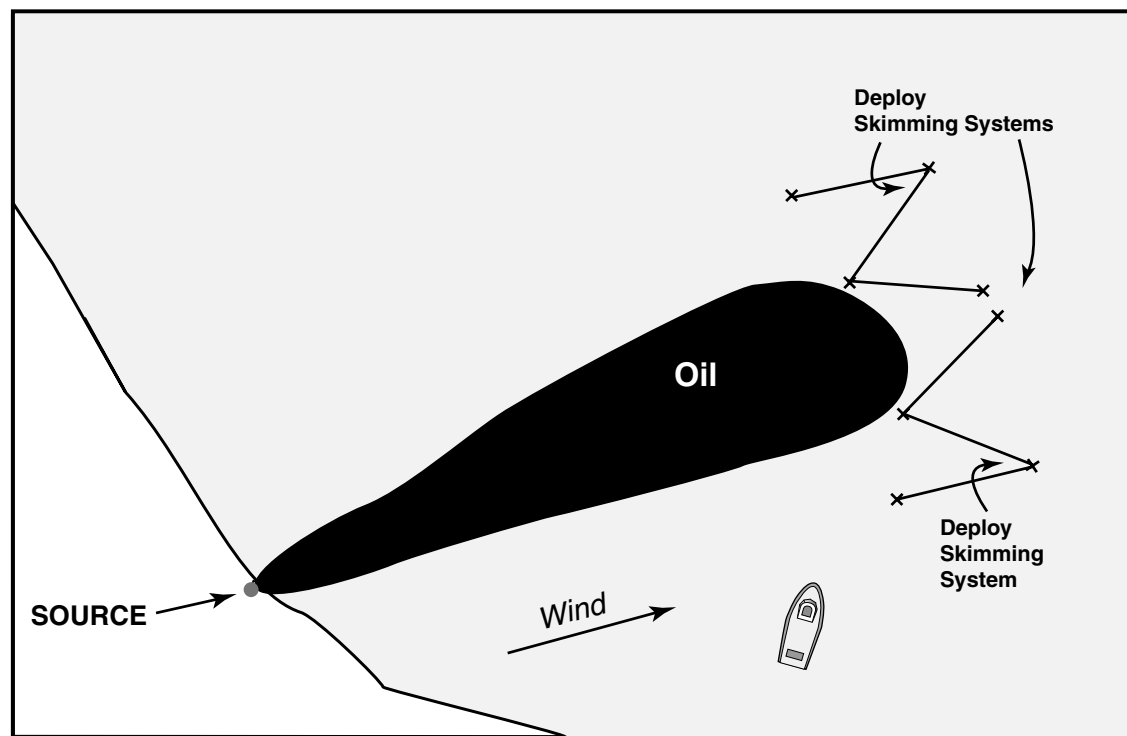
**CAPACITIES FOR PLANNING**

- One tactical unit can deploy and tend up to 4,000 ft of Shore Seal boom in a 12-hour shift along 2 miles of shoreline (assumes 10 working hours in a 12-hour shift).

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- Shore Seal boom uses water ballast so that it can float free in high tide and seal to the intertidal shore during low tide. Shore Seal booms also protect shoreline from wave events. Shore Seal boom will adjust to changing water levels.
- When the boom is grounded, the heavy water ballast seals the boom to the shoreline and prevents oil from moving along the intertidal zone.





Lengths of deflection boom are anchored in a “W” configuration. Boom sections up to 1,000 feet long are oriented at an angle to the wind and to each other. Oil encountering the center “V” of the boom becomes more concentrated at the downwind end of the configuration and is recovered with a positioned skimming system. Oil is collected from the pockets of the “V”s with a vessel with a skimmer and mini-barge.

See Tactic R-30 for boom configuration for subsea pipeline leak.



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**EQUIPMENT AND PERSONNEL**

- Initial deployment of a section of boom and setting of anchor points involve one boat with one operator and two crew members. Select vessels and boom according to area, water depth restrictions, and function (see Tactic L-6). Specific personnel requirements depend on the length and type of boom and the nature of the area.

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Boom	All	Spill deflection	≥300 ft	9 for setup 6 to maintain	1 hr	6 hr
Work Boat	All	Deploy and tend boom	3 for setup 2 to maintain		1 hr	
Anchor Systems	40-lb: All 66-lb: ACS	Anchor boom	Variable		1 hr	

**SUPPORT**

- An aircraft can track oil from above and coordinate the on-water task forces.

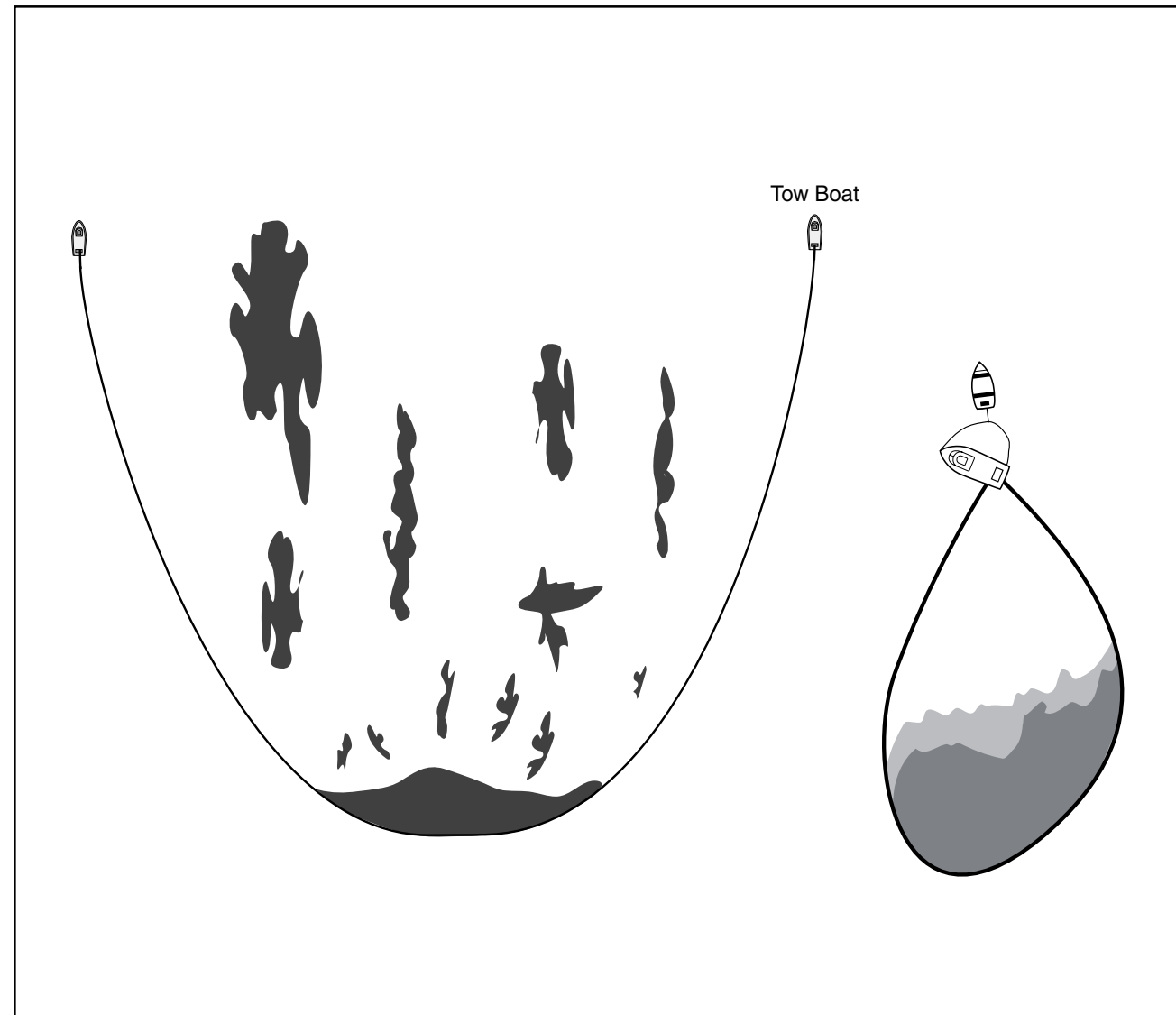
EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Avgas Trailer	ACS, EOA, KRU, Badami	Airboat fuel	1	1 (initial)	1 hr	0.5 hr
Mechanic Truck	All, except Badami	Support equipment	1	1	1 hr	0.5 hr
Fuel Truck	All	Fuel	1	Once per shift	1 hr	0.5 hr

**CAPACITIES FOR PLANNING**

- Swath width varies with currents, wind, and the total length of booms.

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- Check anchor points frequently and reposition them as necessary by lifting the crown line.
- Change the length and position of the boom as oil conditions change.
- See recovery tactics for information on recovery equipment used with this tactic.



The cotainment boom has a swath width of up to 1,000 feet. The two tow boats pull up to 3,000 feet of boom. This method can be used for temporary containment and/or transport of oil.

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**EQUIPMENT AND PERSONNEL**

- Select vessels and booms according to area, water depth restrictions, and function (see Tactic L-6).

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Work Boat	West Dock, Oliktok, Northstar	Tow boom	2	6	1 hr	2 hr
Boom	All	Containment	Variable	—	1 hr	

**TOTAL STAFF 6**

**SUPPORT**

- An aircraft tracks the oil from above and coordinates the on-water task forces (preferably twin-engined aircraft or single-engined aircraft on floats).

**CAPACITIES FOR PLANNING**

- Swath width varies with currents, wind, and the total length of boom.

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- See recovery tactis for information on recovery equipment used with this tactic.

NOTE: All values given on these pages are for planning purposes only.



Snow provides a good sorbent material for oil and forms a mulch-like mixture that is easily removed with heavy equipment such as front-end loaders and dump trucks.

A Challenger and front-end loader pile the snow, and then a loader loads it into dump trucks on nearby gravel pads, roads, or ice roads. After a loader has filled a truck, the truck hauls the oiled snow off for disposal. A Bobcat would replace the front-end loader in hard-to-reach or tight quarters.

If nearby heavily oiled snow needs blending to ease recovery, then loaders and dozers may be used to push the lightly oiled snow into the heavily oiled snow area. Mixing the lightly oiled snow with the heavily oiled snow would generate less waste.

**EQUIPMENT AND PERSONNEL**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Challenger Dozer	KRU, EOA, Alpine, Western Geophysical, and Caribou Construction*	Piling oiled snow	1	1	1 hr	0.5 hr
Front-End Loader	All	Transfer oiled snow into dump trucks	1	1	1 hr	0.5 hr
Dump Trucks	KRU, WOA, EOA, Peak, AIC, VECO	Transfer oiled snow to disposal site	≥2**	≥2	1 hr	0.5 hr

**TOTAL STAFF ≥5 (includes 1 spotter that works with equipment to protect tundra)**

\*Alpine and Western Geo have 1 Challenger with blade and Caribou Construction has 6. Western Geo's and Caribou's Challengers are normally out with seismic crews in winter and will not be available for at least 24 hours.

\*\*Number of dump trucks depends on distance to disposal area.

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NOTE: All values given on these pages are for planning purposes only.

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**SUPPORT**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Semi and Trailer	EOA, WOA, KRU	Transport Challenger	1	1 driver	1 hr	0
Tioga Heaters	All	Heat	≥1	1 initial setup	1 hr	0.5 hr
Fuel Truck	All	Fuel heavy equipment	1	Once per shift	1 hr	0.5 hr
Mechanic Truck	All, except Badami	Support heavy equipment	1	1	1 hr	0.5 hr
Lube Truck	All	Provide fluids to heavy equipment	1	Once per shift	1 hr	0.5 hr
Light Plants	All	Illumination	≥1	2 for initial setup, and 1 to check and fuel occasionally.	1 hr	0.5 hr

**CAPACITIES FOR PLANNING**

- One cubic yard of lightly oiled snow contains 0.3 bbl of oil. Snowmelters can typically handle 30 cubic yd of lightly oiled snow per hour.
- A Challenger can build an initial snow berm around the largest tank spill on the Slope within an hour.
- A front-end loader with an 8-cubic-yd snow bucket can move 500 cubic yd of snow in an hour and fill a dump truck in 10 minutes. Dump trucks immediately available from owner companies on the North Slope:

KRU:	5 trucks	10 to 25 yd <sup>3</sup> capacity each
WOA:	2 trucks	10 yd <sup>3</sup> capacity each
EOA:	2 trucks	18 and 20 yd <sup>3</sup> capacity each
APC @ KRU:	4 trucks	10 to 30 yd <sup>3</sup> capacity each
VECO:	2 trucks	30 yd <sup>3</sup> capacity each
Peak:	4 trucks	10 to 30 yd <sup>3</sup> capacity each
AIC:	21 belly dumps	48 yd <sup>3</sup> capacity each

- Following is an example of recovery of lightly oiled snow for one 20-cubic-yd dump truck, with 2 miles between load and unload points:

$$\text{Dump Truck Recovery Rate} = \frac{T_c}{L_t + T_t + U_t} = \frac{20 \text{ cubic yd}}{0.17 \text{ hr} + \left(\frac{2 \text{ mi} * 2}{35 \text{ mph}}\right) + 0.08 \text{ hr}} = 55 \text{ cubic yd/hr (or 16.5 bbl/hr)}$$

Where:

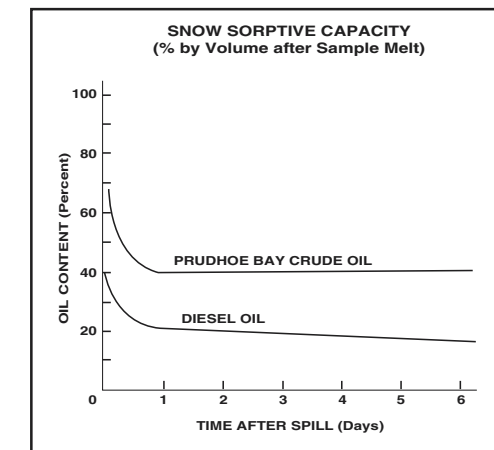
$T_c$  = Truck Capacity

$L_t$  = Load Time (10 min or 0.17 hr)

$U_t$  = Unload Time (5 min or 0.08 hr)

$T_t$  = Travel Time  $\left(\frac{\text{miles to disposal} * 2}{35 \text{ mph}}\right)$

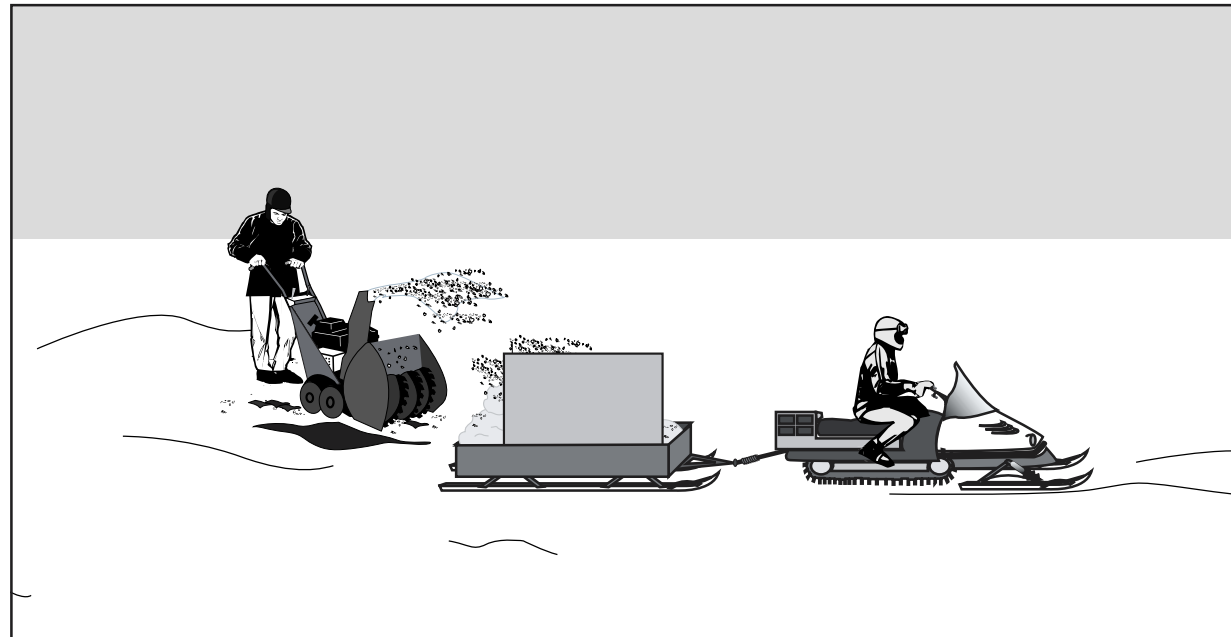
The ratio of dump trucks to loaders to fill trucks without delay =  $1 / (0.17 \text{ hr} + 0.114 \text{ hr} + 0.08 \text{ hr})$   
 =  $1 / (0.364) = 2.2$  trucks per loader.



**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- This tactic is limited to oiled snow with no free liquids. Collect the top 6 inches of snow into piles for recovery. If snow cover is light or the snow will be used for blending, collect all of the snow.
- When working with equipment around or near flowlines, add a spotter to each front-end loader and Challenger.
- An ice road allows dump trucks into recovery sites on tundra.

NOTE: All values given on these pages are for planning purposes only.



Lightly misted snow can be cleaned up using a snow blower and snow machine with trailer. The snow can be cleaned up either directly off of the ground or by using brooms to sweep oiled snow into windrows for more effective recovery. Once the trailer is full, it is transferred by snow machine to a front-end loader on the gravel pad or road. The loader then transfers the snow into dump trucks on the pad or road.

**EQUIPMENT AND PERSONNEL**

- Crew size consists of two sweepers, a snow blower operator, and a snow machine operator. The number of crews will not exceed the number of snow blowers available.

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Shovels and Brooms	All	Recovery	Variable	—	0.5 hr	0.5 hr
Snow Machine with Trailer	All	Transfer	3	3	1 hr	
Snow Blower	ACS, Badami, Northstar	Recovery	1	1	1 hr	
Front-End Loader (8-cubic-yd)	All	Transfer	1	1	1 hr	
Dump Truck	KRU, EOA, WOA, VECO, Peak, AIC	Transfer	≥2	≥2	1 hr	

**TOTAL STAFF ≥7**

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**SUPPORT**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Light Plant	All	Illumination	≥1	2 for initial setup, and 1 to check and fuel occasionally	1 hr	0.5 hr
Heater	All	Heat	1	1 for initial setup	1 hr	
Fuel Trailer	All (except END)	Fuel	1	1 for initial setup	1 hr	

**CAPACITIES FOR PLANNING**

- See Tactic R-1 for capacities of dump trucks available on the North Slope.
- Snow machine trailers have a 1/2 cubic yd capacity.
- Snowmelters typically handle 30 cubic yd of lightly oiled now per hour, providing 30 bbl/hr of water, plus the oil.

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- This tactic is limited to oiled snow with no free liquids.
- The number of crews on the spill depends on the size of the spill.
- Lightly oiled snow may be blended with heavily oiled snow in the area to enhance recovery.
- Warm-up areas are needed for responders.

NOTE: All values given on these pages are for planning purposes only.





Broom and shovel the oiled snow into piles. The piles are then transferred with shovels to garbage cans, totes, or similar containers. Once a container is full, it is transferred with a snow machine or Argo to a front-end loader near the gravel pad or road. The loader then transfers the snow into dump trucks on the pad or road.

**EQUIPMENT AND PERSONNEL**

- Crew size consists of six shovelers, and the number of crews varies with the size of the spill.

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Shovels and Brooms	All	Recovery	6	6	0.5 hr	0.5 hr
Snow Machine or Argo	Snow machines: All Argos: ACS, WOA, KRU	Transfer	3	3	1 hr	
Front-End Loader (8-cubic-yd)	All	Transfer	1	1	1 hr	
Dump Truck	KRU, EOA, WOA, Peak, AIC, VECO	Transfer	1	1	1 hr	

**TOTAL STAFF 11 (10 if dump-truck operator loads truck)**

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**NOTE:** "Base Location" is storage location (may change seasonally); "Mobe Time" is time to get it out of storage, prepare it for operation, and make it ready to travel (concurrent for all equipment); "Deploy Time" is time to make it operational for its intended use at the spill site. These times do not include travel time from base to spill site, which may have multiple components (see Tactic L-3).

**SUPPORT**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Light Plant	All	Illumination	≥1	2 for initial setup, and 1 to check and fuel occasionally.	1 hr	0.5 hr
Heater	All	Heat	1	1 initial	1 hr	0.5 hr
Fuel Truck	All	Fuel heavy equipment	1	Once per shift	1 hr	0.5 hr

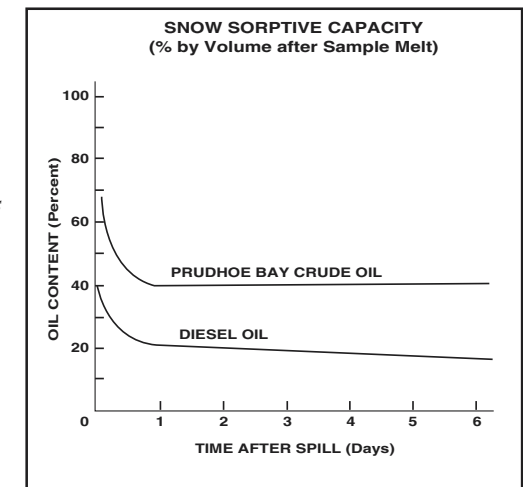
**CAPACITIES FOR PLANNING**

- See Tactic R-1 for capacities of dump trucks available on the North Slope.
- With 6 workers, this technique can recover 30 cubic yd of snow in 10 hours (10 hours worked in a 12-hour shift), depending on weather and terrain. In cold weather a typical 12-hr work shift provides 8 labor hours from a shoveler. Because lightly oiled snow contains 0.3 bbl of oil per cubic yd of snow, one crew of 6 can recover 9 bbl of oil in 10 hours, or 0.9 bbl/hr oil.

$$30 \text{ cubic yd snow} \times \frac{1 \text{ cubic yd water}}{10 \text{ cubic yards snow}} = 3 \text{ cubic yd liquids}$$

$$3 \text{ cubic yd liquids} \times \frac{27 \text{ cubic ft}}{1 \text{ cubic yd}} \times \frac{1 \text{ bbl}}{5.6 \text{ cubic ft}} = 14.5 \text{ bbl liquids}$$

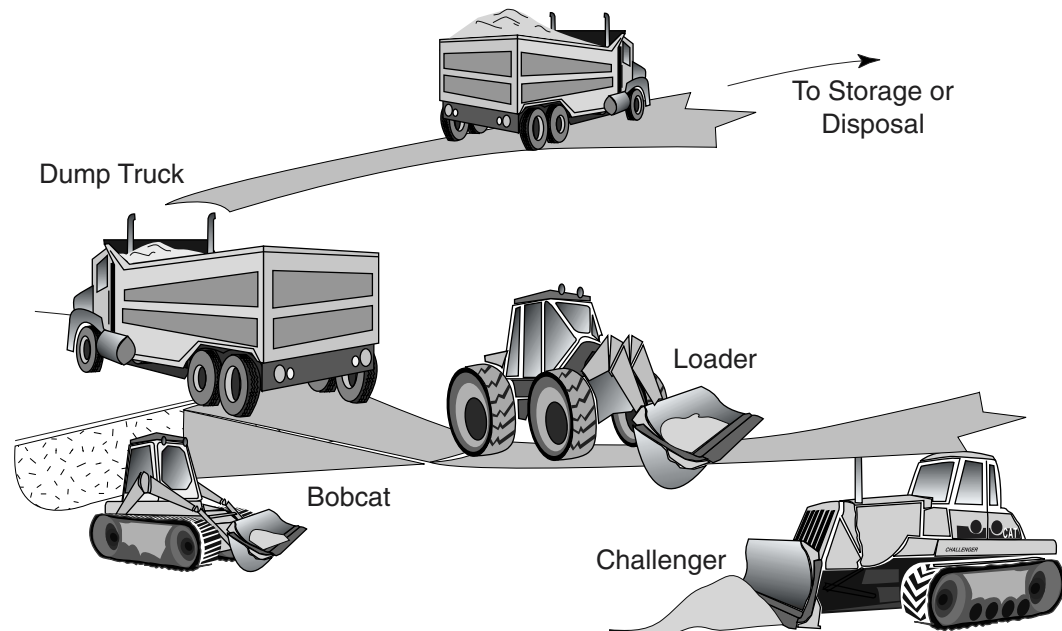
$$\frac{30 \text{ cubic yd snow}}{14.5 \text{ bbl liquids}} \approx 2 \text{ cubic yd snow per bbl of liquids}$$



**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- This tactic is limited to oiled snow with no free liquids.
- When working with equipment around or near flowlines, add a spotter to each front-end loader and Challenger.
- Manual recovery is the preferred technique when working in tight areas, when the ground is too rough for equipment, or there is insufficient snow cover for equipment.
- The number of crews on the spill depends on the size of the spill.
- The lightly oiled snow may be blended with heavily oiled snow in the area.
- Snowmelters typically handle 30 cubic yd of lightly oiled snow per hour, providing 30 bbl/hr of water, plus the oil.
- Warm-up areas are needed for responders.

NOTE: All values given on these pages are for planning purposes only.



Snow provides a good sorbent material for oil and forms a mulch-like mixture that is easily removed with heavy equipment such as front-end loaders and dump trucks. A Bobcat replaces the front-end loader in hard-to-reach or tight quarters.

Access the oiled snow with dozers and loaders, pile the snow with the dozers, and then load it into dump trucks located on nearby gravel pads, roads, or ice roads. After a front-end loader has filled a truck, the truck hauls the oiled snow off for disposal, typically to snowmelters in lined pits. If heavily oiled snow needs blending to ease recovery, loaders and dozers push nearby lightly oiled snow into the heavily oiled snow area for recovery. Clean snow can also be used for blending.

Oil in areas inaccessible by vacuum trucks or heavy equipment is recovered with sorbents and manual labor. The sorbents are collected in totes, garbage cans, or bags and transferred with snow machine, Argos, or pickup truck to a front-end loader, which transfer the waste into a dump truck for removal and disposal. Sorbents must be placed in oily waste bags and then put in an oily waste dumpster.

**EQUIPMENT AND PERSONNEL**

- A dump truck requires one operator. Personnel numbers deploying and collecting sorbents vary with the size and configuration of the spill. Personnel typically work in pairs for sorbent deployment and recovery.

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Challenger Dozer	KRU, EOA, Alpine, Western Geophysical, and Caribou Construction*	Piling oiled snow	1	1	1 hr	0.5 hr
Front-End Loader	All	Transfer oiled snow into dump trucks	1	1	1 hr	
Bobcat	ACS, EOA, KRU	Transfer oiled snow to loaders	1	1	1 hr	
Dump Trucks	KRU, WOA, EOA, Peak, AIC	Transfer oiled snow to disposal site	2	2	1 hr	
Snowmelters	EOA, APC	Melt snow	2	8	2 hr	
Sorbents	All	Recovery	Variable	Variable	0.5 hr	

**TOTAL STAFF 11 (includes 1 spotter that works with equipment to protect tundra)**

\*Alpine and Western Geo have 1 Challenger with blade and Caribou Construction has 6. Western Geo's and Caribou's Challengers are normally out with seismic crews in winter and will not be available for at least 24 hours.

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**SUPPORT**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Semi and Trailer	EOA, WOA, KRU	Transport Challenger	1	1 driver	1 hr	0
Tioga Heaters	All	Support heavy equipment	≥1	1 initial setup	1 hr	0.5 hr
Fuel Truck	All	Fuel heavy equipment	1	Once per shift	1 hr	0.5 hr
Mechanic Truck	All, except Badami	Support equipment	1	1	1 hr	0.5 hr
Lube Truck	All	Provide fluids to heavy equipment	1	Once per shift	1 hr	0.5 hr
Light Plant	All	Illumination	Variable	2 for initial setup, and 1 to check and fuel occasionally.	1 hr	0.5 hr

**CAPACITIES FOR PLANNING**

- A front-end loader with an 8-cubic-yd snow bucket can fill a dump truck in 10 minutes and move 500 cubic yd of snow per hour. The dump trucks available on the Slope typically have 10-, 20-, or 25-cubic-yd capacity. Because the front-end loaders fill dump trucks as fast as they pull into position, dump trucks are the bottleneck.
- Heavily oiled snow may contain up to 100 gal of oil per cubic yd at 3.7 gal of oil per cubic ft of snow. A snowmelter at 70 bbl/hr of resulting oil can handle approximately 30 cubic yd of heavily oiled snow per hour.
- One cubic yard of oil-saturated snow contains up to 2.4 bbl of oil.
- See Tactic R-1 for capacities of dump trucks available on the North Slope.
- Following is an example of recovery of oiled snow for one 20-cubic-yd dump unit:

$$Dump\ Truck\ Recovery = \frac{T_c}{L_t + T_t + U_t} = \frac{20\ cubic\ yd}{0.17\ hr + \left(\frac{2\ mi * 2}{35\ mph}\right) + 0.08\ hr} = 55\ cubic\ yd/hr$$

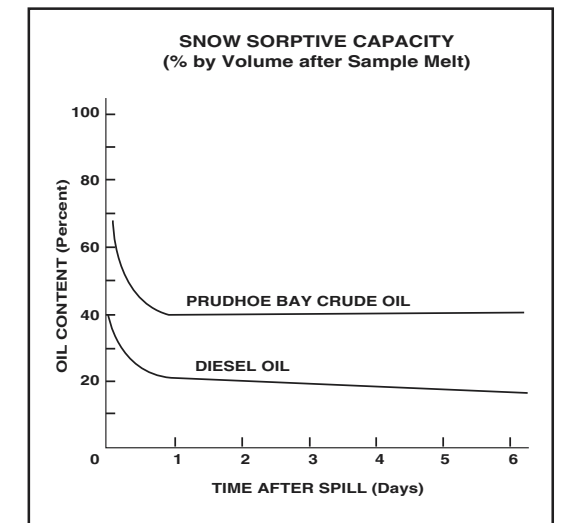
Example:  $T_c = Truck\ Capacity$

$L_t = Load\ Time\ (10\ min\ or\ 0.17\ hr)$       $T_t = Travel\ Time\ \left(\frac{miles\ to\ disposal * 2}{35\ mph}\right)$

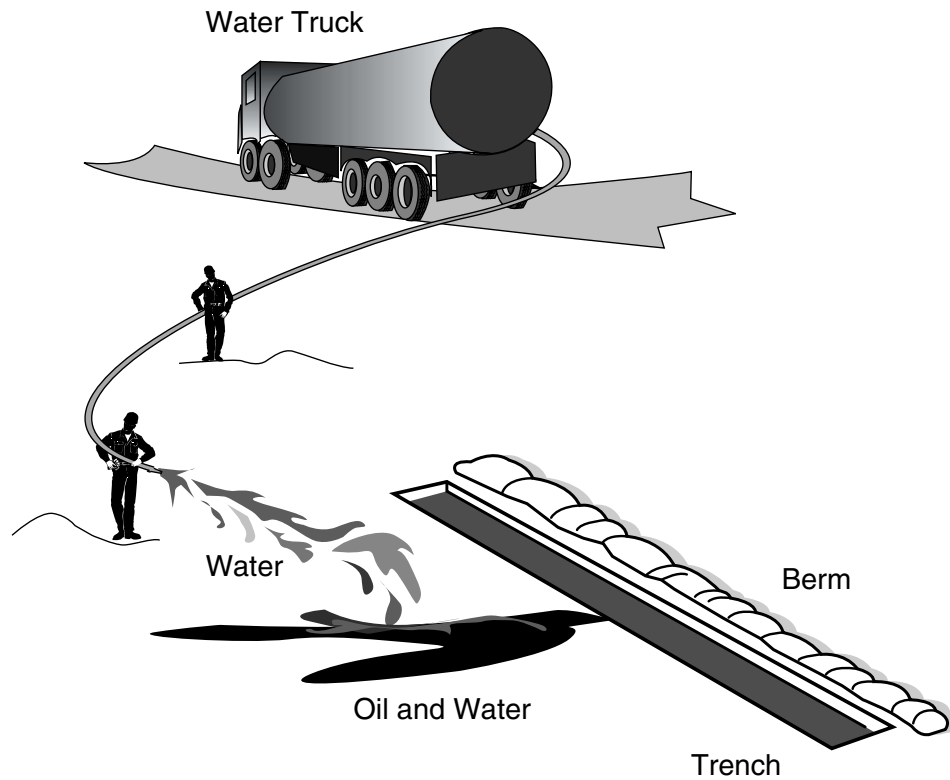
$U_t = Unload\ Time\ (5\ min\ or\ 0.08\ hr)$

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

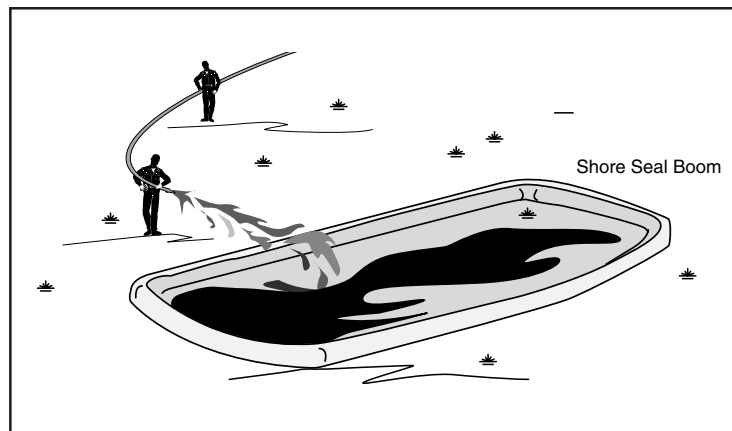
- This tactic is limited to oiled snow with no free liquids. Otherwise, lined or leak-proof dump trucks may be used.
- If the oiled snow is too saturated for handling, blend lightly oiled snow or clean snow with it, or use Tactic R-6.
- If delivery of snow exceeds snowmelter capacity, the snow can be contained in lined pits until it is processed. Existing lined pits, upright tanks, or dry ponds can be used, when available, to store snow; otherwise temporary lined pits can be constructed as necessary.
- If the dump trucks cannot access the oiled area, build an ice road to keep the loaders from traveling too far.
- After removal of free oil, oiled snow, and after flushing, contain and monitor the area until breakup. Insulate ice roads or ice berms to provide containment during breakup, when the oil can be removed with direct suction, portable skimmers, or burning.



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**FLOATING OIL WITHIN SHORE SEAL BOOM**



In spring or fall, flushing is used to concentrate oil into pits or trenches, where the oil is collected with direct suction using a Manta Ray skimmer head, sorbents, or a portable skimming system. The pits or trenches are constructed by cutting slots in ice, utilizing natural depressions, digging into tundra or gravel with a backhoe or Bobcat, or by augmenting a depression or pit with sandbags and Shore Seal boom (see Tactic C-4). Shore Seal boom is particularly effective when frozen in place. Constructed pits or trenches are lined with Visqueen or similar plastic sheeting.

The water source for the flushing unit is either a water truck or an auger hole in the ice of a nearby lake. Flushing usually occurs after pooled areas and contaminated snow have been removed.

The flush should consist of high-volume, low-energy flushing with water less than 106°F. This is essentially a mop-up technique after the majority of oil and oiled snow has been removed.

See Tactic R-7 for recovery of concentrated oil.

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**EQUIPMENT AND PERSONNEL**

- The number of staff to deploy sandbags depends on the size of the constructed concentration area.

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Water Truck	All	Water source	1	2	2 hr	0.5 hr
Upright Tank (400 bbl)	KRU	Water source	1	2	2 hr	1 hr
Ice Auger	WOA, EOA, KRU, ACS, Endicott	Water source	1		1 hr	0
Trash Pump (2-inch)	All	Flushing of oil	1		1 hr	1 hr
Suction Hose (2-inch)	All	Flushing of oil	≥20 ft	—	2 hr	1 hr
Discharge Hose (3-inch)	All	Flushing of oil	≥50 ft	—	1 hr	1 hr

**TOTAL STAFF 2**

**SUPPORT**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Tioga Heater	All	Support heavy equipment	≥1	1 initial setup	1 hr	0.5 hr
Fuel Truck	All	Fuel heavy equipment	1	Once per shift	1 hr	0.5 hr
Mechanic Truck	All, except Badami	Support equipment	1	1	1 hr	0.5 hr
Lube Truck	All	Provide fluids to heavy equipment	1	Once per shift	1 hr	0.5 hr
Light Plant	All	Illumination	≥1	2 for initial setup, and 1 to check and fuel occasionally.	1 hr	0.5 hr

**CAPACITIES FOR PLANNING**

- 2-inch trash pump operates at 312 bbl/hr nameplate capacity.
- Recovery capacity depends on the nature of the spill, the size of the concentration area, and terrain features.
- For recovery rates from the pits or trenches, see recovery rates for portable skimmers and/or vacuum trucks.

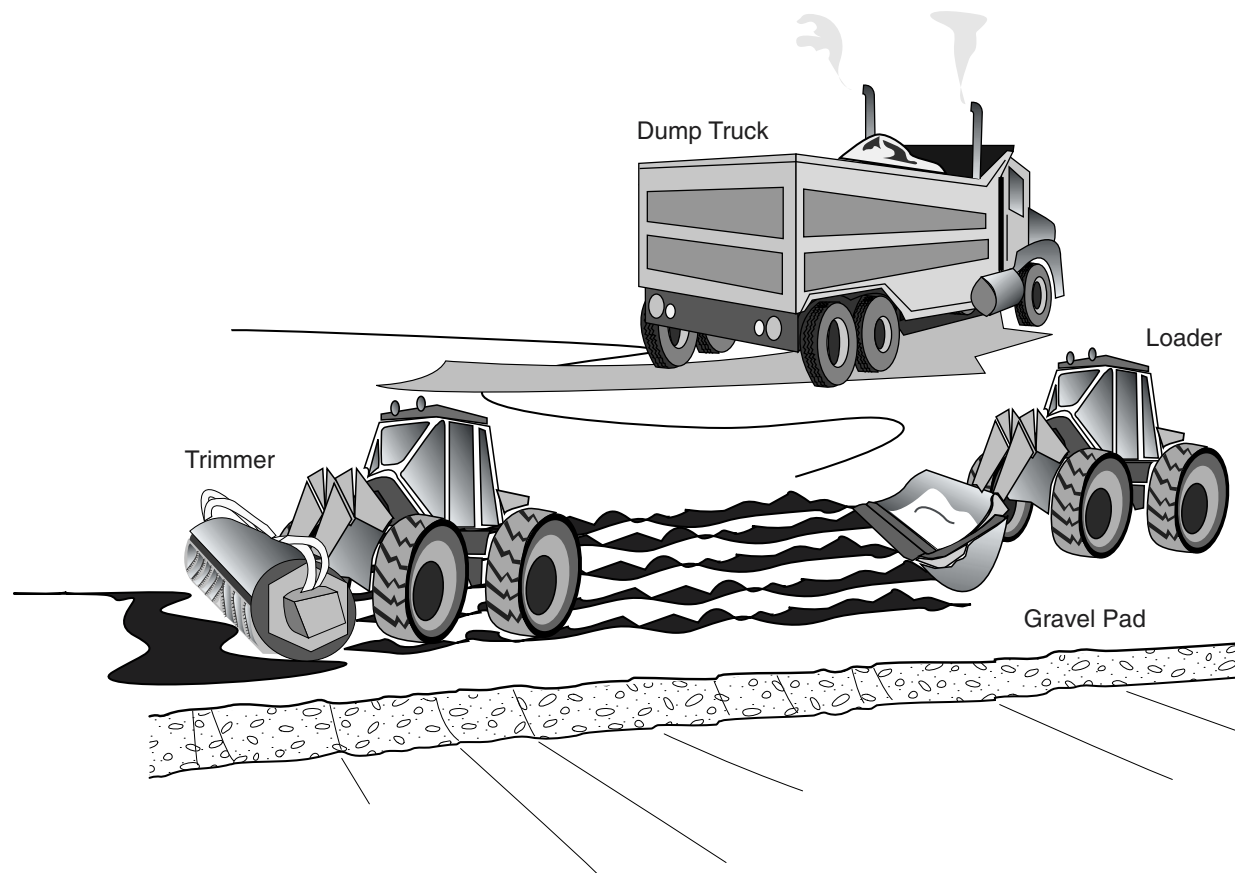
**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- Flushing is a viable option only when air temperatures permit. Warm water (no more than 106°F) is preferred for flushing.
- Flushing works on oil contained on and in the surface of tundra, gravel, and ice, and is particularly effective on ice. The tundra can be damaged if it thaws; don't flush the same area more than 2 or 3 times and don't suck the tundra dry. Also, stay off the tundra that's being flushed.
- Personnel or small equipment should traverse the tundra on plywood sheets.
- Approval from the Operations Section Chief is required for any vehicle tundra travel (off-road or off-pad), which must be in accordance with ACS' emergency tundra travel permit (See Tactic A-3). Any excavations in tundra or any tundra damage must be reported to the Operations Section Chief. All on-tundra activity must be documented and reported to the Planning Section for reporting to ensure permit compliance. Avoid archeological sites and biologically sensitive habitats. Travel across tundra with tracked vehicles, heavy equipment, and even foot traffic can seriously damage the vegetative mat, induce thermokarst, and cause structure disturbance. Using sheets of plywood as a traveling surface and minimizing trips with equipment greatly reduce disturbance of the tundra.

*NOTE: All values given on these pages are for planning purposes only.*

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A trimmer is used to recover oil embedded in the surface of a frozen pad or ice. A trimmer uses a rotary blade system to chop and collect the surface material at varying depths. The worked-over material is collected with a front-end loader and transferred to a dump truck.

A scratcher is used to break up frozen gravel or ice in areas where a trimmer cannot reach. A scratcher is a fork attachment for a front-end loader which can reach areas in tight quarters. A Super Sucker may also be used to remove a thin top layer.

Where the embedded oil is not recovered, the area is stabilized and the perimeter bermed and sealed, and monitored until breakup. Breakup is accelerated in the contained area by placing a layer of black Visqueen over it. The Visqueen is lifted as necessary, and the pools of oil removed with direct suction, portable skimmers, or burning.

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**EQUIPMENT AND PERSONNEL**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Trimmer (loader-mounted, 10 ft wide)	APC, Peak	Recovery of frozen surface material	1	1	2 hr	0.5 hr
or Trimmer (Bobcat-mounted, 2 ft wide)	ACS, KRU	Recovery of frozen surface material	1	1	1 hr	0.5 hr
or Front-End Loader w/Scratcher and Bucket	All	Transfer oiled snow into dump trucks	1	1	1 hr	0.5 hr
or Backhoe	EOA, WOA, KRU, Peak, AIC, APC	Recovery of frozen surface material	1	1	2 hr	0.5 hr
or Super Sucker	Peak, APC, Veco	Recovery of frozen surface material	1	2	1 hr	0.5 hr
Dump Trucks	WOA, EOA, KRU, Peak, AIC	Transfer oiled snow to disposal site	≥2	≥2	1 hr	0.5 hr

**TOTAL STAFF ≥4**

**SUPPORT**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Semi and Trailer	EOA, WOA, KRU	Transport heavy equipment	1	1 driver	1 hr	0
Tioga Heaters	All	Support heavy equipment	≥1	1 initial setup	1 hr	0.5 hr
Fuel Truck	All	Fuel heavy equipment	1	Once per shift	1 hr	0.5 hr
Mechanic Truck	All, except Badami	Support equipment	1	1	1 hr	0.5 hr
Lube Truck	All	Provide fluids to heavy equipment	1	Once per shift	1 hr	0.5 hr
Light Plants	All	Illumination	≥1	2 for initial setup, and 1 to check and fuel occasionally.	1 hr	0.5 hr

**CAPACITIES FOR PLANNING**

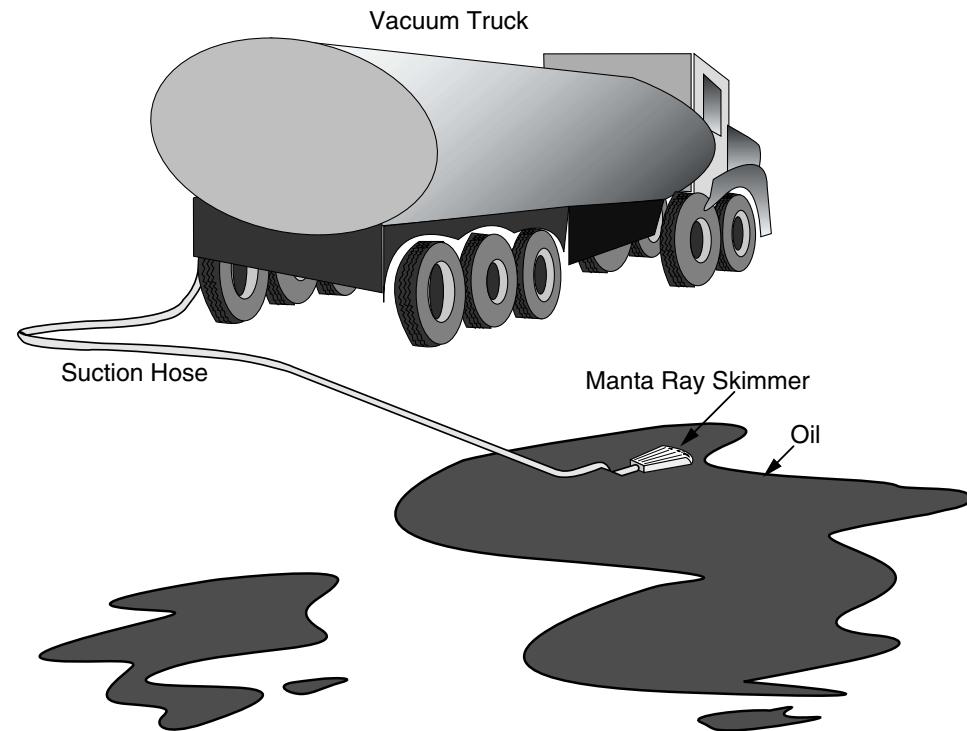
- A front-end loader with an 8-cubic-yd snow bucket can fill a dump truck in 10 minutes. The average dump truck available on the Slope has a 20-cubic-yd capacity.
- See Tactic R-1 for capacities of dump trucks available on the North Slope.
- One cubic yard of oiled gravel contains 0.125 bbl of oil.
- A Super Sucker uses an 8-inch hose and can recover 14 cubic yd of gravel in one hour. The storage capacity of a Super Sucker is 65 bbl or 14 cubic yd. A Super Sucker can also be reduced to 6-inch, 4-inch, or 2-inch hose, and "Ys" allow the use of more than one hose.
- The speed of a trimmer operation depends on many variables, including depth of contamination, hardness of surface, and size of trimmer.

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- A trimmer is preferred over a backhoe to remove frozen gravel. When gravel is loose enough, a backhoe or front-end loader may be used.
- Removal of oil embedded in tundra can be achieved by removing the tundra or burning it out with weed burners. Alternatively, the tundra can be contained and monitored until breakup when oil melts out, allowing recovery with direct suction, portable skimmers, or burning.
- A civil work permit from the operator is required for work on a pad.

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For spills off pad or road, a vacuum truck can effectively reach out 200 feet. If the oil is pooled on water, a Manta Ray skimmer head is attached to the hose extending from the vacuum truck. The hose or skimmer head is placed in the pooled oil for recovery. SRT staff man the hose or skimmer head and move it to other pooled areas as necessary. A Super Sucker can also be used for direct suction.

DOP pumps or 4-inch trash pumps can also be used for this task since they can move oil more than 200 feet, and could either pump the pooled oil into vacuum trucks on a pad/road, into holding tanks, or into the slop oil tank at a nearby production facility.

Free oil can be recovered from any pooled area including natural depressions, barriers, constructed trenches, or containment dikes.

**EQUIPMENT AND PERSONNEL**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Vacuum Truck	All	Direct suction	1	2	1 hr	0.5 hr
or DOP Pump w/Power Pack	ACS	Direct suction	1	2	1 hr	0.5 hr
or Trash Pump (4-inch)	ACS, EOA, WOA	Direct suction	1	2	1 hr	0.5 hr
Suction Hose (4-inch)	ACS, WOA	Transfer	≥20 ft	2 for setup	2 hr	0
Discharge Hose (4-inch)	ACS, WOA, KRU	Transfer	≥50 ft	—	1 hr	0
Manta Ray Skimmer Head (optional)	WOA, EOA, KRU, ACS,MPU	Direct suction	1	—	0.5 hr	0
Upright Tank (400 bbl)	KRU	Store fluids	1	1 initial	2 hr	1 hr

**TOTAL STAFF ≥3**

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**SUPPORT**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Tioga Heater	All	Support heavy equipment	≥1	1 initial setup	1 hr	0.5 hr
Fuel Truck	All	Fuel heavy equipment	1	Once per shift	1 hr	0.5 hr
Mechanic Truck	All, except Badami	Support heavy equipment	1	1	1 hr	0.5 hr
Lube Truck	All	Provide fluids to heavy equipment	1	Once per shift	1 hr	0.5 hr
Light Plant	All	Illumination	≥1	2 for initial setup, and 1 to check and fuel occasionally.	1 hr	0.5 hr

**RECOVERY CAPACITIES FOR PLANNING**

PUMP CATEGORY	MANUFACTURER'S NAMEPLATE CAPACITY (BBL/HR)	ACS DISCHARGE HOSE TEST (9/97) WITH 4" TRASH PUMP AND 2,000' OF 6" DISCHARGE HOSE
Gorman Rupp 4" Trash Pump	1,074	690
DOP 250 Pump	628	N/A
Manta Ray	34	N/A

- The typical suction rate for liquids by a vacuum truck is 200 bbl/hr in the summer and 150 bbl/hr in the winter. The typical suction rate for pooled diesel remains at 200 bbl/hr year round. (Vacuum truck recovery rate is reduced to about 34 bbl/hr if a Manta Ray skimmer is used.)
- Vacuum truck recovery of pooled oil with one unit equals:

$$Time = \left( \frac{\text{miles to disposal} * 2}{35 \text{ mph}} \right) + 2 \left( \frac{T_c}{S_r} \right) \quad ORR = \left( \frac{\text{Vac Truck Capacity}}{\text{Time}} \right)$$

$$T_c = \text{Vac Truck Capacity (bbl)}$$

$$S_r = \text{Suction Rate} = 150 \text{ bbl/hr of oil in winter; } 200 \text{ bbl/hr of oil in summer (and for diesel)}$$

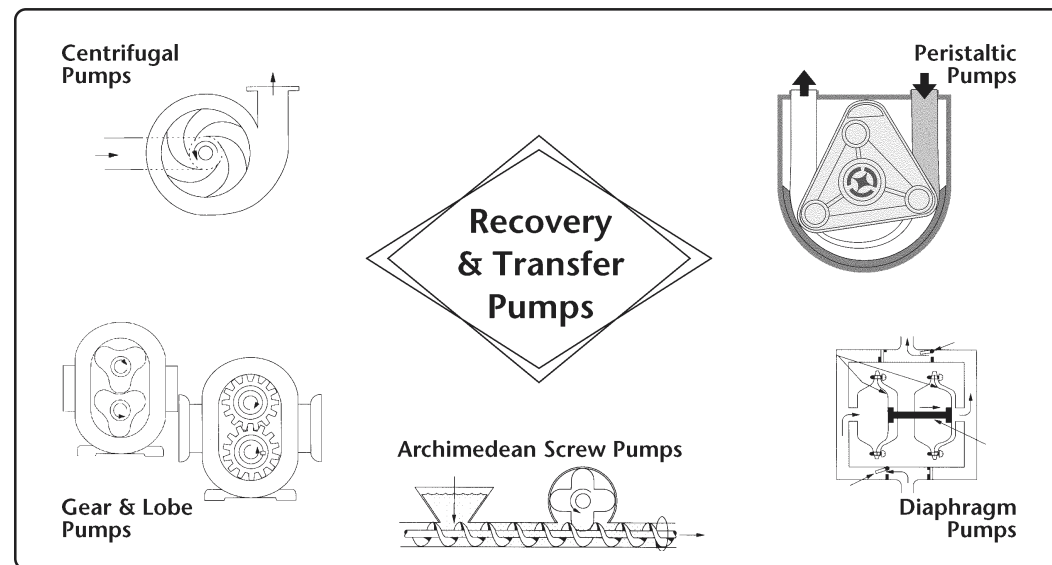
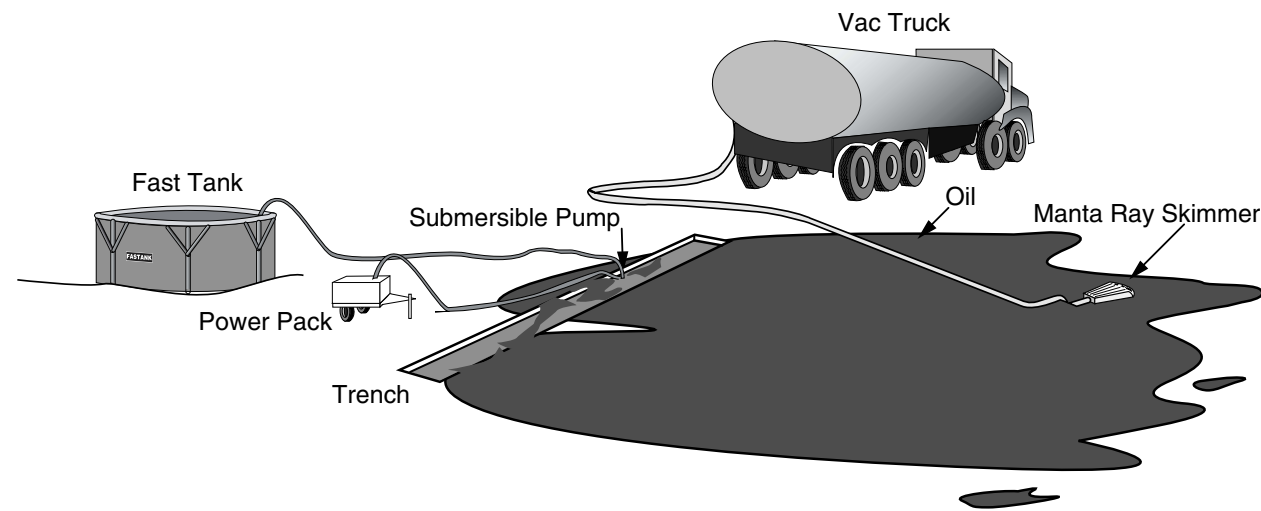
$$\text{Example of ORR for a 300 bbl vac truck: } ORR = \left( \frac{300 \text{ bbl}}{4.6 \text{ hr}} \right) = 65 \text{ bph}$$

$$T = \left( \frac{10 \text{ mi} * 2}{35 \text{ mph}} \right) + 2 \left( \frac{300 \text{ bbl}}{150 \text{ bph}} \right) = 4.6 \text{ hr}$$

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- Vacuum trucks provide efficient spill recovery, unless vehicle access is prohibited or not possible, the spill is unpumpable (highly viscous, cold or weathered), the spill is in a thin layer, or debris will clog the recovery line.
- Identify the disposal facility to be used before calling out a vacuum truck.
- Viscous liquids accessible within 200 ft by a vacuum truck are recovered with direct suction of that vacuum truck. Access could be made available to areas in the winter with ice roads. Pooled areas could be in natural depressions or in constructed trenches.
- Vacuum trucks can access pooled diesel up to 400 ft away from the truck.
- Use of Manta Ray skimmers with vacuum trucks decreases recovery capacity.
- Super Suckers are available to remove liquids with solids that vacuum trucks cannot handle. See Tactic R-5 for more details.
- With a trash pump, the suction head must be completely submerged.
- Since a DOP pump is submersible, oil must be deep enough for effective pumping.
- The amount of oil will be estimated based on gauging by appropriate means (e.g., Coliwasa tube). Emulsion samples will be collected and analyzed for oil content.

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An excavated trench is used to intercept the flow of a spill or divert the flow around a sensitive area (see Tactic C-4). Dig the trench at right angles to the flow of the spill. The trench should be angled slightly downslope (in the direction of surface flow) to avoid excessive pooling in the trench.

Place excavated material on the downhill side of the trench. In areas with a low water table, line the sides and bottom of the trench with plastic sheeting or similar impermeable materials. Where the groundwater table is high, line the downhill side of the trench.

The trench can be flooded with water to inhibit spill penetration into sediments and to stimulate flow toward the recovery device in the trench or pit.

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**EQUIPMENT AND PERSONNEL**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Vacuum Truck	All	Recovery	1	2	1 hr	0.5 hr
DOP 250 Pump w/Power Pack	ACS	Recovery	1	2	1 hr	1 hr
Peristaltic Pump (2-inch)	ACS	Recovery	1	2	1 hr	
Trash Pump (3-inch)	All	Recovery	1	2	1 hr	
Diaphragm Pump (3-inch diesel)	All (ACS, MPU have diesel)	Recovery	1	2	1 hr	
TransVac	ACS, WOA	Recovery	1	2	2 hr	
Fastank or Fold-a-Tank	All	Storage	1	2 for setup	1 hr	
Suction Hose (2-inch)	All	Transfer	≥20 ft	—	2 hr	
Suction Hose (3-inch)	All	Transfer	≥20 ft	—	2 hr	
Discharge Hose (3-inch)	All	Transfer	≥50 ft	2 for setup	1 hr	

**TOTAL STAFF FOR SETUP** 4 (2 if only vacuum truck used)  
**TOTAL STAFF TO SUSTAIN OPERATIONS** 2

**SUPPORT**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Fuel Truck	All	Fuel heavy equipment	1	Once per shift	1 hr	0.5 hr
Mechanic Truck	All, except Badami	Support equipment	1	1	1 hr	0.5 hr
Light Plant	All	Illumination	≥1	2 for initial setup, and 1 to check and fuel occasionally	1 hr	0.5 hr
Semi and Trailer	EOA, WOA, KRU	Haul backhoe	1	1	1 hr	0

**RECOVERY CAPACITIES FOR PLANNING**

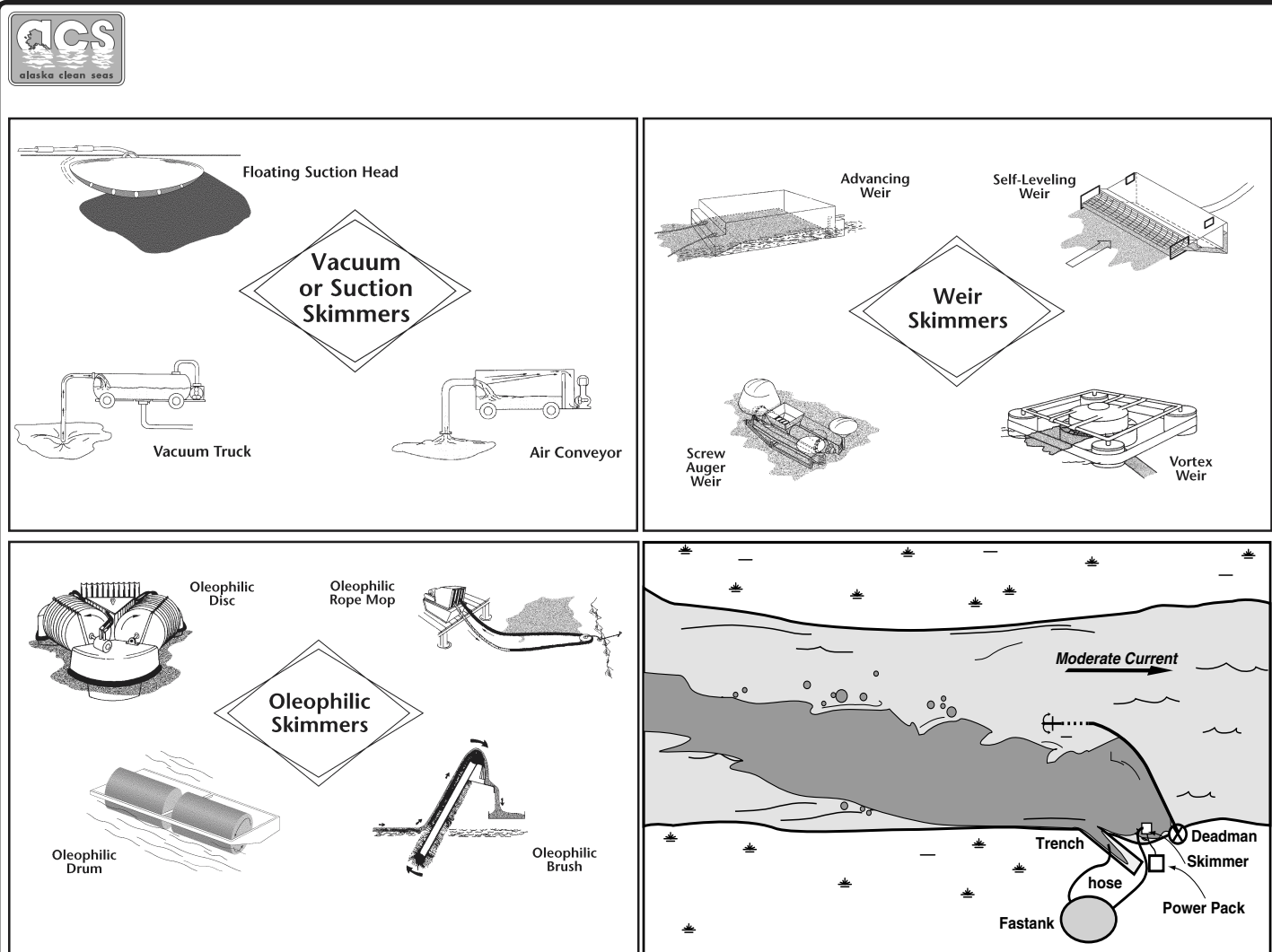
- Vacuum truck recovery rate: 200 bbl/hr, 150 bbl/hr winter (reduced to 34 bbl/hr if a Manta Ray skimmer is used with the vacuum truck). Remains at 200 bbl/hr year-round for pooled diesel.
- 3-inch trash pump: 485 bbl/hr nameplate
- 3-inch diaphragm pump: 114 bbl/hr nameplate
- DOP 250 pump: 628 bbl/hr nameplate
- 2-inch peristaltic pump: 163 bbl/hr nameplate

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- Disposal of construction material should be taken into account before using this tactic.
- Do not excavate an interception trench in an area where the excavation will cause more damage than the spill itself. Before excavating in tundra, check for the presence of groundwater or permafrost. Do not excavate into frost-laden (cemented) soils, since disruption of the permafrost could accelerate thermal erosion. The depth of the trench is limited by the depth of the permafrost.
- Approval from the Operations Section Chief is required for any vehicle tundra travel (off-road or off-pad), which must be in accordance with ACS' emergency tundra travel permit (See Tactic A-3). Any excavations in tundra or any tundra damage must be reported to the Operations Section Chief. All on-tundra activity must be documented and reported to the Planning Section for reporting to ensure permit compliance. Avoid archeological sites and biologically sensitive habitats. Travel across tundra with tracked vehicles, heavy equipment, and even foot traffic can seriously damage the vegetative mat, induce thermokarst, and cause structure disturbance. Using sheets of plywood as a traveling surface and minimizing trips with equipment greatly reduce disturbance of the tundra.
- On pads, check for buried pipe and/or cables prior to excavation. Obtain a civil work permit from the operator.
- The amount of oil will be estimated based on gauging by appropriate means (e.g., Coliwasa tube). Emulsion samples will be collected and analyzed for oil content.

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Portable skimmers are easily mobilized, transported, and deployed and can be used in most spill situations for recovery. They can be used to recover oil from containment areas such as the apex of a diversion boom or natural or artificial deadarms. The typical portable skimming system includes:

- Skimmer, pump, or skimmer/pump (with fuel) with power pack
- Hose (suction and discharge with fittings)
- Storage container (tank truck, storage bladder, barrels, Fastank, etc.)

Portable skimmers can be deployed on land or from small boats to recover oil contained on water.

A weir skimmer has a “lip” or weir at its intake over which liquids flow into the skimmer pump. The user can adjust the working depth of the weir. Weir skimmers will pick up any product on water, including emulsified and weathered product; however, they recover more water than oil in thin oil layers. (Avoid using a centrifugal pump since emulsification will occur; use a diaphragm pump instead.)

Oil adheres to an oleophilic skimmer, while water is repelled. These skimmers include rotating disks, rotating drums, or endless belts (including rope mop). Brush and rope mop skimmers can be effective in any oil thickness, while disk and drum skimmers require fresh oil. (Any pump can be used as long as the pump rate can be adjusted so as not to exceed the recovery rate of the skimmer.)

NOTE: All values given on these pages are for planning purposes only.



EQUIPMENT AND PERSONNEL

- Typically, portable skimmers require 2 persons for setup and 1 or 2 to operate.

SUPPORT

- Fold-A-Tank, bladders, Fastanks, Rolligon with tank, mini-barge possible.

CAPACITIES FOR PLANNING

BRAND	MANUFACTURER	TYPE	TYPE OF WATER	NAMEPLATE CAPACITY (bbl/hr)
Desmi 250 (Ocean)	Desmi	Weir/Screw Auger/Stationary	Open	628
Desmi 250 (Harbor)	Desmi	Weir/Screw Auger/Stationary	Protected	440
Destroil 150	Desmi	Weir/Screw Auger/Stationary	Open	157
Fasflow	Vikoma	Weir/Stationary	Protected	628
Foxtail V.A.B. 4-9	Normarine	Rope Mop/Suspended	Calm	249
Foxtail V.A.B. 2-9	Normarine	Rope Mop/Suspended	Calm	100
12K MKII	Vikoma	Disc/Stationary	Protected	75
Lori Side Collector	Lars Lundin	Chain Brush/Advancing	Open	271
Manta Ray	Slickbar	Weir/Suction/Stationary	Calm	34
MI-2	Morris	Disc/Stationary	Calm	7
MI-11/24	Morris	Disc/Stationary	Protected	28
MI-30	Morris	Disc/Stationary	Protected	142
MW-41	Containment Systems	Rope Mop/Stationary	Calm	10
Pedco 4'	Versatech	Weir/Stationary	Calm	223
RBS-10/1D	Aqua Guard	Drum/Brush	Calm	138
24 MD	Action Petroleum	Drum/Brush	Protected	100
SeaVac Heliskimmer	Kepner	Weir/Advancing	Protected	937
SLURP	Slickbar	Weir/Advancing	Calm	62
T-54	Hoyle	Disc/Stationary	Open	338
TDS-118	Elastec	Drum/Stationary	Calm	71
TDS-136	Elastec	Drum/Stationary	Calm	128
Transrec	Frank Mohn	Weir/Stationary	Protected	1,510
Walosep W4	Walosep	Weir/Vortex/Stationary	Calm	566
Walosep W1	Walosep	Weir/Vortex/Stationary	Calm	250
Z14E	CSI	Rope Mop/Stationary	Calm	14
Vikoma 30K	Vikoma	Disc	Calm	189

SKIMMER	EFFICIENCY MULTIPLIER	DERATED CAPACITY
Weir	0.2	Nameplate x 0.2
Oleophilic	0.2	Nameplate x 0.2
Vikoma 30K and Morris MI-30	N/A	10 bbl/hr
Foxtail	0.3	Nameplate pump capacity x 0.3
Lori LSC	0.8	217 bbl/hr

DEPLOYMENT CONSIDERATIONS AND LIMITATIONS

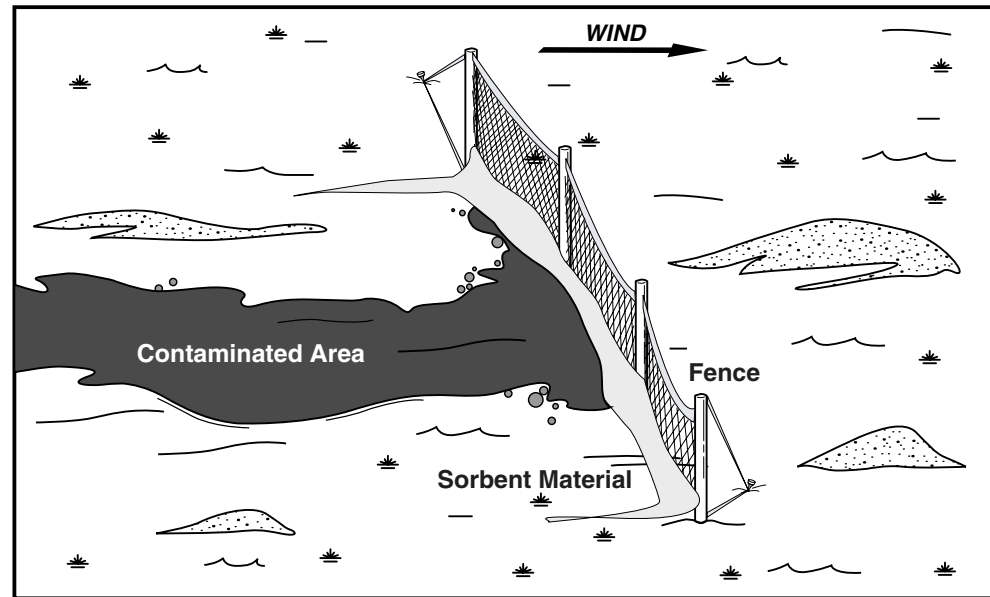
- Portable skimmers are initially used to pick up concentrations of oil, then are used in containment areas. The skimmers can be land-based or deployed from boats, and require power packs (a jon boat can be used for the power pack). When requesting a skimmer, always ask for the total skimming system.
- The only differences in equipment or techniques for road access or no road access are logistical in nature.
- Position the skimmer or pump with suction hose in area of heaviest spill concentration. Make sure intake end of hose is fitted with a screen. Use a diaphragm pump (not a centrifugal pump) with a weir skimmer.

NOTE: All values given on these pages are for planning purposes only.





**USE OF SORBENT FENCE**



Sorbent pads and rolls can be used onshore to remove small pools of liquid or oil layers on rocks or man-made structures. If the spill is at the shoreline, sorbent boom can be deployed and backed up with conventional containment boom as necessary to keep the oil from drifting away.

Sorbents can be used with Shore Seal boom or fences to create an oil absorbent barrier.

Place oiled sorbents in plastic bags marked "oily waste" for removal and disposal. Larger quantities can be placed in barrels or debris boxes. Minimize the amount of sorbent material used. Oily sorbent bags must be placed in oily waste dumpsters.

**EQUIPMENT AND PERSONNEL**

- Personnel requirements depend on the nature and area of oil contamination. Personnel typically work in pairs for sorbent deployment and recovery. Additional personnel are required for loaders, dump trucks, vessel, etc.

EQUIPMENT	BASE LOCATION
Sorbent Boom (8 inch)	All
Double Sorbent Boom (8 inch)	ACS
Sorbent Boom (4 inch)	All
Double Sorbent Boom (4 inch)	ACS
Sorbent Pads (18 x 18 inch)	All
Sorbent Sweeps (18 x 18 inch)	All
Sorbent Pads (36 x 36 inch)	All
Sorbent Roll (36 inch x 150 ft)	All
Pom Poms	ACS, WOA

**NOTE:** "Base Location" is storage location (may change seasonally); "Mobe Time" is time to get it out of storage, prepare it for operation, and make it ready to travel (concurrent for all equipment); "Deploy Time" is time to make it operational for its intended use at the spill site. These times do not include travel time from base to spill site, which may have multiple components (see Tactic L-3).

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**NOTE:** "Base Location" is storage location (may change seasonally); "Mobe Time" is time to get it out of storage, prepare it for operation, and make it ready to travel (concurrent for all equipment); "Deploy Time" is time to make it operational for its intended use at the spill site. These times do not include travel time from base to spill site, which may have multiple components (see Tactic L-3).

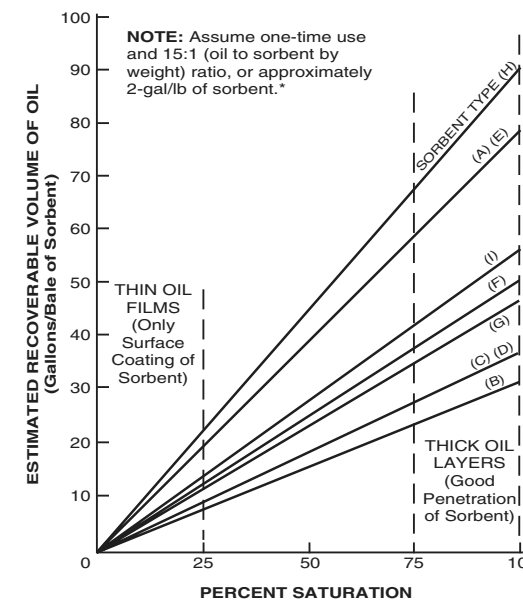
**SUPPORT**

- Support equipment may include heavy-duty plastic bags and liners, shovels, rakes, poles with gripping claws, pitchforks with wire mesh, and heavy equipment.

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Rakes	All	Recovery	≥1	1 per	1 hr	0
Pitchforks w/Screen	All	Recovery	≥1	1 per	1 hr	0
Shovels	All	Recovery	≥1	1 per	1 hr	0
Oily Waste Bags	All	Disposal	≥1 Box	—	1 hr	0
Fencing Material	ACS	Containment	Variable	2	1 hr	2 hr

**CAPACITIES FOR PLANNING**

**TYPICAL OIL HOLDING CAPACITIES**  
(For Fibrous Polypropylene Sorbents with Medium-Grade Crude Oil)



**COMMON SORBENT PACKAGING CHARACTERISTICS**  
(For Fibrous Polypropylene Products)

Sorbent Type	Dimensions	Units/Bale	Approximate Weight (Pounds/Bale)
(A) Rolls	3/8" x 36" x 150'	1 Roll	38
(B) Sweeps	3/8" x 19" x 100'	1 Sweep	15
(C) Sheets	3/16" x 18" x 18"	200 Sheets	18
(D) Sheets	3/8" x 18" x 18"	100 Sheets	18
(E) Sheets	3/8" x 36" x 36"	50 Sheets	38
(F) Particulate	—	1 Bag	25
(G) Pillows	5" x 14" x 25"	10 Pillows	23
(H) Booms	8" Diam. x 10' Long	4 Booms	44
(I) Double Booms	5" Diam. x 10' Long	4 Double Booms	28

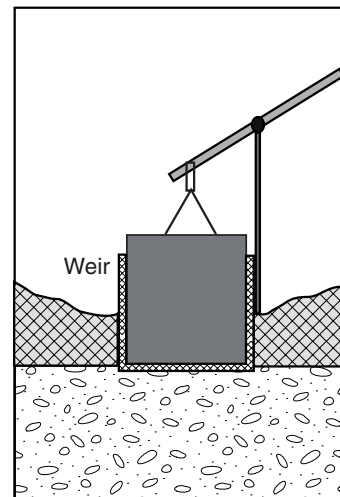
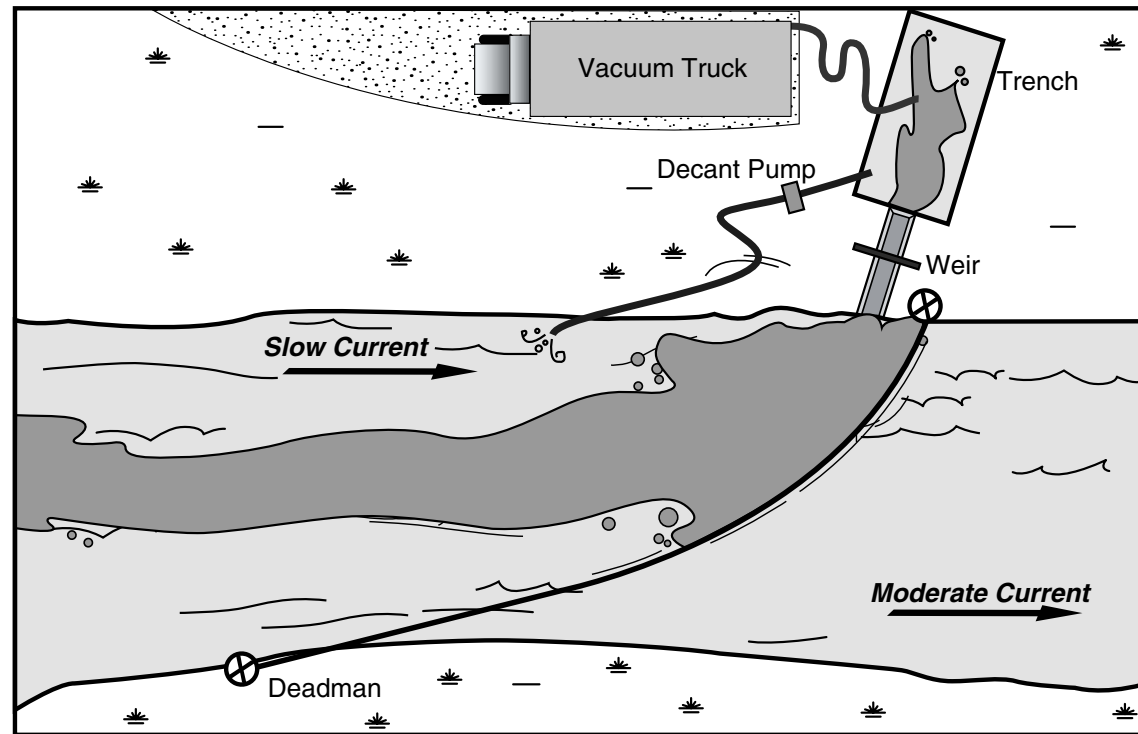
\* Ratio of oil weight to sorbent weight at saturation may be as low as 10:1 for light oils (e.g., avgas, JP-4, and gasoline) and greater than 20:1 for heavy lube oils and Bunker C.

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- Approval from the Operations Section Chief is required for any vehicle tundra travel (off-road or off-pad), which must be in accordance with ACS' emergency tundra travel permit (See Tactic A-3). Any excavations in tundra or any tundra damage must be reported to the Operations Section Chief. All on-tundra activity must be documented and reported to the Planning Section for reporting to ensure permit compliance. Avoid archeological sites and biologically sensitive habitats. Travel across tundra with tracked vehicles, heavy equipment, and even foot traffic can seriously damage the vegetative mat, induce thermokarst, and cause structure disturbance. Using sheets of plywood as a traveling surface and minimizing trips with equipment greatly reduce disturbance of the tundra.
- Use of sorbents should be minimized because of disposal problem.
- Sorbent wringers can be used to extend the life of sorbents.
- Do not use Pom Poms in conjunction with pumping.
- Sorbents work well on fresh crude, light refined oils, and thick sheens, but are only partially effective on solidified or weathered oil, highly viscous oil, very thin sheens, or emulsified oil. Sorbent products are ineffective unless all layers become saturated when in contact with spilled product. Use sorbent boom when overland flow is minor, and terrain has low slope or is wetland.
- Hay bales could be deployed in place of or in conjunction with sorbent material.

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The Fairchild gate weir provides a closable opening for an existing storage trench or deadarm along a river bank. Oil moving on the river is deflected so that it enters the recovery weir into the storage area, and the liquid flow can be controlled as necessary.

A 3- or 4-inch trash pump is used to decant fluids back upstream into the boomed area. This will allow for greater storage capacity in the trench area.

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**EQUIPMENT AND PERSONNEL**

- Select vessels and boom according to area, water depth restrictions, and function (see Tactic L-6). Specific personnel requirements depend on the length and type of boom and the nature of the area.
- Equipment and personnel required to set up and maintain boom are listed in the applicable containment tactic.

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Backhoe	EOA, WOA, KRU, Peak, APC, AIC	Trenching	1	1	2 hr	
Vacuum Truck (300-bbl)	All	Recovery	1	1	1 hr	
Fairchild Weir	KRU	Recovery	1	2	1 hr	
Trash Pump (4-inch)	ACS, WOA, EOA	Decanting	1	1	1 hr	
Suction Hose (4-inch)	ACS, WOA	Liquid transfer	≥20 ft	2 for setup	2 hr	
Discharge Hose (4-inch)	ACS, WOA, KRU	Liquid transfer	≥50 ft	—	1 hr	

**TOTAL STAFF FOR SETUP** 7

**TOTAL STAFF TO SUSTAIN OPERATIONS** 5

**SUPPORT**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Avgas Trailer	ACS, EOA, KRU, Badami	Airboat fuel	1	1 (initial)	1 hr	0.5 hr
Fuel Truck	All	Fuel heavy equipment	1	Once per shift	1 hr	0.5 hr
Mechanic Truck	All, except Badami	Support equipment	1	1	1 hr	0.5 hr
Lube Truck	All	Provide fluids to heavy equipment	1	Once per shift	1 hr	0.5 hr

**CAPACITIES FOR PLANNING**

- Gorman Rupp 4-inch trash pump = 1,074 bbl/hr nameplate
- The typical suction rate for liquids by a vacuum truck is 200 bbl/hr in the summer and 150 bbl/hr in the winter. The typical suction rate for pooled diesel remains at 200 bbl/hr year round. (Vacuum truck recovery rate is reduced to 34 bbl/hr if a Manta Ray skimmer is used.)
- For planning purposes, 80% of the liquid passing over the gate is oil and 20% is free water. The responder adjusts the moveable gate to maximize oil flow into the containment area and minimize water flow through the weir.

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

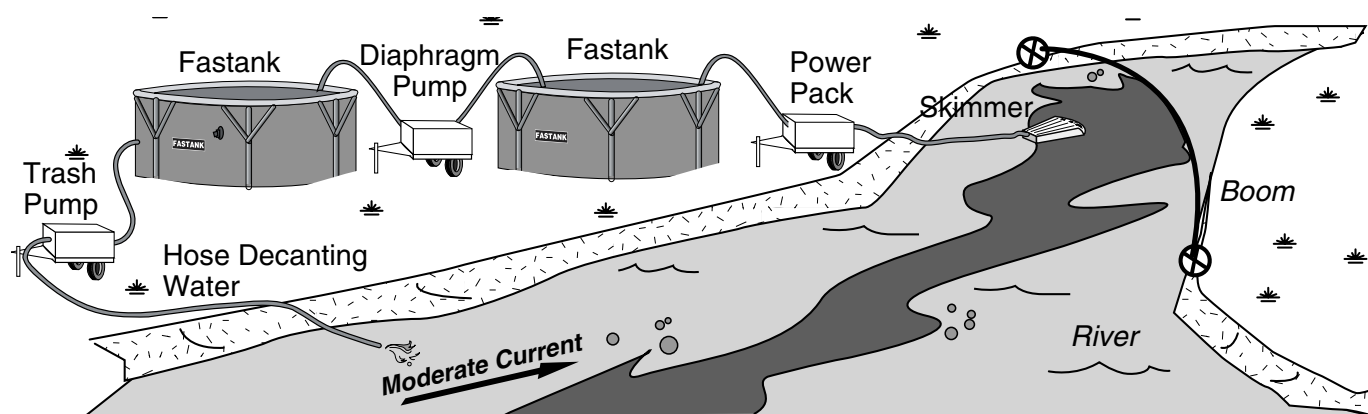
- Use an existing trench or deadarm. If necessary, dig a new one or modify an existing one.
- Disposal of construction material should be taken into account before using this tactic.
- Do not excavate where excavation will cause more damage than the spill. Before excavating in tundra, check for the presence of groundwater or permafrost. Do not excavate into frost-laden (cemented) soils, since disruption of the permafrost could accelerate thermal erosion. The depth of the trench is limited by the depth of the permafrost.
- Approval from the Operations Section Chief is required for any vehicle tundra travel (off-road or off-pad), which must be in accordance with ACS' emergency tundra travel permit (See Tactic A-3). Any excavations in tundra or any tundra damage must be reported to the Operations Section Chief. All on-tundra activity must be documented and reported to the Planning Section for reporting to ensure permit compliance. Avoid archeological sites and biologically sensitive habitats. Travel across tundra with tracked vehicles, heavy equipment, and even foot traffic can seriously damage the vegetative mat, induce thermokarst, and cause structure disturbance. Using sheets of plywood as a traveling surface and minimizing trips with equipment greatly reduce disturbance of the tundra.
- The amount of oil will be estimated based on gauging by appropriate means (e.g., Coliwasa tube). Emulsion samples will be collected and analyzed for oil content.

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**NOTE:** This illustration depicts a typical deployment for this tactic. See Tactic R-8 for recovery equipment.



When oil is being skimmed from the water surface, it is likely that considerable volumes of water will be recovered as well. Decanting excess water from oily water storage is an important tool to reduce the volume of oil water that must be taken for disposal.

Oily water is pumped to a primary storage tank such as a Fastank or larger tanks. As the water separates, it can be pumped back into the containment area on the water.

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**EQUIPMENT AND PERSONNEL**

- Equipment and personnel required to set up and maintain boom are listed in the applicable containment tactic.

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Diaphragm Pump (3-inch)	All (ACS and MPU have diesel)	Transfer	1	1	1 hr	0.5 hr
Suction Hose (3-inch)	All	Transfer	≥20 ft	—	1 hr	
Discharge Hose (3-inch)	All	Transfer	≥50 ft	2 for setup	1 hr	
Trash Pump (2-inch)	All	Decanting	1	1	1 hr	
Fastank	All	Temporary storage	2	2 for setup	1 hr	
Suction Hose (2-inch)	All	Decanting	≥20 ft	1	1 hr	
Discharge Hose (2-inch)	All	Decanting	≥50 ft	1	1 hr	

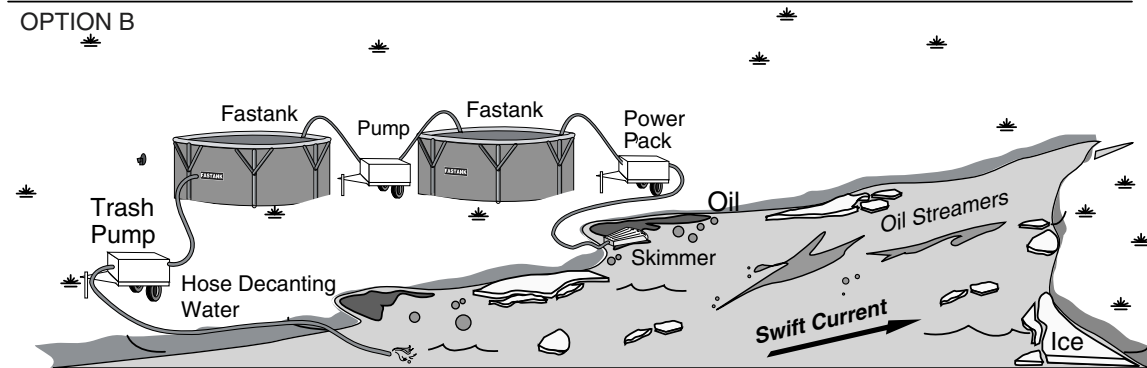
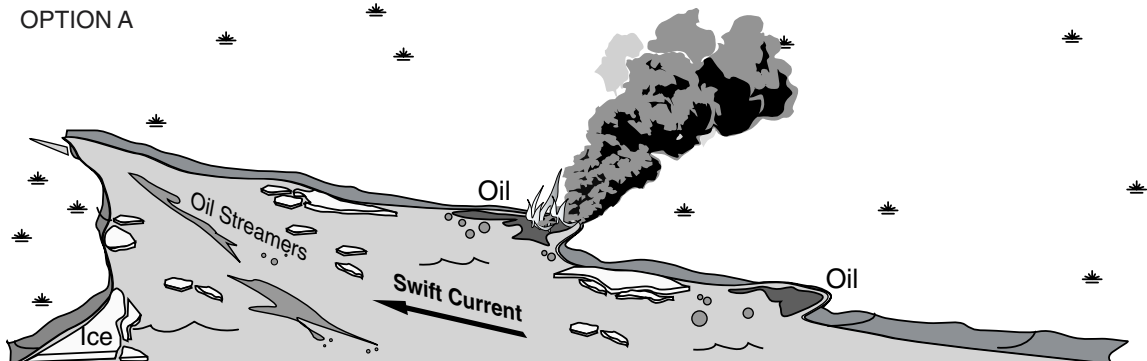
**TOTAL STAFF FOR SETUP** 5  
**TOTAL STAFF TO SUSTAIN OPERATIONS** 3

**RECOVERY CAPACITIES FOR PLANNING**

- 3-inch diaphragm pump = 114 bbl/hr nameplate.
- 3-inch trash pump = 485 bbl/hr nameplate.

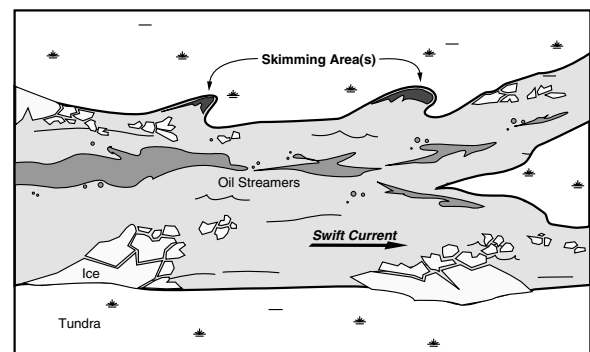
**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- Gravity flow is the best method for decanting water from a tank.
- Ensure decanting operation is constantly monitored to ensure only water is decanted.
- Approval from the Operations Section Chief is required for any vehicle tundra travel (off-road or off-pad), which must be in accordance with ACS' emergency tundra travel permit (See Tactic A-3). Any excavations in tundra or any tundra damage must be reported to the Operations Section Chief. All on-tundra activity must be documented and reported to the Planning Section for reporting to ensure permit compliance. Avoid archeological sites and biologically sensitive habitats. Travel across tundra with tracked vehicles, heavy equipment, and even foot traffic can seriously damage the vegetative mat, induce thermokarst, and cause structure disturbance. Using sheets of plywood as a traveling surface and minimizing trips with equipment greatly reduce disturbance of the tundra.
- Consider use of valves on discharge hoses.
- The amount of oil will be estimated based on gauging by appropriate means (e.g., Coliwasa tube). Emulsion samples will be collected and analyzed for oil content.



Tactical options are limited during the aggressive river breakup period when currents are strong from bank to bank, large pieces of ice are flowing in the river, and it is not safe to deploy airboats or other vessels. Personnel will not be placed at risk to deploy any containment or recovery equipment in the river channel.

The overall strategy is to go downstream from the point where the spill is entering the water to look for mechanical recovery or burn opportunities in quiet-water areas along the stream banks where boom could be deployed. The Heli-torch can be used to ignite inaccessible oil pockets, while skimmers and pumps or vacuum trucks can be used where road access is available.



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**EQUIPMENT AND PERSONNEL**

OPTION A

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Heli-torch (55 gal)	ACS	Ignition	2	2 for setup	1 hr	2 hr
Helicopter with FAR Part 137 Approved Pilot	Alyeska	Sling-load Heli-torch	1	1	2 hr	
Hand-held Igniters	ACS	Ignition	≥6	1	1 hr	
Surefire Gel	ACS	Gelled fuel	≥5 lb.	—	1 hr	
Fire Extinguisher	All	Suppress accidental fires	>2	—	0.5 hr	
Batch Mixer (300 gal)	ACS, KRU	Mix gel	1	2	1 hr	

**TOTAL STAFF WITH HELI-TORCH 3**

**TOTAL STAFF WITH HAND-HELD IGNITERS 2**

OPTION B

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Small Stationary Skimmer System	ACS, KRU, EOA, WOA, Endicott	Recovery	1	1	1 hr	3 hr
Diaphragm Pump (3-inch)	All (ACS and MPU have diesel)	Transfer	1	1	1 hr	
Suction Hose (3-inch)	All	Recovery	2≥20 ft	2 for setup	2 hr	
Discharge Hose (3-inch)	All	Recovery	2≥50 ft	—	1 hr	
Trash Pump (2-inch)	All	Decanting	1	1	1 hr	
Fastank or Fold-a-Tank	All	Temporary storage	2	2 for setup	1 hr	

**TOTAL STAFF FOR SETUP 5**

**TOTAL STAFF TO SUSTAIN OPERATIONS 3**

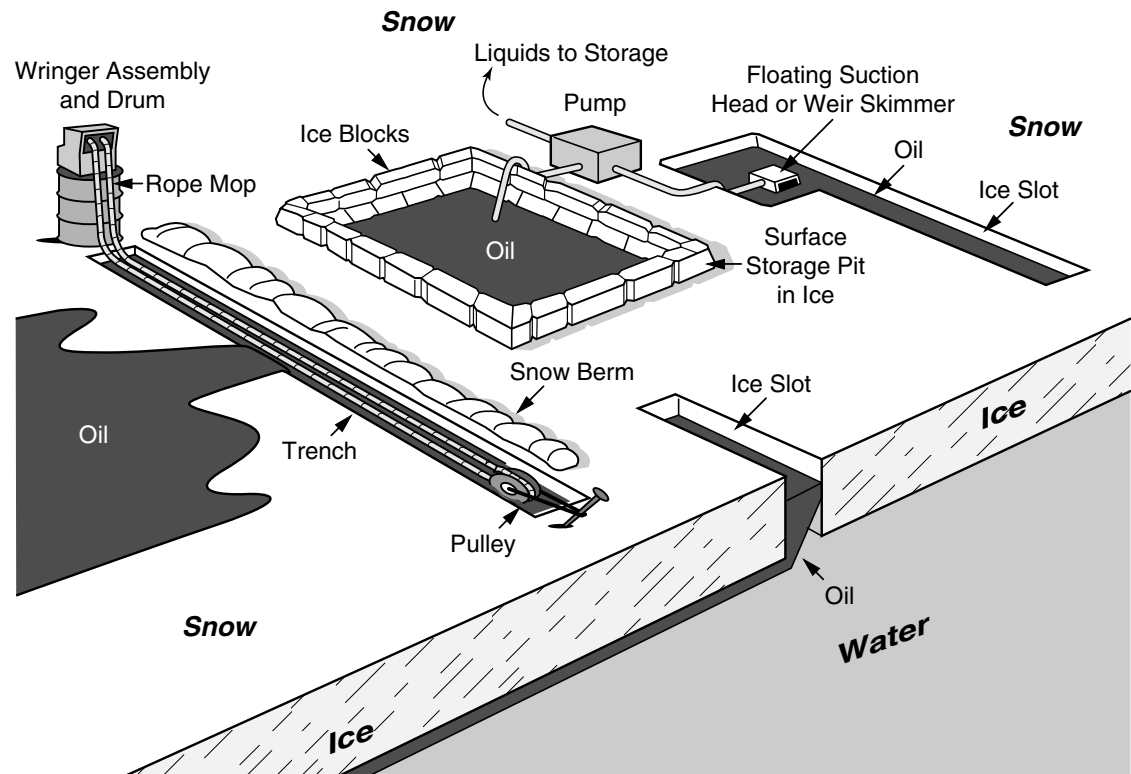
**CAPACITIES FOR PLANNING**

- Many different types of small skimmers may be used; see Tactic R-8.

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- Oil will tend to be naturally dispersed by the water's turbulence and by adherence to silt and sinking.
- Two people are needed to mix gelled fuel for the Heli-torch and to attach it to the helicopter.
- Batch mixer can be used for mixing large amounts of gelled fuel for Heli-torch.
- Approval from the Operations Section Chief is required for any vehicle tundra travel (off-road or off-pad), which must be in accordance with ACS' emergency tundra travel permit (See Tactic A-3). Any excavations in tundra or any tundra damage must be reported to the Operations Section Chief. All on-tundra activity must be documented and reported to the Planning Section for reporting to ensure permit compliance. Avoid archeological sites and biologically sensitive habitats. Travel across tundra with tracked vehicles, heavy equipment, and even foot traffic can seriously damage the vegetative mat, induce thermokarst, and cause structure disturbance. Using sheets of plywood as a traveling surface and minimizing trips with equipment greatly reduce disturbance of the tundra.
- The amount of oil will be estimated based on gauging by appropriate means (e.g., Coliwasa tube). Emulsion samples will be collected and analyzed for oil content.

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Oil moving both on the surface of ice and underneath it can be concentrated in slots cut in the ice and recovered by skimming with rope mops or other types of skimmers. If the oil in the slot is thick enough, it can be removed using weir skimmers or direct suction.

Oil entrained in subsurface pockets can be reached by drilling holes with ice augers and pumping the oil directly to storage containers such as drums or bladders. Temporary storage can also be provided by excavating shallow pits in the ice surface using chain saws and chipper bars. These oil concentrations can be pumped off or burned.

**EQUIPMENT AND PERSONNEL**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Rube Witch w/Chain Saw	All	Trenching	3	6	1 hr	0.5 hr
Ice Auger	WOA, EOA, KRU, ACS, Endicott	Recovery hole	1	4	1 hr	0.5 hr
Rope Mop (4-inch)	All	Recovery	1		1 hr	1 hr
Weatherport (10x12)	ACS, WOA	Shelter	1		1 hr	1 hr
Diaphragm Pump (3-inch)	All (ACS and MPU have diesel)	Recovery	1		1 hr	0.5 hr
Slurp Skimmer	ACS	Recovery	1		1 hr	0.5 hr
Suction Hose (3-inch)	All	Recovery	2 ≥20 ft	2 for setup	2 hr	0.5 hr
Discharge Hose (3-inch)	All	Recovery	2 ≥50 ft	—	1 hr	0.5 hr
Generator	All	Rope mop power	1	2 for setup	1 hr	0.5 hr
4-Wheeler w/Plow	All, except Badami & MPU	Berming	2	2	1 hr	0.5 hr

**TOTAL STAFF FOR SETUP AND TRENCHING 12**

**TOTAL STAFF TO SUSTAIN OPERATIONS 3**

**NOTE:** "Base Location" is storage location (may change seasonally); "Mobe Time" is time to get it out of storage, prepare it for operation, and make it ready to travel (concurrent for all equipment); "Deploy Time" is time to make it operational for its intended use at the spill site. These times do not include travel time from base to spill site, which may have multiple components (see Tactic L-3).

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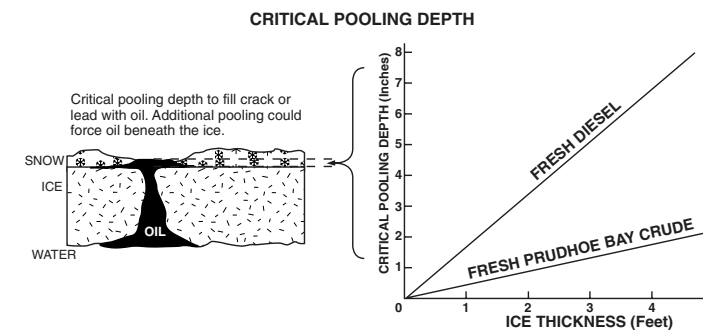
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**SUPPORT**

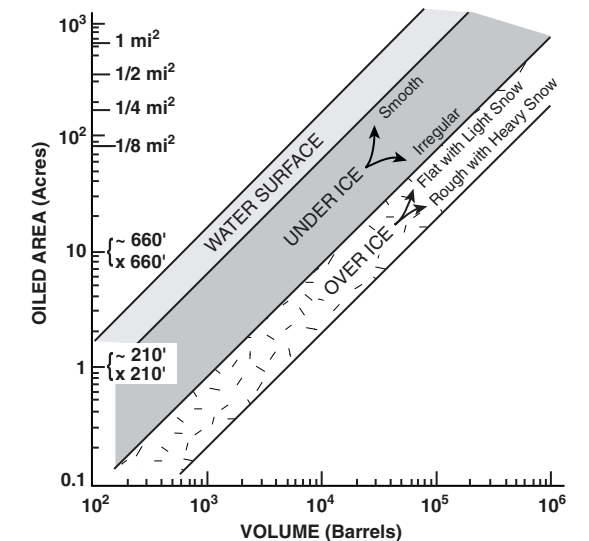
EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Mechanic Truck	All	Support equipment	1	1	1 hr	0.5 hr
Light Plant	All	Illumination	≥1	2 for initial setup, and 1 to check and fuel occasionally	1 hr	0.5 hr
Tioga Heater	All	Heat	≥1	1 initial setup	1 hr	0.5 hr

**CAPACITIES FOR PLANNING**

- Slurp skimmer = 62 bbl/hr nameplate
- 3-inch diaphragm pump = 114 bbl/hr nameplate



**TYPICAL ARCTIC HOLDING CAPACITY**

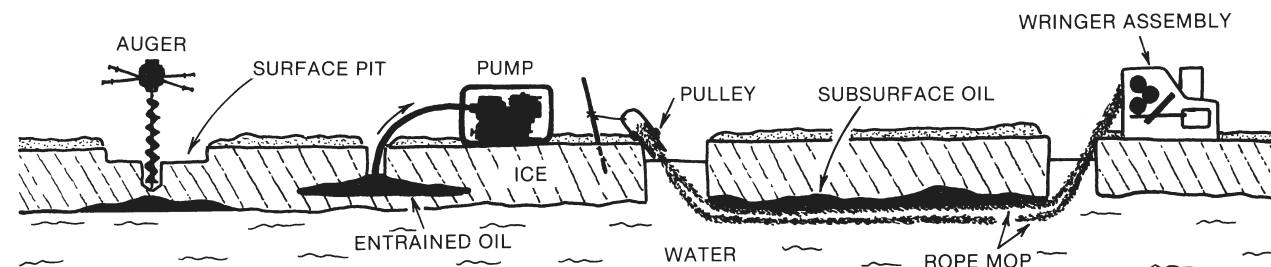
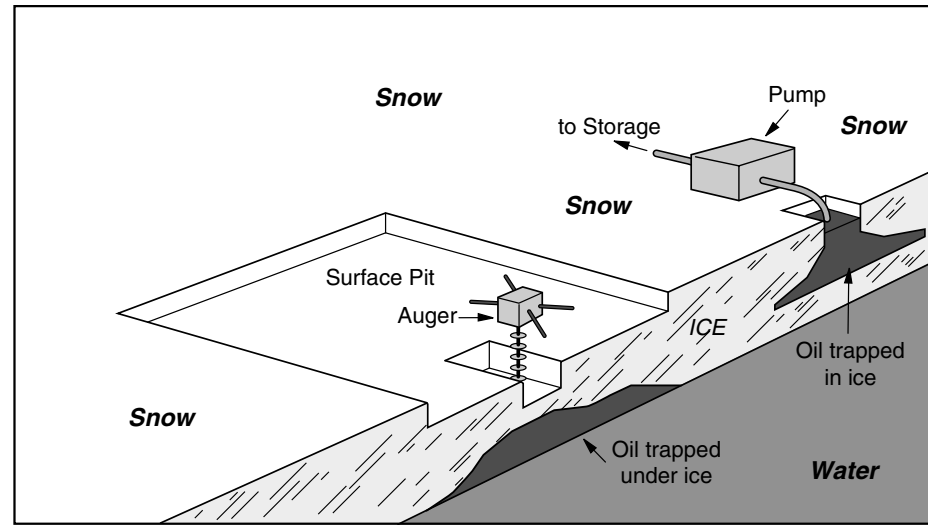


**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- Check ice thickness for safe bearing capacity before working on ice. The ice must be sufficiently strong to support personnel and heavy equipment. See Tactic L-7 for realistic maximum operating limits (RMOL) for ice thickness and temperature. Also, ensure ice can withstand extra load of oil and snow on the surface without either breaking the ice or forcing oil to migrate through existing cracks. Extreme care must be taken when positioning or operating any heavy equipment close to trenches or slots in the ice. Stresses in the ice for a given load can double under these situations. Ensure that oil that accumulates in an ice trench is continually removed. If allowed to build up to a thick layer, some oil may escape the ice slot.
- "In-ice" trenches do not extend through the ice and contain spills flowing over the ice surface. "Through-ice" or slots or trenches extend through ice to free water to contain spills moving under the ice.
- Ice trenches can be configured in "U" shapes or herringbone patterns to contain oil. Remove cut ice blocks in 1-cubic-ft pieces and place on side opposite oil. The width of the trench should not exceed 4 ft.
- Use of Rube Witch chain saw is labor-intensive.
- Use of heat will make the rope mop and pump more effective.

NOTE: All values given on these pages are for planning purposes only.





A sump is cut in the ice around a hole augered through the ice to pockets of oil under the ice or encapsulated in the ice. The oil is pumped directly from the sump to temporary storage containers. A heated shelter can be erected over the sump.

Another option involves deploying rope mop through holes in the ice to recover oil trapped in under-ice depressions. Two holes are drilled in the ice using ice augers or chainsaws, and the rope mop is strung under the ice between the holes.

**EQUIPMENT AND PERSONNEL**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Rube Witch w/Chain Saw	All	Sump construction	3	6	1 hr	0.5 hr
Weatherport (10x12)	WOA, ACS	Shelter	1	4	1 hr	1 hr
Ice Auger	WOA, EOA, KRJ, ACS, Endicott	Recovery hole	1		1 hr	0.5 hr
Rope Mop (4-inch)	All	Recovery	1		1 hr	1 hr
Diaphragm Pump (3-inch)	All (ACS and MPU have diesel)	Recovery	1		1 hr	0.5 hr
Suction Hose (3-inch)	All	Recovery	2 ≥20 ft	2 for setup	2 hr	0.5 hr
Discharge Hose (3-inch)	All	Recovery	2 ≥50 ft	—	1 hr	

**TOTAL STAFF FOR SETUP** ≥10  
**TOTAL STAFF TO SUSTAIN OPERATIONS** 4

**NOTE:** "Base Location" is storage location (may change seasonally); "Mobe Time" is time to get it out of storage, prepare it for operation, and make it ready to travel (concurrent for all equipment); "Deploy Time" is time to make it operational for its intended use at the spill site. These times do not include travel time from base to spill site, which may have multiple components (see Tactic L-3).

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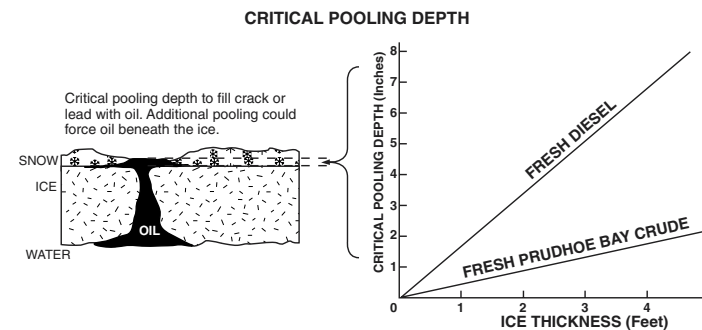
**NOTE:** "Base Location" is storage location (may change seasonally); "Mobe Time" is time to get it out of storage, prepare it for operation, and make it ready to travel (concurrent for all equipment); "Deploy Time" is time to make it operational for its intended use at the spill site. These times do not include travel time from base to spill site, which may have multiple components (see Tactic L-3).

**SUPPORT**

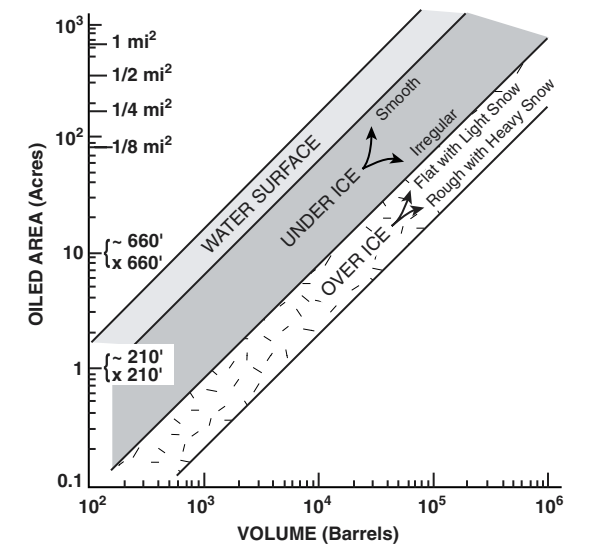
EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Tioga Heater	All	Heat	1	1 initial setup	1 hr	0.5 hr
Mechanic Truck	All, except Badami	Support equipment	1	1	1 hr	0.5 hr
Light Plant	All	Illumination	≥1	2 for initial setup, and 1 to check and fuel occasionally	1 hr	0.5 hr

**CAPACITIES FOR PLANNING**

- Depending on the thickness of a trapped oil pool, a single sump or auger hole may drain a very small lateral area. Repeated holes may have to be drilled at a close spacing to recover most of the oil. This technique is most effective for thicker oil pockets on the order of 4 to 6 inches or more. Thin oil lenses in the ice on the order of 2 to 3 inches or less may not drain effectively to individual holes.
- 3-inch diaphragm pump = 114 bbl/hr nameplate capacity.



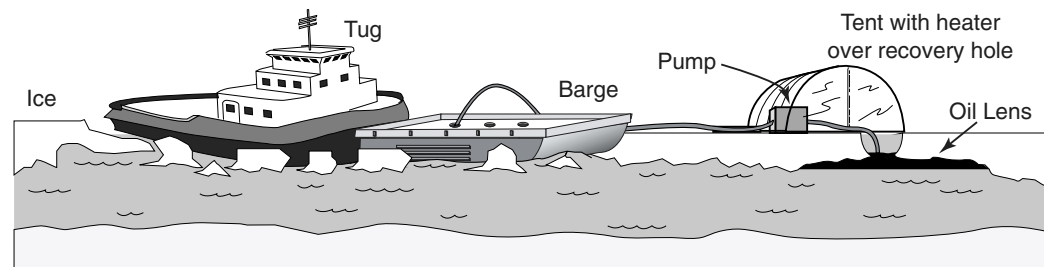
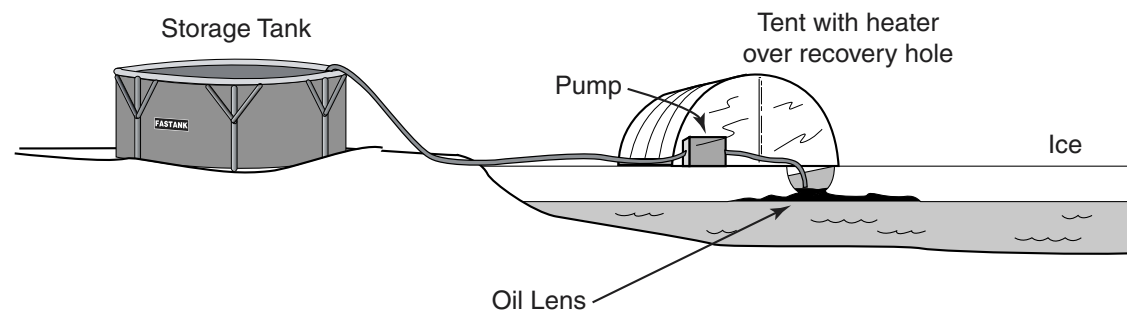
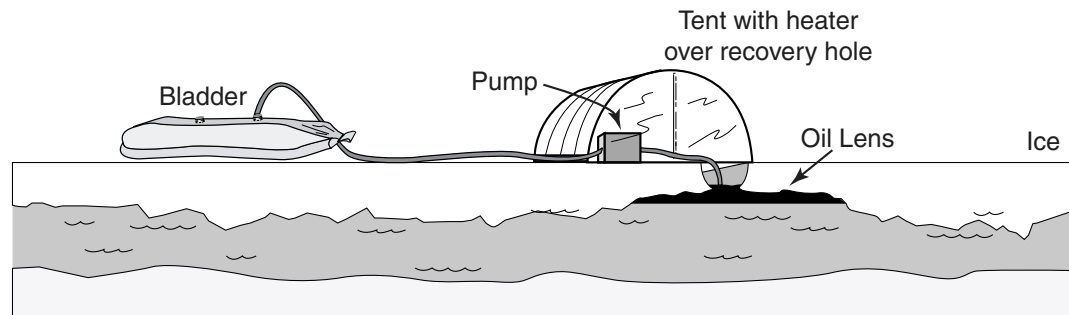
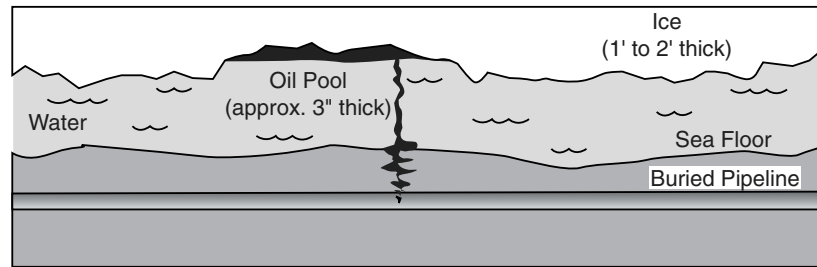
**TYPICAL ARCTIC HOLDING CAPACITY**



**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- Heat inside the shelter will make the rope mop and pump more effective.
- Use of the Rube Witch with chain saw is labor-intensive.
- Check ice thickness for safe bearing capacity before working on ice. The ice must be sufficiently strong to support personnel and heavy equipment. See Tactic L-7 for realistic maximum operating limits (RMOL) for ice thickness and temperature. Also, ensure ice can withstand extra load of oil and snow on the surface without either breaking the ice or forcing oil to migrate through existing cracks. Extreme care must be taken when positioning or operating any heavy equipment close to trenches or slots in the ice. Stresses in the ice for a given load can double under these situations. Ensure that oil that accumulates in an ice trench is continually removed. If allowed to build up to a thick layer, some oil may escape the ice slot.

NOTE: All values given on these pages are for planning purposes only.



Oil trapped under solid ice or in a lens within solid ice can be removed by augering into the oil lens and pumping out the oil. If the ice is thick enough to support heavy equipment, the oil can be pumped directly into bladders or other portable tanks and hauled to shore. In the case of thin nearshore ice, the oil can be pumped to storage containers on shore. Finally, if the site can be reached by an ice-strengthened tug-and-barge combination, the oil can be pumped directly into the barge.

A heated portable shelter should be placed over the auger holes to protect personnel and pumps.

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NOTE: "Base Location" is storage location (may change seasonally); "Mobe Time" is time to get it out of storage, prepare it for operation, and make it ready to travel (concurrent for all equipment); "Deploy Time" is time to make it operational for its intended use at the spill site. These times do not include travel time from base to spill site, which may have multiple components (see Tactic L-3).

**EQUIPMENT AND PERSONNEL**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Ice Auger	WOA, EOA, KRU, ACS, Endicott	Recovery hole	1	2	1 hr	0.5 hr
Weatherport (10x12)	ACS, WOA	Shelter	1	3 for setup	1 hr	1 hr
Diaphragm Pump (3-inch)	All (ACS and MPU have diesel)	Recovery	1	1	1 hr	0.5 hr
Suction Hose (3-inch)	All	Recovery	2 ≥ 20 ft	2 for setup	2 hr	0 hr
Discharge Hose (3-inch)	All	Recovery	2 ≥ 50 ft	—	1 hr	0 hr
Tank Bladder	ACS, WOA	Storage	1	—	1 hr	1 hr
Fastank or Fold-a-Tank	All	Storage	1	2 (initial)	1 hr	0.5 hr
Ice-Strengthened Tank Barge	West Dock	Storage	1	8	4 hr	6 hr
Tug	West Dock	Tow barge	1	4	2 hr	

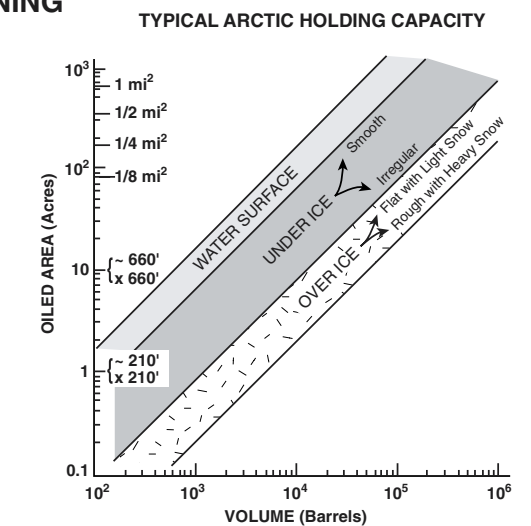
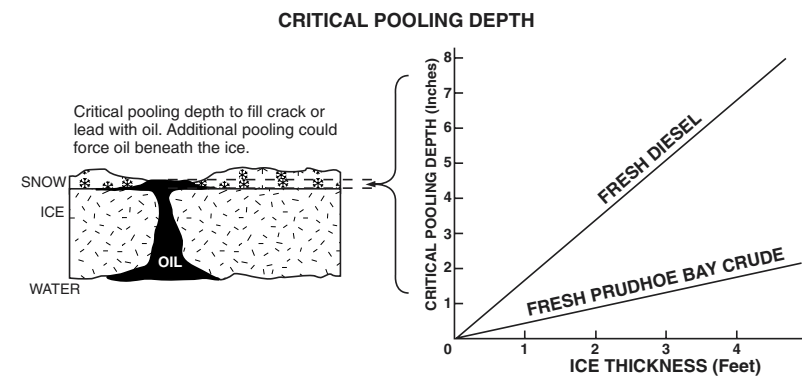
TOTAL STAFF FOR SETUP ≥ 4 (12 if barge used)  
 TOTAL STAFF TO SUSTAIN OPERATIONS 2 (12 if barge used)

**SUPPORT**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Tioga Heater	All	Heat	1	1 initial setup	1 hr	0.5 hr
Light Plant	All	Illumination	≥ 1	2 for initial setup, and 1 to check and fuel occasionally	1 hr	0.5 hr

**CAPACITIES FOR PLANNING**

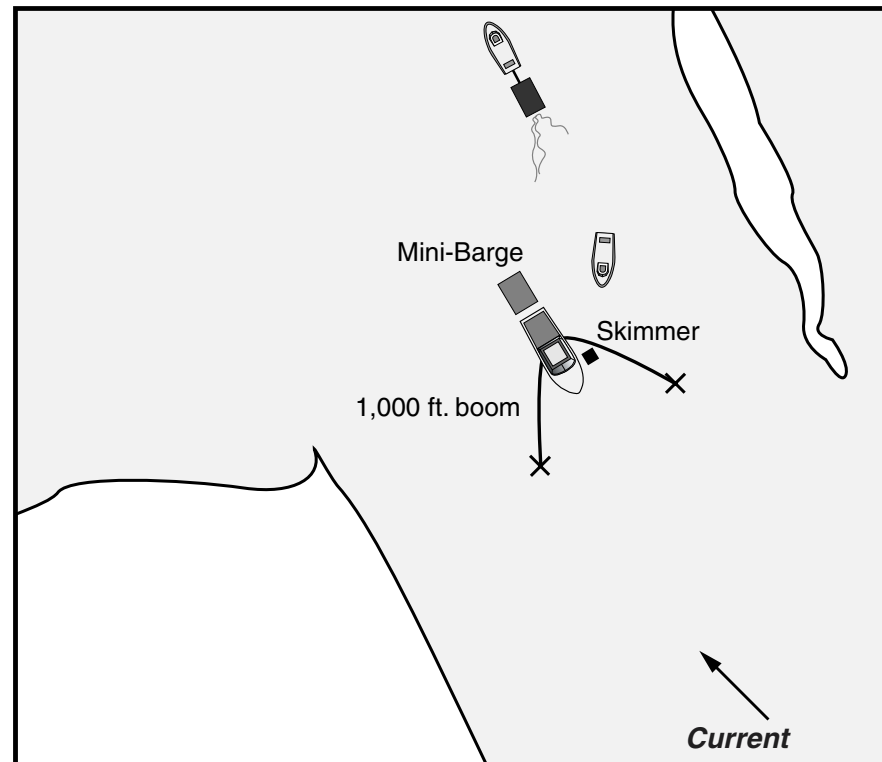
- 3-inch diaphragm pump = 114 bbl/hr nameplate capacity



**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- Check ice thickness for safe bearing capacity before working on ice. The ice must be sufficiently strong to support personnel and heavy equipment. See Tactic L-7 for realistic maximum operating limits (RMOL) for ice thickness and temperature. Also, ensure ice can withstand extra load of oil and snow on the surface without either breaking the ice or forcing oil to migrate through existing cracks. Extreme care must be taken when positioning or operating any heavy equipment close to trenches or slots in the ice. Stresses in the ice for a given load can double under these situations. Ensure that oil that accumulates in an ice trench is continually removed. If allowed to build up to a thick layer, some oil may escape the ice slot.
- Heat in the shelter will make the rope mop and pump more effective.
- When appropriate, the amount of oil will be estimated based on gauging by appropriate means (e.g., Coliwas tube). Emulsion samples will be collected and analyzed for oil content.

NOTE: All values given on these pages are for planning purposes only.



A V-shaped boom configuration is anchored with two booms of 1,000 feet each, with a typical sweep opening of 800 feet. Anchors are placed as appropriate.

A skimmer may be tied in at the apex — e.g., Heliskimmer system or a Swamp vessel with a Destroyil skimmer, or other skimmers may be placed in a closed boom configuration. A workboat supports the skimmer and tends the boom. The skimmer pumps oil and water into a mini-barge anchored immediately downcurrent.

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**EQUIPMENT AND PERSONNEL**

- Select vessels, booms, and skimmers according to area, water depth restrictions, and function (see Tactic L-6).

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Skimmer	All	On-water recovery	1	4	4 hr	3 hr
Work Boat	All	Support skimmer and tend boom	1		1 hr	
Boom	All	V boom	2,000 ft		1 hr	
Anchor System	All	Anchor boom	Variable		1 hr	
Anchor System	All	Anchor discharge hose	Variable		1 hr	
Anchor System	All	Anchor mini-barge	Variable		1 hr	
249-bbl Mini-barge (237 bbl available storage)	West Dock, Oliktok	Immediate storage	2	—	1 hr	
Work Boat or Runabout	All	Deploy boom	1	3 for setup	1 hr	
Work Boat	All	Tow mini-barge to unload	1	2	1 hr	

**TOTAL STAFF FOR SETUP** 9  
**TOTAL STAFF TO SUSTAIN OPERATIONS** 6

**SUPPORT**

- An aircraft will track the oil and help coordinate the on-water task forces. A work boat with propeller tows the mini-barge into place and leaves once the barge is anchored.

**CAPACITIES FOR PLANNING**

- See Tactic R-28 for lightering of mini-barges.
- Boom throughput efficiency is 100% in open sea water and 90% in rivers.

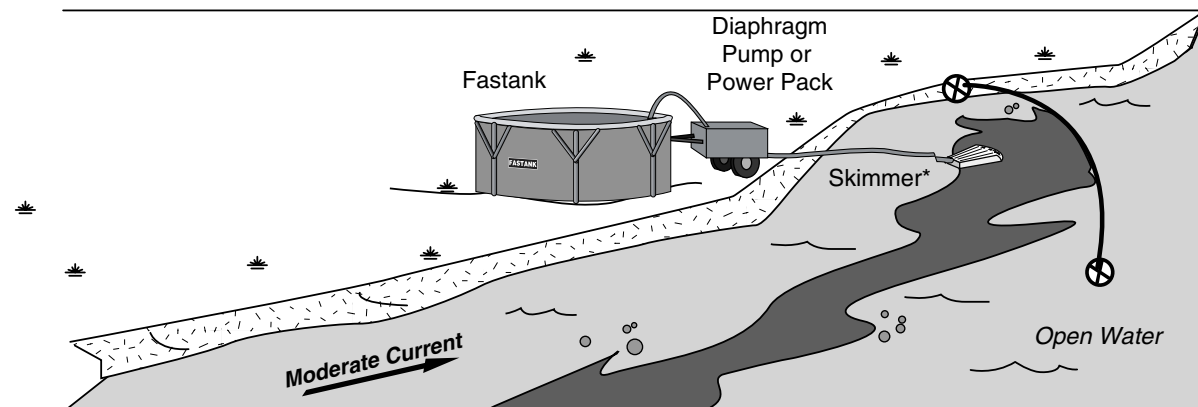
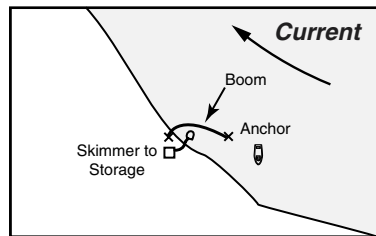
SKIMMER EQUIVALENT	UN-DERATED LIQUID CAPACITY (BBL/HR)	EFFICIENCY MULTIPLIER	DERATED ORR (BBL/HR)
Weir Skimmers	Manufacturer's nameplate pump capacity	0.2	0.2 times manufacturer's nameplate pump capacity
Seavac 660 Heli-Skimmer	937	0.2	187
LORI	271	0.8	217
Vikoma 30K	189	N/A	10
Morris MI-30	142	N/A	10
Foxtail Rope Mop V.A.B. 4-9	249	0.3	75
Other Oleophilic Skimmers	Manufacturer's nameplate pump capacity	0.2	0.2 times manufacturer's nameplate pump capacity

NOTE: Emulsification factor is 1.67 times oil volume.

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- Approval to decant is needed from the State On-Scene Coordinator. Appropriate agencies will be consulted to determine site-specific stipulations.
- The amount of oil recovered will be estimated based on gauging by appropriate means (e.g., ullage tape). Emulsion samples will be collected and analyzed for oil content.

NOTE: All values given on these pages are for planning purposes only.



\*A Manta Ray skimmer is shown, but other types of portable skimmers may be used.

Boom is anchored on the shore in lengths of 50 to 300 feet. An anchor holds the boom off the shore, and a work boat tends the booms and anchors.

A skimmer is placed near the shore in the recovery area of the boom. Diesel power packs on shore power the skimmer. A temporary tank and a trash pump are set up on shore (see Tactic R-22).

Liquids are pumped to the temporary tank on shore. Onshore tanks decant 80% of the fluids as free water into the collection boom area, with approval of the State On-Scene Coordinator.

Additional Fastanks and diaphragm pumps can be added as needed depending on oil encounter rates.

**EQUIPMENT AND PERSONNEL**

- Select vessels, booms, and skimmers according to area, water depth restrictions, and function (see Tactic L-6).
- Equipment and personnel required to set up and maintain boom are listed in the applicable containment tactic.

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Small Stationary Skimmer System	ACS, KRU, EOA, WOA, Endicott	Recovery	1	4 for setup 2 to maintain	1 hr	3 hr
Diaphragm Pump (3-inch)	All (ACS and MPU have diesel)	Transfer	1		1 hr	
Suction Hose (3-inch)	All	Recovery	2 ≥ 20 ft		2 hr	
Discharge Hose (3-inch)	All	Recovery	2 ≥ 50 ft		1 hr	
Fastank or Fold-a-tank	All	Storage	1		1 hr	
or Tank Bladder (500 gal)	ACS, WOA	Storage	1	—	1 hr	1hr

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**NOTE:** "Base Location" is storage location (may change seasonally); "Mobe Time" is time to get it out of storage, prepare it for operation, and make it ready to travel (concurrent for all equipment); "Deploy Time" is time to make it operational for its intended use at the spill site. These times do not include travel time from base to spill site, which may have multiple components (see Tactic L-3).

**SUPPORT**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Avgas Trailer	ACS, EOA, KRU, Badami	Airboat fuel	1	1 (initial)	1 hr	0.5 hr
Fuel Truck	All	Fuel heavy equipment	1	Once per shift	1 hr	0.5 hr

**CAPACITIES FOR PLANNING**

- Equipment operates 10 hr per 12-hr shift, 2 shifts per day.
- 3-inch diaphragm pump = 114 bbl/hr nameplate.
- Up to 10 tactical units deployed within a 5-mile area can share the boom deployment/tending crew (e.g., one boom crew can deploy and tend up to 2,000 ft of boom within 5 miles), but a skimmer, power pack, storage and operators must be included for each hook boom deployed. For example, to set 10 hooks deployed within a 5-mile area, the following are needed: 2,000 ft boom, 1 boat with 3 personnel, 10 skimmers each with an operator, 10 power packs each with an operator, and 10 Fastanks with associated hoses.

SKIMMER EQUIVALENT	UNDERATED LIQUID CAPACITY (BBL/HR)	EFFICIENCY MULTIPLIER	DERATED ORR (BBL/HR)
Oleophilic skimmer	Manufacturer's nameplate pump capacity	0.2	0.2 times manufacturer's nameplate pump capacity
Vikoma 30K	189	N/A	10
Vikoma 12K MKII	75	N/A	10
Morris MI-30	142	N/A	10
Foxtail Rope Mop V.A.B. 4-9	249	0.3	75
Weir Skimmer	Manufacturer's nameplate pump capacity	0.2	0.2 times manufacturer's nameplate pump capacity

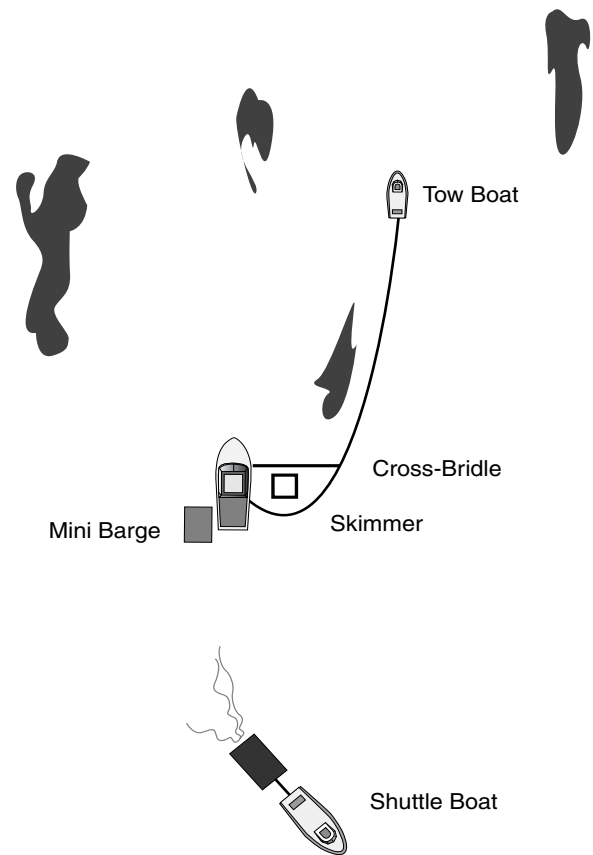
NOTE: Emulsification factor is 1.67 times oil volume

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- Approval from the Operations Section Chief is required for any vehicle tundra travel (off-road or off-pad), which must be in accordance with ACS' emergency tundra travel permit (See Tactic A-3). Any excavations in tundra or any tundra damage must be reported to the Operations Section Chief. All on-tundra activity must be documented and reported to the Planning Section for reporting to ensure permit compliance. Avoid archeological sites and biologically sensitive habitats. Travel across tundra with tracked vehicles, heavy equipment, and even foot traffic can seriously damage the vegetative mat, induce thermokarst, and cause structure disturbance. Using sheets of plywood as a traveling surface and minimizing trips with equipment greatly reduce disturbance of the tundra.
- Rubber-tracked Challenger dozers or Rolligons can pull tanks across the tundra to waiting vacuum trucks on a pad or road. Backhoes or Bobcats can dig collection pits along the shore for storage.
- Airboats can be used to move oil into collection points.
- KRU has Rolligons with cranes to lift skimmers, if necessary.
- 500-gallon bladders with cargo nets placed underneath could also be used for helicopter slinging or storage.
- Bigger bladders could be used if Rolligon transport is available.
- The amount of oil will be estimated based on gauging by appropriate means (e.g., Coliwasa tube). Emulsion samples will be collected and analyzed for oil content.

NOTE: All values given on these pages are for planning purposes only.





A work boat tows 350 to 500 feet of boom, with swath widths of 100 to 150 feet, respectively. The other end of the boom is connected to the boat that operates the skimmer. The boom is towed in a J-boom configuration that directs oil into a skimmer in the apex. Continued operations offshore involve boom of 350 feet. Operations that enter nearshore areas and encounter lesser waves involve boom of 500 feet.

Skimmed liquids are pumped into mini-barges. A skimmer vessel tows and fills a mini-barge until it is replaced by an empty mini-barge. Free water from the bottom of the mini-barge tank is decanted during the skimming and loading. The discharge hose, fastened upcurrent of the skimmer, directs the free water into the boomed area. The operator turns off the pump when the discharge water becomes black with oil. Mini-barges are towed to, and deliver liquids to, an intermediate storage barge.

**EQUIPMENT AND PERSONNEL**

- Select vessels, booms, and skimmers according to area, water depth restrictions, and function (see Tactic L-6).

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Skimmer	All	On-water recovery	1	3	1 hr	2 hr
Work Boat	All	Tow boom and mini-barge, operate skimmer and pump	1		1 hr	
Work Boat	All	Tow J-boom	1	2	1 hr	
Boom	All	On-water collection	Variable		1 hr	
Work Boat	All	Shuttle mini-barge	1	2	1 hr	
249-bbl Mini-Barge (237-bbl available storage)	West Dock, Oliktok	Immediate storage	2	—	1 hr	

**TOTAL STAFF 7**

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**EQUIPMENT AND PERSONNEL (CONT.)**

**DECANTING**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Trash Pump (3-inch)	All	Decanting	1	1	1 hr	2 hr
Suction Hose (3-inch)	All	Decanting	≥20 ft	2 for setup	2 hr	
Discharge Hose (3-inch)	All	Decanting	≥50 ft	2 for setup	2 hr	

**SUPPORT**

- An aircraft tracks the oil and helps coordinate the on-water task forces (preferably twin-engined aircraft or single-engined aircraft on floats).
- See Tactic R-28 for lightering with mini-barges.

**CAPACITIES FOR PLANNING**

- 1 hr to load mini-barge; 1.5 hr to unload. Manufacturer's nameplate pump capacity for 3-inch trash pump is 485 bbl/hr. (See Tactic R-28)
- When used with a weir skimmer and after decanting, a mini-barge contains 79 bbl oil, 53 bbl water in emulsion, 104 bbl free water, 237 total bbl.
- Equipment operates 10 hr in 12-hr shift, two shifts per day.

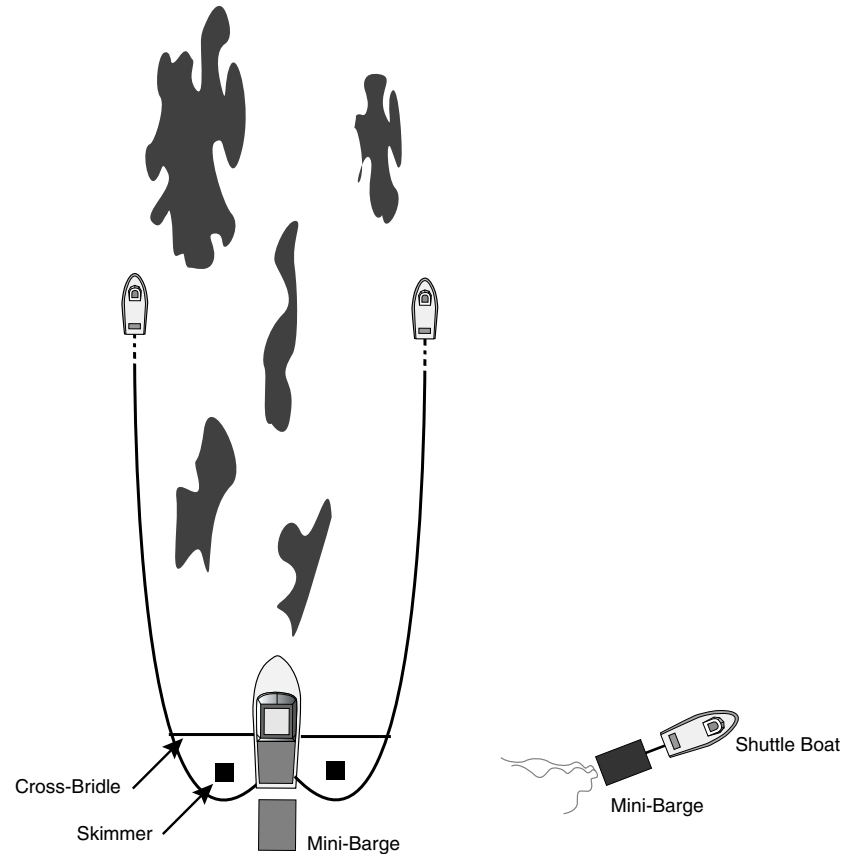
SKIMMER EQUIVALENT	UN-DERATED LIQUID CAPACITY (BBL/HR)	EFFICIENCY MULTIPLIER	DERATED ORR (BBL/HR)
Weir Skimmers	Manufacturer's nameplate pump capacity	0.2	0.2 times manufacturer's nameplate pump capacity
LORI LSC	271	0.8	217
Desmi 250 (Ocean)	628	0.2	125
Desmi 250 (Habor)	440	0.2	88
Foxtail Rope Mop V.A.B. 4-9	249	0.3	75
Other Oleophilic Skimmers	Manufacturer's nameplate pump capacity	0.2	0.2 times manufacturer's nameplate pump capacity

NOTE: Emulsification factor is 1.67 times oil volume.

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- Approval to decant is needed from the State On-Scene Coordinator. Appropriate agencies will be consulted to determine site-specific stipulations.
- The amount of oil recovered will be estimated based on gauging by appropriate means (e.g., ullage tape). Emulsion samples will be collected and analyzed for oil content.

NOTE: All values given on these pages are for planning purposes only.



Two work boats each tow 500 feet of ocean boom in a 300-foot-wide sweep. The skimming vessel is tied into the boom. The oil passes into the boom configuration and then into a skimmer. The vessel's hydraulics power the skimmer and the skimmer pump.

From the skimmer, recovered liquids are pumped into a 249-bbl mini-barge towed by the skimmer vessel. The mini-barge decants part of the free water during the loading step. When the mini-barge is full, a work boat shuttles it to offload. As the full mini-barge is unhooked from the skimmer vessel, an empty mini-barge is hooked up. The skimmer continues uninterrupted.

**EQUIPMENT AND PERSONNEL**

- Select vessels, booms, and skimmers according to area, water depth restrictions, and function (see Tactic L-6).

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Skimmer	All	On-water recovery	2	4	1 hr	2 hr
Work Boat	All	Run skimmer and pump; tow mini-barge while loading; tow boom	1		1 hr	
Work Boat	All	Shuttle	1	2	1 hr	
Work Boat	All	Tow boom, up to 500 ft	2	4	1 hr	
249-bbl Mini-Barge (237 bbl available storage)	West Dock, Oliktok	Immediate storage	2	—	1 hr	
Boom	All	On-water recovery	1,000 ft	—	1 hr	

**TOTAL STAFF 10**

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**EQUIPMENT AND PERSONNEL (CONT.)**

**DECANTING**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Trash Pump (3-inch)	All	Decanting	1	1	1 hr	2 hr
Suction Hose (3-inch)	All	Decanting	≥20 ft	2 for setup	2 hr	
Discharge Hose (3-inch)	All	Decanting	≥50 ft	2 for setup	2 hr	

**SUPPORT**

- An aircraft tracks the oil from above and coordinates the on-water task forces (preferably twin-engined aircraft or single-engined aircraft on floats).

**CAPACITIES FOR PLANNING**

- Period to load mini-barge is 1 hr. When used with a weir skimmer and after decanting, a mini-barge contains 79 bbl oil, 53 bbl water in emulsion, 104 bbl free water, 237 total bbl.
- 3-inch trash pump = 485 bbl/hr nameplate capacity.

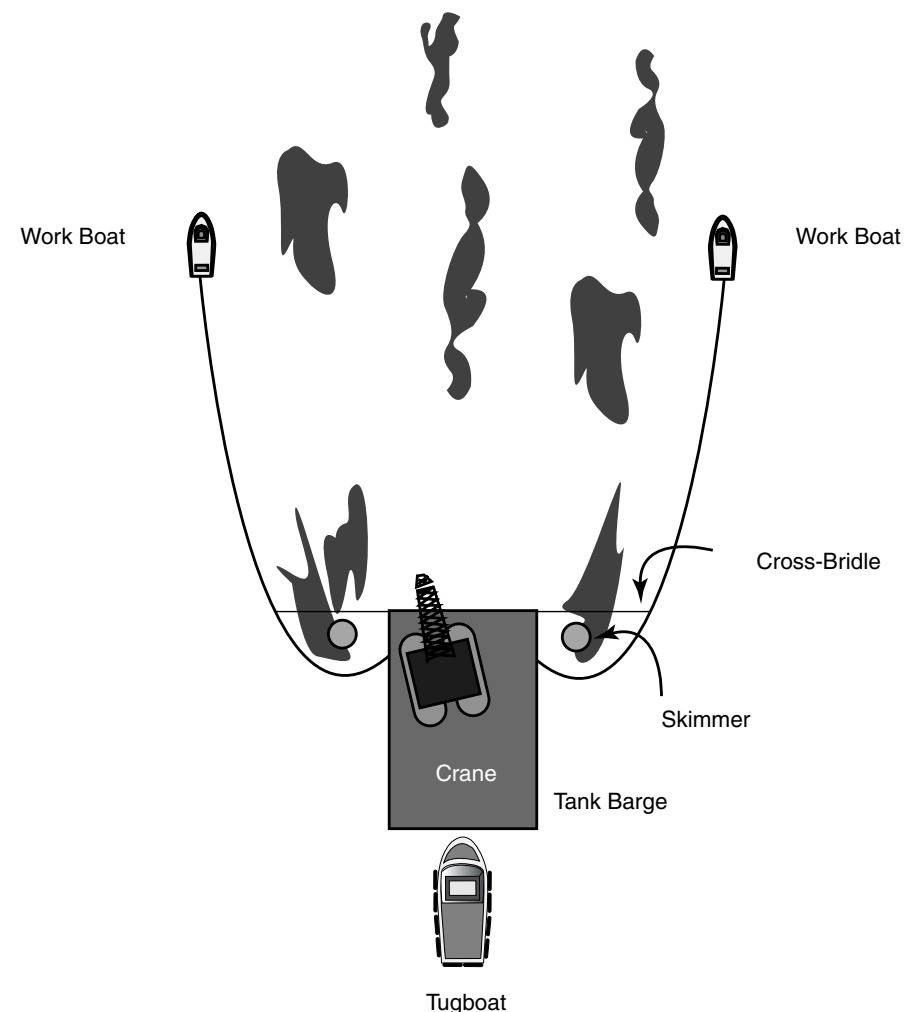
SKIMMER EQUIVALENT	UN-DERATED LIQUID CAPACITY (BBL/HR)	EFFICIENCY MULTIPLIER	DERATED ORR (BBL/HR)
Weir Skimmer	Manufacturer's nameplate pump capacity	0.2	0.2 times manufacturer's nameplate pump capacity
LORI LSC	271	0.8	217
Desmi 250 (Ocean)	628	0.2	125
Desmi 250 (Harbor)	440	0.2	88
Foxtail Rope Mop V.A.B. 4-9	249	0.3	75
Other Oleophilic Skimmers	Manufacturer's nameplate pump capacity	0.2	0.2 times manufacturer's nameplate pump capacity

NOTE: Emulsification factor is 1.67 times oil volume.

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- Equipment operates 10 hr in 12-hr shift; two shifts per day
- The oil recovery rate and number of mini-barges vary with the oil encounter rate and differ from values shown above.
- Approval to decant is needed from the State On-Scene Coordinator. Appropriate agencies will be consulted to determine site-specific stipulations.
- The amount of oil recovered will be estimated based on gauging by appropriate means (e.g., ullage tape). Emulsion samples will be collected and analyzed for oil content.

NOTE: All values given on these pages are for planning purposes only.



Two work boats each tow 1,000 feet of ocean boom into a J-shape to make a 700-foot sweep. The boom is inflated and deployed from the deck of the barge. A crane lifts a skimmer from one side of barge's deck into the apex of the boom. The crane positions the skimmers where the oil is deepest. The barge pumps up to 80% of its free water back into the boomed area. The task force advances at a speed no greater than 0.7 knot.

NOTE: All values given on these pages are for planning purposes only.



NOTE: "Base Location" is storage location (may change seasonally); "Mobe Time" is time to get it out of storage, prepare it for operation, and make it ready to travel (concurrent for all equipment); "Deploy Time" is time to make it operational for its intended use at the spill site. These times do not include travel time from base to spill site, which may have multiple components (see Tactic L-3).

**EQUIPMENT AND PERSONNEL**

- Select vessels, booms, and skimmers according to area, water depth restrictions, and function (see Tactic L-6).

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Transrec 250 Skimmer* (w/ power pack)	West Dock	On-water recovery	1	—	2 hr	3 hr
Walosep W4 Skimmer* (w/ power pack)	West Dock	On-water recovery	1	—	2 hr	
LORI LFS Skimmers*	West Dock	On-water recovery	2	—	1 hr	
Work Boat (ACS Bay Class or equivalent**)	West Dock, Northstar, Oliktok	Tow boom	2	6	1 hr	
Tug	West Dock	Tow barge	1	4	2 hr	
Tank Barge	West Dock	Skimmer mount	1	14	4 hr	
Boom	West Dock, Oliktok	On-water collection	Variable	4	1 hr	
Mobile Crane (minimum 90-ton)	EOA, WOA, KRU, Peak	Skimmer deployment	1	1	2 hr	
DOP 250 Pump (w/power pack)	ACS, KRU	Decant	1	—	1 hr	
Discharge Hose (4-inch w/ 6-inch to 4-inch reducer)	ACS, WOA, KRU	Decant	≥50 ft	—	1 hr	

**TOTAL STAFF 25**

\*Two LORI LFS skimmers are interchangeable with the Transrec 250 and Walosep W-4 skimmers, depending on ice conditions.

\*\*200 hp minimum.

**SUPPORT**

- An aircraft tracks the oil from above and coordinates the on-water task forces (preferably twin-engined aircraft or single-engined aircraft on floats).

**CAPACITIES FOR PLANNING**

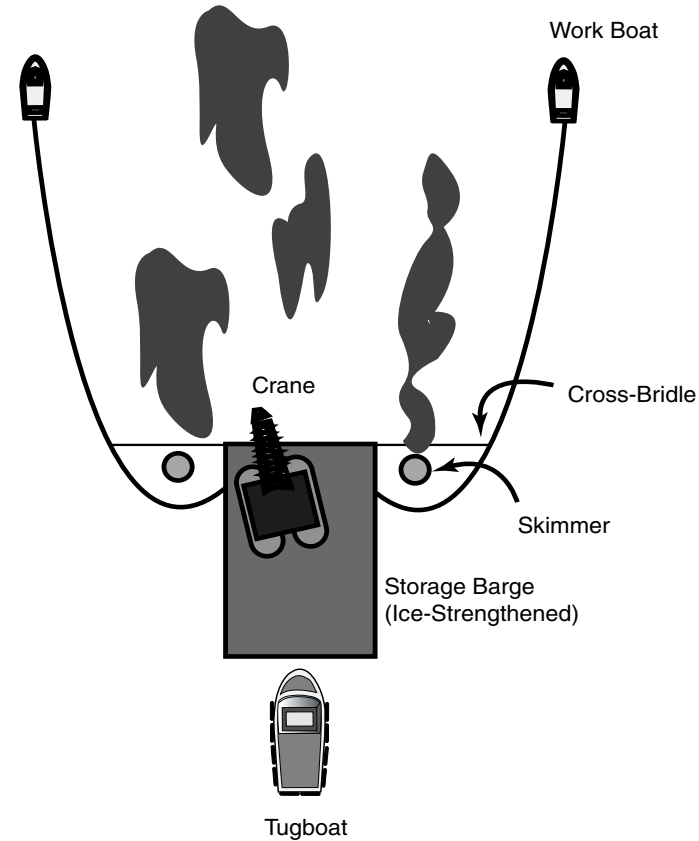
- Equipment operates 10 hr per 12-hr shift, 2 shifts per day. DOP 250 pump = 628 bbl/hr nameplate capacity.

SKIMMER CATEGORY	EFFICIENCY MULTIPLIER	MANUFACTURER'S NAMEPLATE PUMP CAPACITY (BBL/HR)	DERATED OIL RECOVERY RATE (BBL/HR)	EMULSI-FICATION FACTOR	OIL/ EMULSION STORED (BBL/HR)	FREE WATER RETAINED AFTER DECANTING (BBL/HR)	NET STORED LIQUIDS (BBL/HR)
Transrec 250 Weir Skimmer	0.2	1,570	314	1.67	524	209	734
Walosep W4 Weir Skimmer	0.2	566	113	1.67	189	75	264
LORI LFS Oleophilic Skimmer	0.8	271	217	1.67	362	n/a	362

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- The Transrec 250 and Walosep W4 are deployed from the barge's deck into the apex of the boom where oil is in thick layers. DOP 250 pumps decant up to 80% of the free water back into the boomed area.
- If less swath width is required, shorter booms and smaller boats could be used.
- Approval to decant is needed from the State On-Scene Coordinator. Appropriate agencies will be consulted to determine site-specific stipulations.
- The amount of oil recovered will be estimated based on gauging by appropriate means (e.g., ullage tape). Emulsion samples will be collected and analyzed for oil content.

NOTE: All values given on these pages are for planning purposes only.



Two work boats each tow 400 feet of ocean boom from the barge into a J-shape to make a 300-foot sweep. Length of boom depends on the ice conditions. A crane lifts a skimmer from one side of the storage barge's deck into the apex of the boom. The crane positions the skimmers where the oil is deepest, and the barge fills with recovered liquids.

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NOTE: "Base Location" is storage location (may change seasonally); "Mobe Time" is time to get it out of storage, prepare it for operation, and make it ready to travel (concurrent for all equipment); "Deploy Time" is time to make it operational for its intended use at the spill site. These times do not include travel time from base to spill site, which may have multiple components (see Tactic L-3).

**EQUIPMENT AND PERSONNEL**

- Select vessels, booms, and skimmers according to area, water depth restrictions, and function (see Tactic L-6).

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Work Boat (ACS Bay Class or equivalent*)	West Dock, Northstar, Oliktok	Tow boom	2	6	1 hr	3 hr
Tug	West Dock	Tow barge	1	4	2 hr	
Tank Barge (ice-strengthened)	West Dock	Skimmer mount	1	14	4 hr	
Boom	West Dock	On-water collection	Variable	4 for setup	1 hr	
Mobile Crane (minimum 90-ton)	EOA, WOA, KRU, Peak	Skimmer deployment	1	1	2 hr	
Desmi 250 (Ocean)	West Dock	On-water recovery	1	—	1 hr	
Desmi 250 (Harbor)	West Dock	On-water recovery	1	—	1 hr	
LORI LFS Skimmer**	West Dock	On-water recovery	2	—	1 hr	
and/or Foxtail Rope Mop V.A.B 2-9	West Dock	On-water recovery	1	—	2 hr	
and/or Foxtail Rope Mop V.A.B. 4-9	West Dock	On-water recovery	1	—	2 hr	
and/or Transrec 250 Skimmer** (w/ power pack)	West Dock	On-water recovery	1	—	2 hr	
and/or Walosep W4 Skimmer** (w/ power pack)	West Dock	On-water recovery	1	—	2 hr	

**TOTAL STAFF 25**

\*200 hp minimum

\*\*Two LORI LFS skimmers are interchangeable with the Transrec 250 and Walosep W-4 skimmers, depending on ice conditions.

**SUPPORT**

- An aircraft tracks the oil from above and coordinates the on-water task forces (preferably twin-engined aircraft or single-engined aircraft on floats).

**CAPACITIES FOR PLANNING**

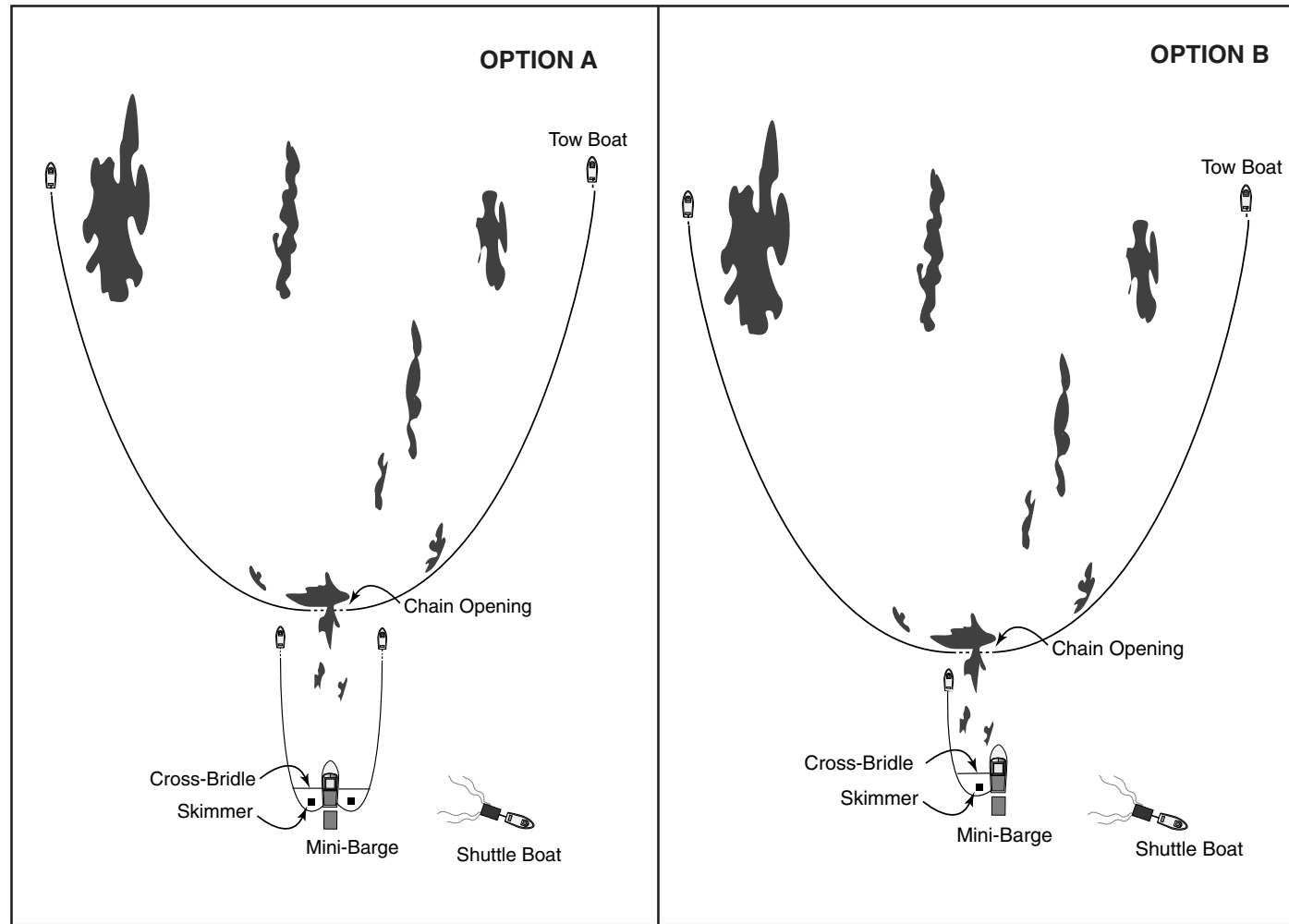
SKIMMER EQUIVALENT	UN-DERATED LIQUID CAPACITY (BBL/HR)	EFFICIENCY MULTIPLIER	DERATED ORR (BBL/HR)
Transrec 250 Weir Skimmer	1,570	0.2	314
Walosep W4 Weir Skimmer	566	0.2	113
LORI LFS	271	0.8	217
Other Oleophilic Skimmers	Manufacturer's nameplate pump capacity	0.2	Derate times manufacturer's nameplate pump capacity
Desmi 250 (Ocean)	628	0.2	125
Desmi 250 (Harbor)	440	0.2	88
Foxtail Rope Mop V.A.B. 4-9	249	0.3	75
Weir Skimmer	Manufacturer's nameplate pump capacity	0.2	Derate times manufacturer's nameplate pump capacity

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- The broken ice deflection system (BIDS) may be used to reduce ice concentrations encountered by the skimmer.
- Ice management may be used to decrease ice concentrations encountered by the containment system.
- Approval to decant is needed from the State On-Scene Coordinator. Appropriate agencies will be consulted to determine site-specific stipulations.
- The amount of oil recovered will be estimated based on gauging by appropriate means (e.g., ullage tape). Emulsion samples will be collected and analyzed for oil content.

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The open-apex boom has a swath width of 1,000 feet. Each of two tow boats pulls 1,500 feet of ocean boom. Oil funnels through the boom's chained opening in the apex, and the concentrated oil moves directly into a collection boom consisting of one or two 250-foot sections, each towed by a boat. A fifth boat fitted with a skimmer is tied into the apex of the collection boom. The boat's engines power a hydraulic system to drive the skimmer and the pumps.

Oil and sea water are pumped into a mini-barge. To replace a full mini-barge, a shuttle boat hooks up an empty mini-barge to the skimmer vessel. The full mini-barge is unhooked and towed to the task force's intermediate storage barge to offload. The empty mini-barge then returns from the intermediate barge to the skimmer vessel.

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**EQUIPMENT AND PERSONNEL**

- Select vessels, booms, and skimmers according to area, water depth restrictions, and function (see Tactic L-6).

**OPTION A**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
LORI LSC Skimmer	West Dock	On-water recovery	2	—	1 hr	4 hr
Work Boat (Bay Class)	West Dock, Oliktok, Northstar	Tow boom for open apex	2	6	1 hr	
Work Boat (29 ft)	West Dock	Tow mini-barge	1	3	1 hr	
Work Boat	All	Tow boom, up to 250 ft	2	6	1 hr	
Work Boat (Bay Class or Big Dipper)	West Dock	Run skimmer and pump; tow mini-barge while loading	1	4	1 hr	
249-bbl Mini-Barge (237-bbl available storage)	West Dock, Oliktok	Immediate storage	2	—	2 hr	
Boom	All	On-water recovery	Variable	—	1 hr	

**TOTAL STAFF 16**

**OPTION B**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
LORI LSC Skimmer	West Dock	On-water recovery	1	—	1 hr	4 hr
Work Boat (Bay Class)	West Dock, Oliktok, Northstar	Tow boom for open apex	2	6	1 hr	
Work Boat (29 ft)	West Dock	Tow mini-barge	1	3	1 hr	
Work Boat	All	Tow boom, up to 250 ft	1	3	1 hr	
Work Boat (Bay Class or Big Dipper)	West Dock	Run skimmer and pump; tow mini-barge while loading	1	4	1 hr	
249-bbl Mini-Barge (237-bbl available storage)	West Dock, Oliktok	Immediate storage	2	—	2 hr	
Boom	All	On-water recovery	Variable	—	1 hr	

**TOTAL STAFF 13**

**SUPPORT**

- An aircraft tracks the oil from above and coordinates the on-water task forces (preferably twin-engined aircraft or single-engined aircraft on floats).

**CAPACITIES FOR PLANNING**

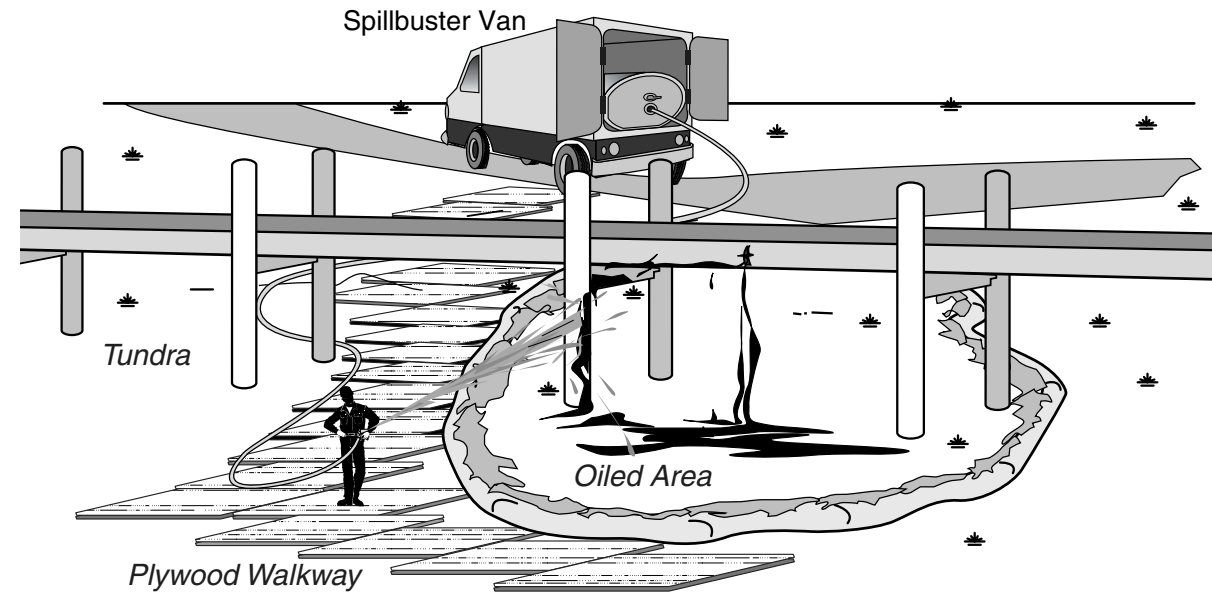
- Equipment operates 10 hr per 12-hr shift, 2 shifts per day.

SKIMMER EQUIVALENT	UN-DERATED LIQUID CAPACITY (BBL/HR)	EFFICIENCY MULTIPLIER	DERATED ORR (BBL/HR)
LORI LSC	271	0.8	217

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- The oil recovery rate and number of mini-barges vary with the oil encounter rate and differ from values shown above. The mini-barges are filled to 95% capacity.
- See Tactic R-28 for lightering mini-barges.
- Approval to decant is needed from the State On-Scene Coordinator. Appropriate agencies will be consulted to determine site-specific stipulations.
- The amount of oil recovered will be estimated based on gauging by appropriate means (e.g., ullage tape). Emulsion samples will be collected and analyzed for oil content.

NOTE: All values given on these pages are for planning purposes only.



Hot-water, high-pressure washing removes oil from concrete, rock, and metal surfaces. Sorbents, containment boom, and Shore Seal boom prevent re-oiling of adjacent areas. Sorbent boom and skimmers recover oil from adjacent water, while trenches collect surface and subsurface oil.

The “Spillbuster” van’s high-pressure, high-temperature spray is directed over the oiled surface to remove the oil. The van has a tank, with heater, hose, and nozzle. Water pressure is approximately 3,000 psi. The removed oil is trapped downstream in a man-made lined pit or trench or in a boomed-off area of open water close to shore. The oil is then removed by direct suction, skimming, burning, or sorbent pads. The Spillbuster van has a 200-gallon water tank with a diesel heater. The van can be coupled with a water truck to give it a continuous supply of water. Without a water truck the van can operate for 4 to 6 hours.

The Spillbuster is loaded onto a deck barge to access offshore oiled structures.

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**EQUIPMENT AND PERSONNEL FOR OPEN WATER**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Spillbuster Van	EOA, KRU	Surface oil removal	1	2 (3 if water truck used)	1 hr	1 hr
Tug*	West Dock	Tow barge	2	8	2 hr	4 hr
Deck/Tank Barge*	West Dock	Work platform, and equipment transport	1		4 hr	

\*Optional **TOTAL STAFF ≥2**

**EQUIPMENT AND PERSONNEL FOR ONSHORE**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Spillbuster Van	EOA, KRU	Surface oil removal	1	2 (3 if water truck is used)	1 hr	1 hr
Plywood	All	Walk path	Varies	2	2 hr	2 hr

**SUPPORT**

- Vacuum trucks, skimmers, and sorbents are used for collection. Trash pumps transfer the oil to mini-barges or bladders towed by work boats. Containment booming is used when recovering near or over water and the oil is washed into the boomed area (see Tactic C-4 for containment options). A water truck is attached to the Spillbuster for an additional water supply, when necessary.

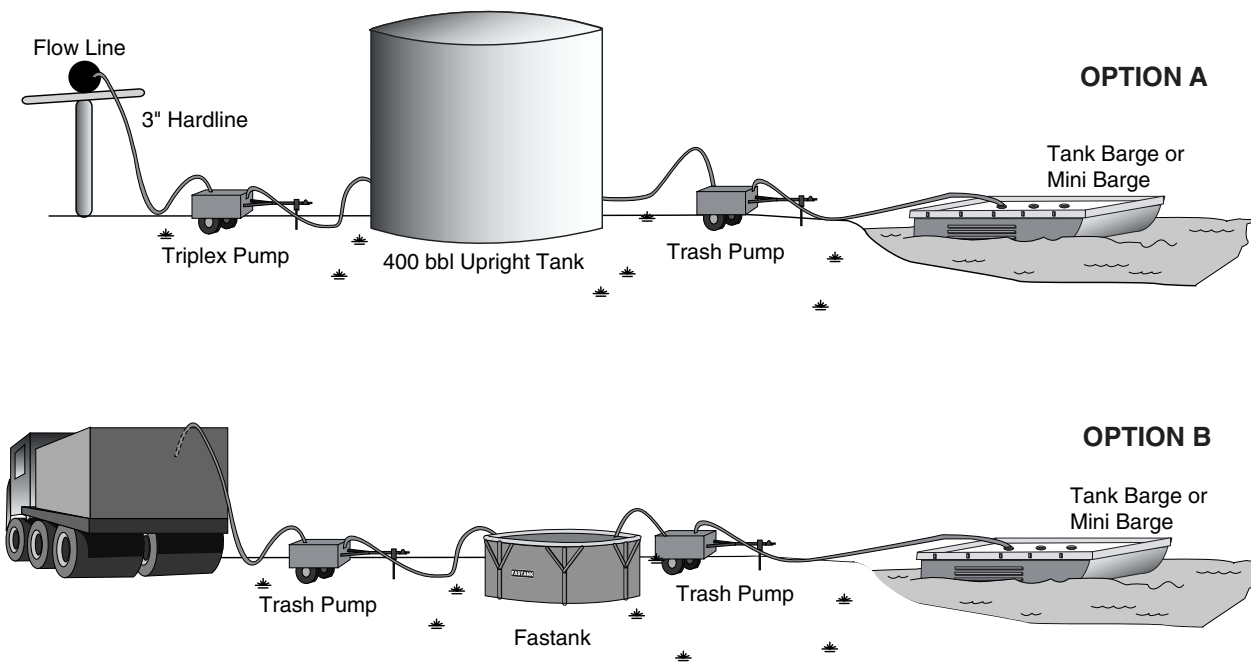
**CAPACITIES FOR PLANNING**

- The water tank on the Spillbuster van has a capacity of 200 gal.

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- Oiled surfaces are cleaned up as a non-emergency project. Cleaning begins at the highest point and continues downslope. Care is taken to avoid contaminating unaffected areas. Removed oil is concentrated for recovery. The Spillbuster van has vacuum capabilities.
- The Spillbuster units come skid-mounted (KRU) and as a mobile van (EOA). The Spillbuster units are kept in warm storage and are not used when the temperature is below freezing. During winter, Phillips’ steam unit from Drill Site Maintenance is used. This unit virtually eliminates free liquids from cleaning.
- The hot-water, high-pressure wash method is harmful to flora and fauna and is not recommended for surfaces that support living plants or animals. When this method is used on oiled surfaces other than boulders, man-made structures, or rock, the oil may penetrate deeper into the sediments.
- Approval from the Operations Section Chief is required for any vehicle tundra travel (off-road or off-pad), which must be in accordance with ACS’ emergency tundra travel permit (See Tactic A-3). Any excavations in tundra or any tundra damage must be reported to the Operations Section Chief. All on-tundra activity must be documented and reported to the Planning Section for reporting to ensure permit compliance. Avoid archeological sites and biologically sensitive habitats. Travel across tundra with tracked vehicles, heavy equipment, and even foot traffic can seriously damage the vegetative mat, induce thermokarst, and cause structure disturbance. Using sheets of plywood as a traveling surface and minimizing trips with equipment greatly reduce disturbance of the tundra.

NOTE: All values given on these pages are for planning purposes only.



In Option A, a pump at the dockhead moves liquids from a storage barge into a temporary upright tank using a trash pump, and a Triplex pump moves the liquid from the tank through a 3-inch hard line and flange connector into a production pipeline. In Option B, a temporary open-top tank such as a Fastank may also be used and trash pump moves the liquid from the open-top tank to a tank truck or tank trailer when a pipeline is not available.

**EQUIPMENT AND PERSONNEL**

OPTION A

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Upright Tank (400-bbl)	KRU	Store recovered fluids	1	1 initial	2 hr	2 hr
Trash Pump (4-inch)	ACS, WOA, EOA	Liquid transfer	1	1	1 hr	
DOP 250 Pump	West Dock	Liquid transfer	1	—	1 hr	3 hr
Piston Pump PZ Triplex (6-inch)	EOA, WOA, KRU	Liquid transfer	1	2	1 hr	2 hr
Suction Hose (6-inch)	ACS	Liquid transfer	≥20 ft	2 for setup	2 hr	
Discharge Hose (6-inch)	ACS, WOA, KRU	Liquid transfer	≥50 ft	—	1 hr	
Suction Hose (4-inch)	ACS, WOA	Liquid transfer	≥20 ft	2 for setup	2 hr	
Discharge Hose (4-inch)	ACS, WOA, KRU	Liquid transfer	≥50 ft	—	1 hr	
Hard Line and Flange Connector (3-in)	Deadhorse	Liquid transfer	1 section	7 for setup	3 hr	

**TOTAL STAFF FOR SETUP 13**  
**TOTAL STAFF TO SUSTAIN OPERATIONS 6**

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**NOTE:** "Base Location" is storage location (may change seasonally); "Mobe Time" is time to get it out of storage, prepare it for operation, and make it ready to travel (concurrent for all equipment); "Deploy Time" is time to make it operational for its intended use at the spill site. These times do not include travel time from base to spill site, which may have multiple components (see Tactic L-3).

**EQUIPMENT AND PERSONNEL (CONT'D)**

OPTION B

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Rolligon	CATCO	Transport tank	1	1	6 hr	2 hr
Diesel Power Pack	ACS, KRU, EOA, WOA, Endicott	Power recovery equipment	1	1	1 hr	1 hr
Fastank or Fold-a-Tank	All	Immediate storage	1	2 for setup	1 hr	0.5 hr
Vacuum Truck	All	Transfer liquid	1	1	1 hr	
Trailer Tank (10,000 gal)	CATCO	Transfer liquid	1	—	6 hr	
DOP 250 Pump	West Dock	Transfer liquid	1	—	1 hr	3 hr
Trash Pump (4-inch)	ACS, WOA, EOA	Transfer liquid	2	2	1 hr	1 hr
Suction Hose (4-inch)	ACS, WOA	Transfer liquid	≥20 ft	2 for setup	2 hr	
Discharge Hose (4-inch)	ACS, WOA, KRU	Transfer liquid	≥50 ft	—	1 hr	

**TOTAL STAFF 7**

**CAPACITIES FOR PLANNING**

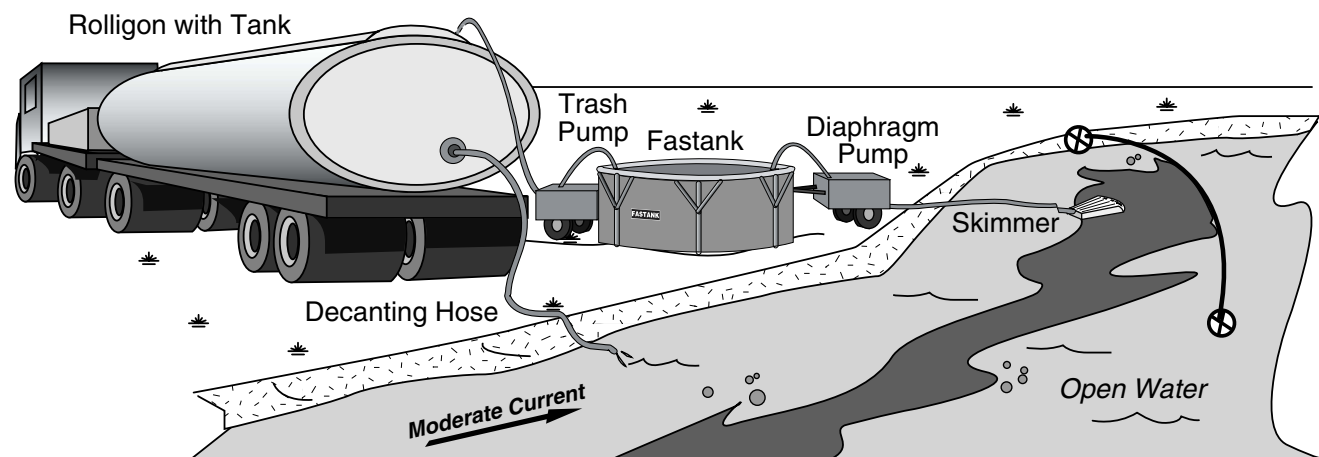
- Piston PZ Triplex 6-inch pump capacity = 1,428 bbl/hr nameplate.
- Gorman Rupp 4-inch trash pump capacity = 1,074 bbl/hr nameplate.
- Pumps operate 10 hr out of 12-hr shift; two shifts per day.
- The typical suction rate for liquids by a vacuum truck is 200 bbl/hr in the summer and 150 bbl/hr in the winter. The typical suction rate for pooled diesel remains at 200 bbl/hr year round. (Vacuum truck recovery rate is reduced to 34 bbl/hr if a Manta Ray skimmer is used.)

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- Approval from the Operations Section Chief is required for any vehicle tundra travel (off-road or off-pad), which must be in accordance with ACS' emergency tundra travel permit (See Tactic A-3). Any excavations in tundra or any tundra damage must be reported to the Operations Section Chief. All on-tundra activity must be documented and reported to the Planning Section for reporting to ensure permit compliance. Avoid archeological sites and biologically sensitive habitats. Travel across tundra with tracked vehicles, heavy equipment, and even foot traffic can seriously damage the vegetative mat, induce thermokarst, and cause structure disturbance. Using sheets of plywood as a traveling surface and minimizing trips with equipment greatly reduce disturbance of the tundra.
- When working with equipment around or near flow lines, a spotter must be added to each front-end loader.
- A civil work permit from the operator is required for all work on owner-company pads.
- Decanting takes place from the temporary storage tanks with approval from the State On-Scene Coordinator to minimize the risk of secondary spills and to reduce the number of trips across the tundra, if necessary.
- The amount of oil will be estimated based on gauging by appropriate means (e.g., Coliwasa tube). Emulsion samples will be collected and analyzed for oil content.

NOTE: All values given on these pages are for planning purposes only.

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A Rolligon pulls the empty CATCO 10,000-gallon trailer tank to a storage site. Liquids are pumped from a temporary tank into the trailer tank using a 4-inch trash pump. The Rolligon then pulls the trailer cross-country and transfers the liquid to a waiting vacuum truck or temporary storage tank on a pad or road. The Rolligon works under ACS's permit for emergency tundra travel.

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**EQUIPMENT AND PERSONNEL**

- Equipment and personnel required to set up and maintain boom are listed in the applicable containment tactic.

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Rolligon	CATCO, APC	Transport tank	1	1	6 hr	2 hr
Trash Pump (4-inch)	ACS, WOA, EOA	Liquid transfer	1	1	1 hr	
Suction Hose (4-inch)	ACS, WOA	Liquid transfer	≥20 ft	2 for setup	2 hr	
Discharge Hose (4-inch)	ACS, WOA, KRU	Liquid transfer	≥50 ft	—	1 hr	
Diaphragm Pump (3-inch)	All (ACS and MPU have diesel)	Recovery	1	1	1 hr	
Suction Hose (3-inch)	All	Recovery	2≥20 ft	2 for setup	2 hr	
Discharge Hose (3-inch)	All	Recovery	2≥50 ft	—	1 hr	
Trailer Tank (10,000 gal.)	CATCO	Intermediate storage	1	—	6 hr	

**TOTAL STAFF 3**

**SUPPORT**

- Temporary storage tanks at a recovery site are the liquid source for the trailer tank. Vacuum trucks wait on gravel pads or nearby roads to empty the trailer tank.

**CAPACITIES FOR PLANNING**

- 4 in. trash pump (Gorman Rupp) capacity = 1,074 bbl/hr nameplate.
- 3 in. diaphragm pump capacity = 114 bbl/hr nameplate.
- Pumps operate 10 hr out of 12-hr shift; two shifts per day
- Trailer tank holds 10,000 gal.
- Travel speed is approximately 5 mph across tundra; Rolligon travels up to 20 mph on roads.

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- Other trailer tanks are available on the Slope. The trailer tank and the temporary storage tanks decant free water to a recovery site. Travel across tundra by tracked vehicles and decanting require approval by the State On-Scene Coordinator.
- Approval from the Operations Section Chief is required for any vehicle tundra travel (off-road or off-pad), which must be in accordance with ACS' emergency tundra travel permit (See Tactic A-3). Any excavations in tundra or any tundra damage must be reported to the Operations Section Chief. All on-tundra activity must be documented and reported to the Planning Section for reporting to ensure permit compliance. Avoid archeological sites and biologically sensitive habitats. Travel across tundra with tracked vehicles, heavy equipment, and even foot traffic can seriously damage the vegetative mat, induce thermokarst, and cause structure disturbance. Using sheets of plywood as a traveling surface and minimizing trips with equipment greatly reduce disturbance of the tundra.
- The amount of oil will be estimated based on gauging by appropriate means (e.g., Coliwasa tube). Emulsion samples will be collected and analyzed for oil content.

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**EQUIPMENT AND PERSONNEL**

- The length of discharge hose required is approximated by the distance of the fluid transfer.

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
ATV	All	Transport equipment	2	2	1 hr	4 hr
Trash Pump (4- or 6-inch)	4-inch: ACS, WOA, EOA; 6-inch: KRU,ACS	Liquid transfer	≥2	4	1 hr	
Suction Hose (4- or 6-inch)	ACS, WOA	Liquid transfer	≥20 ft	—	2 hr	
Discharge Hose (4- or 6-inch)	ACS, WOA, KRU	Liquid transfer	≥500 ft	6	1 hr	

**TOTAL STAFF FOR SETUP 12**

**TOTAL STAFF TO SUSTAIN OPERATIONS 6**

**SUPPORT**

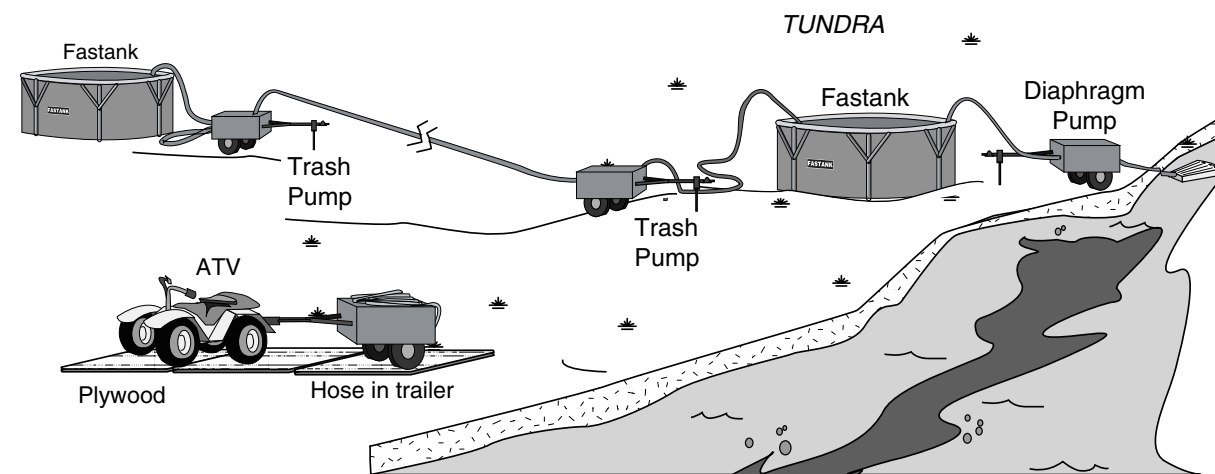
- A pipeline, tank, vacuum truck, or other suitable storage receives the transported liquids from the hose and pump in series. Plywood sheets are laid across the tundra to ease travel and minimize impact to the tundra.

**CAPACITIES FOR PLANNING**

- Gorman Rupp 4-inch trash pump capacity = 1,074 bbl/hr nameplate; 6-inch trash pump = 1,500 bbl/hr; 3-inch diaphragm pump = 114 bbl/hr.
- Pumps operate 10 hr out of 12-hr shift; two shifts per day.
- One tactical crew unit can deploy approximately 1,500 ft of hose per hour if the hose is prestacked on a trailer.

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- The ACS discharge hose test performed on September 27, 1997, with a Gorman Rupp pump, 4-inch suction hose, and 2,000 ft of 6-inch discharge hose demonstrated a capacity of 690 bbl/hr. The test was performed with water, and the pump had no problem pumping large volumes of water through 2,000 ft of hose.
- Approval from the Operations Section Chief is required for any vehicle tundra travel (off-road or off-pad), which must be in accordance with ACS' emergency tundra travel permit (See Tactic A-3). Any excavations in tundra or any tundra damage must be reported to the Operations Section Chief. All on-tundra activity must be documented and reported to the Planning Section for reporting to ensure permit compliance. Avoid archeological sites and biologically sensitive habitats. Travel across tundra with tracked vehicles, heavy equipment, and even foot traffic can seriously damage the vegetative mat, induce thermokarst, and cause structure disturbance. Using sheets of plywood as a traveling surface and minimizing trips with equipment greatly reduce disturbance of the tundra.
- The amount of oil will be estimated based on gauging by appropriate means (e.g., Coliwasa tube). Emulsion samples will be collected and analyzed for oil content.

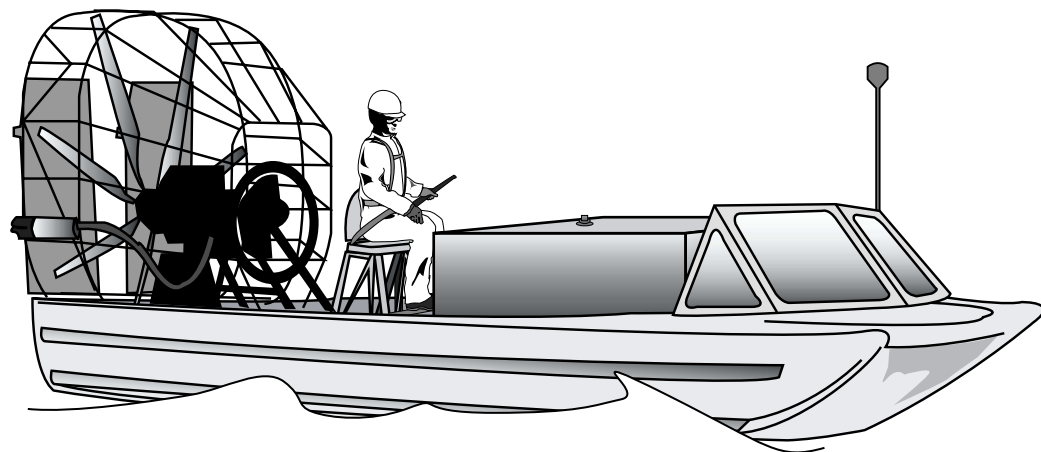


A system of hoses and pumps in series system is assembled to transfer stored liquids. Four- or 6-inch discharge hose is used in sections, with 4-inch or 6-inch trash pumps in series approximately 1,000 feet apart. Liquids are pumped to a storage tank or vacuum trucks, or are recycled into a pipeline. Hose and pumps in series are typically used across tundra, but if the hose crosses a road or pad, crossings are flagged and constructed with timbers over the hose. The hose is clearly marked.

To transport pumps and hose across the tundra, plywood sheets are laid out in the path. The trash pumps are towed behind an Argo all-terrain vehicle (ATV) or 4-wheeler across the plywood. A 4-inch trash pump weighs 825 pounds, and has an axle and wheels under its skid mount. An ATV towing a trailer carries the hose.

*NOTE: All values given on these pages are for planning purposes only.*

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A 300-gallon DOT tank is mounted on a 30-foot freighter airboat. Liquid is pumped from a recovery site pit, trench, or tank with a 2-inch trash pump onboard. The boat hauls the liquids to a disposal, transfer or storage site.

The airboat's tank is unloaded with a vacuum truck or at a tank farm.

**NOTE:** "Base Location" is storage location (may change seasonally); "Mobe Time" is time to get it out of storage, prepare it for operation, and make it ready to travel (concurrent for all equipment); "Deploy Time" is time to make it operational for its intended use at the spill site. These times do not include travel time from base to spill site, which may have multiple components (see Tactic L-3).

**EQUIPMENT AND PERSONNEL**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Freighter Airboat	ACS, KRU	Transport tank	1	4	1 hr	1 hr
Trash Pump (2-inch)	MPU, ACS, KRU	Fluid transfer	1	—	1 hr	
Discharge Hose (2-inch)	All	Fluid transfer	≥50 ft	—	1 hr	
Suction Hose (2-inch)	All	Fluid transfer	≥20 ft	—	2 hr	
Tank (300-gallon)	KRU	Fluid storage	1	—	1 hr	

**TOTAL STAFF 4**

**SUPPORT**

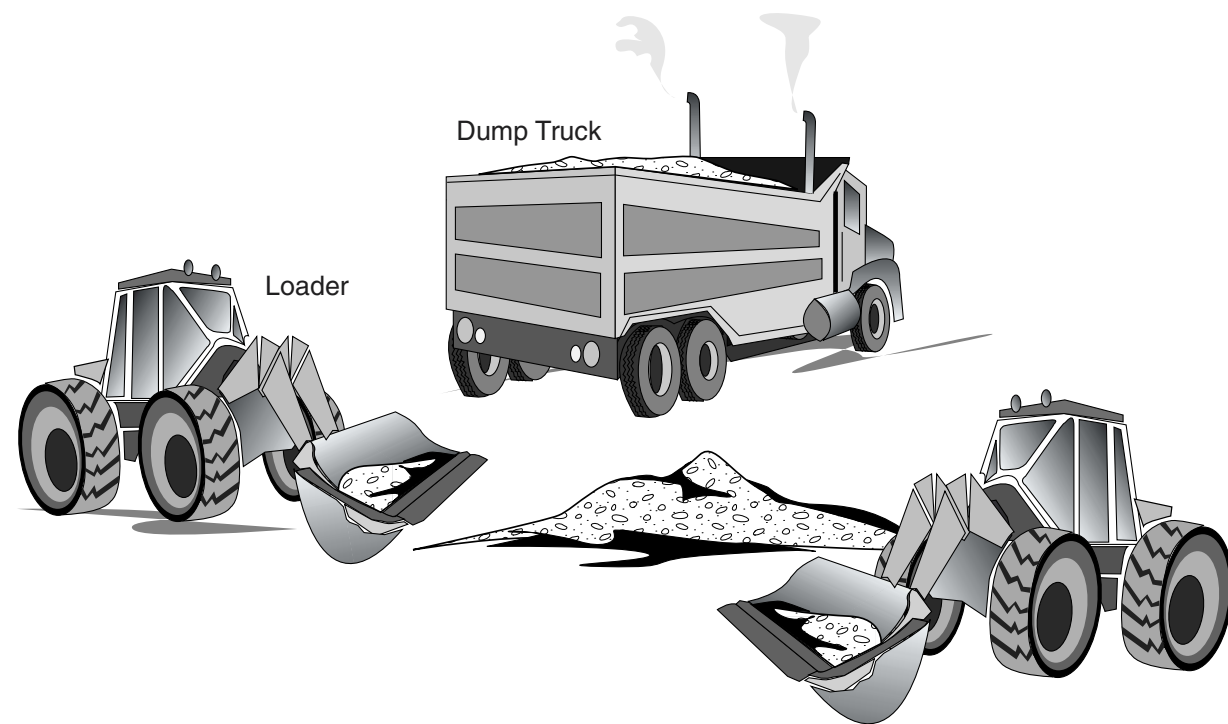
- The freighter airboat is offloaded to a tank farm or vacuum truck at a boat launch on the road system, or at a marine dock.
- A Manta Ray skimmer head onboard the airboat will serve as an option to recover from pits or trenches.

**CAPACITIES FOR PLANNING**

- Manufacturer's nameplate capacity of Multiquip/Tokai 2-inch trash pump: 312 bbl/hr
- The typical suction rate for liquids by a vacuum truck is 200 bbl/hr in the summer and 150 bbl/hr in the winter. The typical suction rate for pooled diesel remains at 200 bbl/hr year round. (Vacuum truck recovery rate is reduced to 34 bbl/hr if a Manta Ray skimmer is used.)
- Equipment and crews operate 10 hr in 12-hr shift; 2 shifts per day.
- Maximum load of freighter airboat = 8,500 lb.

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- Approval from the State On-Scene Coordinator is required for decanting available free water in inshore storage tanks.
- Have sorbent boom available at the transfer/disposal site as a contingency during tank offloading.
- The amount of oil will be estimated based on gauging by appropriate means (e.g., Coliwasa tube). Emulsion samples will be collected and analyzed for oil content.



Oiled gravel not considered a regulated waste is excavated with a front-end loader into dump trucks, which then drive to a temporary storage site or a disposal site. Contaminated gravel is stockpiled in temporary lined and diked containment areas.

A bulldozer or grader loosens the gravel for the front-end loader when necessary. A Bobcat replaces the front-end loader in hard-to-reach or tight quarters. Manpower with shovels may also be required under lines or facilities with less than 6-foot clearance.

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**EQUIPMENT AND PERSONNEL**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Front-End Loader	All	Recover oiled gravel	1	1	1 hr	0.5 hr
Bobcat	KRU, EOA, ACS	Recover oiled gravel	1	1	1 hr	0.5 hr
Grader Backhoe Dozer	All KRU, EOA, WOA, Peak, AIC, APC All	Loosen gravel	1	1	1 hr	0.5 hr
Dump Truck	KRU, EOA, WOA	Transfer oiled gravel	2 to 9	2 to 9	1 hr	0.5 hr

**TOTAL STAFF 3 (4 if grader, backhoe, or dozer used)**

**SUPPORT**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Semi and Trailer	EOA, WOA, KRU	Transport backhoe	1	1 driver	1 hr	0
Fuel Truck	All	Fuel heavy equipment	1	Once per shift	1 hr	0.5 hr
Mechanic Truck	All, except Badami	Support heavy equipment	1	1	1 hr	0.5 hr
Lube Truck	All	Provide fluids to heavy equipment	1	Once per shift	1 hr	0.5 hr

**CAPACITIES FOR PLANNING**

- A front-end loader with a 3-cubic-yd bucket recovers 100 cubic yd of gravel per hour, and can fill a dump truck in 30 minutes. The average dump truck available on the Slope has a 20-cubic-yd capacity.
- A front-end loader with a 4-cubic-yd bucket recovers 150 cubic yd of gravel per hour, and can fill a dump truck in 15 minutes.
- See Tactic R-1 for capacities of dump trucks available on the North Slope.
- Following is an example of dump-truck delivery rate of gravel for one 20-cubic-yd dump truck traveling 4 miles round trip (equipment and crews operate 10 hr in 12-hr shift; 2 shifts per day):

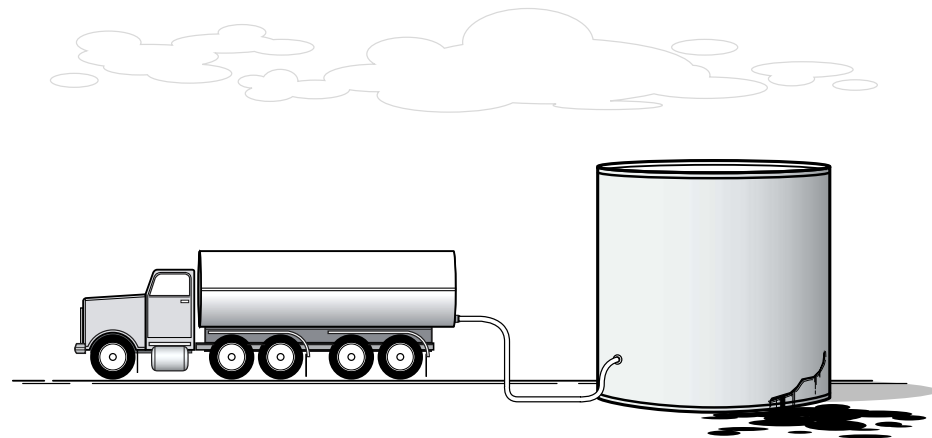
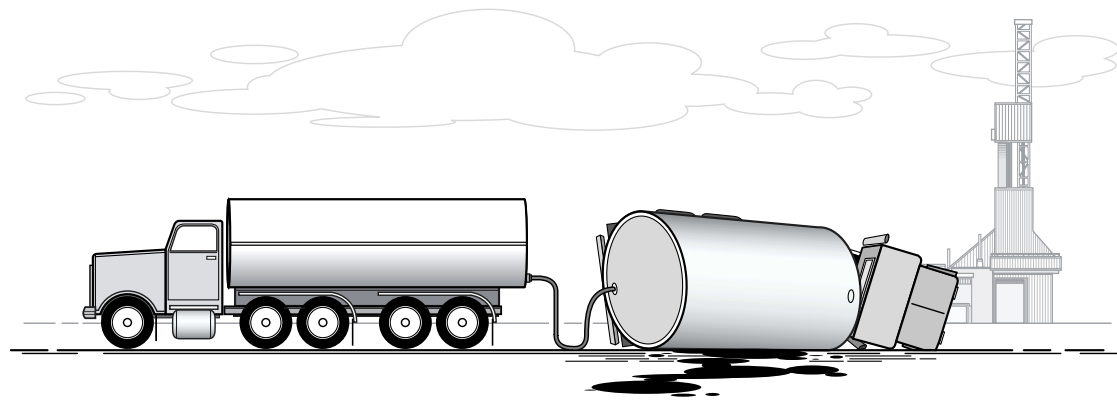
$$Dump\ Recovery = \frac{T_c}{L_t + T_t + U_t} = \frac{20\ cubic\ yd}{0.25\ hr + \left(\frac{2\ mi * 2}{35\ mph}\right) + 0.08\ hr} = 45\ cubic\ yd/hr\ or\ 5.6\ bbl/hr$$

Example:  $T_c = Truck\ Capacity$   
 $L_t = Load\ Time\ (15\ min\ or\ 0.25\ hr)$      $T_t = Travel\ Time\ \left(\frac{miles\ to\ disposal * 2\ trips}{35\ mph}\right)$   
 $U_t = Unload\ Time\ (5\ min\ or\ 0.08\ hr)$

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- This tactic is limited to oiled gravel with no free liquids. Depth of penetration of the spill into the gravel depends on the type of release and the released fluid. Diesel penetrates the gravel pad to a greater depth than crude oil.
- Storage sites must be located where they present minimal environmental impact.
- Set up a decontamination unit before oil handling work is performed.
- A temporary storage permit will be required from ADEC.
- On pads, check for buried pipe and/or cables prior to excavation. Obtain a civil work permit from the operator.

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Typically, transfer from a tank would be required if a stationary storage tank either was damaged or developed a serious integrity problem, or if a vacuum truck rolled over on the road and was damaged. Tank holes can be patched by different methods including plug and dike, wooden stakes, and patch kits.

Damaged tank transfers will generally involve flammable liquids, which require special considerations. Non-sparking pumps must be used for such transfers. Vacuum trucks are specially designed for most of these products and are readily available on the Slope. Product can also be transferred to a stationary tank in the vicinity of the damaged tank.

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NOTE: "Base Location" is storage location (may change seasonally); "Mobe Time" is time to get it out of storage, prepare it for operation, and make it ready to travel (concurrent for all equipment); "Deploy Time" is time to make it operational for its intended use at the spill site. These times do not include travel time from base to spill site, which may have multiple components (see Tactic L-3).

**EQUIPMENT AND PERSONNEL**

- Support personnel required include 2 responders per shift and one Safety Officer per shift.

	EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
	Vacuum Truck (300-bbl)*	All	Transfer	1	1	1 hr	0.5 hr
or	Fuel Truck	All	Transfer	1	1	1 hr	0.5 hr
or	Diaphragm Pump (3-inch)	All (ACS and MPU have diesel)	Transfer	1	2	1 hr	1 hr
	Suction Hose (3-inch)	All	Transfer	≥20 ft	—	2 hr	
	Discharge Hose (3-inch)	All	Transfer	≥50 ft	—	2 hr	

**TOTAL STAFF 3**

NOTE: Deploy times vary greatly based on the safety risk of the product involved.

\* Badami vacuum truck capacity = 80 bbl

**RECOVERY CAPACITIES FOR PLANNING**

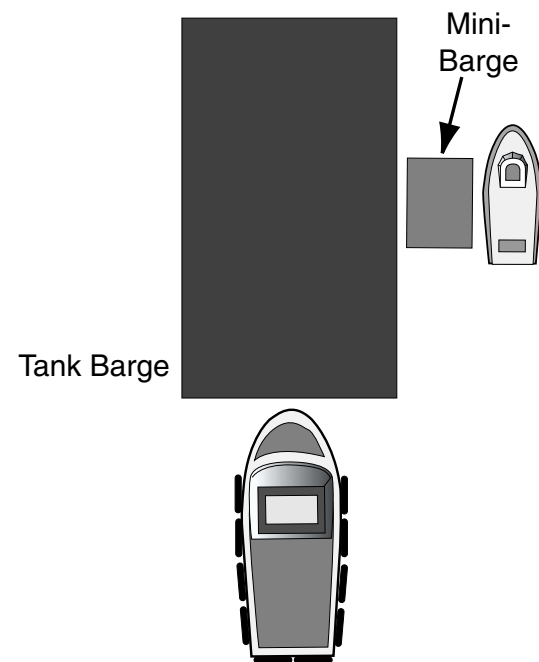
- The typical suction rate for liquids by a vacuum truck is 200 bbl/hr in the summer and 150 bbl/hr in the winter. The typical suction rate for pooled diesel remains at 200 bbl/hr year round. (Vacuum truck recovery rate is reduced to 34 bbl/hr if a Manta Ray skimmer is used.)
- 3-inch diaphragm pump capacity = 114 bbl/hr nameplate.
- Pumps operate 10 hr out of 12-hr shift; two shifts per day.

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- Inert gases may be required for displacing flammable or explosive air mixtures.
- A Safety Officer should be on site conducting continuous air monitoring.
- Plug-and-patch kits are available from owner company HAZMAT teams.
- Non-sparking tools may be required for working on equipment.
- The amount of oil will be estimated based on gauging by appropriate means (e.g., Coliwasa tube). Emulsion samples will be collected and analyzed for oil content.

NOTE: All values given on these pages are for planning purposes only.





A workboat with a crew of two tows a fully laden mini-barge to a waiting tank barge with a lightering crew of three; the towing speed is 5 knots. The mini-barge is tied off using appropriate fendering, and a Declaration of Inspection form is filled out. Before the mini-barge is offloaded, a bonding cable is used for protection against accidental ignition.

To offload the mini-barge, a 4-inch trash pump or DOP 250 pump is used depending on the oil viscosity. Personnel monitor the barge tie-up lines during offloading to minimize barge surge. When pumping is complete, hatches are put back in place, and hoses and pumps are retrieved and secured. After the bonding cable is removed, the mini-barge is ready to return to service.

The barges can also be offloaded directly to a tank onshore.

**NOTE:** "Base Location" is storage location (may change seasonally); "Mobe Time" is time to get it out of storage, prepare it for operation, and make it ready to travel (concurrent for all equipment); "Deploy Time" is time to make it operational for its intended use at the spill site. These times do not include travel time from base to spill site, which may have multiple components (see Tactic L-3).

**EQUIPMENT AND PERSONNEL**

- Vessels are to be selected according to area, water depth restrictions, and function (see Tactic L-6).

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Tug	West Dock	Tow barge	1	4	2 hr	2 hr
Tank Barge	West Dock	Fluid storage	1	3	4 hr	
249-bbl Mini-Barge (with 237 bbl available storage)	West Dock, Oliktok	Fluid storage and transport	≥1	—	1 hr	
Work Boat*	All	Tow mini-barge	1	—	1 hr	
Suction Hose (4-inch)	ACS, WOA	Lightering	≥20 ft	—	2 hr	
Discharge Hose (4-inch w/ 6-inch to 4-inch reducer)	All	Lightering	≥50 ft	—	1 hr	
Trash Pump (4-inch)	ACS, WOA, EOA	Lightering	2	2	1 hr	
DOP 250 Pump w/Power Pack	ACS, KRU	Lightering	1	2	1 hr	

**TOTAL STAFF 11**

\*Work boat staff are counted in recovery.

**SUPPORT**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Fuel Truck	All	Provide diesel fuel for boats and pumps	1	Once per shift	1 hr	0.5 hr

**RECOVERY CAPACITIES FOR PLANNING**

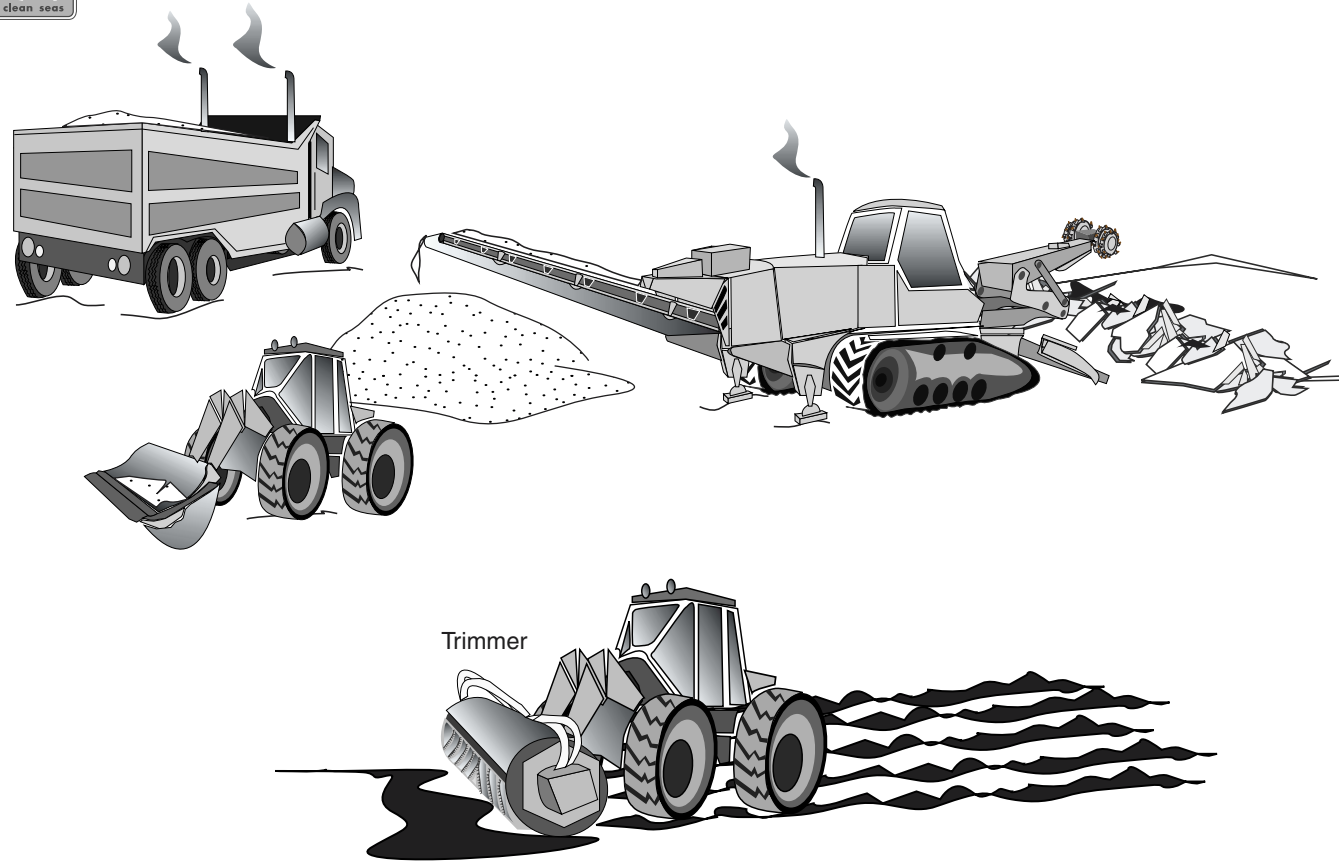
- 4-inch Gorman-Rupp trash pump capacity = 1,014 bbl/hr nameplate.
- DOP 250 pump capacity = 628 bbl/hr nameplate

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- A tankerman will assist with any lightering operations.
- The mini-barges have davits, but the DOP 250 pumps can be deployed by hand.
- If the recovered oil is weathered to the point that the 4-inch trash pump will not work, the DOP 250 pump will be used.
- Hazards include open hatches, coiled lines, and hoses. Beware of pinch points between barges and boats. Hearing protection and possibly respirators will be required.
- Approval from the Operations Section Chief is required for any vehicle tundra travel (off-road or off-pad), which must be in accordance with ACS' emergency tundra travel permit (See Tactic A-3). Any excavations in tundra or any tundra damage must be reported to the Operations Section Chief. All on-tundra activity must be documented and reported to the Planning Section for reporting to ensure permit compliance. Avoid archeological sites and biologically sensitive habitats. Travel across tundra with tracked vehicles, heavy equipment, and even foot traffic can seriously damage the vegetative mat, induce thermokarst, and cause structure disturbance. Using sheets of plywood as a traveling surface and minimizing trips with equipment greatly reduce disturbance of the tundra.
- The amount of oil recovered will be estimated based on gauging by appropriate means (e.g., ullage tape). Emulsion samples will be collected and analyzed for oil content.

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During the winter, ice rubble piles can form at shorelines and manmade structures in the Beaufort Sea. Oil entrained in these piles can be accessed by removing the oiled ice with an ice-miner that grinds up the ice and deposits it in a pile that can be picked up with a front end loader and hauled away by dump truck.

This tactic can be used in winter and into breakup as long as the ice is thick enough to support the weight of vehicles and heavy equipment

**EQUIPMENT AND PERSONNEL**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Ice Miner	KRU, WOA, EOA	Grinding oiled ice rubble	1 (3 are available on the Slope)	1	1 hr	0.5 hr
Roto Trimmer	KRU, WOA, EOA	Grinding oiled ice rubble	1 (3 are available on the Slope)	1	1 hr	0.5 hr
Front-End Loader	All	Transfer oiled snow into dump trucks	1	1	1 hr	0.5 hr
Dump Trucks	KRU, WOA, EOA, Peak, AIC	Transfer oiled snow to disposal site	≥2	≥2	1 hr	0.5 hr

**NOTE:** "Base Location" is storage location (may change seasonally); "Mobe Time" is time to get it out of storage, prepare it for operation, and make it ready to travel (concurrent for all equipment); "Deploy Time" is time to make it operational for its intended use at the spill site. These times do not include travel time from base to spill site, which may have multiple components (see Tactic L-3).

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**NOTE:** "Base Location" is storage location (may change seasonally); "Mobe Time" is time to get it out of storage, prepare it for operation, and make it ready to travel (concurrent for all equipment); "Deploy Time" is time to make it operational for its intended use at the spill site. These times do not include travel time from base to spill site, which may have multiple components (see Tactic L-3).

**SUPPORT**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Semi and Trailer	EOA, WOA, KRU	Transport ice miner	1	1 driver	1 hr	0
Tioga Heaters	All	Heat	≥1	1 initial setup	1 hr	0.5 hr
Fuel Truck	All	Fuel heavy equipment	1	Once per shift	1 hr	0.5 hr
Mechanic Truck	All, except Badami	Support heavy equipment	1	1	1 hr	0.5 hr
Lube Truck	All	Provide fluids to heavy equipment	1	Once per shift	1 hr	0.5 hr
Light Plants	All	Illumination	≥1	2 for initial setup, and 1 to check and fuel occasionally.	1 hr	0.5 hr

**CAPACITIES FOR PLANNING**

- Capacity of ice miner: 1,400 cubic yd per hour for sea ice, 1,420 cubic yd per hour for freshwater ice.
- A front-end loader with an 8-cubic-yd snow bucket can fill a dump truck in 10 minutes and move 500 cubic yd per hour. The dump trucks available on the Slope typically have 10-, 20-, or 25-cubic-yd capacity. To keep pace with the ice miner, it may be necessary to load more than one truck at a time.
- See Tactic R-1 for capacities of dump trucks available on the North Slope.
- Following is an example of recovery of oiled ice for one 20-cubic-yd dump unit:

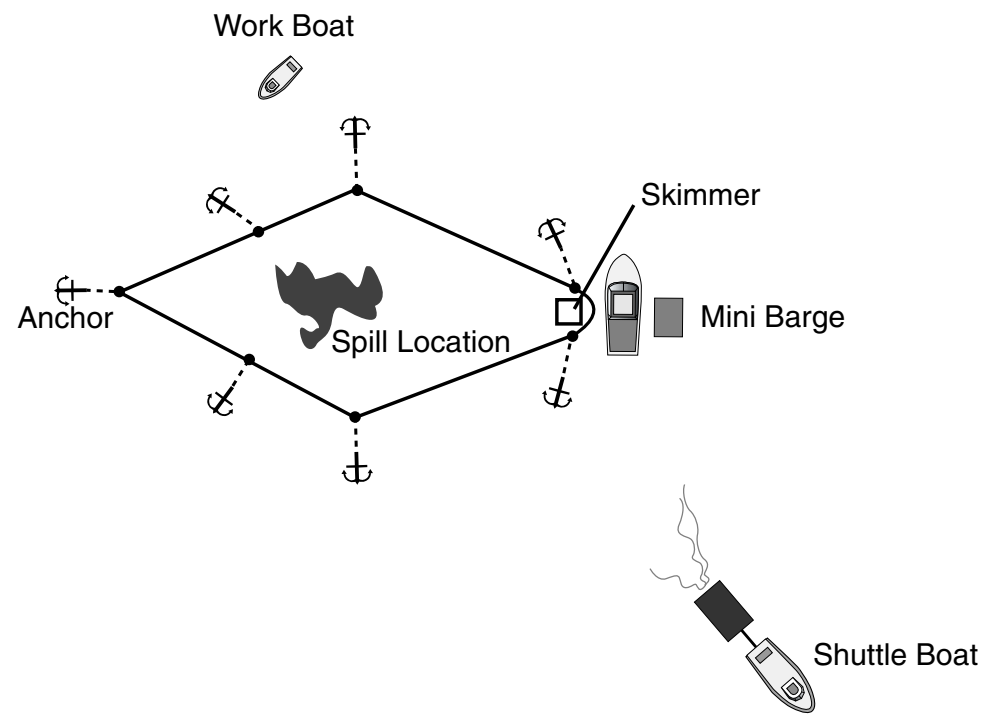
$$Dump\ Truck\ Recovery = \frac{T_c}{L_t + T_t + U_t} = \frac{20\ cubic\ yd}{0.17\ hr + \left(\frac{2\ mi * 2}{35\ mph}\right) + 0.08\ hr} = 55\ cubic\ yd/hr$$

Example:  $T_c = Truck\ Capacity$   
 $L_t = Load\ Time\ (10\ min\ or\ 0.17\ hr)$       $T_t = Travel\ Time\ \left(\frac{miles\ to\ disposal * 2}{35\ mph}\right)$   
 $U_t = Unload\ Time\ (5\ min\ or\ 0.08\ hr)$

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- This tactic is limited to oiled ice with no free liquids.
- If the dump trucks cannot access the oiled area, build an ice road to keep the loaders from traveling too far.
- After removal of free oil, oiled snow, and after flushing, contain and monitor the area until breakup. Insulate ice roads or ice berms to provide containment during breakup, when the oil can be removed with direct suction, portable skimmers, or burning.

NOTE: All values given on these pages are for planning purposes only.



During a subsea pipeline break a diamond-patterned boom can be deployed around the break. A skimmer can be used at any point of the diamond to ensure collection regardless of the wind direction.

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**EQUIPMENT AND PERSONNEL**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Work Boat	West Dock	Run skimmer and pump; tow mini-barge while loading	1	4	1 hr	4 hr
Work Boat	West Dock	Boom deployment and tending	1	3	1 hr	
Work Boat	West Dock	Tow mini-barge to unload	1	3		
Skimmer	ACS	On-water recovery	1	—	0.5 hr	
Boom	All	On-water recovery	Variable	—	1 hr	
Anchor System	All	Anchor boom	8	—	1 hr	
249-bbl Mini-Barge (237-bbl available storage)	West Dock, Oliktok	Immediate storage	2	—	1 hr	2 hr

**TOTAL STAFF 10**

**SUPPORT**

- See Tactic R-28 for lightering with mini-barges.

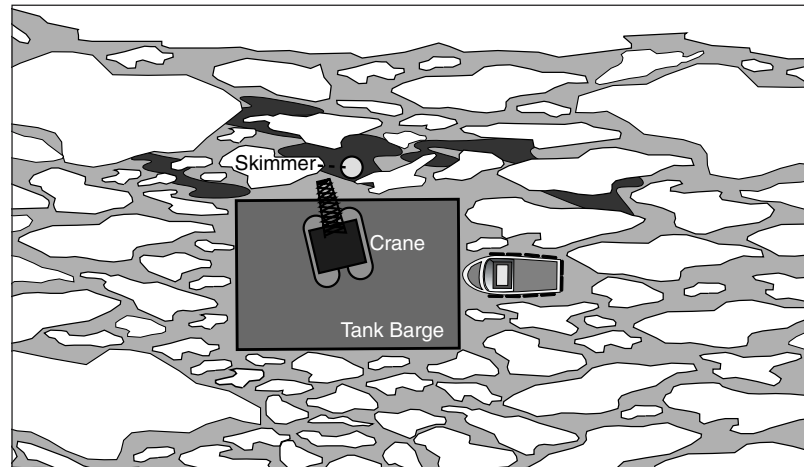
**CAPACITIES FOR PLANNING**

SKIMMER EQUIVALENT	UN-DERATED LIQUID CAPACITY (BBL/HR)	EFFICIENCY MULTIPLIER	DERATED ORR (BBL/HR)
Weir Skimmer	Manufacturer's nameplate pump capacity	0.2	0.2 times manufacturer's nameplate pump capacity
LORI LSC	271	0.8	217
Vikoma 30K	189	N/A	10
Morris 30K	142	N/A	10
Foxtail Rope Mop V.A.B. 4-9	249	0.3	75
Other Oleophilic Skimmers	Manufacturer's nameplate pump capacity	0.8	0.8 times manufacturer's nameplate pump capacity

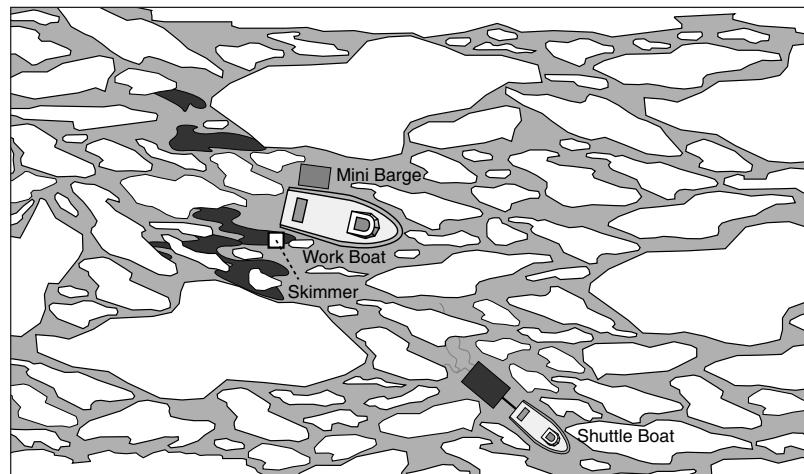
**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- The skimming system would be located on the downwind side of the diamond.
- This tactic may also be used in broken ice conditions to deflect ice away from the spill location.
- Boom apex may be opened to direct oil to vessel-based containment.
- Approval to decant is needed from the State On-Scene Coordinator. Appropriate agencies will be consulted to determine site-specific stipulations.
- The amount of oil recovered will be estimated based on gauging by appropriate means (e.g., ullage tape). Emulsion samples will be collected and analyzed for oil content.

NOTE: All values given on these pages are for planning purposes only.



OPTION A



OPTION B

A workboat/barge utilizing various skimmers travels around the spill area collecting oil in pockets from areas of broken ice. The workboat/barge crane places the skimmers into the deepest pools of oil. The workboat/barge has no advance speed as it is collecting oil in pockets and is not using boom.

**EQUIPMENT AND PERSONNEL**

- Select vessels, booms, and skimmers according to area, water depth restrictions, and function (see Tactic L-6).

OPTION A

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Tank Barge	West Dock	Skimmer mount	1	14	4 hr	3 hr
Tug	West Dock	Tow barge	1	4	2 hr	
Skimmer (various)	ACS	On-water recovery	1	—	1 hr	
Mobile Crane (minimum 90-ton)	EOA, WOA, KRU, Peak	Skimmer deployment	1	1	1 hr	
DOP 250 Pump (w/power pack)	ACS, KRU, North Star	Decant	1	—	1 hr	
Discharge Hose (4-inch w/ 6-inch to 4-inch reducer)	ACS, WOA, KRU	Decant	≥50 ft	—	1 hr	

**TOTAL STAFF 19**

**NOTE:** "Base Location" is storage location (may change seasonally); "Mobe Time" is time to get it out of storage, prepare it for operation, and make it ready to travel (concurrent for all equipment); "Deploy Time" is time to make it operational for its intended use at the spill site. These times do not include travel time from base to spill site, which may have multiple components (see Tactic L-3).

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**NOTE:** "Base Location" is storage location (may change seasonally); "Mobe Time" is time to get it out of storage, prepare it for operation, and make it ready to travel (concurrent for all equipment); "Deploy Time" is time to make it operational for its intended use at the spill site. These times do not include travel time from base to spill site, which may have multiple components (see Tactic L-3).

**EQUIPMENT AND PERSONNEL (CONT.)**

OPTION B

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Work Boat	West Dock	Tow mini-barge while loading, operate skimmer and pump	1	4	1 hr	4 hr
Work Boat	West Dock	Tow mini-barge	1	3	1 hr	
Skimmer	West Dock	On-water recovery	1	—	1 hr	
249-bbl Mini-Barge (237-bbl available storage)	West Dock, KRU	Immediate storage	2	—	1 hr	
Trash Pump (3-inch)	All	Decanting	1	—	1 hr	
Suction Hose (3-inch)	All	Decanting	≥20 ft	—	2 hr	
Discharge Hose (3-inch)	All	Decanting	≥50 ft	—	2 hr	

**TOTAL STAFF 7**

**SUPPORT**

- An aircraft tracks the oil from above and coordinates the on-water task forces (preferably twin-engined aircraft or single-engined aircraft on floats).

**CAPACITIES FOR PLANNING**

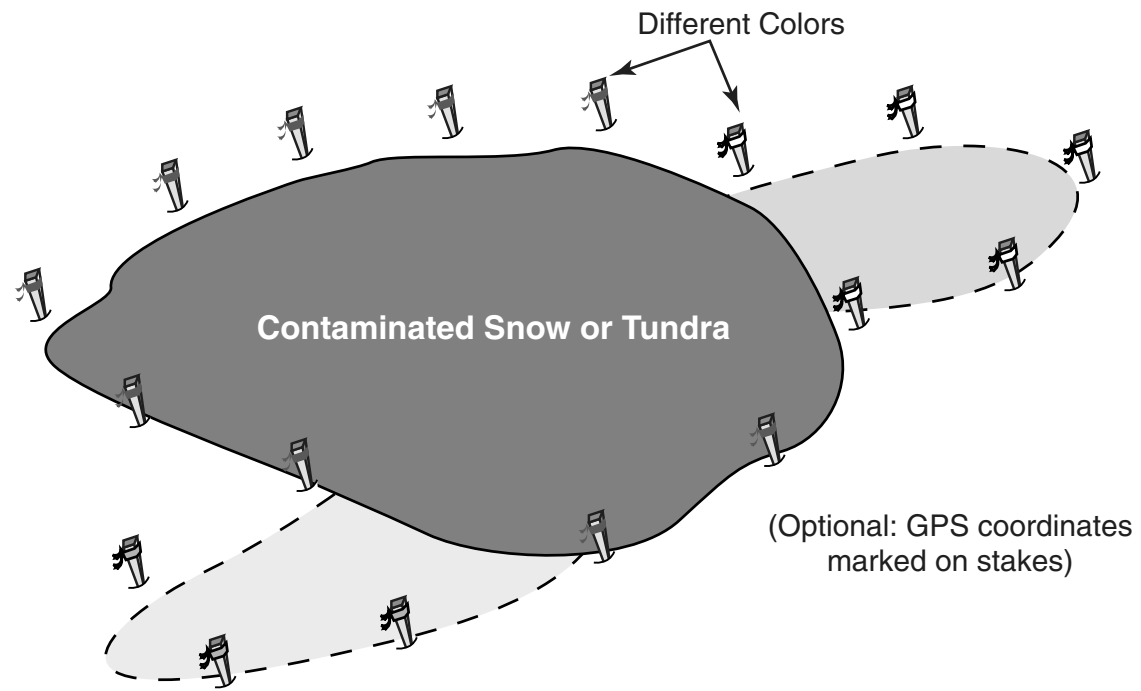
SKIMMER EQUIVALENT	UN-DERATED LIQUID CAPACITY (BBL/HR)	EFFICIENCY MULTIPLIER	DERATED ORR (BBL/HR)
Weir Skimmer	Manufacturer's nameplate pump capacity	0.2	0.2 times manufacturer's nameplate pump capacity
LORI LSC	271	0.8	217
Vikoma 30K	189	N/A	10
Morris 30K	142	N/A	10
Desmi 250 (Ocean)	628	0.2	125
Desmi 250 (Habor)	440	0.2	88
Foxtail Rope Mop V.A.B. 4-9	249	0.3	75
Other Oleophilic Skimmers	Manufacturer's nameplate pump capacity	0.8	0.8 times manufacturer's nameplate pump capacity

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- Approval to decant is needed from the State On-Scene Coordinator. Appropriate agencies will be consulted to determine site-specific stipulations.
- The amount of oil recovered will be estimated based on gauging by appropriate means (e.g., ullage tape). Emulsion samples will be collected and analyzed for oil content.

NOTE: All values given on these pages are for planning purposes only.





The extent of an oil spill on snow or tundra is delineated so that the oil can be found if subsequent snowfall or windblown snow covers the spill.

Two crews walk the perimeter of the spill in opposite directions from a common point, and meet on the opposite side of the spill. As they walk, they place wood laths in the ground/snow every 50 to 100 feet at the edge of the spill, depending on terrain and the spill detail. The crews then retrace their routes to confirm their delineation. The crews may be assisted by snow machine, Argo, pickup truck with Mattracks, or similar personal motorized vehicle. The crews are part of the SRT.

For a small spill, one crew is sufficient.

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**EQUIPMENT AND PERSONNEL**

- Each staking crew has 2 SRT staff.

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Wooden Lath Stakes	All	Delineation	One for every 100 ft of spill perimeter	2	1 hr	0.5 hr
Light Plant	All	Illumination	≥1	2 for initial setup, and 1 to check and fuel occasionally.	1 hr	0.5 hr
GPS Unit	All	Mapping	1 per crew	—	0.5 hr	0.5 hr

**TOTAL STAFF 4**

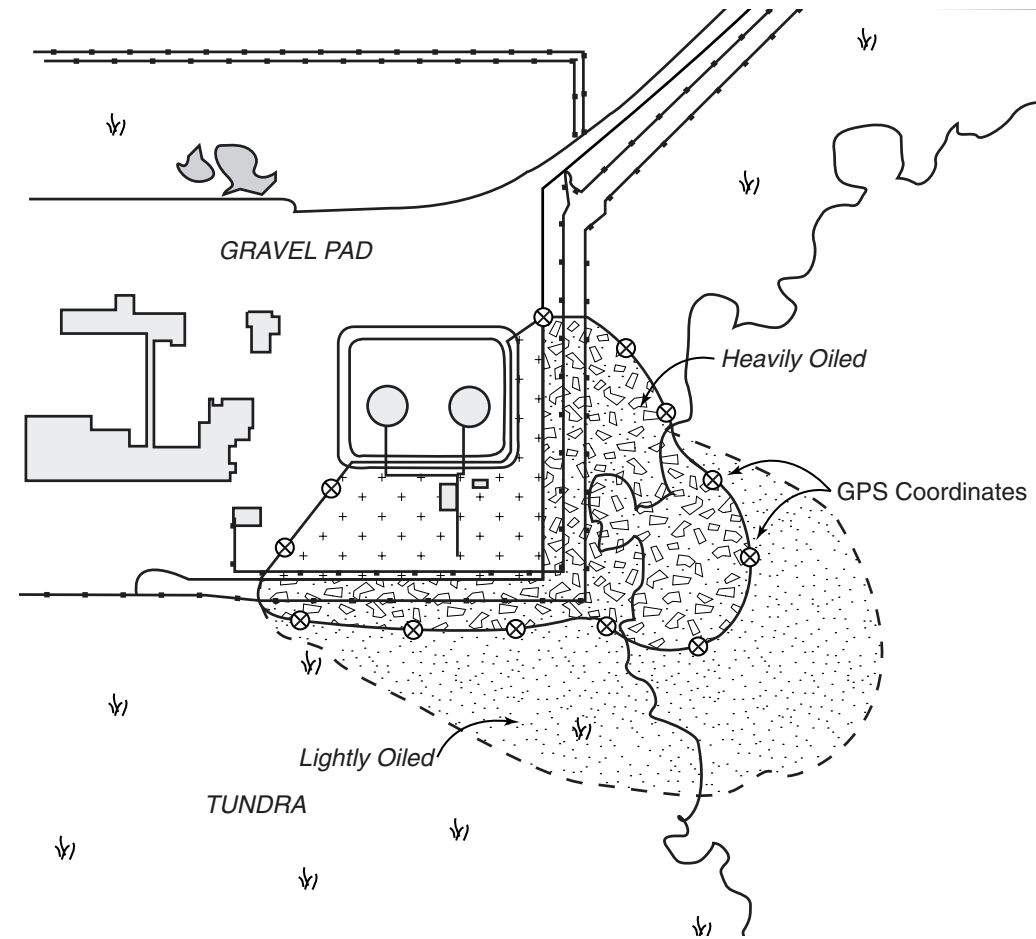
**SUPPORT**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Argo	ACS, KRU, WOA	Support	2	4	1 hr	0.5 hr
Snow Machines	All	Support	2	2	1 hr	0.5 hr
Tracked Vehicle	KRU, WOA	Support	1/crew	2 to 3	1 hr	0

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- If the wind is blowing contaminated snow outside the originally staked perimeter, make subsequent delineations as necessary.
- Use flagging on the new stakes to distinguish delineation events.
- Designate further staking with different colors of flagging.
- Approval from the Operations Section Chief is required for any vehicle tundra travel (off-road or off-pad), which must be in accordance with ACS' emergency tundra travel permit (See Tactic A-3). Any excavations in tundra or any tundra damage must be reported to the Operations Section Chief. All on-tundra activity must be documented and reported to the Planning Section for reporting to ensure permit compliance. Avoid archeological sites and biologically sensitive habitats. Travel across tundra with tracked vehicles, heavy equipment, and even foot traffic can seriously damage the vegetative mat, induce thermokarst, and cause structure disturbance. Using sheets of plywood as a traveling surface and minimizing trips with equipment greatly reduce disturbance of the tundra.

NOTE: All values given on these pages are for planning purposes only.



An initial hand-drawn map is delivered to other responders by the staff performing the initial surveillance. A more detailed and accurate map is then provided using one of the following options:

- The crews performing the delineation take GPS readings at each stake point. The point is recorded on the stake with a permanent marker, recorded in the GPS unit, and later entered into MapInfo® GIS software (available at all owner locations). A detailed map is drawn by one Situation Unit support staff using MapInfo®. The map is available within two hours after the information is provided to the SRT support staff.
- A survey crew is called out after the delineation crew has staked the area, and the contractor records the staked points with GPS or survey equipment. The contractor transfers the information to MapInfo®, and a detailed map is drawn from that information.
- The Kuparuk Twin Otter flies over the spill-affected area, recording the fly-over with the forward-looking infrared (FLIR) system. The IR readings recorded by the fly-over are then overlain on a MapInfo® map of the area, and a detailed map of the spill is produced from that. This same task can be performed by a hand-held IR sensor available at Kuparuk.

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**EQUIPMENT AND PERSONNEL**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Kuparuk Twin Otter with FLIR	KRU	Surveillance	1	3	1 hr	1 hr
Hand-Held FLIR	KRU	Mapping	1/crew	Part of delineation staff	0.5 hr	0.5 hr
MapInfo® Software	All	Mapping	1	Part of delineation staff	—	—
GPS Unit	All	Mapping	1/crew	Part of delineation staff	0.5 hr	0.5 hr

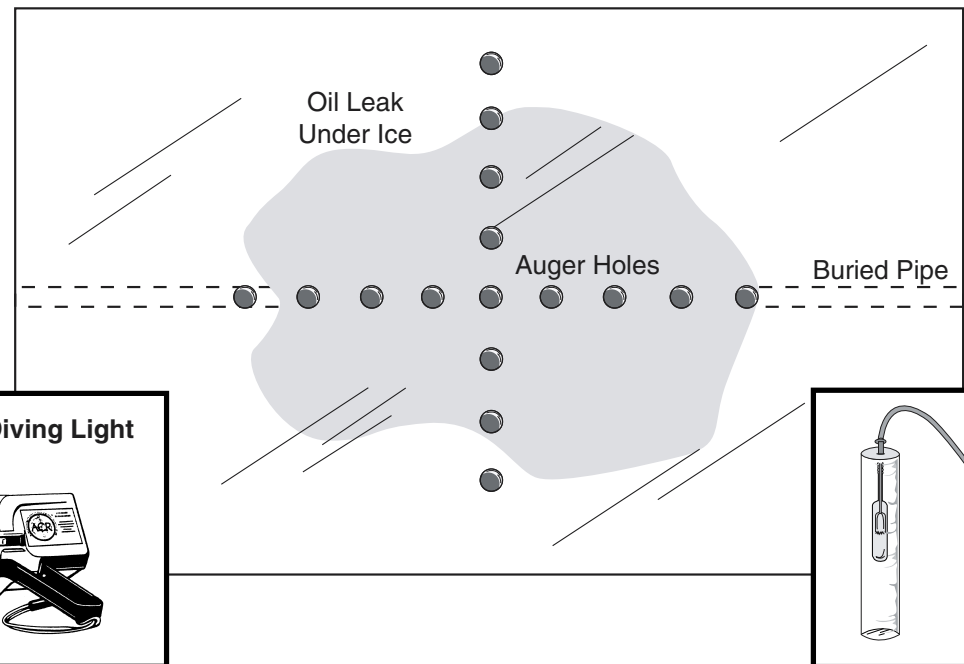
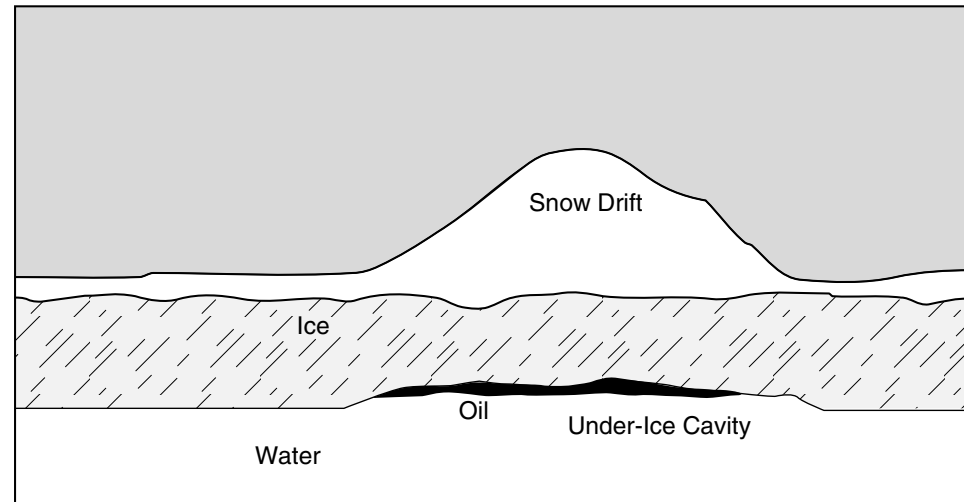
**SUPPORT**

- Support for this function is administrative.

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- The choice of surveillance and mapping instruments is determined by the size of the spill, site access, available equipment, and weather.
- If the spill is re-delineated, update the maps.
- Approval from the Operations Section Chief is required for any vehicle tundra travel (off-road or off-pad), which must be in accordance with ACS' emergency tundra travel permit (See Tactic A-3). Any excavations in tundra or any tundra damage must be reported to the Operations Section Chief. All on-tundra activity must be documented and reported to the Planning Section for reporting to ensure permit compliance. Avoid archeological sites and biologically sensitive habitats. Travel across tundra with tracked vehicles, heavy equipment, and even foot traffic can seriously damage the vegetative mat, induce thermokarst, and cause structure disturbance. Using sheets of plywood as a traveling surface and minimizing trips with equipment greatly reduce disturbance of the tundra.

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Oil released under a solid sea-ice sheet or that finds its way under the ice through cracks and leads will spread under the ice and collect in under-ice pockets. The underside of sea ice contains many of these pockets that reflect snow drifts on the surface of the ice. Snow drifts insulate the ice, thereby reducing ice growth and forming pockets. Once in a pocket, oil will tend to stay in place, since it takes a current of approximately 0.7 feet/second to push the oil out. Oil in pockets will become encapsulated as the ice grows.

Use an ice auger to drill holes and place underwater lights to shine up through the ice (the snow must first be removed from surface). A series of auger holes can be drilled in a line from the source to delineate the extent of under-ice oil contamination.



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**EQUIPMENT AND PERSONNEL**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Ice Auger	All	Detection	2	4	1 hr	0.5 hr
Underwater Light	ACS, WOA	Detection	2	1	1 hr	0.5 hr
Front-end Loader w/Bucket	All	Snow Removal	1	1	1 hr	0.5 hr
ATVs w/Plow	ACS, EOA, END, KRU, WOA	Snow Removal	2	2	1 hr	0.5 hr
Snow Machine	All	Personnel Transportation	4	4	1 hr	0.5 hr

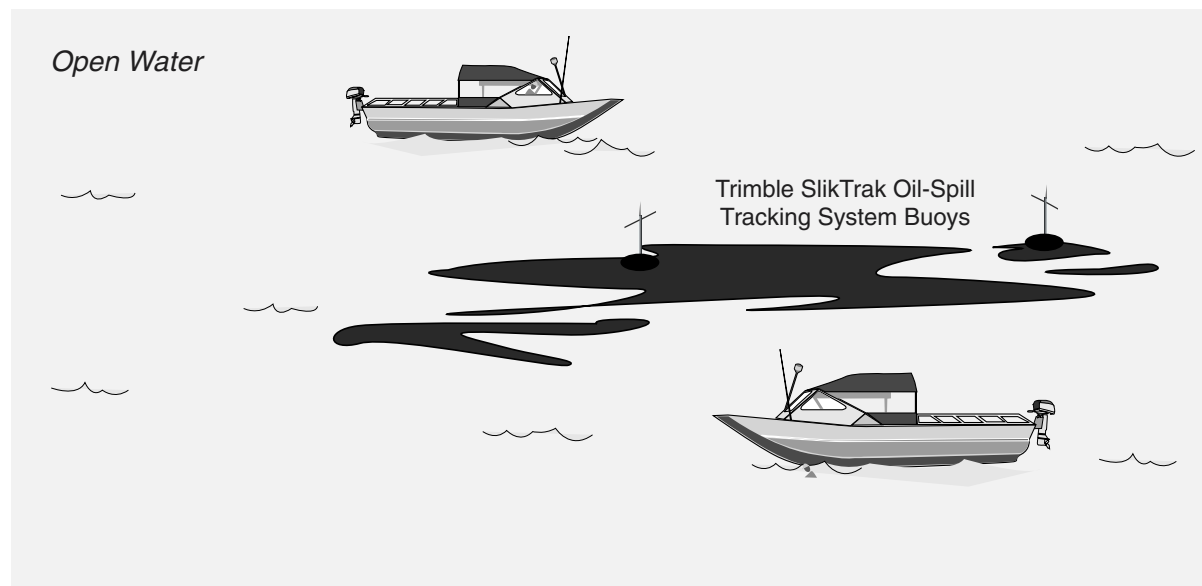
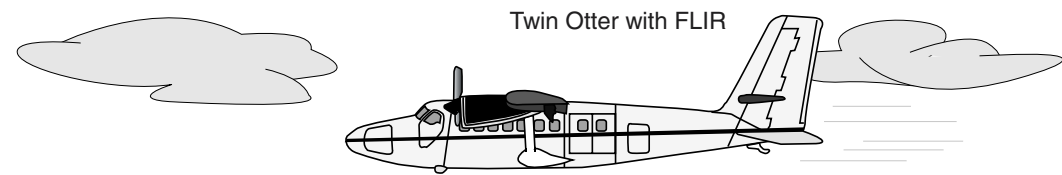
**TOTAL STAFF 6**

**SUPPORT**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Generator	All	Electricity	2	2 for setup	1 hr	0.5 hr
Light Plant	All	Illumination	≥1	2 for initial setup, and 1 to check and fuel occasionally	1 hr	0.5 hr
Mechanic Truck	All, except Badami	Support equipment	1	1	1 hr	0.5 hr
Fuel Truck	All	Fuel heavy equipment	1	Once per shift	1 hr	0.5 hr
Lube Truck	All	Provide fluids to heavy equipment	1	Once per shift	1 hr	0.5 hr

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- Check ice thickness before moving heavy equipment onto ice (see Tactic L-7).
- A loader with tundra tires or possibly a Challenger rubber-tracked dozer may have to move snowdrifts.
- Winds will affect water movement even under ice.
- During the ice-growth period from December to April, oil films up to several inches thick can be completely encapsulated by new ice within 36 hours.
- In some situations, it may be most effective to cut a hole in the ice and have divers conduct an underwater survey for oil.



The oil slick is tracked by visual observation from the Kugaruk Twin Otter. The Twin Otter provides radio reports and forward-looking infrared (FLIR) videotape images. The thicker areas of oil within an oil slick emit more thermal radiation than the surrounding water and show up in the image as white or hot spots. The FLIR system works day or night.

Boat operators deploy Trimble SlikTrak Oil-Spill Tracking System buoys into the slick from response vessels. This system consists of a receiver, antenna, computer, and buoy equipped with a transmitter. The receiver package is located onboard either a boat or an aircraft. The onboard Trimble SlikTrak receiver monitors the buoys within line-of-sight and tracks up to six buoys at once.



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**EQUIPMENT AND PERSONNEL**

- Each aircraft carries two observation personnel: the FLIR or Trimble SlikTrak receiver operator and an additional oil observer. The response vessel crew deploys the tracking buoys.

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Kugaruk Twin Otter with FLIR	KRU	Aerial tracking and response coordination	1	3	1 hr	1 hr
Trimble SlikTrak Receiver (with antenna, computer, power supply, and cables)	ACS	Track transmitter buoys	1	1	2 hr	1 hr
Trimble SlikTrak Oil-Spill Tracking Buoys	ACS	Track the oil slick	6	—	2 hr	1 hr
Work Boat	All	Deploy tracking buoys	1	2	2 hr	0

**SUPPORT**

- A response vessel berthed at West Dock deploys the transmitter buoys into the slick during response operations.

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- Most skimming operations receive aerial observation reports to help them position for oil recovery. A helicopter can also help coordinate on-water operations.





Helicopter operators deploy ice beacons into the slick. The beacon system consists of a GPS receiver, antenna, and beacon equipped with a transmitter. Beacon positions are transmitted to the Command Center via e-mail.

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**EQUIPMENT AND PERSONNEL**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Helicopter		Deployment of beacons	1	2	1 hr	1 hr
Ice Beacons	ACS Base	Track oil in ice	6	—	2 hr	1 hr

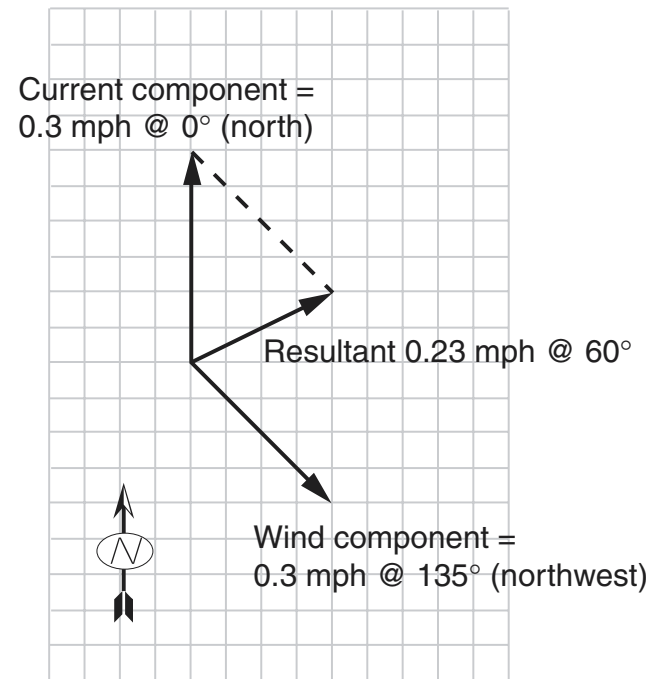
**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- This tactic is used to track oil in ice that is not thick enough to support on-ice response tactics.

NOTE: All values given on these pages are for planning purposes only.



**SAMPLE VECTOR ADDITION**



**VECTOR ADDITION**

Movement of oil on the open ocean is affected by two forces: water current and the wind. Oil is predicted to move at the same speed as the underlying water and at about 3% of the wind speed. The direction and speed of movement of oil on water can be predicted by vector addition. An example is provided above.

Reports of current wind and temperature and 24-hour weather forecasts are available from 659-5888 (recording) and 659-5251 (Prudhoe Bay airport tower). Surface water direction and speed may be estimated by three methods:

- Reports of observed water movement from field staff,
- The oceanography volumes of the Endicott Environmental Monitoring Program annual reports (e.g., U.S. Army Corps of Engineers, 1990), and
- *Alaska Clean Seas Technical Manual Atlas*.

Wind generally drives ocean surface currents in the vicinity of the North Slope oil production facilities. Wind shifts can reverse surface water currents within a few hours (Bryan Trimm, pers. comm., 1997). Coastal landforms affect the nearshore currents.

**TRAJECTORY MODELLING**

The National Oceanic and Atmospheric Administration (NOAA) has the ability to provide computer-generated predictions of oil movement on water. NOAA provides the predicted trajectory based on data on the product released, its location, current and predicted weather.

ACS maintains an Internet account with NOAA for downloading trajectory predictions. NOAA requires approximately 3 hours to calculate the trajectory. The model can also be accessed by contacting Dr. John Whitney, Scientific Support Coordinator, USCG Marine Safety Office in Anchorage (phone 907-271-3593 and fax 907-271-3139) or NOAA Hazardous Materials Response and Assessment Division in Seattle (206-526-6317).

An example of the exact information required to run the trajectory analysis is provided below.

Gentlemen: In response to a release of oil, please provide spill trajectories for the next 24 hour period. Transmit the trajectories by Internet to Alaska Clean Seas NOAA account. Notify Alaska Clean Seas of the transfer at (907) 659-2405.

Incident Name \_\_\_\_\_ Release Location Lat. \_\_\_\_\_ Long. \_\_\_\_\_

Geographic Description: \_\_\_\_\_

Is release continuing?  Yes  No Time of Release \_\_\_\_\_ Volume Spill \_\_\_\_\_

If continuing release, what is rate? \_\_\_\_\_ bbl/hr

Material Spilled \_\_\_\_\_ Current Weather Air Temp. \_\_\_\_\_ °F

Wind Speed \_\_\_\_\_ kt Wind Direction \_\_\_\_\_ 24 hour Forecast Air Temp \_\_\_\_\_ °F

Wind Speed \_\_\_\_\_ kt Wind Direction \_\_\_\_\_

Current Slick Location Lat. \_\_\_\_\_ Long. \_\_\_\_\_

(Optional)

Time of Current Slick Location \_\_\_\_\_

(Optional)

**FOR DRILLS ONLY**

1. Is this a tabletop drill?  Yes  No
2. Is this an equipment deployment drill?  Yes  No
3. Are objects in water being used to simulate oil?  Yes  No
4. Are other trajectory models being used?  Yes  No

**REFERENCES**

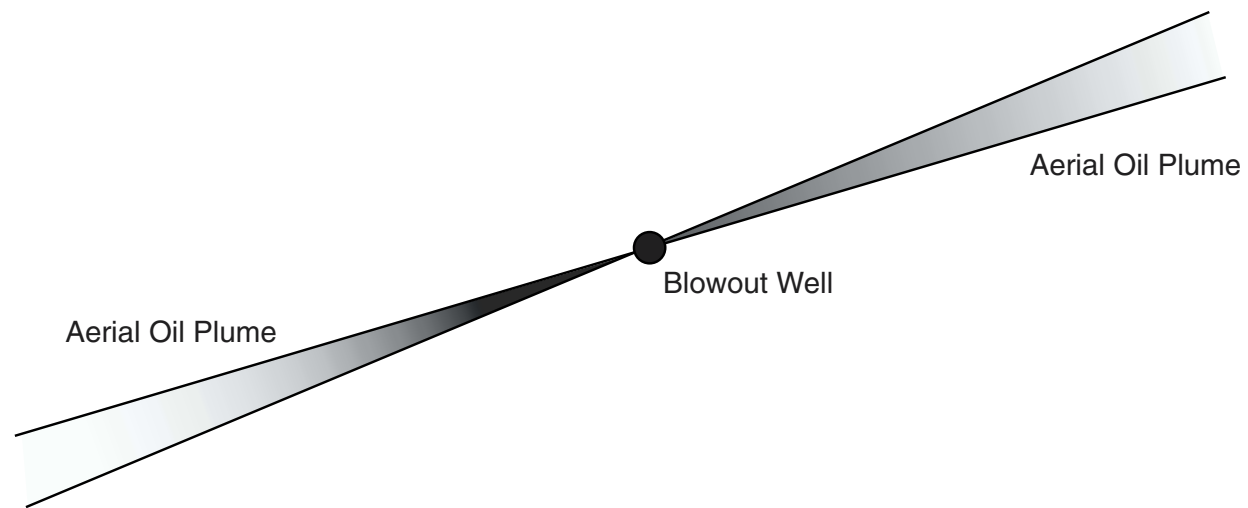
Waldman, G. A., R. A. Johnson, and P. C. Smith. 1973. The spreading and transport of oil slicks on the ocean in the presence of wind, waves, and current. AVCO Systems Division. USCG Report CG-D-17-73.

Fay, J. A. 1969. The spread of oil slicks on a calm sea. Pages 53-63 in *Oil on the Sea*. D. P. Hoult (ed.). Plenum Press, New York.

McCourt, J. 1998. Interaction between oil and suspended particulate matter in the Yukon River. Prepared by S. L. Ross Environmental Research Ltd. for Alyeska Pipeline Service Company. 22 pages plus appendices.

National Research Council. 1989. *Using Oil Dispersants on the Sea*. Marine Board Commission on Engineering and Technical Systems. National Academy Press, Washington, D.C. 335 pages.

U.S. Army Corps of Engineers. 1990. *Endicott Environmental Monitoring Program Final Report*. Prepared by Science Applications International Corporation.



The purpose of this tactic is to provide contingency planners with a method for approximating how oil will be deposited from a well blowout, for use in developing response scenarios in facility-specific contingency plans.

An unobstructed surface well blowout, while a highly unlikely event, could send a plume of oil into the atmosphere. The distribution of oil falling from the aerial plume depends upon the height that the oil is propelled and the size of the oil droplets. Factors such as pipe diameter and gas flow rate control the plume height and subsequent fallout distribution.

Downwind oil distribution predictions are found in *Oil Deposition Modeling for Surface Well Blowouts* (Belore, 1997, prepared by S.L. Ross Environmental Research Ltd. for Alaska Clean Seas). The model assumes the following conditions:

- Alaska North Slope crude oil
- Atmospheric Stability Class D
- Median oil drop diameter of 750 μm
- Release height (feet above ground surface) of 0

Wind speed has no practical net effect on the deposition pattern. A high wind reduces the plume-rise height by bending the rising plume, but it also carries the oil downwind faster. Drops fall to the ground sooner but travel just as far from the source.

Figures 1A and 1B associate typical gas flow rates with oil flow rates and gas-to-oil ratios. A gas flow rate found in these figures is then used to select curves in Figures 2 through 7, which have been developed using an oil-drop-size distribution with a 750 μm volume median diameter. This drop-size distribution was derived from an annular, two-phase flow situation. The shaded area in Figure 1B identifies flows outside the annular flow conditions for which this drop-size distribution was derived. The oil drops formed under these low-flow conditions are likely to be larger than those used to develop Figures 2 through 7; therefore, these are not valid for flow conditions that fall in the shaded areas below the limits plotted for each of the pipe diameters in Figure 1B.

Figures 2 through 7 show the downwind length and width of the aerial plume where a percentage of the total oil flow has fallen to the surface. Ten percent of the oil is assumed to be in the form of drops so small (50 μm or less) that they do not fall to the ground but are held aloft by atmospheric turbulence.



The following example illustrates how to use Figures 1 through 7:

A well is assumed to be discharging oil and gas at a rate of 12,000 bopd with a gas-to-oil ratio (GOR) of 750 scf/bbl through a 6.3-inch-diameter (7-inch outer diameter) pipe. To determine the amount of oil that falls within 200 meters from the source, complete the following steps:

From Figure 1, determine the gas flow to be about 8.75 mmscf/d.

On Figure 4, interpolate between the 5 and 10 mmscf/d curves to approximate the 8.75 curve. From this interpolated curve, get the percent of oil falling within 200 meters of the source (about 72%). The total volume of oil falling within 200 meters of the source will be the total oil flow of 12,000 bopd times 0.72 times the duration of the blowout period.

To determine the width of the fallout at 200 meters, use Figure 5 in the same way, and determine the fallout width at 72% of oil on "ground" (about 35 meters). This is the width that would be oiled if the wind came from the same direction during the entire release. If the wind is shifting, the plume will deposit oil over a much wider area. If the wind's directional persistence throughout the release period is known, these values can be applied to determine the percentage of oil falling and the resulting oil thickness in the various sectors around the spill source.

FIGURE 1A  
GAS FLOW - OIL FLOW - GOR

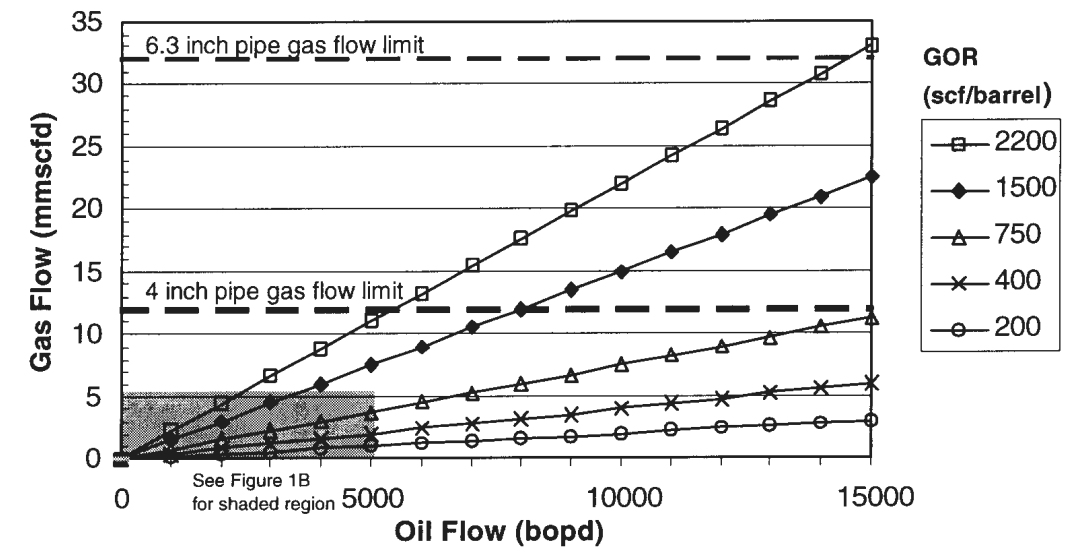
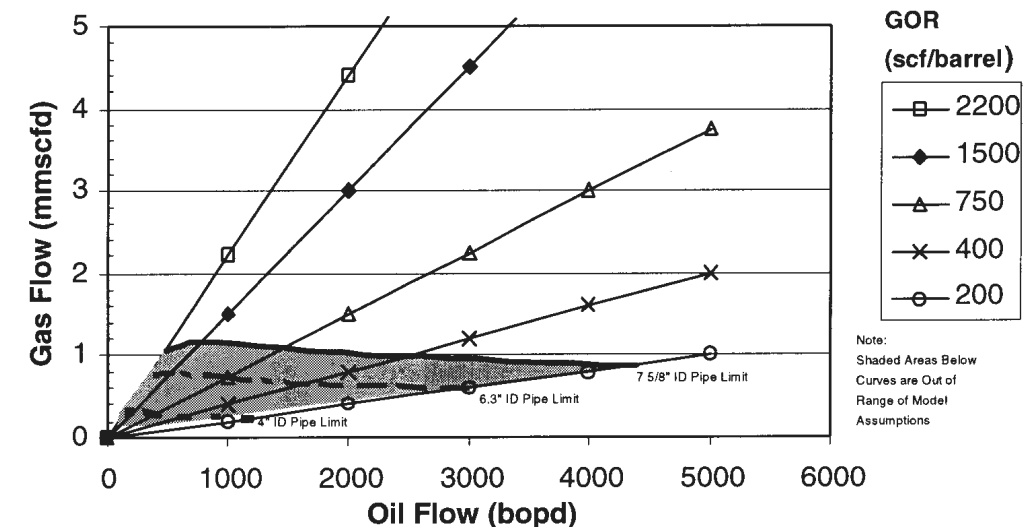
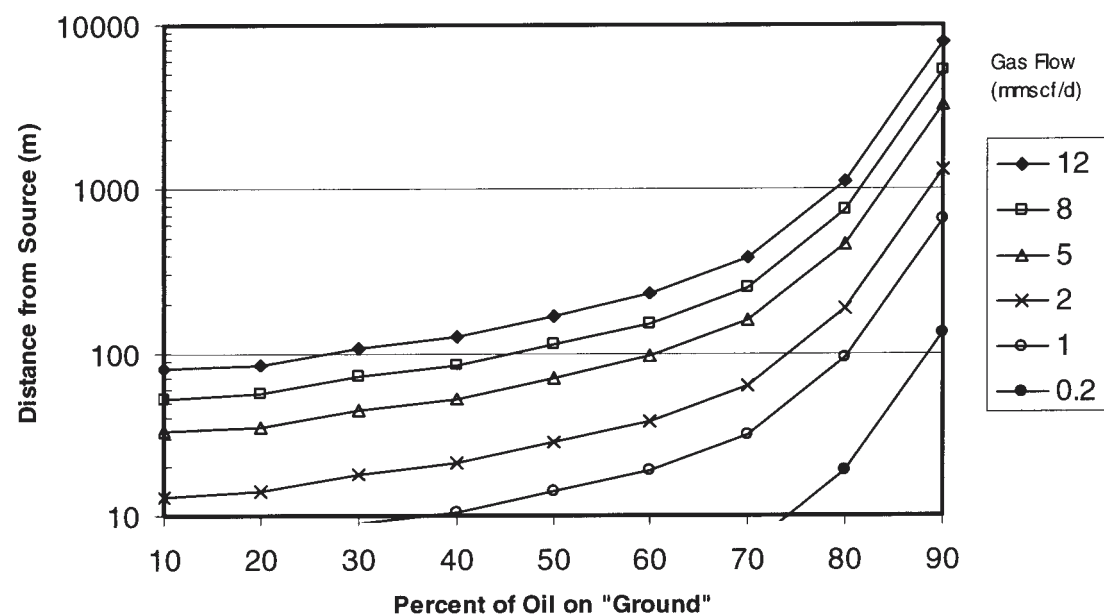


FIGURE 1B  
GAS FLOW - OIL FLOW - GOR (LOW FLOWS)

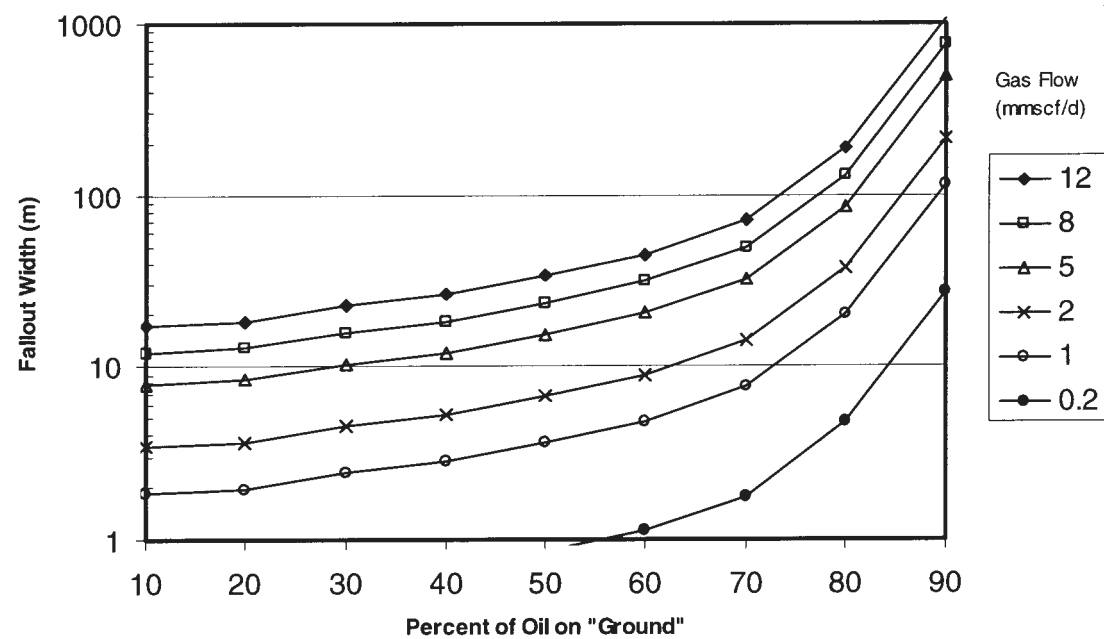




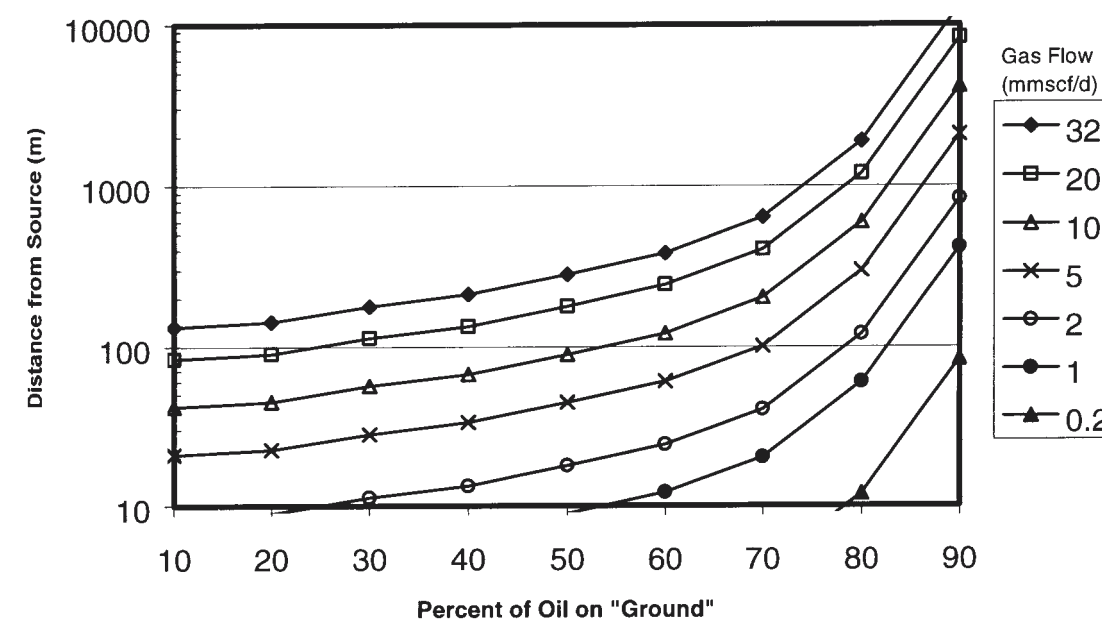
**FIGURE 2**  
OIL FALLOUT PERCENT VS. DISTANCE FROM SOURCE (4-INCH ID PIPE)



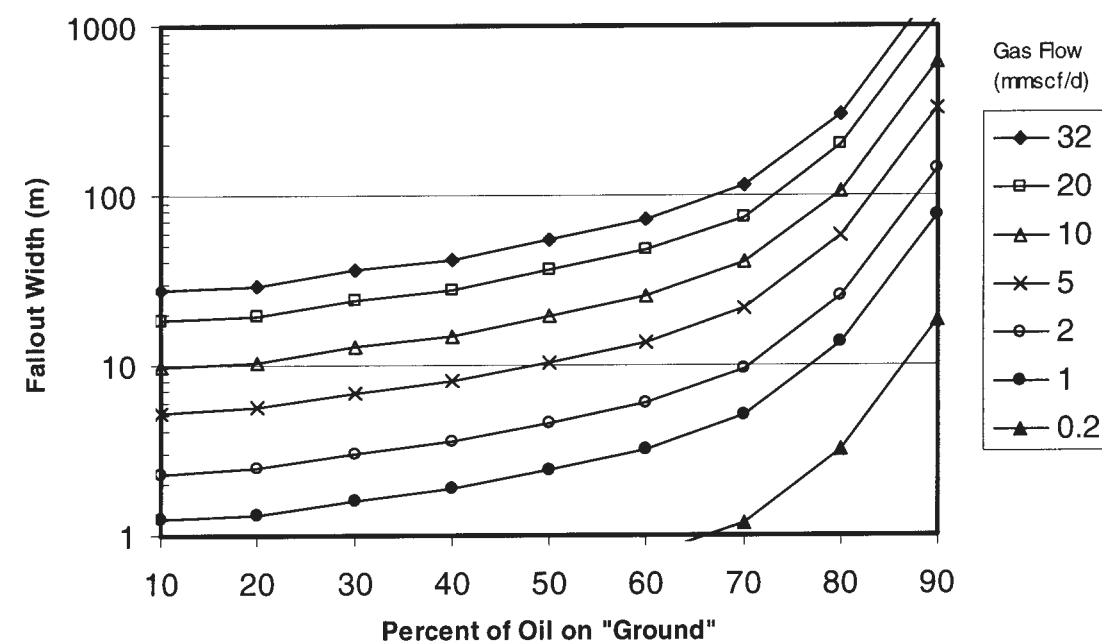
**FIGURE 3**  
FALLOUT WIDTH VS. PERCENT ON THE GROUND (4-INCH ID PIPE)



**FIGURE 4**  
OIL FALLOUT PERCENT VS. DISTANCE FROM SOURCE (6.3-INCH ID PIPE)



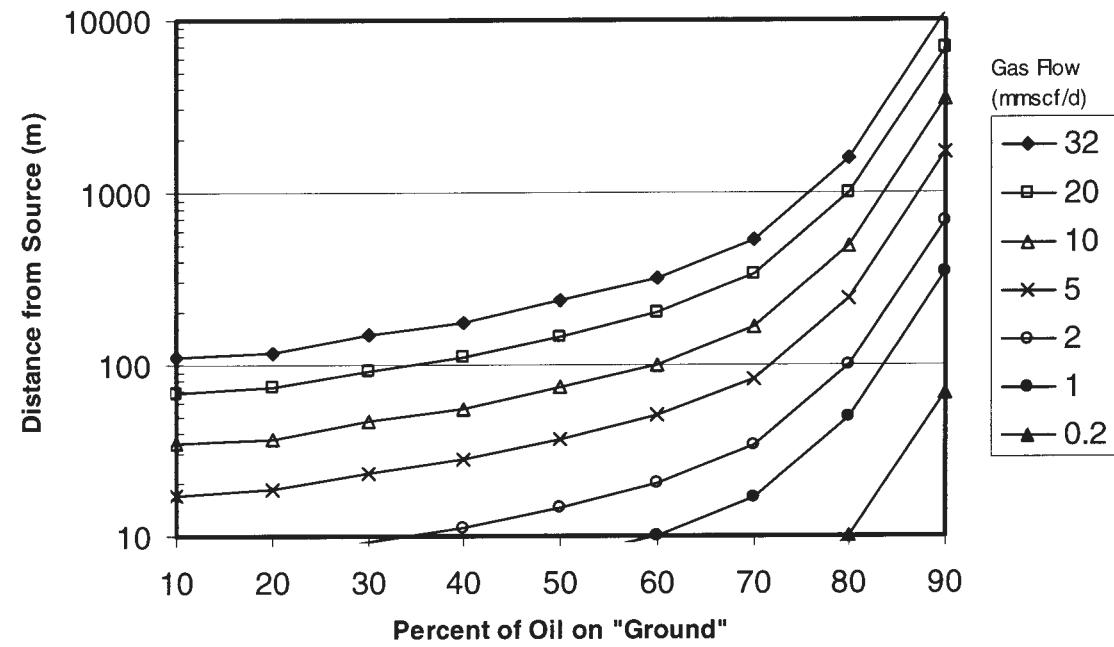
**FIGURE 5**  
FALLOUT WIDTH VS. PERCENT ON THE GROUND (6.3-INCH ID PIPE)







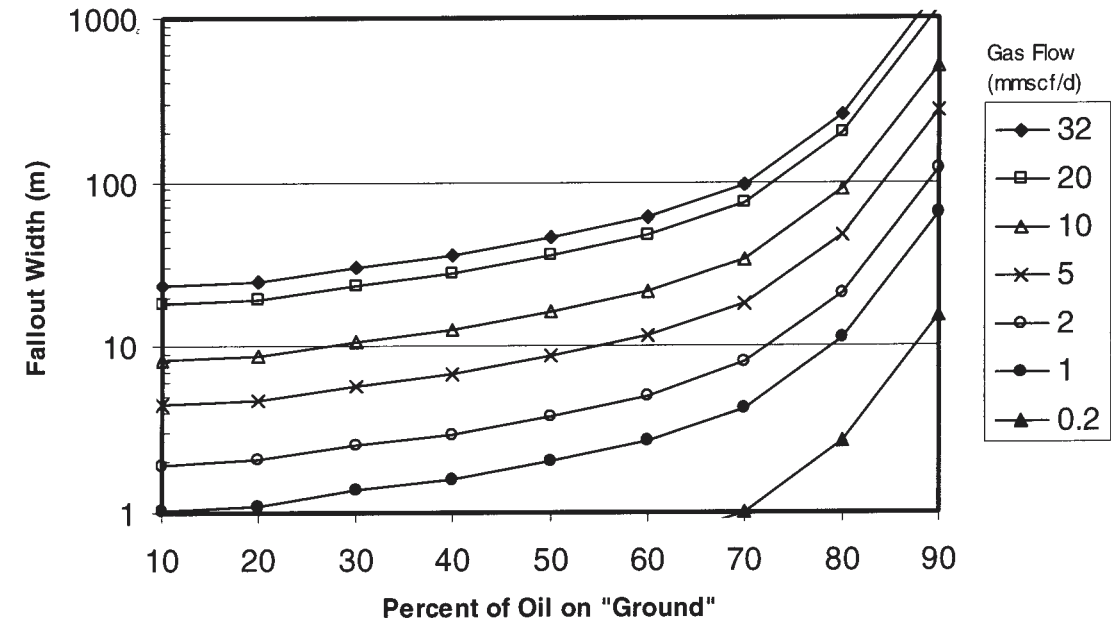
**FIGURE 6**  
OIL FALLOUT PERCENT VS. DISTANCE FROM SOURCE (7 5/8-INCH ID PIPE)



NOTE: All values given on these pages are for planning purposes only.



**FIGURE 7**  
FALLOUT WIDTH VS. PERCENT ON THE GROUND (7 5/8-INCH ID PIPE)



NOTE: All values given on these pages are for planning purposes only.



**SPILL VOLUME ESTIMATION**

**OIL IN OR ON SOILS**

- It is difficult to estimate the amount and extent of subsurface pollution from hydrocarbons spilled and trapped in soil.
- Hydrocarbons in soil may exist in three phases:
  - As vapors within the pore spaces
  - As residual liquid attached to or trapped between soil particles
  - As dissolved components of oil in moisture surrounding soil particles
- Generally, oil retention increases with: decreasing grain size, poorer sorting of soils, and increasing oil viscosity.
- Oil retention of initially water-saturated soils is generally lower than for initially dry soils.
- The “retention capacity” factor for different types of soils provides an estimate of volume of liquid retained per unit pore volume. Following are rules of thumb for retention capacity of soil types:

	<b>Silt</b>	<b>Sand</b>	<b>Gravel</b>
<b>Crude Oil</b>	12% - 20%	4% - 13%	0% - 5%
<b>Diesel</b>	7% - 12%	2% - 8%	0% - 2%
<b>Gasoline</b>	3% - 7%	1% - 5%	0% - 1%

**OIL ON ICE AND SNOW**

- Field experience and data from actual spills indicate that oil-holding capacities of ice and snow range as high as 1,600 barrels per acre.
- Equations for estimates:
  - $V \text{ (bbl)} = (4.14 \times 10^5) \times A \text{ (mi}^2) \times t \text{ (in.)}$
  - $V \text{ (bbl)} = 647 \times A \text{ (acres)} \times t \text{ (in.)}$
  - $V \text{ (bbl)} = (1.48 \times 10^{-2}) \times A \text{ (ft}^2) \times t \text{ (in.)}$
  - $V \text{ (gal)} = 42 \times V \text{ (bbl)}$
  - $V$  = Volume of oil spill
  - $A$  = Area of oil slick or contaminated zone
  - $t$  = Thickness of oil slick or contaminated zone (with snow,  $t$  = equivalent oil thickness)

**OIL ON WATER**

- Oil Color
  - Sheen (silver-gray): Use  $10^{-6}$  inch as average thickness
  - Iridescent (blue green): Use  $10^{-4}$  to  $10^{-5}$  inch as average thickness
  - Blue-black (aged, wind-blown): Use  $10^{-2}$  to  $10^{-3}$  as average thickness
  - Blue-black (fresh/equilibrium conditions): Use  $10^{-1}$  inch as average thickness
  - Emulsion (brown/ “chocolate mousse”): Use  $10^{-1}$  inch as average “oil” thickness (actually 2 to  $3 \times 10^{-1}$  inch with 50% to 70% water).
- Equations for estimates:
  - $V \text{ (bbl)} = 4.14 \times 10^5 A \text{ (mi}^2) \times t \text{ (inches)}$
  - $V \text{ (bbl)} = 647 A \text{ (acres)} \times t \text{ (inches)}$
  - $V \text{ (bbl)} = 1.48 \times 10^{-2} A \text{ (ft}^2) \times t \text{ (inches)}$
  - $V \text{ (gal)} = 0.624 A \text{ (ft}^2) \times t \text{ (inches)}$

NOTE: All values given on these pages are for planning purposes only.



**ESTIMATING SPILL SOURCE VOLUMES AND FLOW RATES**

**LEAK RATE CALCULATIONS**

- One drop/second = 1 gallon per day
- Thin stream breaking to drops = 24 gallons per day
- Small stream (about 1/8 inch) = 84 gallons per day
- Large stream (about 1/4 inch) = 936 gallons per day

*A simple rule of thumb is to divide 10,000 by the number of seconds it takes to fill a five-gallon pail.*

**ESTIMATES FOR CAPACITY**

- Pipeline per linear foot
  - For volume in gallons per foot: square the inside diameter (in inches) and multiply by 4 percent (0.04)
  - For volume in barrels per foot: square the inside diameter (in inches) and divide by 1,000
  - To find the volume of a pipeline in barrels per mile: square the inside diameter (in inches) and multiply by 5.13
- For vertical cylindrical tanks:

$$V \text{ (gal)} = 0.0034 d \text{ (in.)} \times d \text{ (in.)} \times h \text{ (in.)}$$

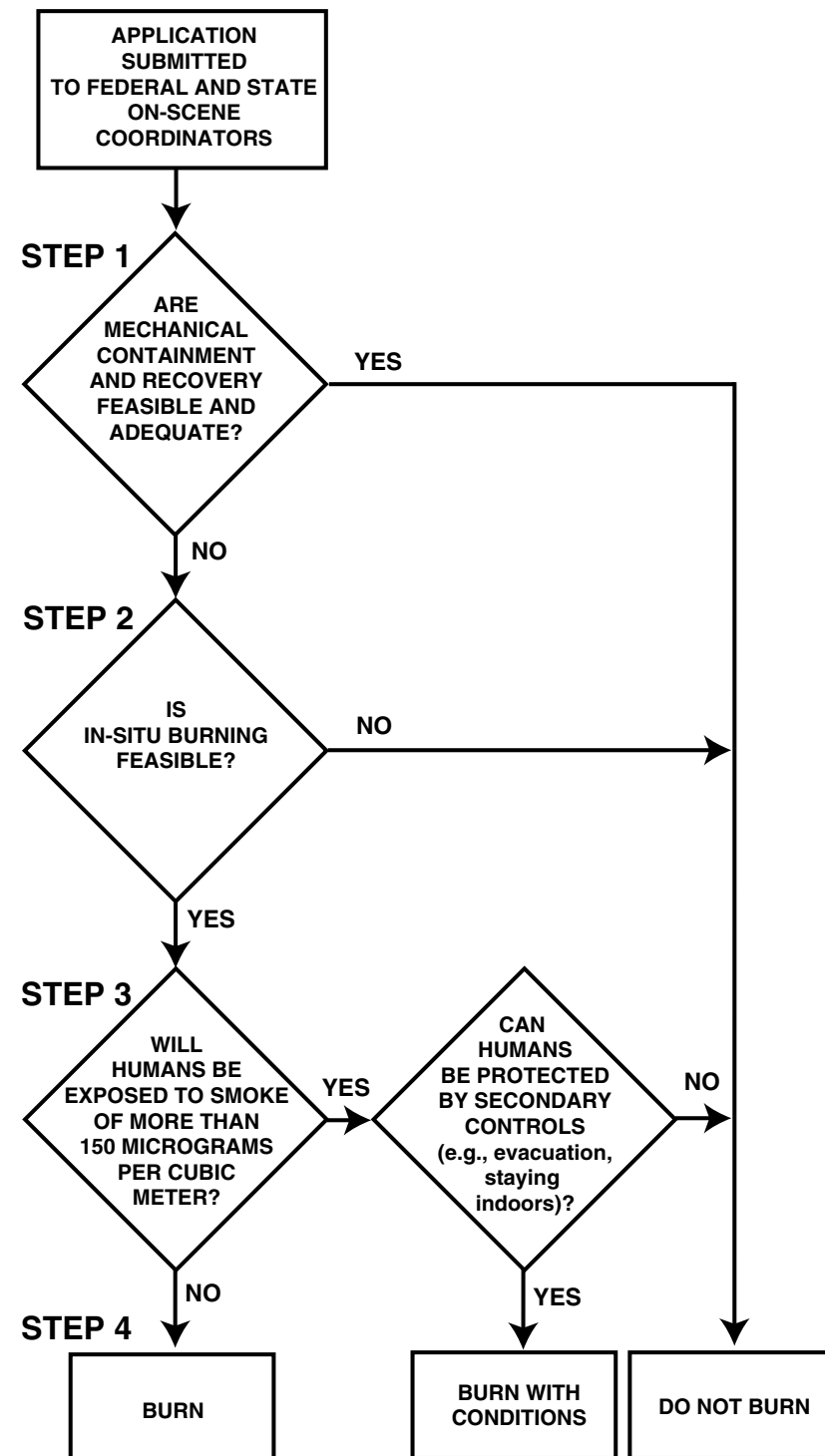
$$V \text{ (gal)} = 5.88 D \text{ (ft)} \times D \text{ (ft)} \times H \text{ (ft)}$$

where  $d$  = diameter in inches  
 $D$  = diameter in feet  
 $h$  = height of liquid in inches  
 $H$  = height of liquid in feet

**NOTE:**

The National Oceanic and Atmospheric Administration publishes an observer’s guide that contains more information on estimating oil spill volumes.

NOTE: All values given on these pages are for planning purposes only.



NOTE: All values given on these pages are for planning purposes only.



Before in-situ burning can be used a spill control measure, regulatory approval must be obtained. **First complete the Alaska Regional Response Team Application for In-Situ Burning, and submit the application to the Unified Command. Approval is required for the burn to proceed (see ARRT Unified Plan, Appendix 2, Annex F, In-Situ Burning Guidelines for Alaska).** The flowchart at left summarizes the steps involved in making the decision to use in-situ burning once an application has been submitted for approval. The application contains the burn plan.

Once in-situ burning is approved, the following steps are involved:

1. Collect and concentrate the oil using a fire-resistant boom, ice floes, ice pits, or other natural features as gathering places for burn.
2. Ignite the oil using the Heli-torch or hand-held igniter, making sure to avoid flashback and ignition of the spill source.
3. Monitor the burn, maintaining constant watch on the fire and smoke plume, condition of containment boom, speed and position of towing vessels, and other safety hazards and issues.
4. Recover and dispose of the burn residue.

**NOTE**

*Proper safety procedures must be followed for burning, and the necessary personal protective equipment (PPE) must be used.*

NOTE: All values given on these pages are for planning purposes only.



**PART III: APPLICATION FOR ISB**

**I. APPLICANT:** (Name of responsible person, title, company, address, phone, fax)

Printed Name of Requestor \_\_\_\_\_

Title of Requestor \_\_\_\_\_

Requestor Affiliation \_\_\_\_\_

Requestor Address \_\_\_\_\_

Phone and Fax numbers (if applicable) \_\_\_\_\_

Time and Date Application Submitted to OSC \_\_\_\_\_

**II. EVALUATION OF ISB:** (provide a brief explanation including why mechanical recovery is not feasible)

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**III. PROPOSED BURN PLAN:** (describe the plan for burning)

- A. Proposed burning strategy (describe strategy and circle appropriate response)
  - 1. Ignition away from source after containment and movement to safe location i.e., controlled burn:
  - 2. Ignition at or near source without controls:
  - 3. Ignition of uncontained slick(s) at a safe distance from the source:
- B. Estimated amount of oil to be burned in boom, expressed in sq. ft.: \_\_\_\_\_
- C. Estimated duration of burn in minutes: \_\_\_\_\_
- D. Are simultaneous burns planned? Yes\_\_\_ No\_\_\_  
 If yes, how many? \_\_\_\_\_ Specify locations: \_\_\_\_\_
- E. Are sequential or repeat burns planned (not simultaneous)? Yes\_\_\_ No\_\_\_
- F. Method for terminating the burn: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



- G. Proposed method for ignition: \_\_\_\_\_
- H. Ability to collect burned oil residue? Yes\_\_\_ No\_\_\_
- I. Estimated smoke plume trajectory (in miles): \_\_\_\_\_

**IV. EQUIPMENT AND PERSONNEL:** (describe the vessels, aircraft, ignition system, personnel and communications that will be used to conduct the burning)

- A. Describe types of vessels, lengths of fire boom, and types of residue containment equipment to be used  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_
- B. Are vessels equipped with appropriate fire fighting gear? Yes\_\_\_ No\_\_\_  
 Provide a brief description of fire fighting capabilities:  
 \_\_\_\_\_  
 \_\_\_\_\_
- C. Describe aircraft(s) to be used for ignition and aerial observation:  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_
- D. Ignition System:
  - 1. Available? Yes\_\_\_ No\_\_\_
  - 2. Type/method to be used? \_\_\_\_\_
  - 3. Burn Promoters? Yes \_\_\_ No\_\_\_
- E. Are personnel properly trained, equipped with safety gear, and covered by a site safety plan addressing burning operations? Yes\_\_\_ No\_\_\_  
 Provide a brief description of available safety gear and certify that a safety plan that specifically addresses the proposed burning operations has been developed and implemented.  
 Safety equipment available:  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 I certify that a comprehensive site safety plan for this specific incident has been developed to specifically address the proposed burning operations and that affected response workers have read the plan and are familiar with its requirements.





\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

F. Are communications systems available to communicate with aircraft, vessels, and control base available and working? Yes\_\_\_ No\_\_\_

**V. EVALUATION OF ANTICIPATED EMISSIONS:** (determine and evaluate the effects of burning)

A. Using a section of an appropriate chart, plot, calculate and determine the following locations and distances:

1. Location of proposed burn in reference to source;
2. Location of proposed burn in reference to nearest ignitable oil slick or slicks;
3. Location of proposed burn in reference to nearest land;
4. Location of nearby human habitation/use areas, (e.g., towns/villages fishing/recreation camps, airports/strips/roads etc.);
5. Distance between burn and land, or non-flat terrain;
6. Distance between proposed burn and spill source;
7. Distance between burn and human habitation/use area;
8. Surface area of the proposed burn or burns;
9. Affects on airports from impairment of visibility;

B. Describe (if applicable) the risk of accidental (secondary) fires: \_\_\_\_\_

C. Can burning be conducted in a controlled fashion? Yes\_\_\_ No\_\_\_

**VI. BURN EXTINGUISHMENT CONTROLS:** (provide a brief description of the ability and procedures available to extinguish the burn if necessary or directed to do so)

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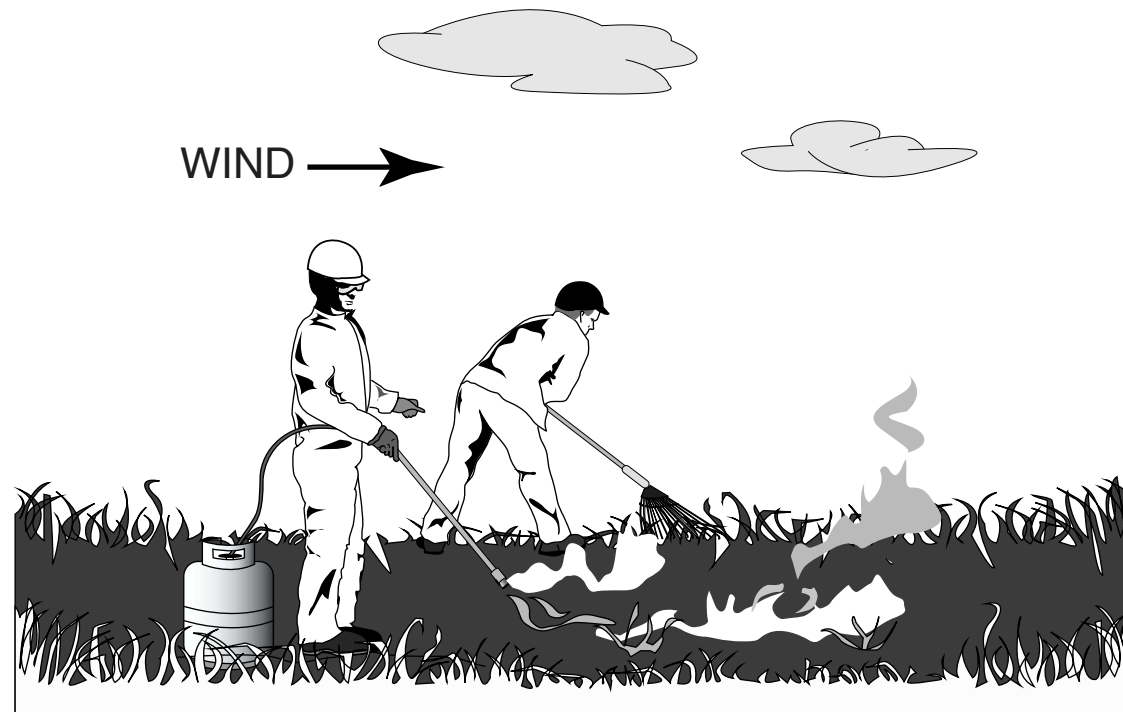


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\_\_\_\_\_  
SIGNATURE OF APPLICANT



**NOTE:**  
**ATTACH THE BURN SAFETY PLAN  
TO THE APPLICATION FOR ISB**



A response worker rakes oiled vegetation with a metal rake so that grass stems are oriented more or less vertically. A second response worker uses a weed burner, which consists of a flame nozzle, hosing, and a propane tank. The weed burner is held just above the oiled vegetation until the vegetation is burned down to a stubble. Care is taken not to burn vegetation down to soil, which would damage the root system. Work is started on the upwind edge of the oiled area and proceeds downwind so that response workers are not exposed to smoke.

**NOTE:** "Base Location" is storage location (may change seasonally); "Mobe Time" is time to get it out of storage, prepare it for operation, and make it ready to travel (concurrent for all equipment); "Deploy Time" is time to make it operational for its intended use at the spill site. These times do not include travel time from base to spill site, which may have multiple components (see Tactic L-3).

**EQUIPMENT AND PERSONNEL**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Weed Burner, with Propane Tank	All	Surface oil removal	1	1	1 hr	0.5 hr
Rake (metal)	All	Rake vegetation upright	≥1	1	1 hr	0
Fire Extinguisher	All	Suppression of unwanted fires	≥2	—	0.5 hr	0

**TOTAL STAFF 2**

**SUPPORT**

- Pickup trucks and four-wheelers transport personnel and equipment.
- Sorbent may be used in conjunction with the weed burners.

**CAPACITIES**

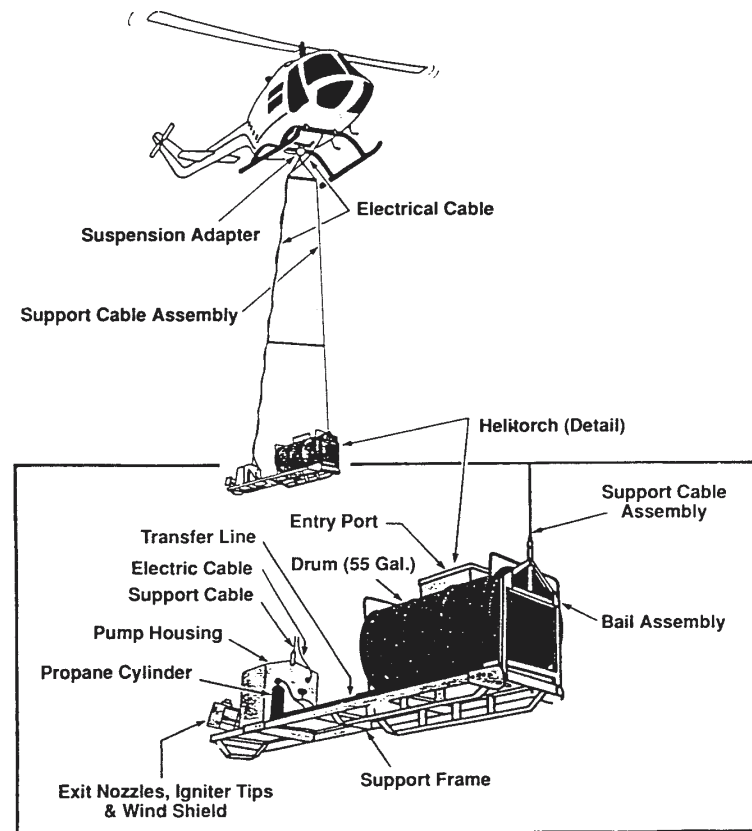
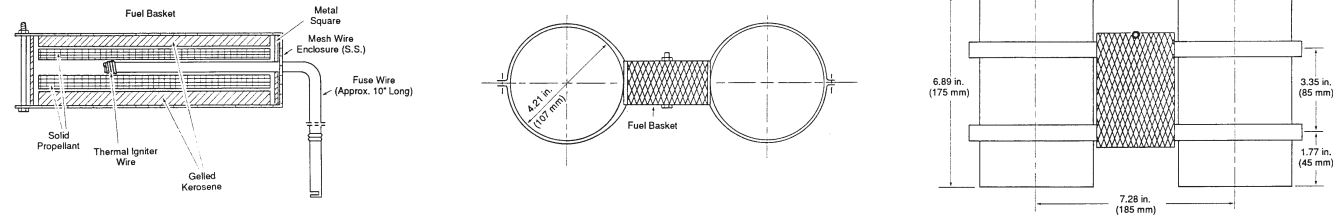
- One weed burner can cover approximately 50 sq. ft in an hour, depending on terrain and degree of oiling.

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- Proper safety procedures must be followed, and the necessary personal protective equipment (PPE) must be used.
- Do not walk on oiled vegetation. Snowshoes can be used to protect unoiled tundra.
- Burning of oiled vegetation is conducted as a non-emergency project and has the objective of reducing re-oiling of adjacent areas. Burning proceeds downwind from its starting point. Care is taken to avoid contaminating unaffected areas. Burning is most effective immediately after the spill, before evaporation of volatile components.
- Take care to avoid secondary fires. If there is access to water, the oiled area and the surrounding vegetation can be saturated with water. Wet vegetation will still burn under the direct flame of a weed burner.
- Fire suppression must be on hand, with staff in direct control of it.
- Burned tundra can regenerate itself, as long as the root structure is left intact. Sedges and grasses recover more quickly than mosses and lichens, which do not have much of an underground structure. It is normally preferable to burn the oil in the tundra rather than to leave oiled vegetation. Tundra vegetation cannot survive under heavy oiling, but it can survive if the oil and vegetation are burned, leaving a healthy root structure.
- Approval from the Operations Section Chief is required for any vehicle tundra travel (off-road or off-pad), which must be in accordance with ACS' emergency tundra travel permit (See Tactic A-3). Any excavations in tundra or any tundra damage must be reported to the Operations Section Chief. All on-tundra activity must be documented and reported to the Planning Section for reporting to ensure permit compliance. Avoid archeological sites and biologically sensitive habitats. Travel across tundra with tracked vehicles, heavy equipment, and even foot traffic can seriously damage the vegetative mat, induce thermokarst, and cause structure disturbance. Using sheets of plywood as a traveling surface and minimizing trips with equipment greatly reduce disturbance of the tundra.
- An ADEC open-burn permit is required.



**BASIC DESIGN AND INTERNAL COMPONENTS OF THE DOME IGNITER**



Numerous methods are available for the ignition of floating oil. Hand-held pyrotechnic devices such as ACS's Dome igniters can be armed and tossed by hand from a helicopter or vessel. If such devices are unavailable, one can often make a simple though effective igniter on location using oil-soaked rags, sorbents, or even a roll of toilet paper. When it is unsafe to use such igniters, and particularly when a large, intense ignition area is needed, a Heli-torch may be used.

The Simplex Model 5400 Heli-torch owned by ACS is a helicopter-slung device for delivering measured amounts of burning gelled fuel to an oil slick for purposes of igniting the slick.

The Heli-torch can be used to ignite inaccessible oil pockets collected in quiet-water areas or on melt pools on the ice.

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**EQUIPMENT AND PERSONNEL**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Heli-torch (55-gal)	ACS/KRU	Ignition	2	3	1 hr	2 hr
Helicopter with FAR Part 137 Approved Pilot	Alyeska	Sling-load Heli-torch	1		2 hr	
Hand-held Igniters	ACS, Northstar	Ignition	≥6	2	1 hr	
Surefire Gel w/Fuel	ACS	Gelled fuel	≥5 lb.	—	1 hr	
Batch Mixer (300 gal)	ACS/KRU	Mix gel	1	2	1 hr	
Fire Extinguisher	All	Suppress accidental fires	≥2	—	0.5 hr	

**TOTAL STAFF ≥4**

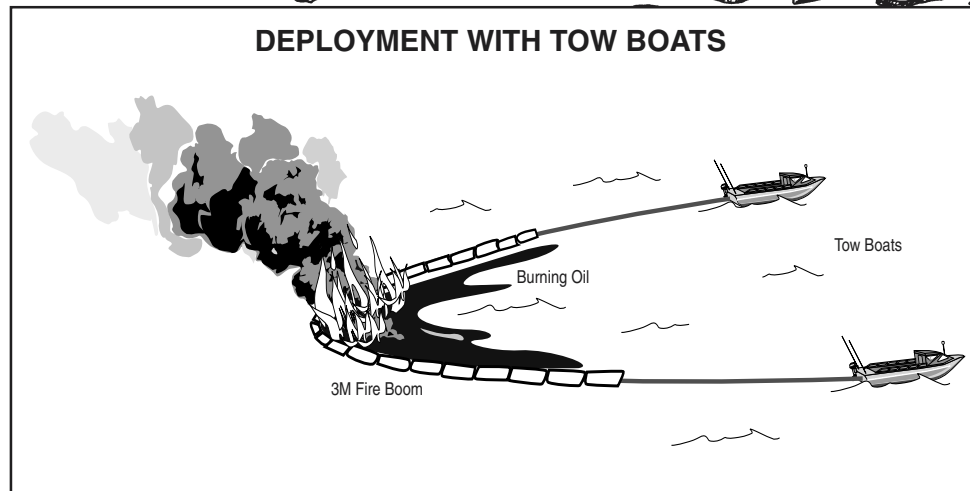
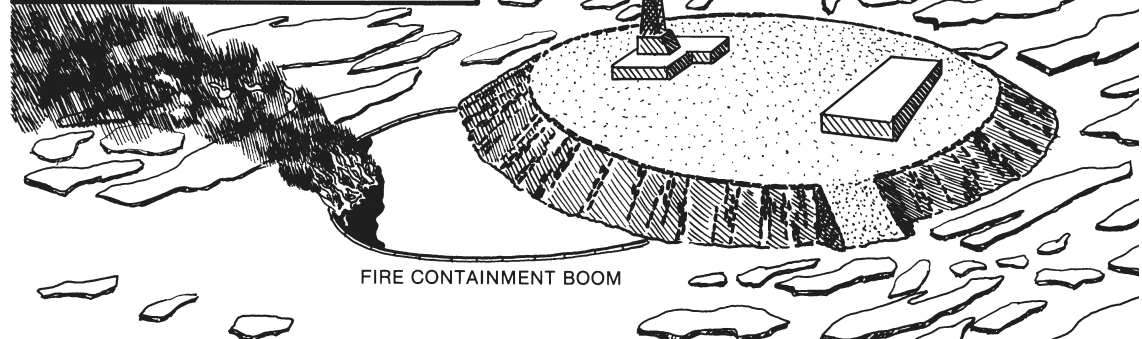
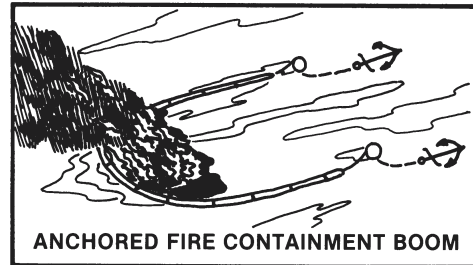
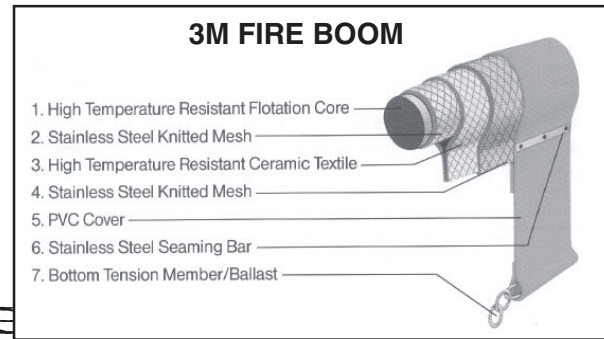
**CAPACITIES**

- Burning on water reduces the volume of a crude oil spill by 75% or more.

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- Proper safety procedures must be followed, and the necessary personal protective equipment (PPE) must be used.
- Follow all manufacturer's instructions carefully. Designated personnel on the surface and in the air maintain a constant watch of the fire and smoke plume, the condition of the boom, the speed and positions of the towing vessels, and the proximity of the burn operations to other vessels, oil slicks, the shoreline, etc. In addition, each vessel should maintain constant contact with the supervisor. The supervisor of the burn operation must be in direct radio contact with all elements of the burn team, including aircraft and the mixing/loading crew.
- It is critical that communications be available to ensure coordination between the burn operations supervisor and all elements of the response. All personnel involved in the operation must be in constant contact with the burn operations supervisor. The following communications are necessary for a burn on water:
  - Dedicated radio links and equipment with specific frequencies for air-to-air and air-to-ground communications
  - Dedicated radio links and equipment with specific frequencies for vessel-to-vessel and vessel-to-command communications
  - Repeater stations as appropriate for distant or blocked communications paths
  - Emergency manual signal (e.g., light or siren)
- Take care when filling, mixing, and dispensing raw or gelled fuel. Always connect a ground wire to an earth ground. Use a non-sparking pump in a well-ventilated area. When mixing by hand, use wooden or aluminum paddles. Have at least two 20-lb dry-chemical fire extinguishers in both the fuel mixing and Heli-torch filling areas. Personnel mixing and dispensing fuel must wear antistatic protective clothing.
- The charter company supplying the helicopter for the Heli-torch must be FAA-certified to sling-load petroleum. In addition, the pilot must have FAR Part 137 certification.
- Burning gelled fuel may sometimes fall off the Heli-torch while in transit to or from the burn site. Pilots should plan their flight path to minimize the risk of starting unwanted fires.
- Certain environmental limitations restrict the feasibility of in-situ burning. Optimal environmental conditions are:
  - Winds less than 20 kt
  - Waves less than 2 to 3 ft
  - Currents less than 3/4 kt relative velocity between boom and water
- The following oil thicknesses are required to support combustion:
  - 2 to 3 mm (0.08 to 0.12 inch) for fresh crude oil
  - 3 to 5 mm (0.12 to 0.2 inch) for diesel and weathered crude
  - 5 to 10 mm (0.2 to 0.4 inch) for emulsions and Bunker C
- Emulsification can affect ignitability. Most oils are readily combustible if water content is less than 25%. For water contents greater than 25% it may be necessary to apply an emulsion breaker to obtain ignition.

NOTE: All values given on these pages are for planning purposes only.



Fire containment boom can be deployed in a stationary mode either anchored to a shore or on the water. In addition, it can be towed like a standard containment boom in a U-configuration to collect oil on water and concentrate it for burning within the boom.

To use the full holding capacity of the boom, oil should fill the lower one-third of the boom's apex while the boom is being towed. During a burn, the oiled area may be expanded by slowing down. This increases the size of the burn and the oil elimination rate.

In-situ burning, without boom, may be used in ice conditions. The ice would act as the containment mechanism.

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**EQUIPMENT AND PERSONNEL**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Fire Boom	ACS, KRU, WOA, Endicott	Contain oil for burning on water	≥500 ft	4 to unload conex	1 hr	2 hr
Work Boat	All	Tow boom	2 per configuration	2 per boat	1 hr	
Tow Line (with bridles and anchors)	ACS	Tow boom	500 to 800 ft per towboat	—	—	
Hand-held Igniters	ACS, Northstar	Ignite oil	10 per platform	1	1 hr	

**TOTAL STAFF FOR SETUP**

**8**

**TOTAL STAFF TO SUSTAIN OPERATIONS**

**7 (including personnel to pick up burn residue)**

**SUPPORT**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Work Boat	All	Recovery and storage of burn residue	1 per configuration	3 per boat	2 hr	1 hr
Fire Extinguishers	All	Fire suppression	≥2 per configuration	—	0.5 hr	—
Fire Boom Repair Kit	ACS	Boom repair	2	—	—	—

**CAPACITIES**

- Burning on water reduces the volume of a crude oil spill by 75% or more.
- For layers of oil 0.5 inch thick or greater, the removal rate is 4.2 gal of oil per hour for every sq. ft of burning oil.

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- Proper safety procedures must be followed, and the necessary personal protective equipment (PPE) must be used.
- Follow all manufacturer's instructions carefully. Designated personnel on the surface and in the air maintain a constant watch of the fire and smoke plume, the condition of the boom, the speed and positions of the towing vessels, and the proximity of the burn operations to other vessels, oil slicks, the shoreline, etc. In addition, each vessel should maintain constant contact with the supervisor. The supervisor of the burn operation must be in direct radio contact with all elements of the burn team, including aircraft and vessels.
- It is critical that communications be available to ensure coordination between the burn operation supervisor and all elements of the response. All personnel involved in the operation must be in constant contact with the burning operations supervisor.

(Continued on next page)

NOTE: All values given on these pages are for planning purposes only.





### DEPLOYMENT CONSIDERATIONS AND LIMITATIONS (CONT'D)

(Continued from previous page)

- The following communications are necessary for a burn on water:
  - Dedicated radio links and equipment with specific frequencies for air-to-air and air-to-ground communications
  - Dedicated radio links and equipment with specific frequencies for vessel-to-vessel and vessel-to-command communications
  - Repeater stations as appropriate for distant or blocked communications paths
  - Emergency manual signal (e.g., light or siren)
- The following oil thicknesses are required to support combustion:
  - 2 to 3 mm (0.08 to 0.12 inch) for fresh crude oil
  - 3 to 5 mm (0.12 to 0.2 inch) for diesel and weathered crude
  - 5 to 10 mm (0.2 to 0.4 inch) for emulsions and Bunker C
- Certain environmental limitations restrict the feasibility of in-situ burning. Optimal environmental conditions are:
  - Winds less than 20 kt
  - Waves less than 2 to 3 ft
  - Currents less than 3/4 kt relative velocity between boom and water
- Note that Fire Boom is very heavy, and proper lifting techniques must be used during deployment.
- Towing vessels should be positioned to avoid any direct contact with floating oil that could accidentally be ignited.
- Keep the operation out of the smoke plume.
- One towing vessel should be designated as the lead vessel for determining course and speed.
- Tow at speeds of 1/2 to 3/4 kt or less and avoid sudden speed changes.
- All personnel and equipment should remain at least 2 to 3 fire diameters away from the pool of burning oil.
- As conditions allow, the rate at which oil can be eliminated may be increased by a factor of 2 to 3 by slowing the boom-towing vessels and permitting the contained burn to spread forward within the boom. Oil should not be allowed to spread within 50 ft or less of the leading (upstream) ends of the boom.
- Boom-towing personnel should be familiar with procedures to terminate the burn.
- Beware of flashback! After the fire appears to be extinguished, unexpected re-ignition can occur.
- As the burn begins to die down, keep the tow at just enough forward speed to let the remaining oil burn as completely as possible.
- Select size and length of boom based on expected wind and sea conditions, staging and logistics constraints, and the volume of oil to be burned.
- Use conventional boom-deployment practices to avoid snags, twists, and fouling with other equipment.
- Select tow line size based on a safety factor of 7. Use long tow lines for each tow vessel (typically 500 to 800 ft) to reduce oil entrainment from prop wash, to position tow vessels safely away from the burn, and to provide additional reaction time in an emergency.
- As necessary, increase oil encounter rate by connecting sections of conventional boom to the leading ends of the fire containment boom. (Maintain a gap ratio of 0.3).

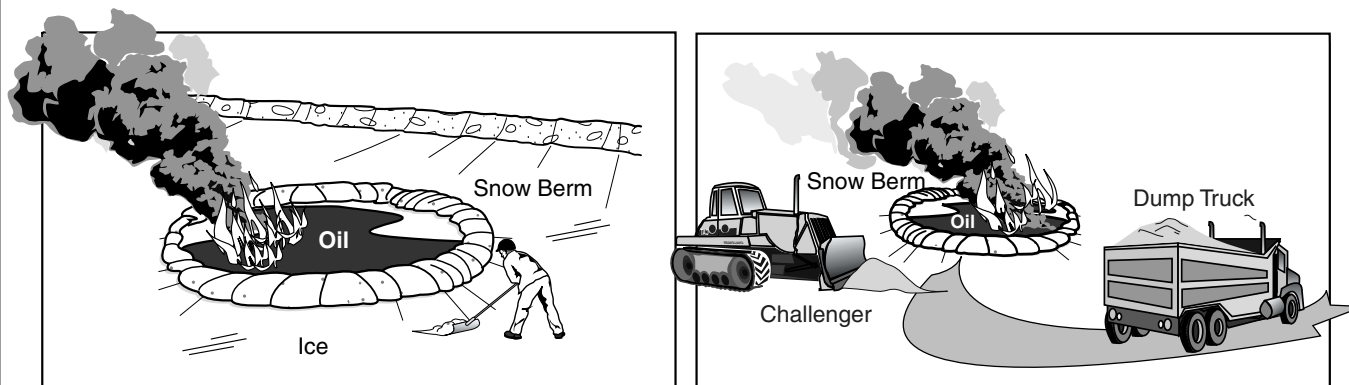
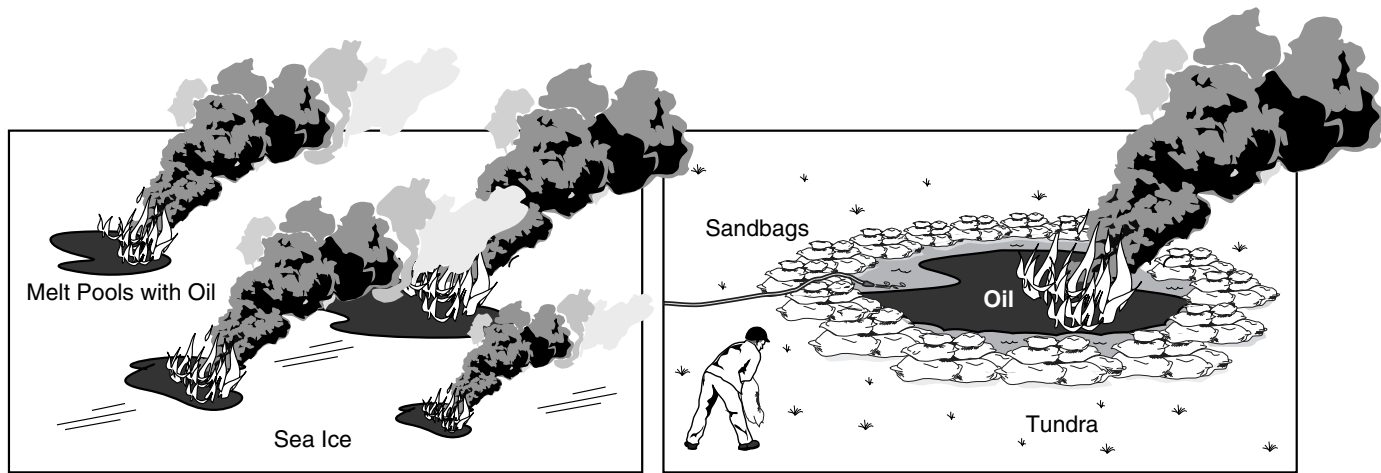
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### DEPLOYMENT CONSIDERATIONS AND LIMITATIONS (CONT'D)

(Continued from previous page)

- Be careful if burning while towing to avoid smoke blowing directly into the vessels.
- Ensure that spotter aircraft are available to direct the boom-towing vessels to the heaviest oil concentration or the highest-priority slick.
- If a U-configuration with collected oil is to be moved before ignition, don't locate it directly upstream or downstream of the source or other ignitable slicks. About 1/4 to 1/2 mile side-wind is adequate.
- Inspect boom after each burn before using again; repair or replace damaged sections.



Oil can be burned on any solid surface provided the oil is thick enough to support combustion. This includes tundra, ice, snow, or gravel.

In-situ burning on land should be considered only if there is a layer of ice covering underlying vegetation to protect it from heat damage. If this is the case, the oil should be pooled into one area and a buffer zone created around this area. Pooling of oil can be accomplished by digging a pit for oil to flow into.

Oil on land can be ignited with torches, igniters, propane weed burners, or a Heli-torch.

If the spill is on tundra, some sort of dike should be built around the oil using sandbags. The diked area should never cover more than 4,000 square feet. Once the dike is in place, flood the diked area with water until the tundra root mass is covered with one-half to one inch of water.

In the case of oil initially spilled on the surface and mixed with snow, burning of oiled snow piles can be successfully achieved even in midwinter conditions. Depending on the initial oil spill volume per unit area of ice, the technique of plowing oiled snow into concentrated piles may be the only way of achieving successful ignition and burning. In many cases, waiting for the snow to melt could result in thin oil films incapable of supporting combustion and spread over a large ice area.

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**EQUIPMENT AND PERSONNEL**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Heli-torch (55-gal)	ACS/KRU	Ignition	2	3	1 hr	2 hr
Helicopter with FAR Part 137 Approved Pilot	Alyeska	Sling-load Heli-torch	1		2 hr	
Surefire Gel w/Fuel	ACS	Gelled fuel	≥5 lb.		1 hr	
Batch Mixer (300 gal)	ACS/KRU	Mix gel	1	2	1 hr	2 hr
Sand Bags	ACS, KRU, EOA, WOA	Containment	≥100	≥6 for setup* 2 to maintain	2 hr	1 hr
Propane Weed Burner	All	Ignition	2	2	1 hr	
Hand-held Igniters	ACS, Northstar	Ignition	≥6	1	1 hr	

or **TOTAL STAFF ≥3**  
 \*Number of personnel depends on number of sandbags needed.

**SUPPORT**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
966 Loader	All	Unload sandbags	1	1	1 hr	0.5 hr
Water Truck	All	Flooding	1	2	2 hr	0.5 hr
Light Plant	All	Illumination	≥1	2 for initial setup and 1 to check and fuel occasionally	1 hr	0.5 hr
Fire Extinguisher	All	Suppress unwanted fires	≥2	—	0.5 hr	—
Marsh Buggy*	AIC	Transportation to site	1	2	1 hr	0.5 hr

\*Marsh buggies may be used in rotting ice conditions.

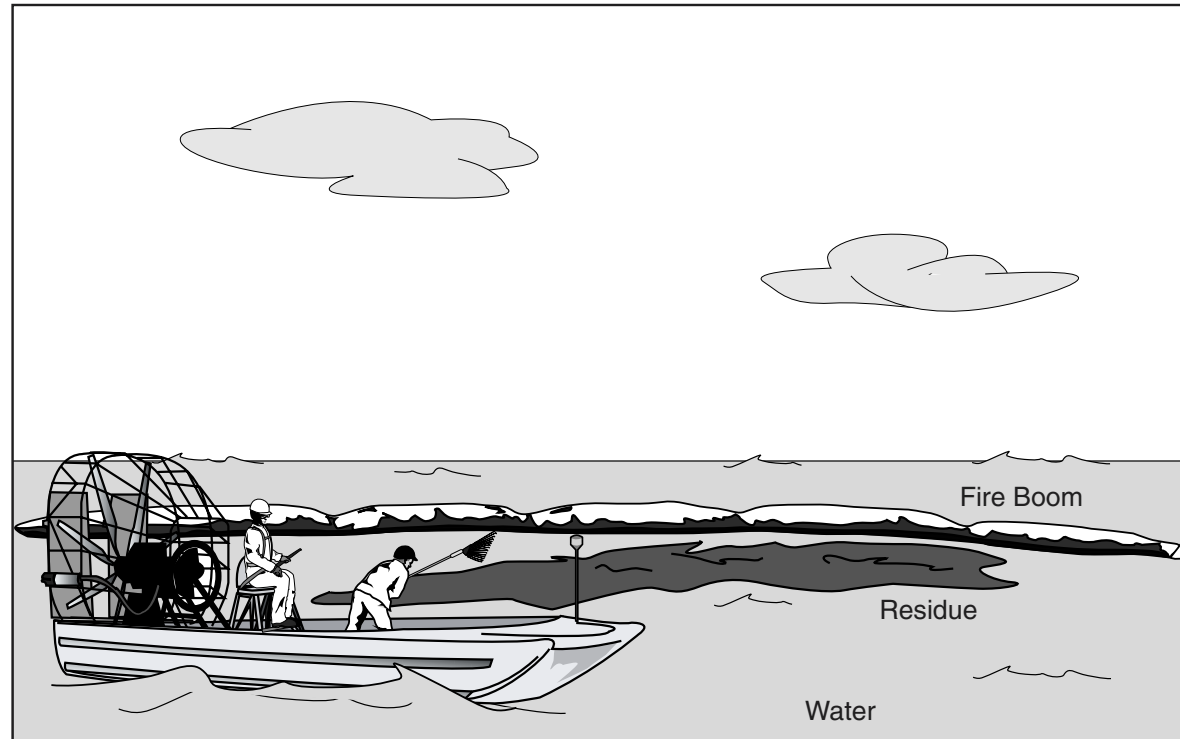
**CAPACITIES**

- For layers of oil 0.5 inch thick or greater, the removal rate is 4.2 gal of oil per hour for every sq. ft of burning oil.

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- Proper safety procedures must be followed, and the necessary personal protective equipment (PPE) must be used. Designated personnel on the surface and in the air should maintain a constant watch of the fire and smoke plume.
- The following oil thicknesses are required to support combustion:
  - 2 to 3 mm (0.08 to 0.12 inch) for fresh crude oil
  - 3 to 5 mm (0.12 to 0.2 inch) for diesel and weathered crude
  - 5 to 10 mm (0.2 to 0.4 inch) for emulsions and Bunker C
- Approval from the Operations Section Chief is required for any vehicle tundra travel (off-road or off-pad), which must be in accordance with ACS' emergency tundra travel permit (See Tactic A-3). Any excavations in tundra or any tundra damage must be reported to the Operations Section Chief. All on-tundra activity must be documented and reported to the Planning Section for reporting to ensure permit compliance. Avoid archeological sites and biologically sensitive habitats. Travel across tundra with tracked vehicles, heavy equipment, and even foot traffic can seriously damage the vegetative mat, induce thermokarst, and cause structure disturbance. Using sheets of plywood as a traveling surface and minimizing trips with equipment greatly reduce disturbance of the tundra.

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The type and amount of residue from an in-situ burn of oil on water depend on the starting oil type and condition, as well as the way in which the oil is contained and/or herded throughout the burn. If wind or currents are available to push burning oil against a barrier (boom, ice, steel structure, etc.), adequate combustion thicknesses will be maintained for a much more efficient burn. The residue may be an inch or more thick.

The residue may continue to pile up on itself and reach an average thickness of several inches. Most burns result in taffy-like layers of weathered, viscous material that is relatively buoyant. Some residues, however, may quickly become negatively or neutrally buoyant because of combustion and/or sediment uptake.

If the residue is sufficiently buoyant, it may be possible to leave it in the apex of the U-boom configuration. By combining the residue with newly collected oil, a major portion of the residue can be eliminated during subsequent burns.

If the burn residue remains buoyant, and it is practical to recover it before collecting and burning additional oil, the residue can be released to secondary collection booms or nets. Whether recovered from secondary booms or the fire containment boom, the burn residue can normally be picked up with large strainers or handtools, with viscous-oil sorbents, or with standard viscous-oil skimmers.

If not recovered, burn residue will normally break up and be dispersed as highly weathered tar balls.

Residue from burning oil on ice will be manually recovered from the surface of the ice.

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**EQUIPMENT AND PERSONNEL**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Handtools	All	Recovery	Varies	Varies	1 hr	1 hr
Large Strainers	All	Recovery	Varies	Varies	1 hr	
Viscous-Oil Sorbent	All	Recovery	Varies	Varies	1 hr	
Viscous-Oil Skimmers	All	Recovery	1	2	2 hr	
Work Boat	All	Recovery	≥1	3	2 hr	
Fire Extinguisher	All	Suppress unwanted fires	≥2	—	0.5 hr	

**TOTAL STAFF 3**

**CAPACITIES**

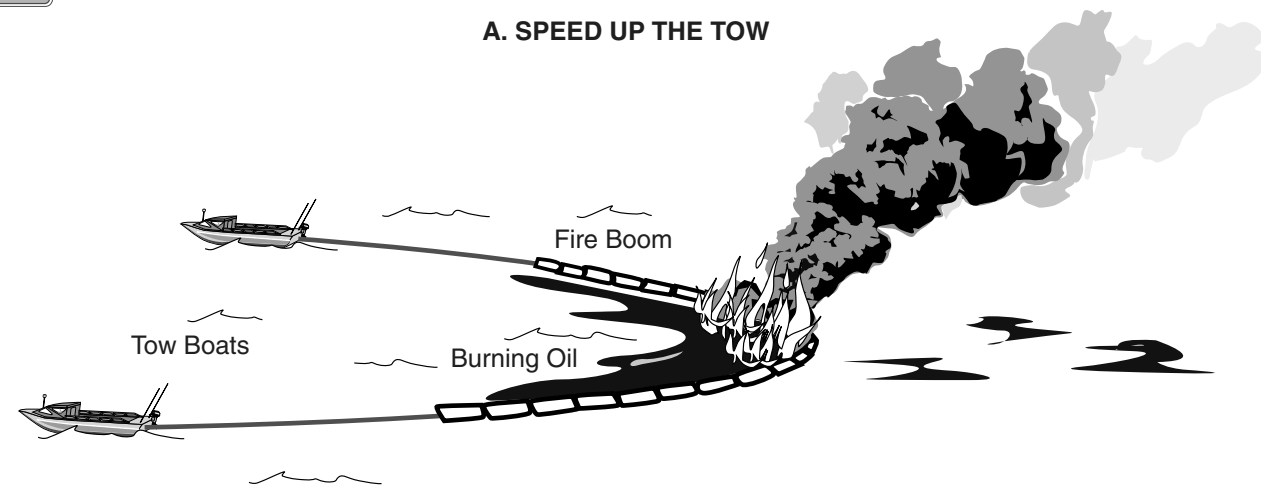
- Burning on water reduces the volume of a crude oil spill by 75% or more.
- For layers of oil 0.5 inch thick or greater, the removal rate is 4.2 gal of oil per hour for every sq. ft of burning oil.

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

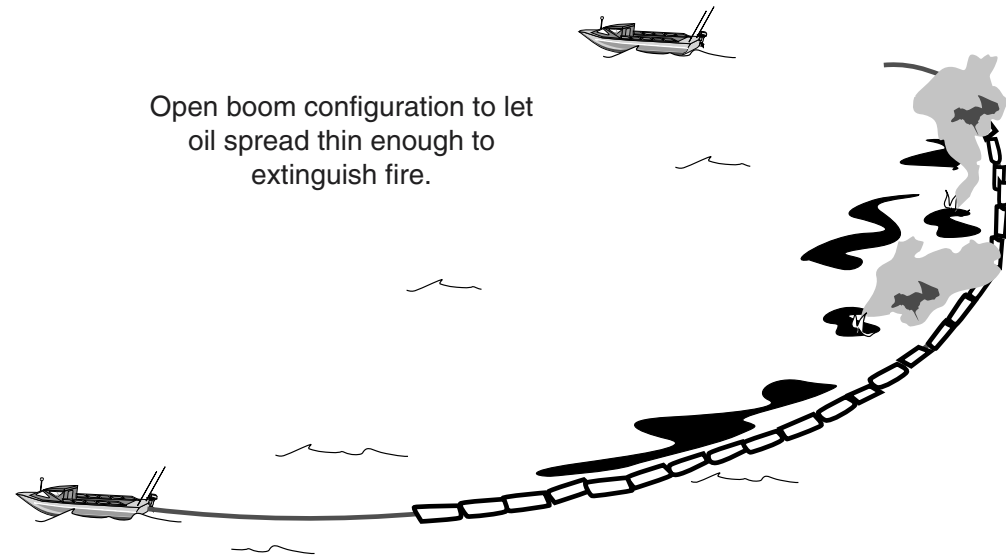
- Proper safety procedures must be followed, and the necessary personal protective equipment (PPE) must be used.
- Beware of flashback! After the fire appears to be extinguished, unexpected re-ignition can occur. Wait until the residue cools before approaching.
- Shortly after it cools, the burn residue becomes viscous and continues to cool to a thick, tarry substance best removed with handtools or nets.
- Initially, the residue floats, but eventually (several hours to several days), it may sink.
- Containers such as drums or plastic bags can be used for temporary storage.
- Handle the residue in the same manner as recovered oil. Testing is necessary to ensure that the residue is not hazardous. A State of Alaska permit is needed for final disposal.



**A. SPEED UP THE TOW**



**B. RELEASE THE BOOM**



It may be necessary to terminate in-situ burning for a variety of reasons:

- Personnel safety
- Adverse weather
- Darkness, especially for aircraft (vessels may still be able to operate with limited light)
- Downwind effects of smoke plume
- Completion of burning

Boom-towing personnel should be familiar with procedures to terminate the burn.

- The oil can be released from the boom and allowed to spread until it is too thin to burn (The potential spread area is possibly as large as ten contained fire diameters).
- The tow speed can be quickly increased to force the oil under the boom. This is less likely to involve downstream combustion; however, anticipate the potential for a ten-fold increase in burn diameter.

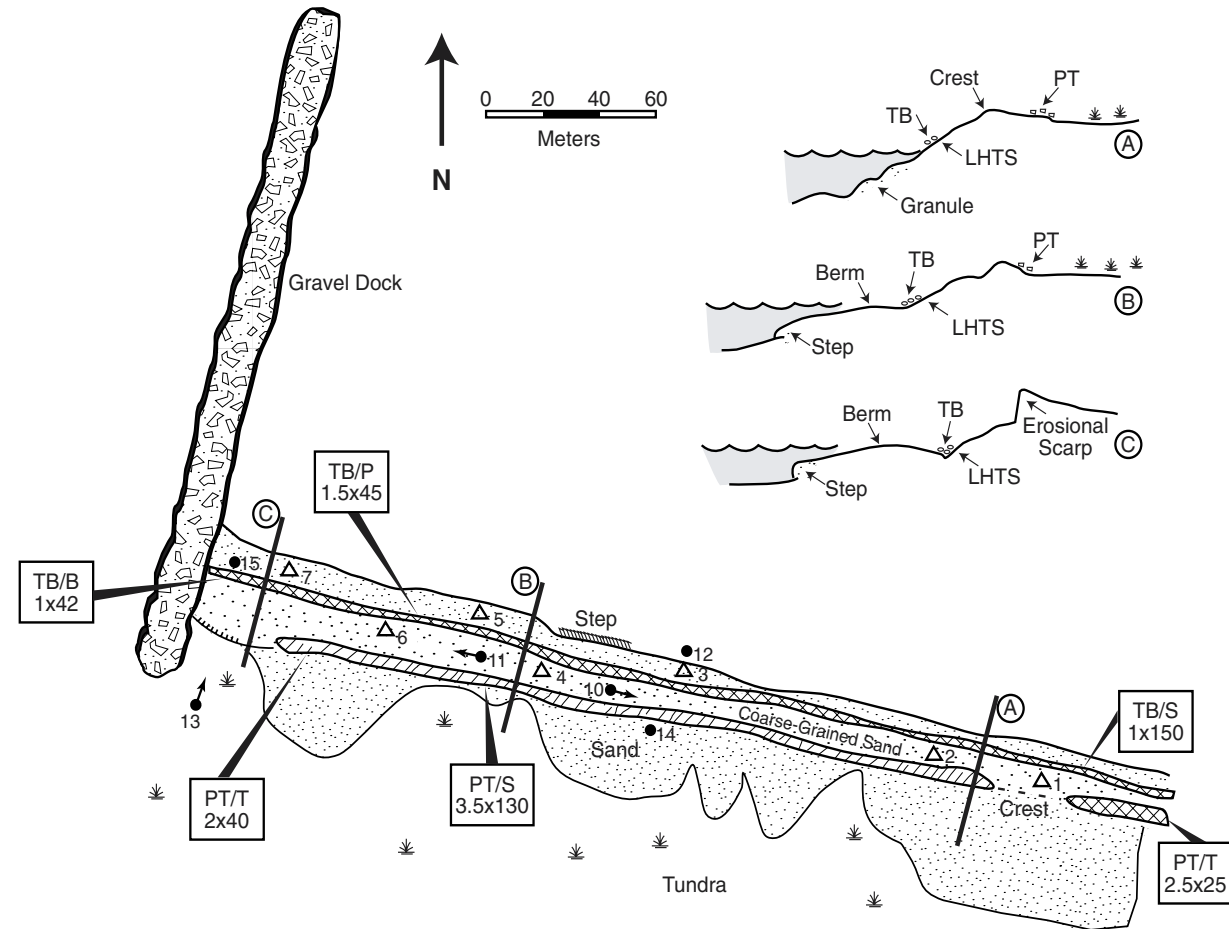
**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- Proper safety procedures must be followed, and the necessary personal protective equipment (PPE) must be used.
- Ensure released burning oil will not start unwanted fires.
- Ensure good communications between both vessels prior to initiating extinguishment procedure.





**SAMPLE SHORELINE ASSESSMENT SKETCH MAP**



**PURPOSE OF SHORELINE ASSESSMENT**

If a spill impacts the shoreline, it is important to have a clear and accurate understanding of the nature and extent of the oiling, particularly before cleanup commences. The Shoreline Cleanup Assessment Team (SCAT) approach is used to collect data on shoreline oiling conditions and support decision-making for cleanup. The objectives are to:

- Systematically collect data on shoreline oiling conditions
- Identify and describe human use, ecological and cultural resource effects and the constraints that they impose on cleanup operations
- Cross-check pre-existing information on environmental sensitivities or clarify observations from aerial surveys
- Identify any constraints that may limit operations
- Provide decision support for onshore response operations

Priorities for shoreline assessment surveys may be determined using information from aerial surveys and pre-existing sensitivity atlases and databases. Priority setting criteria include:

- Degree of oiling
- Environmental resources
- Projected tide and wind conditions
- Available transportation and logistics

Information collected from the SCAT process is the basis for development of the shoreline treatment or cleanup operation.

SCAT may involve:

- An aerial reconnaissance survey to identify areas of current or potential impact
- An aerial video survey to document shoreline oil conditions and geomorphology and to establish locations and priorities for ground surveys
- A ground survey to document shoreline oil conditions, geology, ecology, cultural resources, and identify constraints

**SHORELINE SEGMENTATION**

Shoreline segmentation provides a systematic and uniform framework for documentation, planning and response consideration.

- The shoreline is divided into working units, called "segments", within which the shoreline character is relatively homogeneous in terms of physical features and sediment type.
- Each segment is given a unique location identifier and is surveyed.
- Segment boundaries can be either prominent geological features (headlands, streams, etc.), changes in shore/substrate types, or changes in oil conditions.
- Segment lengths are small enough to obtain adequate resolution and detail on the distribution of oil, but not so small that too much data is generated. Most segments in oiled areas would be in the range of 0.2 to 2.0 km.
- Segments are identified on an alphanumeric scheme with an alphabetical prefix, keyed to a geographic place name (e.g., MP = Milne Point), followed by a number based on an alongshore sequence (MP-4).

Segmentation for the North Slope region has already been accomplished as part of the pre-planning exercise (see the ACS Technical Manual Map Atlas). It should be reviewed for suitability at the time of a spill, since the segment boundaries may need to be adapted to existing spill conditions. Predesignated segments can be subdivided if oiling conditions vary significantly within the segment; segment subdivision can be identified by a suffix (e.g., MP-4-A).

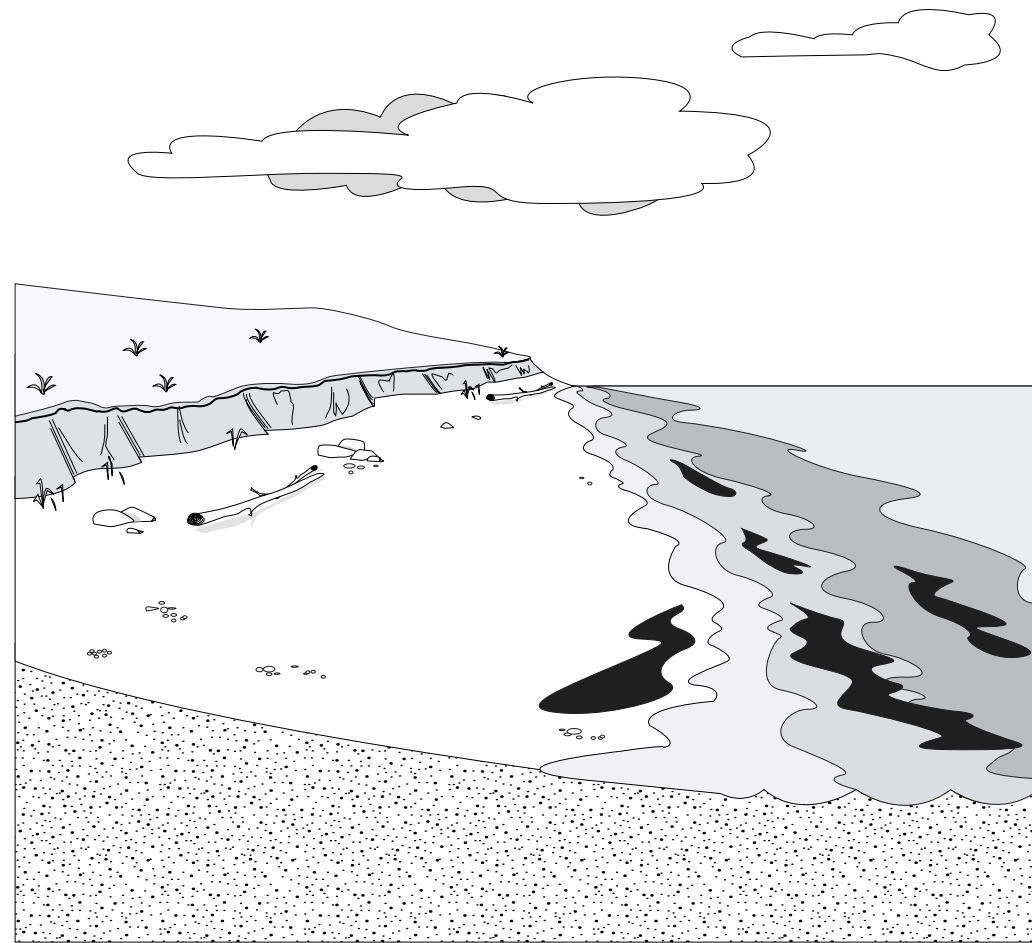
**SCAT SURVEY TEAM AND RESPONSIBILITIES**

Primary team members for the surveys and their responsibilities are outlined below. Assignments can be modified according to survey objectives and the composition of the team. Government or landowner representatives will participate and may assist in the data collection.

TEAM MEMBER	RESPONSIBILITIES
Oil Spill Geomorphologist	<ul style="list-style-type: none"> <li>• Logistical direction and management of the survey team</li> <li>• Review of existing data, maps and photos</li> <li>• Reviewing and verifying existing shoreline segmentation and adapting it as necessary</li> <li>• Photographic/video documentation</li> <li>• Collection and documentation of any sediment/oil samples that may be required</li> <li>• Consultation with the spill response operations representative and other team members concerning appropriate response options and constraints for a given site</li> <li>• Post-survey mapping, documentation, and categorization of the severity of oiling based on on-site observations</li> </ul>
Ecologist	<ul style="list-style-type: none"> <li>• Cross-checking information from existing sensitivity atlases and databases with actual conditions</li> <li>• Describing the abundance and location of different coastal ecosystems in the segment</li> <li>• Tabulating information on the general character and health of indicator species along the shoreline</li> <li>• Providing information on nearshore, shallow areas and wildlife observations</li> <li>• Recommending ecological constraints on operations or cleanup activities</li> <li>• Providing photo documentation and a sketch map of the surveyed area</li> </ul>
Archaeologist	<ul style="list-style-type: none"> <li>• Evaluate the foreshore areas to identify likely site locations</li> <li>• Update known site by recording additional information on site location, size, depth, presence of surface features and conditions</li> <li>• Document newly discovered sites</li> <li>• Complete forms as required (Cultural Resource Evaluation Form and Human Use Summary Form)</li> <li>• Apply constraints as necessary on operations or cleanup activities</li> <li>• Provide photo documentation and draw a sketch map</li> </ul>

Detailed information on the SCAT process is provided in the two following documents:

- Owens Coastal Consultants. 1994. *North Slope Shoreline Oil Spill Countermeasures Manual*. Prepared for Alaska Clean Seas, Prudhoe Bay, Alaska.
- Michel, J. and I. Byron. 1997. *Shoreline Assessment Manual*. Hazardous Materials Response and Assessment Division, National Ocean Service, National Oceanic and Atmospheric Administration, Report No. HAZMAT 97-4.



Natural recovery allows the shoreline to recover without intervention. This option requires field observations of the oiling conditions and of the resources at risk to assess the effects of allowing the oil to weather naturally. In some cases, monitoring the location may be necessary to ensure that the assessment is correct.

Natural recovery can be applicable on any spill incident and for any shoreline type, but requires a decision that:

- To treat or clean stranded oil may cause more damage than leaving the site to recover naturally, or
- Response techniques cannot accelerate natural recovery, or
- Safety considerations could place response personnel in danger either from the oil (itself) or from environmental conditions (weather, access, etc.).

Other factors include an analysis of the:

- Resources at risk,
- The type and amount of oil, and
- The location of the site.

For example, a decision could be made that a small amount of nonpersistent oil on an exposed shore at a remote location may weather and degrade without any active or potential future threat to the local environment.

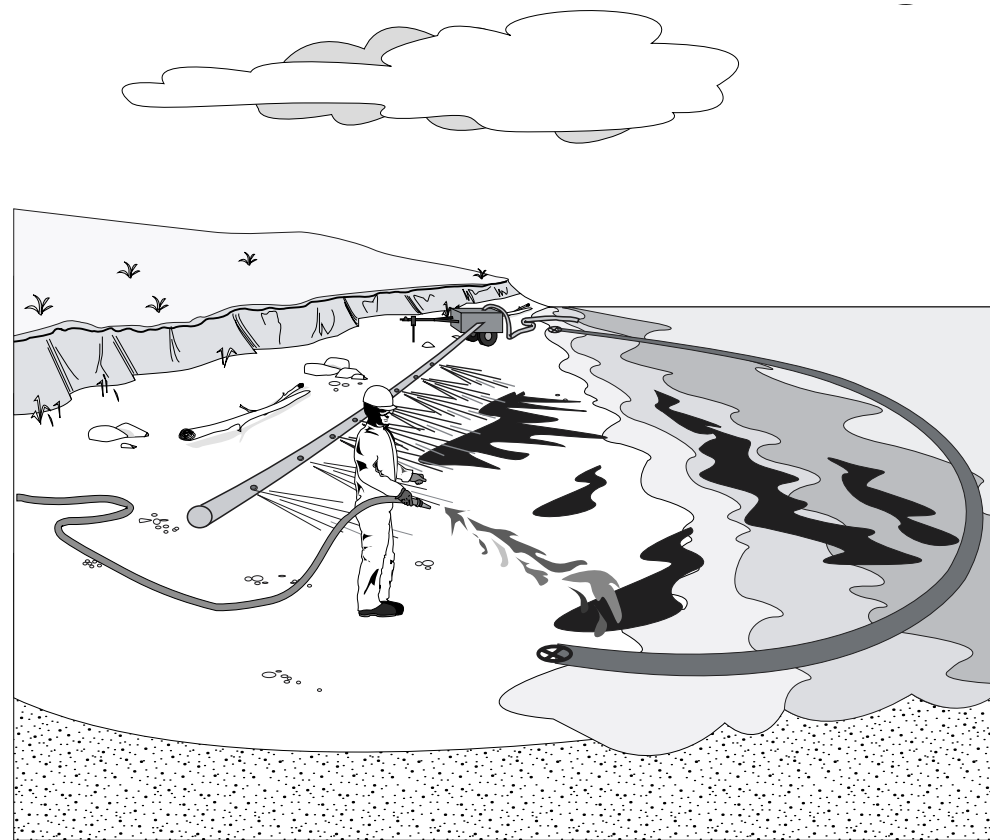
*NOTE: All values given on these pages are for planning purpose only.*



### DEPLOYMENT CONSIDERATIONS AND LIMITATIONS

- Unified Command approval is required for any shoreline cleanup tactic.
- Natural recovery of oiled shorelines is more applicable for:
  - Small than large amounts of oil,
  - Nonpersistent than persistent oil, and
  - Exposed shorelines than sheltered or low wave-energy environments.
- Natural recovery may not be appropriate if important ecological resources or human activities/resources are threatened.
- Natural recovery should always be considered as the preferred option, particularly for small amounts of oil. The trade-off analysis involves (1) natural recovery, (2) the possible benefits of a response to accelerate recovery, and (3) any possible delays to recovery that may be caused by response activities.

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Physical removal involves a variety of washing or flushing tactics to move oil from the shore zone to a location for collection and removal. The variables that distinguish each tactic are pressure and temperature. For all these tactics, booms or other methods of trapping and containment are used to collect the oil for removal.

**FLOODING (“DELUGE”)**

A high-volume (50 to 250 gpm), low-pressure supply of seawater at ambient temperature is pumped using large-diameter (3- to 6-inch) pipe and/or hose (“header”) to the upper section of the oiled area. Water can be pumped either directly from a hose without a nozzle, or the pipe or hose can be perforated (0.1- to 0.2-inch holes) at intervals and placed along the shoreline parallel to the water line. Output pressures are less than 20 psi.

The high volume of water floods the surface area (in the case of impermeable man-made shorelines) or the beach sediments. Mobile or non-sticky oil is transported with the water as it flows downslope. Flooding can be used in combination with trenches or sumps and vacuum systems to float and collect oil for recovery.

**LOW-PRESSURE, COLD-WATER FLUSHING**

Hand-operated or remote-controlled hoses use ambient temperature seawater to flush, wash, and herd oil to a collection point for removal. Output pressures are controlled, usually by a nozzle, and are low (less than 50 psi). The tactic can be used with flooding to prevent redeposition of the oil.

**LOW-PRESSURE, WARM/HOT-WATER FLUSHING**

Hand-operated or remote-controlled hoses use heated (80°F to 212°F) seawater to flush, wash, and herd oil to a collection point. This tactic is used primarily to dislodge and flush oil that cannot be washed using low-pressure, ambient-temperature water. Output pressures are controlled, usually by a nozzle, and are low (less than 50 psi). This tactic can be used with flooding to prevent redeposition of the oil.

**HIGH-PRESSURE, COLD-WATER FLUSHING**

Hand-operated or remote-controlled hoses use ambient temperature seawater jets to flush, wash, and herd oil to a collection point. The higher water pressures dislodge and flush oil that cannot be washed or mobilized using lower pressure, ambient temperature water. Output pressures are controlled and are in the range of 100 psi or greater. On sloping outcrops or structures this technique can be used with flooding to prevent redeposition of the oil.

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**HIGH-PRESSURE, WARM/HOT-WATER FLUSHING**

Hand-operated or remote-controlled hoses use high-pressure, heated (80°F to 212°F) seawater to flush, wash, and herd oil to a collection point. Output pressures may be fixed or controlled by a nozzle and are in the range of 100 psi or greater. The higher pressure and warm water dislodge and flush oil that cannot be washed by lower pressure and temperature water. On sloping structures, this technique can be used with flooding or low-pressure flushing to prevent redeposition of the oil.

**EQUIPMENT AND PERSONNEL**

- See tactics on booming and skimming for additional equipment and personnel needs for recovery of free oil generated by these tactics.

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Trash Pump (2-inch)	ACS, KRU, MPU	Deluge	≥1	2	1 hr	2 hr
Suction Hose (2-inch)	All	Suction	≥20 ft	2 for setup	2 hr	
Discharge Hose (3-inch)	All	Deluge	≥50 ft	—	2 hr	
Perforated Header Hose	ACS	Deluge	≥100 ft	2 for setup	1 hr	
Water Heating Plant*	EOA	Heat water	—	—	—	
Water Truck*	All	Transport heated water	1	1	2 hr	

**TOTAL STAFF 2 (3 if water truck is used)**

\*Warm/hot-water flushing would be used only where road access is available to truck heated water to the site.

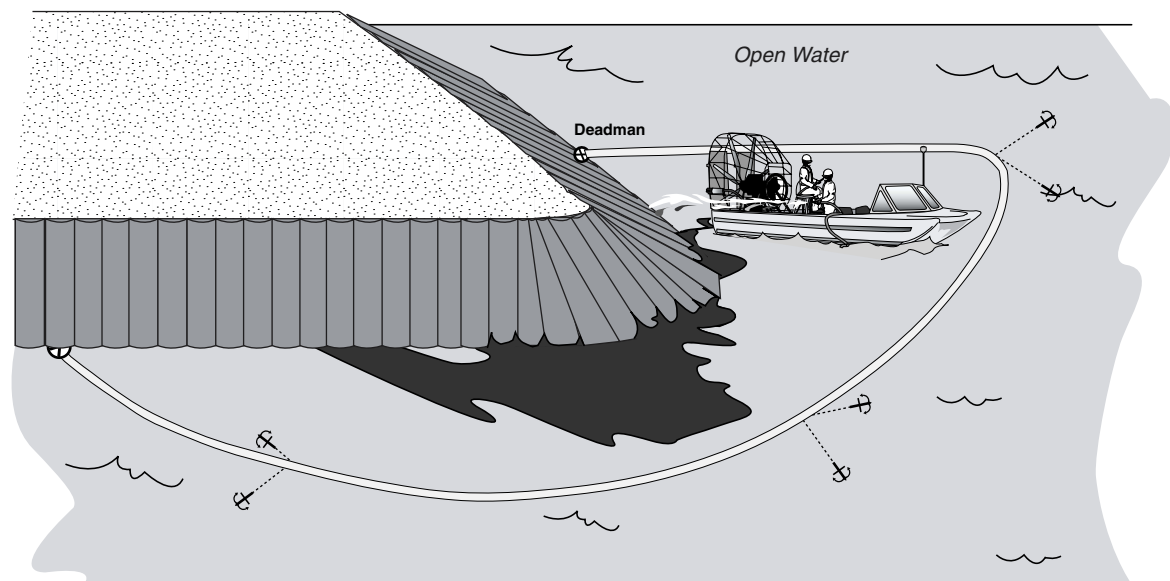
**CAPACITIES FOR PLANNING**

- A 2-inch trash pump operates at 220 gpm.

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- Unified Command approval is required for any shoreline cleanup tactic.
- Washing oil and/or sediments downslope to lower intertidal zones that may have plant or animal communities should be avoided, particularly if these were not initially oiled. This can be avoided by working at only mid-tide or higher water levels so that these communities are below the water line. This oil and oiled sediment should be contained and collected as part of the treatment process. If it cannot be recovered, the technique only disperses oil rather than cleans the shoreline.
- *Flooding* is effective on most shoreline types, but it may have limited application only on sand or mud flats and on steep man-made solid structures. Generally, flooding is not a very intrusive technique.
- *Low-pressure, cold-water flushing* is effective on most impermeable shoreline types and on some permeable shores or marshes. It may have limited application only on sand beaches, sand-gravel beaches, or sand flats, and is probably not appropriate on mud flats. Generally, this is not an intrusive technique and leaves most organisms in place.
- *Low-pressure, warm/hot water flushing* is effective on most impermeable shoreline types, but may have limited application only on sand beaches, sand-gravel beaches, and sand flats and is probably not appropriate on mud flats. Generally, this is not a highly intrusive technique if used carefully in conjunction with high-volume flooding, which minimizes the potential adverse effects on shoreline organisms of using heated water.
- The effectiveness of flooding and low-pressure flushing decreases as oil viscosity increases and as depth of penetration increases on cobble beaches.
- *High-pressure, cold-water flushing* has limited application only for oiled bedrock or solid man-made shorelines. High-pressure water can dislodge attached organisms and may damage others.
- *High-pressure, warm/hot-water flushing* usually has only limited application for solid man-made structures. The heated water or the pressures may dislodge attached organisms or damage others.

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**STEAM CLEANING**

Hand-operated or remote-controlled units are used to dislodge, wash, and herd oil to a collection point. Output pressures from the unit are generally over 100 psi and may be as high as 1,000 psi with steam temperatures over 200°F. This tactic can be used with flooding to prevent redeposition of the oil.

**SAND BLASTING**

Hand-operated or remote-operated units are used to dislodge oil or abrade stains and thin weathered films of oil from a hard surface. Output pressures from the hose are usually less than 100 psi. Spent sand and dislodged oil can be collected by a drop-cloth arrangement below the working area.

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**EQUIPMENT AND PERSONNEL**

- See tactics on booming and skimming for additional equipment and personnel needs for recovery of free oil generated by these tactics.

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Small Sand Blaster	ACS	Sand blasting	1	2	2 hr	2 hr
Air Compressor	All	Air for sand blaster	1	—	1 hr	
Spillbuster Van	EOA, KRU	Steam cleaning	1	2	1 hr	2 hr
Steam Cleaner	ACS	Steam cleaning	1	2	2 hr	
1000-Gal Water Tank	ACS	Water	1	—	2 hr	

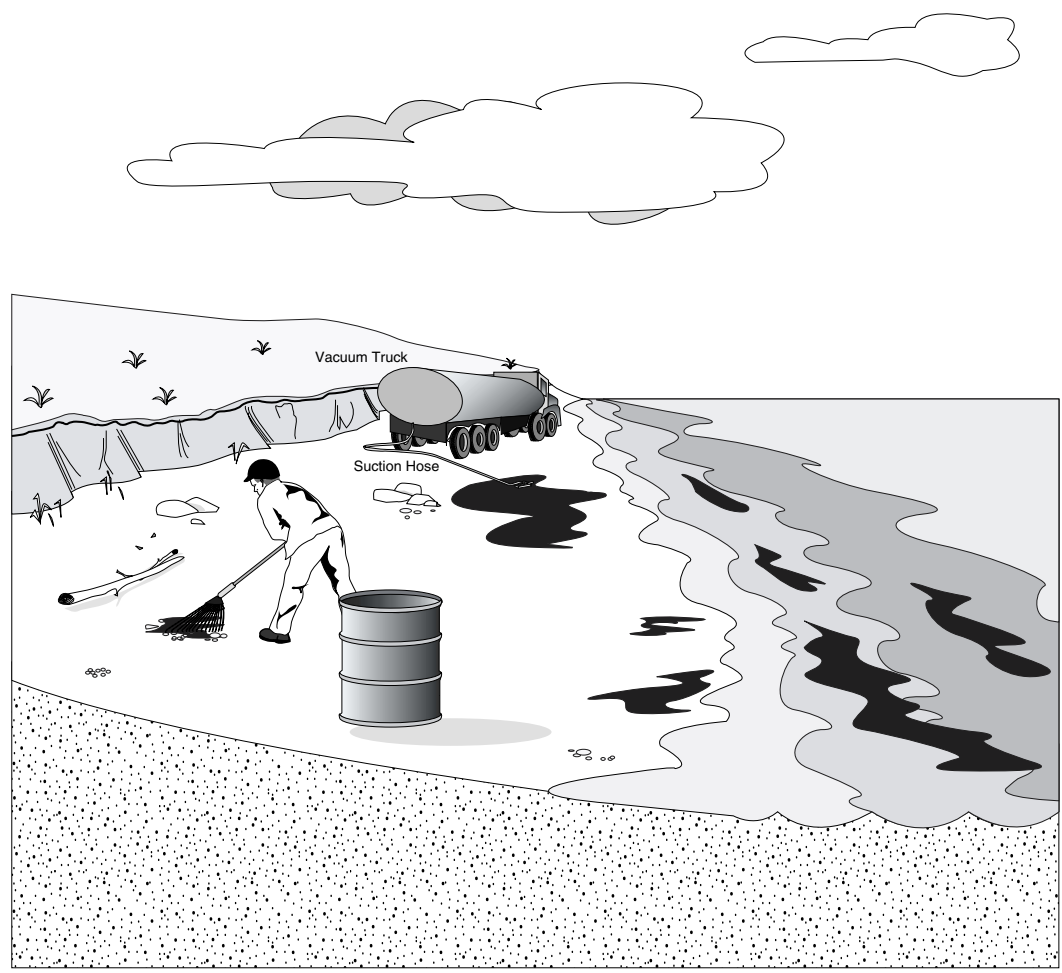
**TOTAL STAFF 2**

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- Unified Command approval is required for any shoreline cleanup tactic.
- Washing oil and/or sediments downslope to lower intertidal zones that may have plant or animal communities should be avoided, particularly if these were not initially oiled. This can be avoided by working at only mid-tide or higher water levels so that these communities are below the water line. This oil and oiled sediment should be contained and collected as part of the treatment process. If it cannot be recovered, the technique only disperses oil rather than cleans the shoreline.
- *Steam cleaning* has limited application and is used only on impermeable man-made surfaces. Generally, this is a very intrusive technique. Steam cleaning will kill most organisms.
- *Sand blasting* has limited application and is used only on impermeable man-made surfaces. Generally, this is a very intrusive technique. Sand blasting will remove all organisms and leave a clean and pristine, but barren, surface.
- Sand blasting systems use up to 1,000 lb. of sand per hour so that a considerable amount of waste material is generated. The movement of sand and oiled sand to lower intertidal zones that have attached plant or animal communities should be avoided.

NOTE: All values given on these pages are for planning purpose only.





This group of physical methods involves removal of the oil or oiled materials (sediments, debris, vegetation etc.) from the shore zone to a location where it can be disposed of.

**MANUAL REMOVAL**

The technique involves picking up oil, oiled sediments, or oily debris using gloved hands, rakes, pitchforks with screens, trowels, shovels, sorbent materials, buckets, etc. It may include scraping or wiping with sorbent materials or sieving if the oil has come ashore as tar balls. Collected material can be placed directly in plastic bags, drums, etc., for transfer. If the containers are to be carried to a temporary storage area they should not weigh more than can be easily and safely carried by one person. This tactic can be used practically and effectively in any location or on any shoreline type or oil type where access to the shore zone is possible and safe.

**VACUUM**

Truck-mounted vacuum systems may be used; the suction end usually is deployed manually to collect oil and/or oily water. These vacuum systems are primarily used where oil is pooled in natural depressions or hollows, or has been herded into collection areas. Vacuums can be used in combination with flooding or deluge techniques to float and collect oil. Vacuum trucks can be used to remove oil that is collected in sumps. A dual-head wash-vacuum system can be used in locations that are hard to access, such as between boulders and logs.

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**EQUIPMENT AND PERSONNEL**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Rakes	All	Recovery	≥1	1	1 hr	0.5 hr
Pitch Forks w/Screen	All	Recovery	≥1	1	1 hr	1 hr
Shovels	All	Recovery	≥1	1	0.5 hr	0.5 hr
Sorbents	All	Recovery	≥1 Pkg.	1	1 hr	1 hr
Vacuum Truck	All	Recovery	1	2	1 hr	0.5 hr
Oily Waste Bags	All	Disposal	≥1 Box	—	0.5 hr	0.5 hr

TOTAL STAFF 2

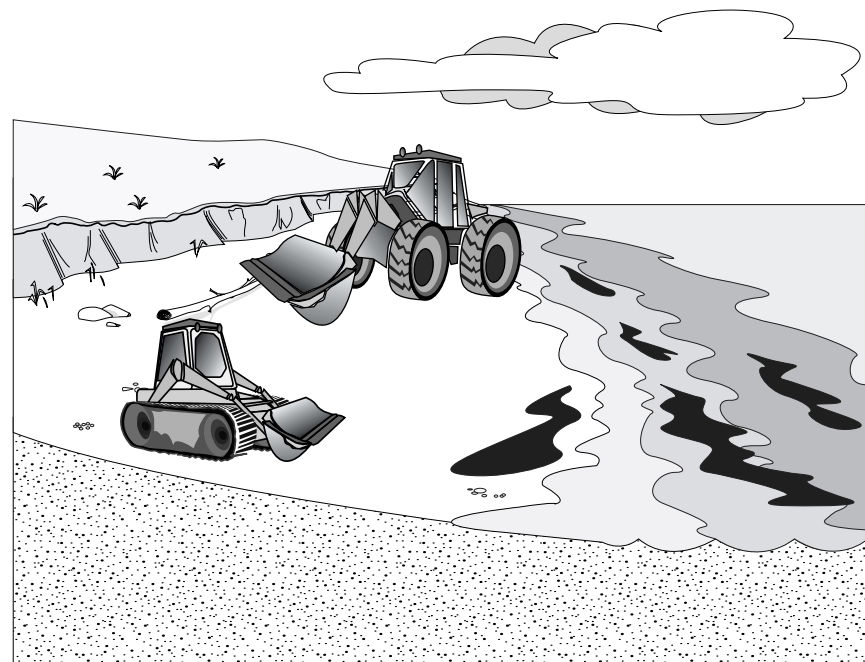
**CAPACITIES FOR PLANNING**

- The typical suction rate for liquids by a vacuum truck is 200 bbl/hr in the summer and 150 bbl/hr in the winter. The typical suction rate for pooled diesel remains at 200 bbl/hr year round. (Vacuum truck recovery rate is reduced to 34 bbl/hr if a Manta Ray skimmer is used.)

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- Unified Command approval is required for any shoreline cleanup tactic.
- Manual removal is most applicable for:
  - Small amounts of viscous oil (e.g., asphalt pavement removal),
  - Surface or near-surface oil, and
  - Areas inaccessible to vehicles.
- Manual removal is labor intensive and slow for large oiled areas; although slower than mechanical removal, it generates less waste and the waste materials can be segregated easily at the source.
- Foot traffic should avoid the oiled zone to prevent carrying oil from there into previously clean locations. Foot traffic can have an adverse impact on marshes or in tidal flat areas. Excessive foot traffic can impact vegetated areas, such as backshore tundra, or can disturb adjacent resources, such as nesting birds.

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Mechanical removal is more rapid than manual removal but generates larger quantities of waste. The method of operation varies considerably depending on the type of equipment that may be available and on the ability of that equipment to operate on a section of shore. The cleaning efficiency for each type of equipment is expressed in terms of the rate of cleaning that can be achieved and the amounts of waste that are generated.

Some equipment (e.g., Bobcats, front-end loaders, or vacuum trucks) can remove and transfer material directly to a truck or temporary storage area in a single step. Other types (graders and bulldozers) are less efficient and require two steps to move or side cast material that must then be picked up by other equipment (Bobcats, front-end loaders or backhoes) for transfer.

Several mobile beach cleaners have been developed specifically for oil spill cleanup; however, these are not locally available on the North Slope but may be brought in for medium- or large-scale response operations, if appropriate. Other beach cleaners designed for cleaning of debris can be adapted to pick up oiled tarballs. A commonly-used example is a mobile sieving unit drawn by a tractor.

Off-site beach cleaning machines that treat or wash and replace oiled materials are included in this part as they involve a waste management program of transfer, temporary storage and treatment, even if replaced on the shore. These off-site cleaners involve a multistep process as oiled material is removed from a beach and subsequently replaced by one or more types of earth-moving equipment.

**EQUIPMENT AND PERSONNEL**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Bobcat	ACS, KRU, EOA	Recovery	1	1	1 hr	0.5 hr
or Front-End Loaders	All	Recovery	1	1	1 hr	0.5 hr
or Backhoe	EOA, WOA, KRU, Peak, AIC, APC	Recovery	1	1	2 hr	0.5 hr
or Challenger Dozer	EOA, KRU, Alpine, Western Geophysical, and Caribou Construction*	Sediment Reworking	1	1	1 hr	0.5 hr
or Grader	All	Recovery	1	1	1 hr	0.5 hr
Vacuum Trucks	All	Recovery	1	1	1 hr	0.5 hr
Dump Trucks	WOA, KRU, EOA, AIC, Peak	Disposal	2	2	1 hr	0

**TOTAL STAFF ≥3**

\*Alpine and Western Geo have 1 Challenger with blade and Caribou Construction has 6. Western Geo and Caribou Challengers are normally out with seismic crews in winter and would not be available for at least 24 hours.

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**SUPPORT**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Fuel Truck	All	Fuel heavy equipment	1	Once per shift	1 hr	0.5 hr
Lube Truck	All	Provide fluids to heavy equipment	1	Once per shift	1 hr	0.5 hr
Mechanic Truck	All, except Badami	Support equipment	1	1	1 hr	0.5 hr
Semi and Trailer	EOA, WOA, KRU	Haul equipment	1	1 driver	1 hr	0

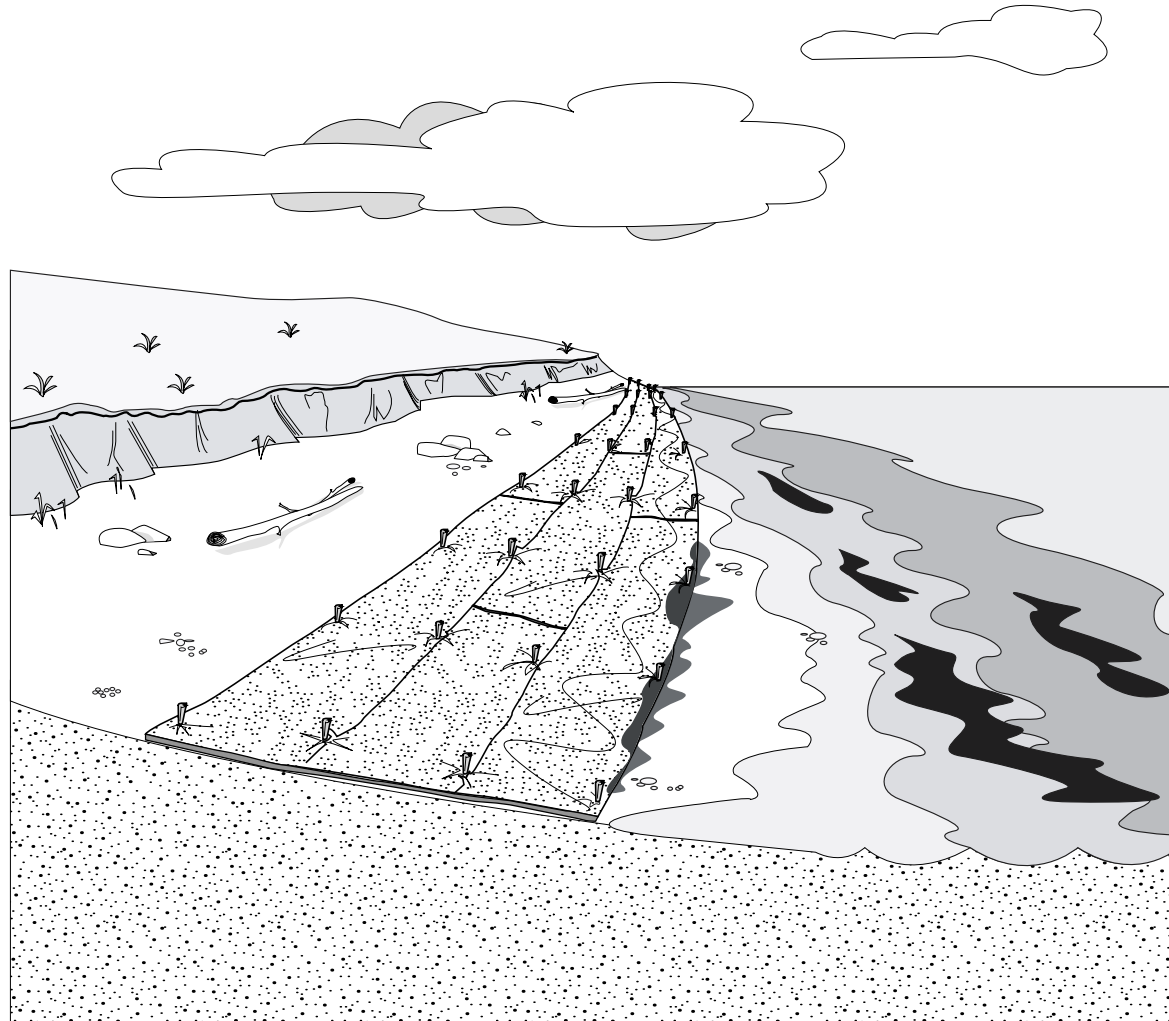
**CAPACITIES FOR PLANNING**

- The typical suction rate for liquids by a vacuum truck is 200 bbl/hr in the summer and 150 bbl/hr in the winter. The typical suction rate for pooled diesel remains at 200 bbl/hr year round. (Vacuum truck recovery rate is reduced to 34 bbl/hr if a Manta Ray skimmer is used.)
- See Tactic R-1 for capacities of dump trucks available on the North Slope.

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- Unified Command approval is required for any shoreline cleanup tactic.
- Mechanical removal can be used on all but solid, man-made shoreline types, although it has limited applicability for tidal flats, due to poor bearing capacity. The bearing capacity of the sediments and the slope of the shore zone, as well as the performance characteristics of the individual equipment, control the applicability of different types of machines.
- The various types of commercially-available earth-moving equipment have different operational requirements and different applications. The most important variable is the ability of a piece of equipment to travel on a beach type without becoming immobilized. Traction for wheeled equipment on soft sediments (low bearing capacity) can be improved by reducing tire pressures. Tracked equipment may be able to operate where wheeled vehicles cannot, but is not a preferred option as tracks disturb sediments or tundra surfaces to a much greater degree than tires. Each type of equipment has a particular application:
  - Graders:** Can operate on only hard and relatively flat surfaces and are capable of moving only a thin cut (<3 inches) of surface material.
  - Loaders, bulldozers and backhoes:** Can operate in a wider range of conditions and are designed to move large volumes of material and can dig as well as move material.
  - Backhoes:** Use an extending arm or crane so that they may be operated from a backshore area and can reach to pick up material.
  - Beach cleaning machines:** Operate in a number of different ways: mobile equipment cleans or treats on a beach whereas other equipment operates off-site (adjacent) to treat sediment so that cleaned material may be replaced on the beach.
  - Vacuum trucks:** Remove pooled oil or oil collected in lined sumps.
- Use of mechanical techniques on tidal flats or marshes can cause significant adverse impacts, either by mixing oil with clean and/or subsurface sediments or by damaging plant stems and root systems.
- All earth-moving equipment is designed to move large volumes of material in a rapid and efficient manner, which is not always an appropriate approach for shoreline cleanup. Frequently the objective of a cleanup program is to use the equipment in such a way that only a thin cut of oiled sediment is removed. Usually the operator can advise on which piece of equipment is the most appropriate or practical to achieve a particular goal.
- Repeated handling or transfer of oiled sediments during mechanical removal should be avoided as much as possible as this increases the potential for spillage and decreases efficiency.

NOTE: All values given on these pages are for planning purpose only.



**SORBENTS**

Sorbent materials such as rolls or snares are placed in the shore zone to collect oil as it comes ashore (protection mode) or in the oiled area after it has been stranded (cleanup mode).

Usually the sorbents are deployed in fixed position, by stakes and/or anchors, as a line or parallel lines in the form of a floating boom or rope so that they are lifted and can move at the water's edge. Alternately, individual sorbents may be staked to swing over a fixed area as the water rises and falls.

In both the protection and cleanup modes, the sorbent material is left in place to collect oil for subsequent removal and disposal.

This technique is distinguished from the use of sorbent materials to manually remove oil. That technique is described under manual removal.

**VEGETATION CUTTING**

Vegetation cutting removes oiled plants to prevent remobilization of the oil and contact by wildlife or to accelerate the recovery of the plants. Usually, this is a manual operation involving knives, powered weed cutters, and/or rakes.



**NOTE:** "Base Location" is storage location (may change seasonally); "Mobe Time" is time to get it out of storage, prepare it for operation, and make it ready to travel (concurrent for all equipment); "Deploy Time" is time to make it operational for its intended use at the spill site. These times do not include travel time from base to spill site, which may have multiple components (see Tactic L-3).

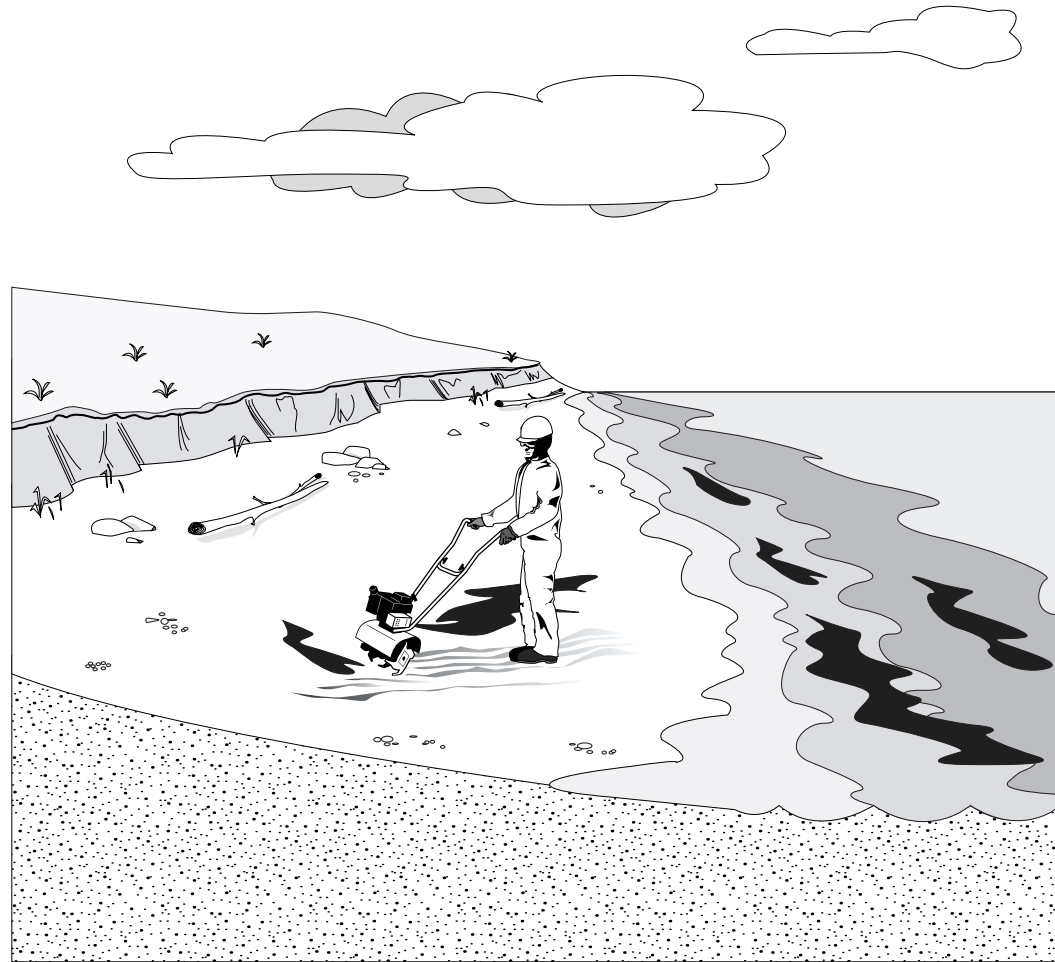
**EQUIPMENT AND PERSONNEL**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Knives	All	Vegetation removal	≥1	1	0.5 hr	0.5 hr
Weed Eater	EOA, KRU	Vegetation removal	≥1	1	1 hr	0.5 hr
Rakes	All	Vegetation removal	≥1	1	1 hr	0.5 hr
Sorbents	All	Recovery	≥ 1 pkg.	1	1 hr	0.5 hr

**TOTAL STAFF ≥2**

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- Unified Command approval is required for any shoreline cleanup tactic.
- *Vegetation cutting* is a labor-intensive technique that is used in marshes or on attached plants, such as seaweed, where there is concern that the oil may be released later to affect other resources, particularly wildlife. Also applicable where the continued presence of oil may pose a contact threat to animals and birds that use the area or to adjacent healthy organisms.
- Foot traffic from vegetation cutting can cause considerable damage in low-lying, drowned tundra, or marsh areas. Loss of plants or of stems and leaves can delay natural recovery rates and remove habitat for some species.
- *Sorbents* can be used on any shoreline type and for most oil types. Less applicable for very viscous, volatile oil types and for semisolid oils.
- Sorbents can quickly reach their capacity when in contact with large amounts of oil. When frequent replacement is necessary, which can occur even for relatively small amounts of oil, this is a labor-intensive activity that can generate large amounts of waste on a daily basis.
- Sorbents can be run through a sorbent wringer and reused.
- Sections of sorbent boom can be placed at the water level and secured with fence posts every 10 feet to catch any oil that may be going back out into the water.



Mechanical tilling/aeration exposes or breaks up surface and/or subsurface oil to accelerate evaporation and other natural degradation processes.

Heavy equipment is used to break up surface oil layers or to expose subsurface oil to natural weathering processes. This tactic may involve the use of farm-type equipment such as a disc system, harrow, plough, rakes or tines, or earth-moving equipment such as front-end loaders, graders, or bulldozers.

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**EQUIPMENT AND PERSONNEL**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Aerator	KRU	Aeration	1	1	2 hr	1 hr
or Roto-tiller	EOA	Aeration	1	1	2 hr	1 hr
or Front-End Loader	All	Aeration	1	1	1 hr	0.5 hr
or Grader w/Scarifying Teeth	All	Aeration	1	1	2 hr	0.5 hr
or Dozer w/Ripper Teeth	EOA, KRU, WOA, Peak, AIC	Aeration	1	1	1 hr	0.5 hr
or Tractor w/Tilling Attachment	Peak	Aeration	1	1	1 hr	0.5 hr

TOTAL STAFF ≥2

**SUPPORT**

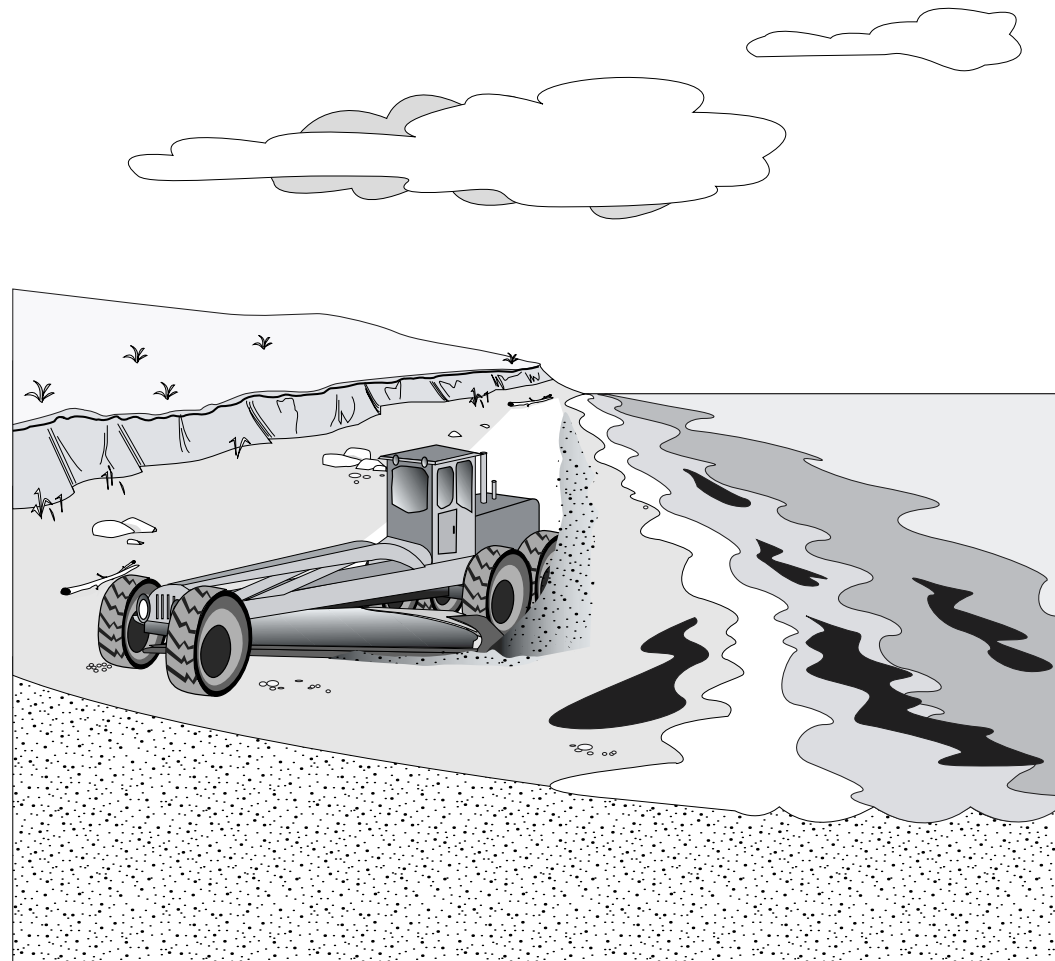
EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Semi and Trailer	EOA, WOA, KRU	Haul equipment	1	1 driver	1 hr	0
Fuel Truck	All	Fuel heavy equipment	1	Once per shift	1 hr	0.5 hr
Lube Truck	All	Provide fluids to heavy equipment	1	Once per shift	1 hr	0.5 hr
Mechanic Truck	All, except Badami	Support equipment	1	1	1 hr	0.5 hr

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- Unified Command approval is required for any shoreline cleanup tactic.
- Mechanical tilling/aeration can be used on coarse sediment (pebble/cobble) or sand beaches and is particularly useful in promoting evaporation (safety evaluations are crucial to ensuring that volatile fractions are not present). This method may be used in conjunction with manual removal (to pick up patches of oil that are exposed) or bioremediation.
- If oil or oiled sediments have been buried by a clean layer of material, it may be appropriate to remove that clean layer to a temporary storage location, replacing it after tilling or aeration and after the exposed oiled materials have been allowed to weather.
- Care should be taken to not alter the shoreline such that erosion/accretion occur. This method may affect biological populations.

NOTE: All values given on these pages are for planning purpose only.





Sediment reworking/surf washing accelerate natural degradation by exposing oil and oiled materials to higher levels of physical (wave) energy.

Earth-moving equipment is used to move oil or oiled sediments to a location where these processes are more active — from surface or subsurface areas where they are protected from natural physical abrasion and weathering processes or where these processes occur at relatively slower rates.

Farm-type machinery (such as a disc system, harrow, plough, rakes or tines) or earth-moving equipment (such as front-end loaders, graders, or bulldozers) can be used.



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**EQUIPMENT AND PERSONNEL**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Front-End Loader	All	Sediment reworking	1	1	1 hr	0.5 hr
or Grader	All	Sediment reworking	1	1	2 hr	0.5 hr
or Challenger Dozer	KRU, EOA, Alpine, Western Geophysical, and Caribou Construction*	Sediment reworking	1	1	1 hr	0.5 hr
or Tractor w/Tilling Attachment	Peak	Aeration	1	1	1 hr	0.5 hr

**TOTAL STAFF ≥2**

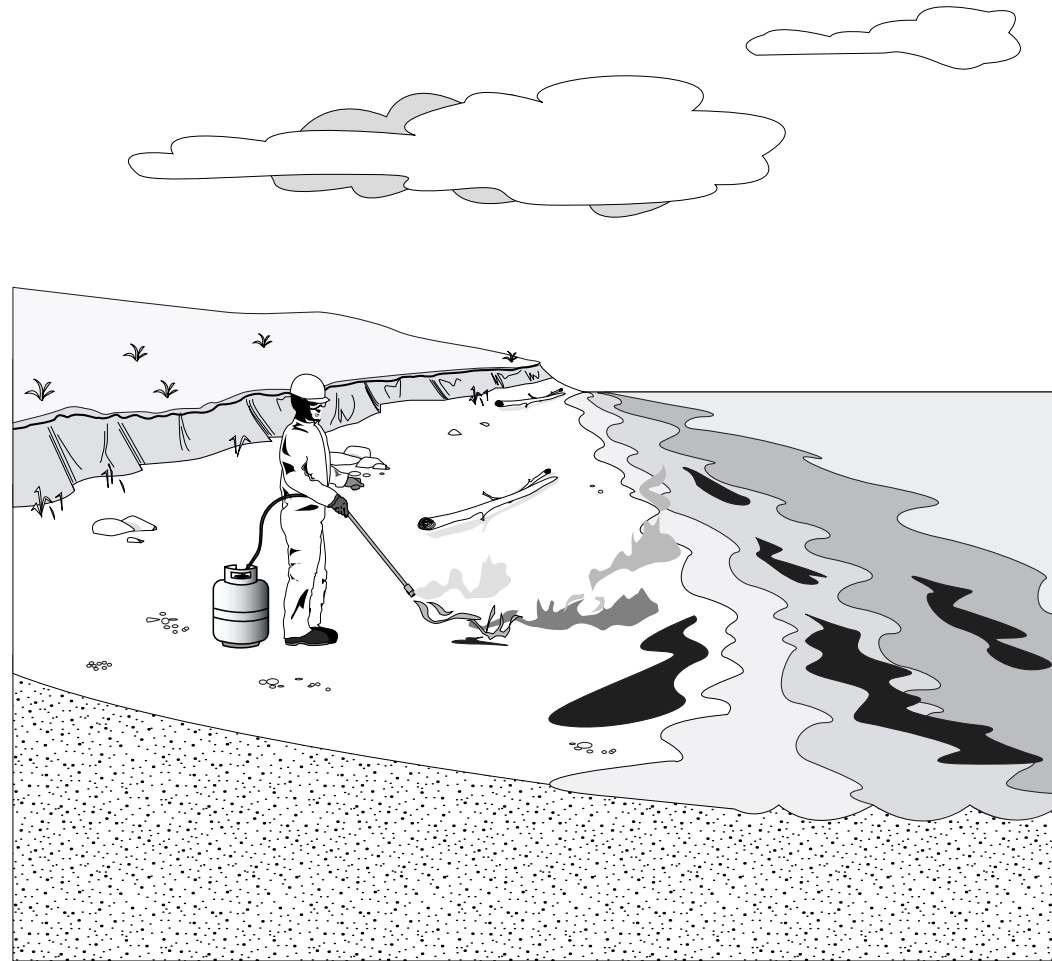
\*Alpine and Western Geo have 1 Challenger with blade and Caribou Construction has 6. Western Geo's and Caribou's Challengers are normally out with seismic crews in winter and will no be available for at least 24 hours.

**SUPPORT**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Semi and Trailer	EOA, WOA, KRU	Haul equipment	1	1 driver	1 hr	0

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- Unified Command approval is required for any shoreline cleanup tactic.
- If oil or oiled sediments have been buried by a clean layer of material, it may be appropriate to remove that clean layer to a temporary storage location, replacing it after reworking or washing the exposed oiled materials and after they have been redistributed by wave action.
- Sediment reworking/surf washing can be used on coarse sediment (pebble-cobble) or sand beaches, and is particularly useful:
  - In promoting evaporation and physical abrasion;
  - Where sediment removal may cause beach instability (i.e., potential erosion);
  - Where oiled sediments are located above the limit of normal wave action;
  - Where oil or oiled sediments have been buried or oil has penetrated to a level below the normal or seasonal wave-action zone; and
  - Where other cleanup or treatment activities have removed most of the oil or oiled sediment and only light oiling (i.e., stains) remains.
- Degradation requires wave action, so that the applicability of the technique decreases in sheltered or low wave-energy environments.
- Sediment reworking/surf washing is not appropriate if large amounts of oil might be released that could threaten to re-oil the beach or adjacent locations. Oiled materials should not be moved into shoreline areas where the oil and/or the sediments could damage other resources.



Oil on a beach will not sustain combustion by itself unless it is pooled or has been concentrated in sumps, trenches, or other types of containers. This technique is used primarily where combustible materials, such as logs or debris, have been oiled and can be collected and burned, or where vegetation, such as a marsh, has been heavily oiled.

Torches can be used to burn oil from hard substrates, but this is a labor-intensive method that uses large amounts of energy to remove small amounts of oil.

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**EQUIPMENT AND PERSONNEL**

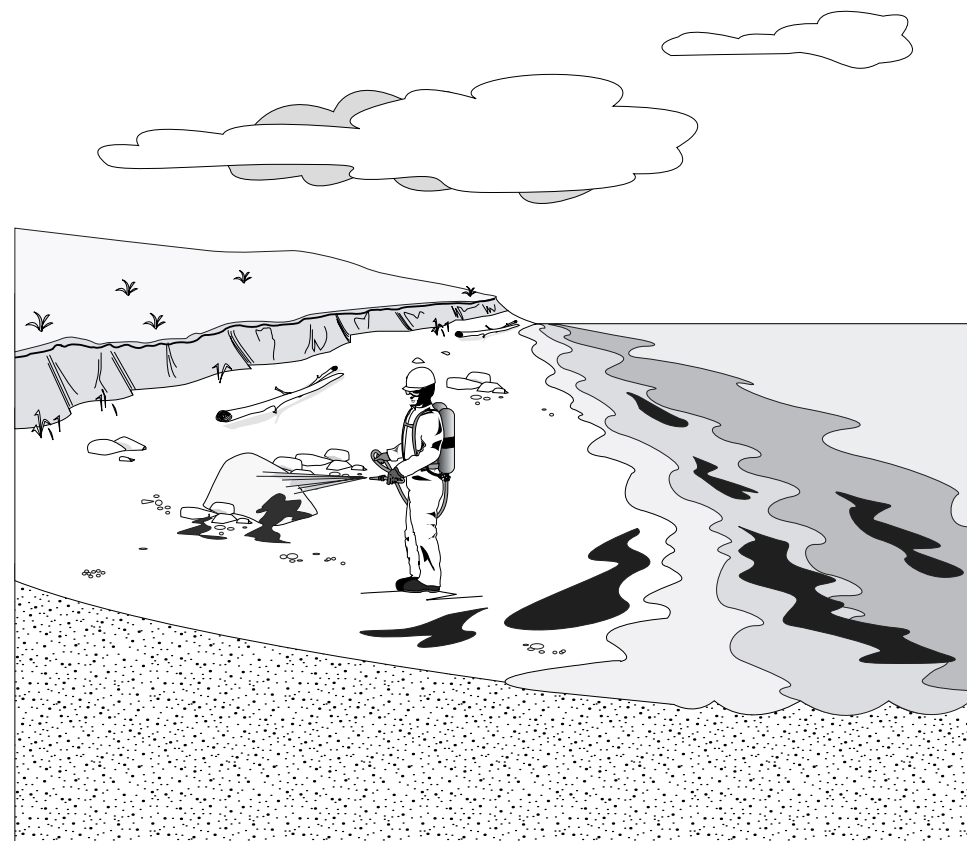
EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Propane Weed Burner	All	In-situ burning	1	1	1 hr	0.5 hr
Hand-Held Igniter	ACS	In-situ burning	≥1	1	1 hr	0.5 hr

TOTAL STAFF ≥2

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- Proper safety procedures must be followed, and the necessary personal protective equipment (PPE) must be used.
- Unified Command approval is required for any shoreline cleanup tactic.
- Responders should work from upwind edge of spill to downwind edge.
- Burning is applicable primarily for oiled peat, logs or debris, or where oil has been collected and can be ignited with sustained combustion in sumps or drums.
- Burning has been used effectively for oil spills on ice.
- Burning of heavily oiled marsh vegetation has a major impact on the ecosystem if the marsh soils are dry, as the root systems can be destroyed. Wet soils protect the root systems from heat damage so that recovery from burning is more rapid.
- Generation of smoke may be an undesirable side effect, although this is not a health or safety issue provided that standard precautions are observed.
- Burning requires that appropriate permit(s) be obtained (see Tactic B-1).

NOTE: All values given on these pages are for planning purpose only.



This technique involves chemical agents or nutrients that alter the character of the stranded oil either to facilitate removal of the oil from the shore zone or to accelerate in-situ weathering. Nutrient enrichment and bioremediation can use products that have been developed for other applications. The other techniques in this group involve agents or materials that are designed specifically for oil spill response and that are available commercially from manufacturers and/or suppliers. Only bioremediation is a stand-alone technique; the remaining methods require an additional removal component.

#### SHORELINE CLEANERS

Shoreline cleaning (or surface washing) agents contain a surfactant that alters the surface tension of the oil, by a mechanism often referred to as detergency, so that the oil does not stick to substrate materials. The oil is lifted by rising tidal water levels and can be transported away from the shore. Cleaners may also be used to pretreat shorelines to prevent oil from becoming stranded.

Cleaning agents can be applied directly to an oiled area with a hand spray or hose system. It may be used directly or as a presoak that is left for some time prior to flooding or flushing. The soak time varies depending on temperature and on the character of the oil. The preferred application is to use the agent on a rising tide so that the oil is immediately lifted from the shore, particularly on coarse-sediment beaches, as this minimizes the amount of oil that can be carried into the subsurface.

#### SOLIDIFIERS AND VISCO-ELASTIC AGENTS

Visco-elastic agents increase the viscosity of oil to enhance recovery and collection. Solidifiers alter the oil from a liquid to a solid in order to make recovery easier or to prevent remobilization or spreading of the oil. Agents may be available in a powder form that can either be applied directly or mixed with water prior to application. The agent is spread over and mixed with the oil. These agents are used in conjunction with removal techniques.



#### NUTRIENT ENRICHMENT/BIOREMEDIATION

Naturally-occurring microorganisms (bacteria) use oxygen to convert hydrocarbons into water and carbon dioxide. This process usually occurs at the water interface and is limited by oxygen and nutrient availability and by the exposed surface area of the oil. If these three factors can be increased, then the rate of biodegradation can be accelerated.

Fertilizers can be obtained in solid or liquid form. Solid fertilizers can be broadcast using seed spreaders. On contact with water, the fertilizer slowly dissolves and releases water-soluble nutrients over time. Liquid fertilizers can be sprayed onto a shoreline using a number of commercially available types of equipment, such as paint sprayers.

#### EQUIPMENT AND PERSONNEL

Equipment for biological/chemical shoreline response tactics must be obtained from out of region.

#### DEPLOYMENT CONSIDERATIONS AND LIMITATIONS

- Unified Command approval is required for any shoreline cleanup tactic.
- The use of chemicals to control oil discharges or treat oiled shorelines is controlled by state and federal regulations; appropriate approvals and permits are required.
- *Shoreline cleaners* can be used on fresh or salt water, and the technique is applicable for all types of oil. Shoreline cleaners are usually used in conjunction with collection techniques, such as sorbents and skimmers, to contain and recover the oil as it is released.
- The effectiveness of shoreline cleaners is a function of oil type, and decreases as the specific gravity of the oil increases. The success of the method is dependent, to a degree, on the ability to contain and collect the oil that is released.
- *Solidifiers and visco-elastic agents* can be used in either fresh or salt water conditions. These agents are not applicable where large pore spaces (cobble or boulders) might result in loss of the oil in the subsurface sediments or where there is oiled vegetation, as it may incorporate or smother healthy plants and animals. The dose increases as the viscosity of the oil decreases so that for some agents, approximately 10 to 20 times more agent is required to alter the viscosity of a light fuel oil than for a heavy fuel oil.
- *Bioremediation* can be used on all shoreline types without affecting plants or animals. Bioremediation is best for use on residual oil after other techniques have been used to remove mobile or bulk oil from the shoreline. Applications may be repeated periodically to continue the supply of nutrients. Bioremediation may require tillers for mixing treatment agents with contaminated material.
- *Fertilizers* may be used alone on a shore to degrade residual surface and/or subsurface oil, but the process is more effective if combined with tilling or other methods of breaking the oil into smaller particles, thereby significantly increasing the surface area for the microorganisms to affect.
- *Nutrient enrichment/bioremediation* is relatively slow compared to other response options. Since the rate of biodegradation decreases with lower temperatures, nutrient enrichment is more effective during warmer summer months.



**SUMMARY OF RELATIVE POTENTIAL IMPACT OF RESPONSE TECHNIQUES IN THE ABSENCE OF OIL**

	SOLID MAN-MADE	PEBBLE COBBLE	MIXED SAND-GRAVEL	SAND BEACH	SAND FLAT	MUD FLAT	MARSH	PEAT	LOW-LYING TUNDRA	TUNDRA CLIFF
1) Natural Recovery	L	L	L	L	L	L	L	L	L	L
<b>Physical Cleaning —Washing</b>										
2) Flooding	L	L	M	L	L	L	L	L	L	L
3) Low-Pressure Cold Flush	L	M	M	M	M	H	L	L	L	L
4) Low-Pressure Hot/Warm Flush	L	M	M	H	H	H	H	M	H	L
5) High-Pressure Cold Flush	L	H	H	H	H	H	H	H	H	M
6) High-Pressure Warm/Hot Flush	M	H	H	H	H	H	H	H	H	H
7) Steam Cleaning	L	H	H	H	H	H	H	H	H	H
8) Sand Blasting	H	H	H	-	-	-	-	-	-	H
<b>Physical Cleaning —Removal/Disposal</b>										
9) Manual Removal	L	L	L	L	M	H	H	L	M	L
10) Vacuums	L	L	L	L	M	H	M	L	M	L
11) Mechanical Removal	-	M	M	M	M	H	H	M	H	L
12) Vegetation Cutting	M	-	-	-	-	H	H	-	H	-
13) Passive Sorbents	L	L	L	L	L	M	L	L	L	L
<b>Physical Cleaning —In Situ</b>										
14) Tilling	-	M	M	M	M	H	H	H	H	-
15) Surf Washing	-	M	M	M	H	H	H	M	H	L
16) Burning	M	H	H	H	M	M	H	H	H	-
<b>Treatment —Chemical/Biological</b>										
17) Shore Cleaners	L	L	L	L	-	-	M	-	M	L
18) Solidifiers	-	L	L	L	M	M	M	L	M	L
19) Bioremediation	L	L	L	L	L	L	L	L	L	L

H = High  
M = Moderate  
L = Low

NOTE: All values given on these pages are for planning purpose only.



**SUMMARY OF WASHING OR FLUSHING TECHNIQUE RANGES**

TECHNIQUE	PRESSURE RANGE (psi)	TEMPERATURE RANGE (° F)
(2) Flooding ("deluge")	< 20	Ambient seawater
(3) Low-pressure, cold flushing	< 50	Ambient seawater
(4) Low-pressure, warm/hot flushing	< 50	80 - 212
(5) High-pressure, cold flushing	50 - 1,000	Ambient seawater
(5) "Pressure washing"	> 1,000	Ambient seawater
(6) High-pressure, warm/hot flushing	50 - 1,000	80 - 212
(7) Steam cleaning	50 - 1,000	212
(8) Sand blasting	~ 50	n/a

**SUMMARY OF RESOURCE REQUIREMENTS, RELATIVE RATES, AND WASTE GENERATION FOR REMOVAL TECHNIQUES**

TECHNIQUE	RESOURCE REQUIREMENTS	CLEANUP RATE	WASTE GENERATION
(9) Manual removal	Labor intensive	Slow	Minimal
(10) Vacuums (manual)	Labor intensive	Slow	Moderate
(11) Mechanical removal			
Grader/scrapper	Minimal labor support	Very rapid	Moderate
Front-end loader	Minimal labor support	Rapid	High
Bulldozer	Minimal labor support	Rapid	Very high
Backhoe	Minimal labor support	Medium	High
Dragline/clamshell	Minimal labor support	Medium	High
Beach cleaners	Minimal labor support	Slow	Low
Vacuum trucks	Minimal labor support	Rapid	Low
(12) Vegetation cutting	Labor intensive	Slow	Can be high
(13) Passive sorbents	Labor intensive if used extensively with large amounts of oil	Slow	Can be high if frequent change-outs required

NOTE: All values given on these pages are for planning purpose only.





### WILDLIFE PROTECTION STRATEGY

The wildlife protection strategy for the North Slope is based on the *Wildlife Protection Guidelines for Alaska* (Annex G of the *Alaska Regional Response Team Unified Plan*). There are three response strategies to protect wildlife:

#### 1. PRIMARY RESPONSE Containment and Recovery of Oil

- Control release and spread of oil.
- Recover oil as quickly as practicable.
- Keep oil from contaminating critical habitat.
- Collect oiled carcasses.

#### 2. SECONDARY RESPONSE Wildlife Hazing

- Haze wildlife away from spill area.
- Deter wildlife from entering spill area.

#### 3. TERTIARY RESPONSE Capture, Stabilization, and Treatment of Oiled Wildlife

- Use as a last resort if primary and secondary response strategies are unsuccessful.

NOTE: All values given on these pages are for planning purposes only.



### WILDLIFE PERMITS

Permits are required for any secondary or tertiary wildlife response (i.e., hazing or collecting and holding).

ACS has obtained permits from the Alaska Department of Fish and Game (ADF&G) and the U.S. Fish and Wildlife Service (USFWS) to allow ACS to deal with birds and land (terrestrial) mammals during an oil spill. This can include hazing of non-oiled animals to keep them away from the spill and capture, stabilization, transport, and rehabilitation of oiled animals. Note that ACS does not have the required permits to haze or handle marine mammals (polar bears, walruses, sea otters, whales, porpoises, seals, or sea lions). ACS defers to BP Exploration and/or Phillips for hazing and incidental take of polar bears. BP Exploration and/or Phillips maintain these permits on behalf of ACS.

ACS has the following permits from ADF&G:

- Permit FG94-III-01H: Hazing, capture, stabilization, transport, and rehabilitation of birds.
- Permit FG94-III-02H: Hazing terrestrial mammals.
- Permit FG94-III-03H: Stabilization, transport, and disposition of large terrestrial mammals.

Each ADF&G permit requires that:

- The Plan of Operations that is attached to the permit must be followed.
- Personnel performing hazing must be appropriately trained (personnel covered by the permit include contractors and employees of ACS and its member companies).
- Hazing is prohibited during oil spill drills and exercises or during construction or maintenance activities.
- The ADF&G Habitat and Restoration Division in Fairbanks must be notified as soon as practical after hazing activities have begun.
- A written report must be submitted to ADF&G within 30 days after hazing has stopped.

The ACS permit from the USFWS covers hazing, capture, stabilization and treatment of migratory birds. This provides the required federal authorization to perform the functions allowed in the ADF&G permit.

Even though ACS has permits for secondary and tertiary response activities, it is still necessary to complete appropriate sections of the *Oil Spill Response Checklist: Wildlife Hazing and/or Oil Spill Response Checklist: Wildlife Capture, Transportation, Stabilization, and Treatment* (from Appendices 24 to 25 of the *Wildlife Protection Guidelines*). These completed checklists must be submitted to the Federal On-Scene Coordinator and appropriate wildlife resource agency representatives within 24 hours following initiation of pre-permitted wildlife response activities.

#### STATE AND FEDERAL PERMITS AND/OR AUTHORIZATIONS REQUIRED FOR HAZING, COLLECTING OR HOLDING LIVE ANIMALS

	ALASKA DEPARTMENT OF FISH AND GAME		FISH & WILDLIFE SERVICE		NATIONAL MARINE FISHERIES SERVICE	
	Collect and Hold	Haze	Collect and Hold	Haze	Collect and Hold	Haze
Migratory Birds	NO <sup>1</sup>	YES <sup>2</sup>	YES <sup>3</sup>	NO <sup>4</sup>	NO	NO
Sea Otters, Walruses, and Polar Bears	NO	NO	YES <sup>3</sup>	YES <sup>1</sup>	NO	NO
Whales, Porpoises, Seals, and Sea Lions	NO <sup>1</sup>	NO <sup>1</sup>	NO	NO	NO	YES
Terrestrial Mammals	YES	YES	NO	NO	NO	NO

1. An ADF&G permit is also needed to collect, hold, or haze any species on the State endangered species list.
2. Passive hazing (e.g., balloons, scare eye balloons, Mylar tape) does not require an ADF&G permit.
3. Includes salvage of dead, oiled wildlife.
4. A USFWS permit is also needed to haze species managed by USFWS including those listed on the Federal endangered species list.

NOTE: All values given on these pages are for planning purposes only.



APPENDIX 24

OIL SPILL RESPONSE CHECKLIST: WILDLIFE HAZING

Responders who do not have pre-authorization to haze wildlife as part of a spill response must receive authorization from the Federal On-Scene Coordinator (OSC) and appropriate wildlife resource agencies; i.e., Fish and Wildlife Service, National Marine Fisheries Service, and Alaska Department of Fish and Game prior to initiating hazing activities. Responders may apply for authorization to haze wildlife by completing Sections I-V of this form and submitting it to the Federal OSC and appropriate wildlife resource agency representatives.

Responders who do not have pre-authorization to haze wildlife should note that completing the requested information on this checklist does not satisfy wildlife resource agencies permitting requirements. However, the information contained in the completed checklist should provide wildlife resource agencies with the necessary information for determining whether or not it is appropriate to issue requested permits.

Responders who have pre-authorization to conduct wildlife hazing and who choose to initiate a hazing program should (1) follow the terms of their permit, and (2) complete Sections I-V of this checklist and submit it to the Federal OSC and appropriate wildlife resource agency representatives within 24-hours following the initiation of a wildlife hazing program.

I. SPILL DATA	
A.	Name of incident: _____
B.	Date of incident: _____
C.	Spill location: _____ latitude: _____ longitude _____
D.	Spill location: land _____ ; water _____ ; land and water _____
E.	Distance to nearest water body, if on land: _____ km/mi
F.	Product released: North Slope Crude _____; Diesel #2 _____; Cook Inlet Crude _____; Chevron Residual _____; JP4 _____; Other _____
G.	Estimated volume of product released: _____ gals/bbls
H.	Release status: Stopped _____ ; Continuing _____ ; Unknown _____
I.	Is spill: Contained _____ ; Spreading _____ ; Unknown _____
J.	Estimated volume of product potentially released: _____ gals/bbls

[Approved 1/22/97 by Alaska RRT]

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NOTE: All values given on these pages are for planning purposes only.



APPENDIX 24, CONT.

II. WILDLIFE DATA				
SPECIES/SPECIES GROUPS	ESTIMATED NUMBERS OF WILDLIFE AT RISK			
	0	1-100	101-1000	> 1000
Waterfowl				
Seabirds				
Shorebirds				
Raptors				
Sea otters				
Seals				
Walrus				
Sea lions				
Whales				
Polar bears				
Black/brown bears				
Hoofed animals				
Furbearers				
Other terrestrial mammals				

NOTE: Circle all estimates that are based on field observations since the spill.

[Approved 1/22/97 by Alaska RRT]

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NOTE: All values given on these pages are for planning purposes only.



APPENDIX 24, CONT.

**III. PRIMARY RESPONSE ACTIONS**

Describe any wildlife response actions underway or previously taken for removal of oily food sources and/or deployment of boom to protect important habitats:

[Approved 1/22/97 by Alaska RRT]

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NOTE: All values given on these pages are for planning purposes only.



APPENDIX 24, CONT.

**IV. SECONDARY RESPONSE ACTIONS: HAZING**

A. Describe hazing plan for each species or species group identified in Section II, including objectives, procedures, equipment, number of persons, and location(s):

B. Information on Person in Charge of Hazing

Name:

Affiliation:

Address:

Qualifications:

Telephone number:

Fax number:

C. Information on Hazing Permittee (if different from Section IV.B above)

Permittee:

Affiliation:

Address:

Telephone number:

Fax number:

[Approved 1/22/97 by Alaska RRT]

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NOTE: All values given on these pages are for planning purposes only.



APPENDIX 24, CONT.

V. REQUESTOR SIGN-OFF

Signature of requestor:

Printed name of requestor:

Title of requestor:

Requestor affiliation:

Requestor representing:

Time and Date Request Submitted to Federal On-Scene Coordinator:

**NOTE: SECTIONS I-V NEED TO BE SUBMITTED TO THE FEDERAL ON-SCENE COORDINATOR AND APPROPRIATE WILDLIFE RESOURCE AGENCY REPRESENTATIVES**



APPENDIX 24, CONT.

**FAX COVER SHEET**

FROM: FEDERAL ON-SCENE COORDINATOR

Telephone: \_\_\_\_\_ FAX Number: \_\_\_\_\_ Date: \_\_\_\_\_

No. Pages to Follow: \_\_\_\_\_ Originator: \_\_\_\_\_

TO: THE FOLLOWING WILDLIFE RESOURCE AGENCY REPRESENTATIVES  
(Check Appropriate Boxes):

**FISH AND WILDLIFE SERVICE:**

(ALTERNATES LISTED BELOW)

Catherine Berg  
Fax: 786-3350  
Wk: 786-3598  
Hm: 694-7379  
Pager: 800-759-8888, Pin 5072270

Phillip Johnson  
Fax: 786-3350  
Wk: 786-3483  
Hm: 345-0300  
Pager: 800-759-8888, Pin 1259849

**NATIONAL MARINE FISHERIES SERVICE:**

Brad Smith  
Fax: 271-3030  
Wk: 271-5006  
Hm: 248-4211

Kaja Brix  
Fax: 586-7012  
Wk: 586-7235  
Hm: 586-1637

**ALASKA DEPARTMENT OF FISH AND GAME:**

Mark Fink  
Fax: 267-2464  
Wk: 267-2338  
Hm: 337-7933

Jack Winters  
Fax: 456-3091  
Wk: 459-7285  
Hm: 479-2320

*The Federal On-Scene Coordinator has received the attached "Oil Spill Response Checklist: Wildlife Hazing". As a representative of an agency with regulatory responsibility for wildlife species affected by the proposed response program, you are requested to complete Section VI of the checklist. Your decision should be transmitted AS SOON AS POSSIBLE via FAX to the Federal On-Scene Coordinator, Attention \_\_\_\_\_.*

**YOUR RECOMMENDATION/DECISION REGARDING THIS REQUEST IS  
TIME SENSITIVE.**





APPENDIX 24, CONT.

**VI. WILDLIFE RESOURCE AGENCY RESPONSE TO REQUEST**

A. Date and time request received by wildlife resource agency representative(s):

**Alaska Department of Fish and Game (ADF&G)**  
 Name: \_\_\_\_\_ Date: \_\_\_\_\_  
 \_\_\_\_\_ Time: \_\_\_\_\_ Phone #: \_\_\_\_\_

**Fish and Wildlife Service (FWS)**  
 Name: \_\_\_\_\_ Date: \_\_\_\_\_  
 \_\_\_\_\_ Time: \_\_\_\_\_ Phone #: \_\_\_\_\_

**National Marine Fisheries Service (NMFS)**  
 Name: \_\_\_\_\_ Date: \_\_\_\_\_  
 \_\_\_\_\_ Time: \_\_\_\_\_ Phone #: \_\_\_\_\_

B. **ADF&G Recommendation/Decision:**

Approve requested program(s) as proposed  
 Approve requested program(s) with the following conditions:  
 Deny requested program(s)

Signature: \_\_\_\_\_ Time: \_\_\_\_\_  
 Date: \_\_\_\_\_

C. **FWS Recommendation/Decision:**

Approve requested program(s) as proposed  
 Approve requested program(s) with the following conditions:  
 Deny requested program(s)

Signature: \_\_\_\_\_ Time: \_\_\_\_\_  
 Date: \_\_\_\_\_

D. **NMFS Recommendation/Decision:**

Approve requested program(s) as proposed  
 Approve requested program(s) with the following conditions:  
 Deny requested program(s)

Signature: \_\_\_\_\_ Time: \_\_\_\_\_  
 Date: \_\_\_\_\_



APPENDIX 24, CONT.

**VII. FEDERAL AND STATE ON-SCENE COORDINATOR RESPONSE TO REQUEST**

A. State On-Scene Coordinator's decision regarding wildlife response program:

Request received by State On-Scene Coordinator:  
 Time: \_\_\_\_\_ Date: \_\_\_\_\_

Concur with wildlife resource agencies  
 Concur with attached conditions  
 Do not concur

Signature: \_\_\_\_\_ Time: \_\_\_\_\_  
 Date: \_\_\_\_\_

B. Federal On-Scene Coordinator's decision regarding response program:

Request received by Federal On-Scene Coordinator:  
 Time: \_\_\_\_\_ Date: \_\_\_\_\_

Concur with wildlife resource agencies  
 Concur with attached conditions  
 Do not concur

Signature: \_\_\_\_\_ Time: \_\_\_\_\_  
 Date: \_\_\_\_\_



APPENDIX 25

**OIL SPILL RESPONSE CHECKLIST: WILDLIFE CAPTURE, TRANSPORTATION, STABILIZATION, AND TREATMENT**

Responders who do not have pre-authorization to capture, transport, stabilize, or treat wildlife as part of a spill response must receive authorization from the Federal On-Scene Coordinator (OSC) and appropriate wildlife resource agencies; i.e., Fish and Wildlife Service, National Marine Fisheries Service, and Alaska Department of Fish and Game prior to initiating those activities. Responders may apply for authorization to capture, transport, stabilize, and/or treat oiled wildlife by completing Sections I-VIII of this form and submitting it to the Federal OSC and appropriate wildlife resource agency representatives.

Responders who do not have pre-authorization for wildlife capture, transportation, stabilization, or treatment should note that completing the requested information on this checklist does not satisfy wildlife resource agencies permitting requirements. However, the information contained in the completed checklist should provide wildlife resource agencies with the necessary information for determining whether or not it is appropriate to issue requested permits.

Responders who have pre-authorization for wildlife capture, transportation, stabilization, or treatment and who choose to initiate one or more of those activities should (1) follow the terms of their permit, and (2) complete Sections I-VIII of this checklist and submit it to the Federal OSC and appropriate wildlife resource agency representatives within 24-hours following the initiation of those activities.

I. SPILL DATA	
A.	Name of incident:
B.	Date of incident:
C.	Spill location: latitude: longitude
D.	Spill location: land ; water ; land and water
E.	Distance to nearest water body, if on land: km/mi
F.	Product released: North Slope Crude ____; Diesel #2 ____; Cook Inlet Crude ____; Chevron Residual ____; JP4 ____; Other
G.	Estimated volume of product released: gals/bbls
H.	Release status: Stopped ; Continuing ; Unknown
I.	Is spill: Contained ; Spreading ; Unknown
J.	Estimated volume of product potentially released: _____ gals/bbls

[Approved 1/22/97 by Alaska RRT]

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NOTE: All values given on these pages are for planning purposes only.



APPENDIX 25, CONT.

II. WILDLIFE DATA				
SPECIES/SPECIES GROUPS	ESTIMATED NUMBERS OF WILDLIFE AT RISK			
	0	1-100	101-1000	>1000
Waterfowl				
Seabirds				
Shorebirds				
Raptors				
Sea otters				
Seals				
Walrus				
Sea lions				
Whales				
Polar bears				
Black/brown bears				
Hoofed animals				
Furbearers				
Other terrestrial mammals				

**NOTE: Circle all estimates that are based on field observations since the spill.**

[Approved 1/22/97 by Alaska RRT]

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NOTE: All values given on these pages are for planning purposes only.



APPENDIX 25, CONT.

**III. PRIMARY RESPONSE ACTIONS**

Describe any wildlife response actions underway or previously taken for removal of oily food sources and/or deployment of boom to protect important habitats:

Empty text area for describing primary response actions.

[Approved 1/22/97 by Alaska RRT]

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APPENDIX 25, CONT.

**IV. SECONDARY RESPONSE ACTIONS: PRE-EMPTIVE CAPTURE**

A. Describe pre-emptive capture plan for each species or species group identified in Section II, including objectives, procedures, equipment, number of persons, and location(s):

B. Information on Person in Charge of Pre-emptive Capture

Name:

Affiliation:

Address:

Qualifications:

Telephone number:

Fax number:

C. Information on Pre-emptive Capture Permittee (if different from Section IV.B above)

Permittee:

Affiliation:

Address:

Telephone number:

Fax number:

Form area for secondary response actions, including pre-emptive capture plans and contact information for personnel and permittees.

[Approved 1/22/97 by Alaska RRT]

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APPENDIX 25, CONT.

**V. TERTIARY RESPONSE ACTIONS: CAPTURE AND TRANSPORTATION**

A. Describe capture, collection, and transportation plan for each species or species group identified in Section II, including objectives, procedures, equipment, number of persons, and location(s):

B. Information on Person in Charge of Capture and Transportation

Name:

Affiliation:

Address:

Qualifications:

Telephone number:

Fax number:

C. Information on Capture and Transportation Permittee (if different from Section IV.B above)

Permittee:

Affiliation:

Address:

Telephone number:

Fax number:



APPENDIX 25, CONT.

**VI. TERTIARY RESPONSE ACTIONS: STABILIZATION**

A. Describe stabilization plan for each species or species group identified in Section II, including objectives, procedures, equipment, number of persons, and location(s):

B. Information on Stabilization Facility

Address:

Specific location (if not discernible from address):

Telephone number:

Fax number:

C. Information on Person in Charge of Stabilization

Name:

Affiliation:

Address:

Qualifications:

Telephone number:

Fax number:

D. Information on Stabilization Permittee (if different from Section IV.B above)

Permittee:

Affiliation:

Address:

Telephone number:

Fax number:





APPENDIX 25, CONT.

**VII. TERTIARY RESPONSE ACTIONS: TREATMENT**

A. Describe treatment plan for each species or species group identified in Section II, including objectives, procedures, equipment, number of persons, and location(s):

B. Information on Treatment Facility

Address:

Specific location (if not discernible from address):

Telephone number:

Fax number:

C. Information on Person in Charge of Treatment

Name:

Affiliation:

Address:

Qualifications:

Telephone number:

Fax number:

D. Information on Treatment Permittee (if different from Section IV.B above)

Permittee:

Affiliation:

Address:

Telephone number:

Fax number:



APPENDIX 25, CONT.

**VIII. REQUESTOR SIGN-OFF**

Signature of requestor:

Printed name of requestor:

Title of requestor:

Requestor affiliation:

Requestor representing:

Time and Date Request Submitted to Federal On-Scene

Coordinator:

**NOTE: SECTIONS I-VIII NEED TO BE SUBMITTED TO THE FEDERAL ON-SCENE COORDINATOR AND APPROPRIATE WILDLIFE RESOURCE AGENCY REPRESENTATIVES**



APPENDIX 25, CONT.

**FAX COVER SHEET**

FROM: FEDERAL ON-SCENE COORDINATOR

Telephone: \_\_\_\_\_ FAX Number: \_\_\_\_\_ Date: \_\_\_\_\_

No. Pages to Follow: \_\_\_\_\_ Originator: \_\_\_\_\_

TO: THE FOLLOWING WILDLIFE RESOURCE AGENCY REPRESENTATIVES  
(Check Appropriate Boxes):

**FISH AND WILDLIFE SERVICE: (ALTERNATES LISTED BELOW)**

- |  |   |
|--|---|
| <input type="checkbox"/> Catherine Berg<br>Fax: 786-3350<br>Wk: 786-3598<br>Hm: 694-7379<br>Pager: 800-759-8888, Pin 5072270 | <input type="checkbox"/> Phillip Johnson<br>Fax: 786-3350<br>Wk: 786-3483<br>Hm: 345-0300<br>Pager: 800-759-8888, Pin 1259849 |
|--|---|

**NATIONAL MARINE FISHERIES SERVICE:**

- |  |   |
|--|---|
| <input type="checkbox"/> Brad Smith<br>Fax: 271-3030<br>Wk: 271-5006<br>Hm: 248-4211 | <input type="checkbox"/> Kaja Brix<br>Fax: 586-7012<br>Wk: 586-7235<br>Hm: 586-1637 |
|--|---|

**ALASKA DEPARTMENT OF FISH AND GAME:**

- |   |  |
|---|--|
| <input type="checkbox"/> Mark Fink<br>Fax: 267-2464<br>Wk: 267-2338<br>Hm: 337-7933 | <input type="checkbox"/> Jack Winters<br>Fax: 456-3091<br>Wk: 459-7285<br>Hm: 479-2320 |
|---|--|

*The Federal On-Scene Coordinator has received the attached "Oil Spill Response Checklist: Wildlife Capture, Transportation, Stabilization, and Treatment". As a representative of an agency with regulatory responsibility for wildlife species affected by the proposed response program, you are requested to complete Section VI of the checklist. Your decision should be transmitted AS SOON AS POSSIBLE via FAX to the Federal On-Scene Coordinator, Attention \_\_\_\_\_.*

**YOUR RECOMMENDATION/DECISION REGARDING THIS REQUEST IS TIME SENSITIVE.**



APPENDIX 25, CONT.

**IX. WILDLIFE RESOURCE AGENCY RESPONSE TO REQUEST**

A. Date and time request received by wildlife resource agency representative(s):

**Alaska Department of Fish and Game (ADF&G)**  
Name: \_\_\_\_\_ Date: \_\_\_\_\_  
Time: \_\_\_\_\_ Phone #: \_\_\_\_\_

**Fish and Wildlife Service (FWS)**  
Name: \_\_\_\_\_ Date: \_\_\_\_\_  
Time: \_\_\_\_\_ Phone #: \_\_\_\_\_

**National Marine Fisheries Service (NMFS)**  
Name: \_\_\_\_\_ Date: \_\_\_\_\_  
Time: \_\_\_\_\_ Phone #: \_\_\_\_\_

B. **ADF&G Recommendation/Decision:**

- \_\_\_ Approve requested program(s) as proposed
- \_\_\_ Approve requested program(s) with the following conditions:
- \_\_\_ Deny requested program(s)

Signature: \_\_\_\_\_ Time: \_\_\_\_\_

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

C. **FWS Recommendation/Decision:**

- \_\_\_ Approve requested program(s) as proposed
- \_\_\_ Approve requested program(s) with the following conditions:
- \_\_\_ Deny requested program(s)

Signature: \_\_\_\_\_ Time: \_\_\_\_\_

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

D. **NMFS Recommendation/Decision:**

- \_\_\_ Approve requested program(s) as proposed
- \_\_\_ Approve requested program(s) with the following conditions:
- \_\_\_ Deny requested program(s)

Signature: \_\_\_\_\_ Time: \_\_\_\_\_

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



APPENDIX 25, CONT.

**X. FEDERAL AND STATE ON-SCENE COORDINATOR RESPONSE TO REQUEST**

A. State On-Scene Coordinator's decision regarding wildlife response program:

Request received by State On-Scene Coordinator:

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

Concur with wildlife resource agencies

Concur with attached conditions

Do not concur

Signature: \_\_\_\_\_ Time: \_\_\_\_\_

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

B. Federal On-Scene Coordinator's decision regarding response program:

Request received by Federal On-Scene Coordinator:

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

Concur with wildlife resource agencies

Concur with attached conditions

Do not concur

Signature: \_\_\_\_\_ Time: \_\_\_\_\_

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



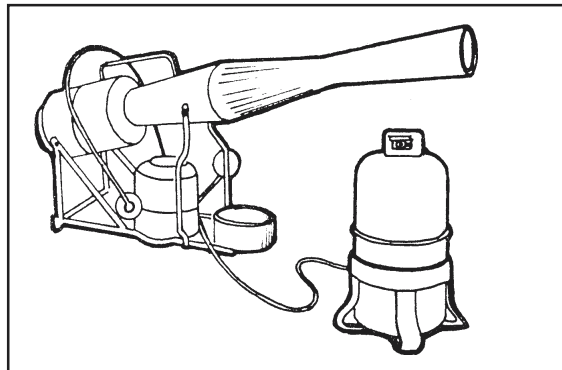
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### 12-GAUGE SHOTGUN



### PROPANE EXPLODER CANNON



### 15-MM PISTOL



The ACS inventory of wildlife hazing equipment includes:

- Passive excluders (balloons, reflector tape).
- Propane exploder cannons.
- 15-mm single-shot pistol/launcher with 22-caliber caps, screamers, and bangers.
- 12-gauge single-shot shotgun with cracker shells, rubber bullets (bear deterrence), and slugs (bear protection).
- Electric fencing.

The ACS equipment is available upon notification 24 hours a day, but will be issued only to certified trained personnel (i.e., those that have completed the ACS wildlife training course). ACS maintains a list of such personnel.

*NOTE: All values given on these pages are for planning purposes only.*



### FIREARM SAFETY

The 15-mm pistols and 12-gauge shotguns in ACS's hazing inventory must be handled properly to ensure the safety of all personnel. No one will be allowed to use ACS firearms without the appropriate training. Following are the primary safety precautions that should be taken when you are using any firearm:

- Never point the muzzle of the gun at anyone at anytime — regardless of whether the gun is empty or loaded.
- Never put your finger on the trigger until you are ready to shoot.
- Never load the gun until you are ready to use it; keep the action open. When you pick up a gun, open the action right away to make sure the chamber is empty.
- Do not use the shotgun or pistol unless you have received training.
- Make sure you use the right ammunition.
- Make sure you know where you're shooting and that no one could be accidentally hit.
- Wear ear and eye protection when shooting.

### 15-MM PISTOL

ACS's hazing equipment includes 15-mm single-shot pistols/launchers with 22-caliber caps, screamers, and bangers. The "caps" are small explosive charges that are placed in the firing mechanism of the pistol and that launch the screamer or banger when the gun is fired. These should be fired above the animals and not at them. The person shooting the gun must wear ear protectors and safety goggles.

### 12-GAUGE SHOTGUN

ACS uses 12-gauge shotguns with cracker shells to scare both birds and mammals. Rubber bullets can be used for bear deterrence, and slugs are available for bear protection if all else fails and humans are threatened by a bear. The guns used are single-barrel, single-shot shotguns that break and load at the breach. The barrel should be inspected for blockage after each shot.

Cracker shells are 12-gauge shotgun shells in which the shot has been replaced with a bulldog firecracker. When fired, the firecracker travels 75 to 150 yards and explodes in the air with a loud sound. It should be noted that cracker shells leave a heavy residue in the barrel of the shotgun, and this residue should be cleaned out regularly.

### FIRING PROCEDURES

The following procedures must be followed for firing either the pistol or the shotgun:

- Check the barrel for blockage after each shot.
- For the shotgun, run the cleaning rod with bore brush through the barrel after every third shot.
- Be aware of fire hazards. Never use cracker shells where smoldering debris may fall into dry areas or on building roofs. Keep a fire extinguisher nearby.
- Never fire into a strong wind.
- You should normally fire at a 45-degree angle above the horizon.
- After firing, if you do not see or hear the firecracker explode, do not look down either end of the shotgun barrel. It is possible that the firecracker is lodged in the barrel, and it could explode in your face. Extreme cold combined with the use of old primer caps can cause the gun to misfire or not fire at all.

### ELECTRIC FENCING

The 5,000 feet of electric fencing ACS maintains can be used to surround a spill area to keep out larger terrestrial mammals. The fence can be used with or without electric current. When electrified, the fence is more effective in keeping out large mammals.

In addition, the fence can be used as protection around a remote camp where bears may be a problem.

*NOTE: All values given on these pages are for planning purposes only.*





12-GAUGE SHOTGUN



Terrestrial mammals that may be present on the North Slope include caribou, muskoxen, moose, brown (grizzly) bear, and foxes. Techniques for hazing mammals involve visual methods, auditory methods, pain (use of rubber bullets), or exclusion by fencing, netting, or gridding. The choice of appropriate method depends on the species involved, the local environment, the spill situation, and the time of year. The table on the next page summarizes available methods.

ACS's permit (ADF&G Permit No. FG94 - III - 02H) allows trained personnel to haze mammals. ADF&G is responsible for overseeing and providing guidance for ACS hazing personnel and may assist ACS with hazing. The minimum amount of hazing required to move animals away from a spill site will be used. The animals should not be unduly stressed during hazing.

Hazing of moose, muskoxen, and caribou would involve either surface or aerial methods. The ACS hazing kits can be used for individual animals and for small groups of animals, including small muskox herds that should be prevented from forming protective circles and encouraged to move away from the spill. According to the permit, prior to initiation, ACS must seek guidance and help from ADF&G on the most appropriate hazing technique for bears.

In addition, scare eye balloons, snow fences, or electric fences may be installed around isolated spill areas, field camps, staging areas, waste disposal sites, or other spill-related areas.

The distance from the spill site, staging area, etc. at which hazing of mammals would begin and end must be determined on a case-by-case basis. In some cases, it may be advantageous to haze animals at a considerable distance from a spill site. For example, a large moving herd of caribou a considerable distance away may be deflected on its course with minimal effort, while it may be nearly impossible to deflect the same herd once it is a few hundred yards from the spill site.

To protect mammals from oil:

- Contain the oil before it reaches the mammals.
- Haze them (scare them away) from oiled areas.
- Collect dead, oiled wildlife to prevent contamination through scavenging.
- Selected capture and stabilization of mammals on case-by-case basis.

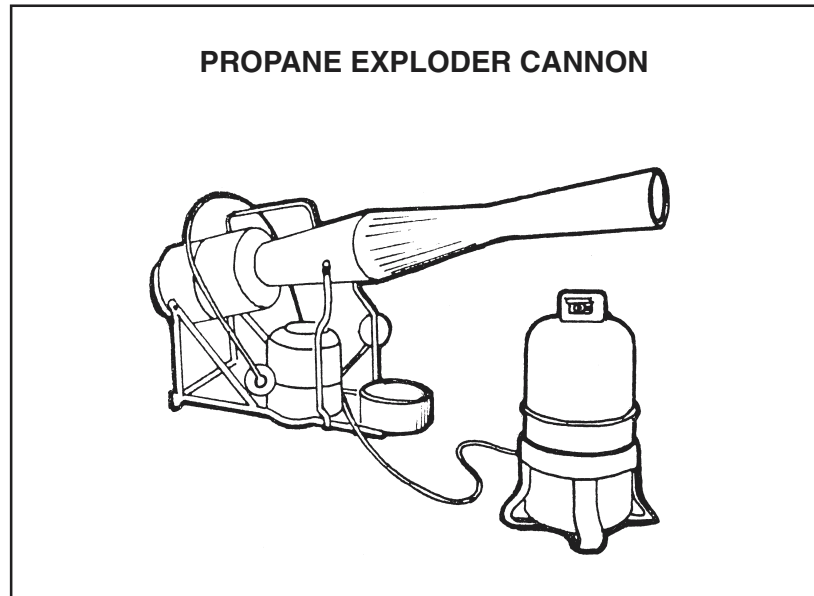
NOTE: All values given on these pages are for planning purposes only.



MAMMAL HAZING TACTICS

SPECIES	TECHNIQUE(S)	COMMENTS
Bear	Pyrotechnics Propane exploder cannons Helicopters Airboats Ground vehicles (snow machines, ATVs, trucks) Rubber bullets	The preferred option is the use of pyrotechnics, if spill conditions allow.  Helicopters, airboats, and ground vehicles are also effective tools, with helicopters being the most versatile of this group.
	Fences (electrified)	Effective for isolating small spill areas, field camps, etc.
Caribou	Pyrotechnics Propane exploder cannons	Most effective on individual animals or small groups.
	Helicopters Airboats Ground vehicles (snow machines, ATVs, trucks)	Most effective on herds. Helicopters are the most versatile and can be used on a herd while it is still far away from the spill.
	Fences	Effective for isolating small spill areas, field camps, etc.
Moose	Pyrotechnics Propane exploder cannons Air horns Helicopters Airboats Ground vehicles (snow machines, ATVs, trucks)	Helicopters and ground vehicles are the best tools to use on moose.  Pyrotechnics can be used individually or with hazing equipment.
	Fences	Effective for isolating small spill areas, field camps, etc.
Muskoxen	Pyrotechnics Propane exploder cannons Helicopters Airboats Ground vehicles (snow machines, ATVs, trucks)	Ensure that animals are not hazed to the point that they form a defensive ring. Drive them slowly with a ground vehicle (ATV or truck).
	Fences	Effective for isolating small spill areas, field camps, etc.

NOTE: All values given on these pages are for planning purposes only.



**PROPANE EXPLODER CANNON**

Birds can be deterred from entering a spill area or hazed from an area by either visual or auditory methods, or both. The choice depends on the species involved, the local environment, and the spill situation. The table on the next page summarizes the available techniques.

The primary method for protecting birds from an oil spill is to prevent oil from reaching areas where birds are concentrated, including migration staging areas, seabird colonies, major feeding areas, nesting colonies, and wintering areas of marine birds.

The secondary response is to deter birds from an oil slick or contaminated shoreline. A deterrent may be used to discourage birds from landing in or near an oil slick or oiled area.

ACS uses the following guidelines for selecting the primary hazing method:

- Use propane exploder cannons to disperse birds where waterfowl, shorebirds, and raptors are dominant. This should include frequent human attendance at the site and supplemental use of shotgun cracker shells or pistol-launched noisemakers to ensure the highest effectiveness and to reduce habituation.
- Visual methods (Mylar tape, balloons) can be used to disperse birds in close proximity to the spill. This is most effective for waterfowl.
- Flightless birds may need to be herded with boats and/or helicopters (aircraft should not be used to disperse birds in any other circumstances). Flightless birds include young birds and molting birds. ("Molting" refers to the annual loss of feathers. Birds that are molting cannot fly.)

Capture and relocation is a tertiary method for dealing with flightless birds that will not leave an area. This could be used for small populations of birds of critical sensitivity. However, it is very labor-intensive and usually not practical.

NOTE: All values given on these pages are for planning purposes only.



**BIRD HAZING TACTICS**

CATEGORY	TECHNIQUE	GENERAL APPLICABILITY	NORTH SLOPE APPLICABILITY
Visual Methods	Floating or Stationary Figures	Human effigy (e.g., a scarecrow) has been shown to be effective in daylight	Scare eye balloons are available from ACS inventory. Preferred response. This is an authorized activity.
	Helium-Filled Balloons	Can prevent birds from landing	Not available on the North Slope, but available from Alyeska.
	Mylar Tape	Can prevent birds from landing	Mylar tape is available from ACS inventory.
Auditory Methods	Propane Cannons and Alarms	<ul style="list-style-type: none"> <li>• Bird density reduction ranges from 50% to 100% depending on species and amount of human attendance</li> <li>• Works for 2 to 3 days</li> <li>• May not be effective in rough, open sea</li> </ul>	Propane exploder cannons and pyrotechnics are available from ACS inventory.
Visual and Auditory Methods	Herding or Hazing with Aircraft	<ul style="list-style-type: none"> <li>• Used for flying waterfowl or waterfowl on the ground that fly in response to disturbances</li> <li>• Aircraft may cause diving birds to dive into contaminated area</li> <li>• Helicopters can be used to herd flightless birds (e.g., young or molting birds)</li> </ul>	Use of aircraft is not approved in ACS permits; aircraft will not be used unless specifically authorized by agency personnel for a specific spill.
	Herding with Boats or by Personnel on Foot	<ul style="list-style-type: none"> <li>• Slow and labor-intensive</li> <li>• May be effective with flightless waterfowl</li> <li>• Ineffective for diving birds</li> </ul>	Small boats available for summer use.
	BRECO Bird Scare Buoys	Floating scare devices	Available from ACS inventory.
Other Methods	Capture and Relocation	<ul style="list-style-type: none"> <li>• For small populations of birds of critical sensitivity</li> <li>• Labor-intensive and not practical in most cases</li> </ul>	Will be used only if visual and auditory methods fail, and only with specific authorization by agency personnel for a specific spill.

NOTE: All values given on these pages are for planning purposes only.



Tertiary response strategy for wildlife on the North Slope involves the capture and initial stabilization of oiled wildlife. When birds are captured, they will receive initial treatment at the ACS North Slope Wildlife Stabilization Center. Once the birds are stabilized, they will be transported to Anchorage for long-term care and rehabilitation.

ADF&G will be responsible for the capture of brown bear, caribou, muskoxen, and moose. ACS, under the supervision of a veterinarian or in consultation with or with assistance from ADF&G, will be responsible for stabilization, transport, and disposition of these species. ACS will use the table below as a guide for activities. A Data Sheet for Collected Live, Oiled Wildlife will be completed for each animal.

Any mammal or bird with serious injuries which would require extensive treatment or which may be unable to survive in the wild will be euthanized. All decisions to euthanize will be reviewed and approved by a licensed veterinarian or an individual with veterinary and rehabilitation experience. Agency approval is required before euthanasia is utilized. Euthanasia drugs are not maintained on the Slope because of North Slope drug restrictions. Licensed veterinarians assisting with wildlife response will be required to bring sufficient quantities of euthanasia drugs.

**CAPTURE, STABILIZATION, AND TRANSPORT OF LARGE MAMMALS**

ACTIVITY	BROWN BEARS	POLAR BEARS	CARIBOU (collared only)	MUSKOX	MOOSE (collared only)
Personnel - Capture	ADF&G personnel only	USFWS	ADF&G personnel only	ADF&G personnel only	ADF&G personnel only
Personnel - Stabilization, Transport, and Disposition	ADF&G or ACS under supervision of DVM	USFWS	ADF&G or ACS under supervision of DVM	ADF&G or ACS under supervision of DVM	ADF&G or ACS under supervision of DVM
Capture Methods	Culvert traps or tranquilizer	Culvert traps or tranquilizer	Tranquilizer	Tranquilizer	Tranquilizer
Stabilization	ACS facility (5 bears maximum)	ACS facility (5 bears maximum)	Field cleaning only	Field cleaning only	Field cleaning only
Transportation	By truck or helicopter	By truck or helicopter	N/A	N/A	N/A
Disposition	Released back into wild unless can't survive. Then look into a facility that might want a bear (zoo). Last resort would be euthanasia.	Released back into wild unless can't survive. Then look into a facility that might want a bear (zoo). Last resort would be euthanasia.	Field released	Field released	Field released

NOTE: All values given on these pages are for planning purposes only.



**Data Sheet for Collected Live, Oiled Wildlife**  
(Adapted from Alaska RRT Wildlife Protection Guidelines for Alaska)

Date:	ID Number:		
Oil Spill Incident:			
Capture Location (Specific):			
Latitude:		Longitude:	
Common Name:			
Genus:		Species:	
Was Specimen Obviously Oiled? (circle one):      Yes    No			
Extent of Oiling (circle one):			
1. Completely Covered		3. Discrete Spots	
2. Ventral or Dorsal Surface Only		4. No Obvious Oil	
Field Treatment:			
1) Mouth & Nostrils cleaned of oil	yes ___	no ___	not applicable ___
2) Excess oil removed from body	yes ___	no ___	not applicable ___
3) Gaviged	yes ___	no ___	Quantity ___ Liters
4) Eyes irrigated	yes ___	no ___	not applicable ___
Collected by:			
Printed Name: _____			
Signature: _____			
Date: _____			
Telephone Number: _____			
Affiliation: _____			
Relinquished to:			
Printed Name: _____			
Signature: _____			
Date: _____			
Telephone Number: _____			
Affiliation: _____			

NOTE: All values given on these pages are for planning purposes only.



**PURPOSE OF SALVAGING DEAD WILDLIFE**

Birds and mammals killed by an oil spill must be collected as quickly as possible to prevent secondary poisoning of scavengers due to hydrocarbon ingestion.

“Salvage” is the collection of oiled carcasses by certified personnel. This activity requires:

- Notification and approval of state and federal agencies
- Proper recordkeeping
- Temporary storage
- Ultimate storage and disposal

Only persons certified in bird hazing or bird collection and stabilization may salvage dead, oiled birds and mammals.

Trustee agencies listed in the ACS Plan of Operations for Salvage (see ACS permit book) must be notified. If the agencies cannot be reached, proceed with salvage, but continue and log attempts to reach agencies.

**SALVAGE PROCEDURE**

The following list of salvage procedures will be included in an incident-specific plan for retrieving dead oiled wildlife. The plan will be reviewed and approved by the appropriate wildlife resource agency(ies), and implemented by the responsible party.

1. Place each animal in a plastic bag, with a copy of the record form filled out and inserted into the bag. Ensure the form is protected from oiling.
2. Take the plastic bags to the Wildlife Stabilization Center in BP EOA Building U-8 to be logged in and placed in refrigerated trailer for holding.
3. Response Center personnel will copy or record the information in the bag, assign a control number, complete any missing information, and file the form. Leave the original collection tag or form in the bag with the carcass.
4. Agency personnel will inspect and catalogue all collected carcasses.
5. Following inspection, carcasses are transferred to the freezer trailer for storage, until plans are made for final disposition.
6. The responsible party will coordinate plans for final disposition with appropriate agencies.

NOTE: All values given on these pages are for planning purposes only.



**DATA SHEET FOR COLLECTED DEAD, OILED WILDLIFE**  
 (Adapted from Alaska RRT Wildlife Protection Guidelines for Alaska)

Fill out one of these data sheets for each oiled carcass collected.

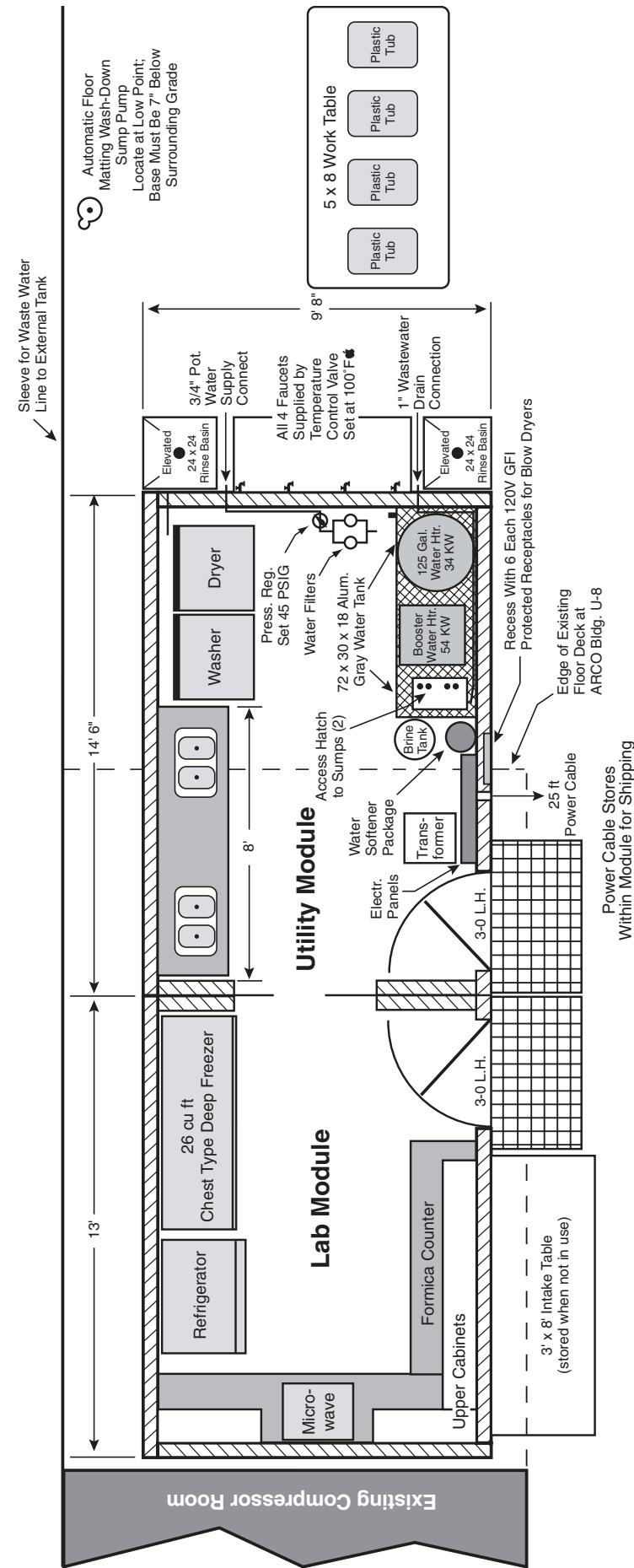
<b>Date:</b>	<b>Control Number:</b>	
<b>Oil Spill Incident:</b>		
<b>Location Animal Found (Specific):</b>		
<b>Latitude/Longitude:</b>		
<b>Species Found:</b>		
<b>Is Specimen Obviously Oiled? (circle one):</b>	<b>Yes</b>	<b>No</b>
<b>Was Specimen Scavenged? (circle one):</b>	<b>Yes</b>	<b>No</b>
<b>Collected by:</b>		
Printed Name: _____		
Signature: _____		
Date: _____		
Telephone Number: _____		
Affiliation: _____		
<b>Relinquished to:</b>		
Printed Name: _____		
Signature: _____		
Date: _____		
Telephone Number: _____		
Affiliation: _____		
<b>Remarks:</b>		

NOTE: All values given on these pages are for planning purposes only.





ALASKA CLEAN SEAS  
WILDLIFE STABILIZATION CENTER



This drawing indicates layout for ARCO Building U-8 at Prudhoe Bay. Balance of floor area with bird holding cages, floor matting, sump pumps, etc. is not shown. There is a separate 20-ft standard shipping conex that contains a 60-ft x 150-ft fabric pit liner and approximately 40 pre-packaged bird cages.

NOTE: All values given on these pages are for planning purposes only.



ACS maintains an initial stabilization facility consisting of air-transportable modules stored at Prudhoe Bay.

**FACILITY CAPABILITIES**

**DESIGN CONSIDERATIONS**

- Initial stabilization of up to 500 ducks or 250 geese
- Long-term treatment of up to 10 birds

**FACILITY CAPABILITIES**

- Gross oil decontamination
- Take vital statistics
- Blood work
- Rehydration
- Stabilization

**MOBILIZATION TIME**

- 4 to 6 hours (longer if facility needs to be transported to remote site)
- 2 personnel are required for shipping or setup

**DEPLOYMENT CONSIDERATIONS**

**TRANSPORTATION MODES:**

- Truck
- Hercules C-130 or C-141 aircraft
- Modules have fork pockets for lifting
- Modules will be placed on a lowboy trailer for loading into the aircraft.

**MODULE DIMENSIONS AND WEIGHTS**

	WIDTH	LENGTH	HEIGHT	WEIGHT
Lab Module	9 ft 8 in.	13 ft	8 ft 7 in.	2,500 lbs
Utility Module	9 ft 8 in.	15 ft	8 ft 7 in.	3,800 lbs
Accessories Conex	8 ft	20 ft	8 ft	5,100 lbs

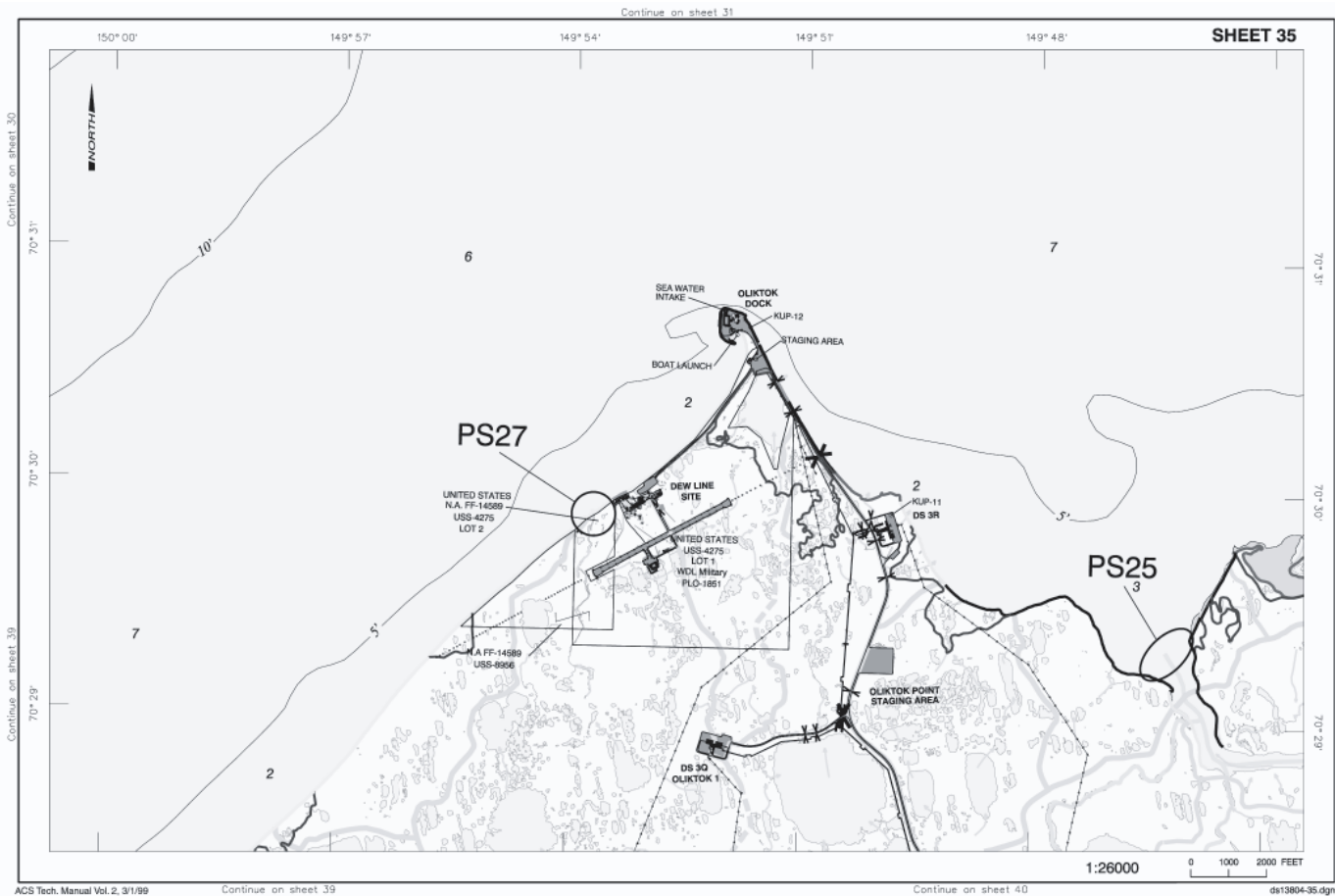
**SETUP CONSIDERATIONS/REQUIREMENTS**

- Electrical: 480 volt, 3 phase, 125 Kw or 208 volt, single phase, 20 Kw.
- Water: Potable water is required. Center has its own pressure system.
- Wastewater: Facility has a 2,000-gallon portable holding tank.
- Flooring: Concrete floors or liner that can be washed down to prevent the spread of disease.
- Heating: Must be capable of maintaining an air temperature of 68°F to 70°F.
- Building Size: A warehouse with minimum of 7,000 sq. ft.
- Ventilation: A minimum of six air exchanges per hour, while maintaining 68°F to 70°F inside air temperature.

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SAMPLE ACS ATLAS MAP



Volume 2 of the *Alaska Clean Seas Technical Manual* contains a map atlas of the North Slope oil fields and vicinity. These maps\* and their accompanying legend pages identify sensitive-area locations for priority protection in the event of a spill. The locations on these maps are ones that can be defended by exclusion or deflection tactics. Also included on the map legend pages are general statements of environmental sensitivity — e.g., presence of birds or marine mammals — provided by the Alaska Regional Response Team (ARRT) Sensitive Areas Working Group.

It is important to remember that detailed protection strategies and incident-specific protection priorities will be developed by the Unified Command at the time of the spill. In evaluating the sites that must be protected, the Unified Command will apply criteria developed by the ARRT Sensitive Areas Working Group with representatives from State and Federal agencies and the private sector. The following relative priority listing prioritizes resources into designations of major, moderate, and lesser concern. Resources are not prioritized within each designation. These designations are for consideration in initial spill response activities; they are not applicable to extended cleanup activities. Specific guidance to On-Scene Coordinators for protecting cultural resources is contained in Annex M of the *Unified Plan*.

\*NOTE: The base maps for the atlas were provided by BP Exploration (Alaska) Inc. (BPXA). While every effort was made to ensure an accurate depiction of surface features, BPXA does not warrant that the data is accurate of fit for any particular use.

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The following criteria were developed as a tool to establish levels of concern.\* These criteria are not listed in a priority order. (This information was excerpted from the Sensitive Areas section of the *Alaska Regional Response Team North Slope Subarea Contingency Plan*. Please refer to the latest version for any revisions that may have occurred since publication of the *ACS Technical Manual*.)

- Human economic disruption — economic/social value; human food source disruption
- Mortality — wildlife, fish, other organisms (how many potentially killed in relation to abundance)
- Animal displacement and sensitivity to displacement
- Aesthetic degradation
- Habitat availability and rarity
- Sublethal effects, including sensitivity to physical or toxic effects of oil or hazardous substances and long-term effects to habitat, species, or both
- Threatened and endangered species, and/or other legal designation
- Persistent concentration of oil or hazardous substances
- Reproduction rate or recolonizing potential
- Relative importance to ecosystem
- Potential for physical contact with spill — pathway of oil or hazardous substance
- Resource sensitivity to response countermeasures

AREAS OF MAJOR CONCERN

- Shoreline Geomorphology - Coastal Habitat Types:
  - River deltas
  - Sheltered lagoons
  - Open lagoons
  - Salt marshes
  - Mud flats
  - Barrier islands
  - Spit beaches
  - Protected bays
- Inland Habitat Types:
  - Riparian willow
  - Connected lakes
  - Freshwater springs
- Threatened or Endangered Species Habitat
- Spotted Seal Haulout Areas (>10 animals)
- Ringed Seal Lairs and Pupping Areas
- Walrus Haulout Areas
- Beluga Whale Concentration Areas
- Bowhead Whale Nearshore Migration Routes
- Polar Bear Denning and Feeding Areas
- Caribou Calving and Insect Relief Areas
- Large Seabird Colonies (>100 birds)
- Waterfowl and Shorebird Spring and Fall Concentration and Staging Areas
- Waterfowl Molting Concentration Areas
- Anadromous Fish Spawning and/or Rearing Streams
  - (i.e., salmon, Dolly Varden, whitefish)
- Land Management Designations
  - Federal: Wilderness
  - Wild and Scenic Rivers
  - National Natural Landmarks
  - Research Natural Areas (Toolik Lake, Galbraith Lake)

(Continued on next page)

NOTE: All values given on these pages are for planning purposes only.



(Continued from previous page)

- Cultural Resources/Archaeological Sites:
  - National Historic Landmarks
  - Burial Sites
  - National Register Eligible Village Sites
  - Intertidal Sites
- Subsistence Harvest Areas
- High Commercial Use Areas
- High Recreational Use Areas
- River Floodplains

#### AREAS OF MODERATE CONCERN

- Shoreline Geomorphology - Coastal Habitat Types:
  - Beaded tundra streams
- Upland Habitat Types:
  - Drained lake basins
- Spotted Seal Haulout Areas (< 10 animals)
- Ringed Seal Shorefast Ice Concentration Areas
- Seabird Colonies (10 - 100 birds)
- Waterfowl and Shorebird Nesting Concentration Areas
- Shorebird Molting Concentration Areas
- Bear Concentration Areas (marine mammal/carcasses; salmon)
- Polar Bear General Distribution
- Walrus General Distribution
- Caribou Migration Routes
- Muskox Riparian Habitat
- Commercial Harvest Areas
- Recreational Use Areas
- Land Management Designations
  - Federal: National Parks
  - National Wildlife Refuges
- Cultural Resources/Archaeological Sites
  - National Register Eligible Sites
  - (Other Than Village Sites)
  - Sites Adjacent To Shorelines

#### AREAS OF LESSER CONCERN

- Upland Habitat Types:
  - Mesic/dry tussock tundra
  - Alpine tundra
- Bearded Seal General Distribution
- Bowhead Whale General Distribution
- Gray Whale Nearshore Migration and Feeding Areas
- Seabird Colonies (<10 birds)
- Waterfowl and Shorebird General Distribution
- General Freshwater Fish Habitat
- Land Management Designations
  - Federal: Public Lands
    - National Forests
    - National Preserves
  - State: General Public Lands

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## CULTURAL RESOURCE CONSIDERATIONS

### DEFINITION OF "CULTURAL RESOURCES"

Federal and state law requires protection of cultural resources in the vicinity of the spill or response.

"Cultural resources" is a broad term used to refer to ruins, structures, sites, graves, artifacts, deposits, and/or objects that pertain to history or prehistory. The question is not whether someone thinks a resource has value, but whether the resource meets the criteria of federal or state law.

There are two kinds of impacts of concern during a spill response operation::

- *Direct impact* from spilled substances
- *Indirect impacts* from ground-disturbing activities, vandalism, and theft

### RESPONSIBILITIES

Cultural resource protection is primarily an agency responsibility. The duties of the responsible party in an oil spill are to:

- Be aware that cultural resources may exist in the response area.
- Recognize that their existence may affect how response is conducted.
- Cooperate with state and federal officials charged with cultural resource protection.
- Assure that all response personnel do not collect, remove, or disturb cultural resources encountered in a response in any way.
- Consider retaining a cultural resources specialist as a consultant to Planning Section in case of a significant spill.

### SITE LOCATIONS

Because of federal law and state policy, the exact locations of cultural resource sites are not shown on ACS or member company maps. Known cultural resource sites on the North Slope have been mapped. Access to this information is restricted. Non-site-specific information on known cultural resources sites can found in the Area Contingency Plans. In a responsible party-funded response to a spill, the FOSC will consult with appropriate ARRT members regarding cultural resources which may be at risk from a spill or response.

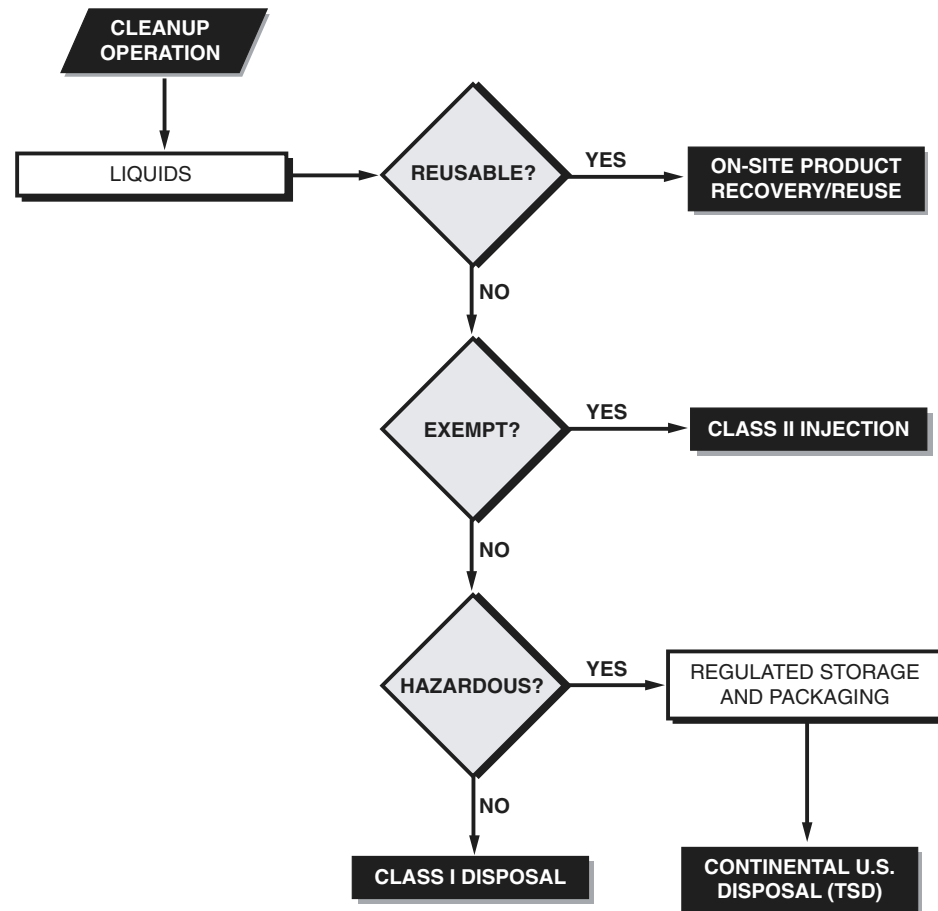
Site-specific cultural resource surveys will be required in areas the State Historic Preservation Officer believes are not well-surveyed for sites.

Responsible parties and response teams should be particularly attentive to the possible existence of cultural resource sites at/on:

- Coastal barrier islands
- Elevated terraces or cut-bank bluffs along rivers
- Pingos
- Most shoreline areas, particularly near embayments or promontories
- Prominent hills inland

For detailed questions, consult the ARRT *Cultural Resources Protection Guidelines* (Alaska Unified Plan, Tab E to Annex X).

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Liquids from cleanup operations include liquid oil; mixtures of oil, water, snow, ice, and/or gravel; used engine oils and hydraulic fluids; contaminated fuels; bilge/ballast waters; stormwater runoff from waste storage areas; and washwaters from decontamination operations.

Do not mix liquids from different sources until classification is confirmed. Mixed wastes can be difficult and expensive to manage. Materials are classified by qualified personnel and segregated until classification is confirmed.

Spill responders must request permission from the pipeline or production facility operator in order for the pipeline or production facility to receive recovered liquids. Note also that users of BPXA/AAI facilities are pre-approved and may have specialized training in handling of wastes. Loads must be accompanied by the appropriate documentation.

Fluids and solids from spill cleanup operations are considered either:

- Reusable products, which can be recovered and returned to service, or
- Wastes, which must be managed according to applicable permits, regulations and policies.

**REUSABLE PRODUCT**

Products that can be recovered and reused are not considered wastes, but must still be managed properly. Examples of reusable fluids include:

- **Crude oil** - returned to the production stream
- **Refined hydrocarbons (fuels, lubrication oil)** - returned to the production stream (note that policies on refined hydrocarbon recycling are not the same in all operating areas)
- **Water, seawater, other approved fluids** - injected underground for enhanced oil recovery (EOR)
- **Crude, diesel, methanol** - reserved for well work or other field operations.

NOTE: All values given on these pages are for planning purposes only.



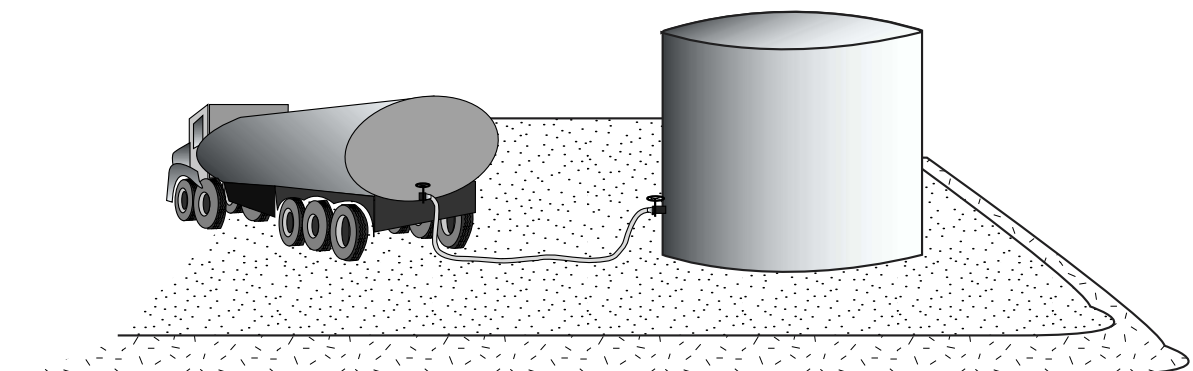
**FACILITIES FOR HYDROCARBON RECOVERY AND ENHANCED OIL RECOVERY**

LOCATION	FACILITY	OFFLOADING LOCATION (TRUCKS)	TYPICAL RESTRICTIONS <sup>1</sup>
Kuparuk River Unit	CPF-1 hydrocarbon recycle facility	CPF-1	Approved hydrocarbons. KRU manifest required.
Kuparuk River Unit	CPF-1 water recycle facility	CPF-1	Approved EOR fluids. KRU manifest required.
Prudhoe Bay Unit - Eastern Operating Area	FS 1 (primary) FS 2, 3 (backup)	Slop oil tank	Approved hydrocarbons. Aqueous fluids must meet Class II disposal criteria. <sup>2</sup> Recyclable hydrocarbon manifest required.
Prudhoe Bay Unit - Western Operating Area	GC 1 (primary) GC 2, 3 (backup)	Dirty water tank	Approved hydrocarbons. No non-exempt diesel. Aqueous fluids must meet Class II disposal criteria. PBU Class II manifest required.
Milne Point Unit	Production Facility	ORT (Oil Reserve Tank)	Approved hydrocarbons and EOR fluids. No non-exempt diesel. MPU fluid transfer manifest required.
Endicott	Production Facility	Snowmelt tank	Approved hydrocarbons and EOR fluids. No non-exempt diesel. Endicott fluid transfer permit required.
Badami	Badami Class I injection	Badami Class I injection skid	Non-hazardous or exempt hydrocarbons and other Class I fluids. Badami manifest required.
	CPU Recycling	Badami CPU	Approved hydrocarbons.
Alyeska PS-1	PS-1	PS-1 injection skids	Fluids must meet Alyeska recycling criteria

1. Contact the facility or asset environmental staff for detailed information.

2. Due to plumbing constraints, PBU facilities cannot always isolate EOR from Class II. Fluids must meet the more restrictive Class II criteria.

Fluids that can be used for well work or other field operations are recovered and stored in designated locations, as directed by asset environmental personnel.



NOTE: All values given on these pages are for planning purposes only.





**WASTE FLUIDS**

Wastes are subdivided into three major categories:

- RCRA-exempt (includes exemptions for oil and gas, sewage, and empty containers)
- Non-exempt, non-hazardous
- Hazardous

Wastes that are managed by underground injection are further classified according to the type of permit held by the injection facility.

- Class II wells are generally restricted to RCRA-exempt wastes that have actually originated in, or circulated through, an oil and gas wellbore. Co-mingled fresh water, seawater, or process additives may also be acceptable.
- Class I wells are authorized to inject a variety of exempt or non-exempt, non-hazardous wastes. They may also accept Class II wastes.

Class I and Class II waste fluid disposal facilities are listed on the following tables. Note that each facility must comply with permits, regulations, ballot agreements, and operational constraints.

**CLASS I DISPOSAL FACILITIES**

LOCATION	FACILITY	OFFLOADING LOCATION (TRUCK)	TYPICAL RESTRICTIONS
Kuparuk River Unit	None – Use Pad 3 (EOA) or evaluate for EOR		See Pad 3 Approved Generators/Transporters <sup>1</sup> only.
Prudhoe Bay Unit - Eastern Operating Area	Pad 3 Waste Injection Facility (WIF)	Pad 3 injection skid	Exempt or non-hazardous fluids only. Approved Generators/Transporters only. Pad 3 manifest required. Additional paperwork for non-PBU users.
Prudhoe Bay Unit - Western Operating Area	None – Use Pad 3 (EOA)		See Pad 3
Milne Point Unit	None – Use Pad 3 (EOA) or evaluate for EOR		See Pad 3
Endicott	None – Evaluate for EOR No ballot agreement for Pad 3. Badami Class I Well if allowed by ballot/logistics.	Snowmelt tank	Exempt or non-hazardous fluids approved for EOR only. Approved Generators/Transporters only. Endicott fluid transfer permit required.
Badami	Badami Class I Well (Pad 3 as backup)	Badami injection skid	Exempt or non-hazardous fluids only. Approved Generators/Transporters only. Badami manifest required.
Alpine	Alpine Class I Well (Pad 3 as backup)	Alpine oily waste injection facility	Exempt or non-hazardous fluids only. Approved Generators/Transporters only. Alpine manifest required.
Northstar	Northstar Class I Well	None	Exempt or non-hazardous fluids only. Approved Generators/Transporters only. North Slope manifest required.
Alyeska PS-1	None – Use Pad 3 (EOA) or evaluate for recycling at PS-1		See Pad 3

1. Must complete appropriate Phillips/BPXA waste management training program.

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**CLASS II DISPOSAL FACILITIES (LIQUIDS)**

LOCATION	FACILITY	OFFLOADING LOCATION (TRUCK)	TYPICAL RESTRICTIONS
Kuparuk River Unit	CPF-1 oily waste disposal facility	CPF-1 oily waste injection skid	Approved Generators/Transporters only. Kuparuk Class II manifest required
	Pad 3 (EOA)		See Pad 3
Prudhoe Bay Unit - Eastern Operating Area	G&I (Grind & Inject) Facility (DS-4) <sup>1</sup>	DS-4 injection skid	Approved Generators/ Transporters only. Check w/AAI for latest G&I procedures.
	Flow Stations 1, 2, 3	Injection skid	Approved Generators/ Transporters only.
	Pad 3		Exempt or non-hazardous fluids only. Approved Generators/ Transporters only. Pad 3 manifest required. Additional paperwork for non-PBU users.
Prudhoe Bay Unit - Western Operating Area	GC 1, 2, 3	Dirty water tank	Approved Generators/Transporters only. PBU Class II manifest required
	Pad 3 (EOA)		See Pad 3
MPU	None - Use G&I (EOA) or Pad 3 (EOA)		See G&I, Pad 3
Endicott	Well P-18/2-02	2-02 injection skid	Approved Generators/ Transporters only. Endicott fluid transfer permit and P-18/2-02 injection log required.
Badami	Badami Class 1 Well	Badami injection skid	Approved Generators/ Transporters only. Badami Manifest required.
	Pad 3 (EOA)		

1. If operating. Check with Phillips/BPXA regarding current status of injection wells.

NOTE: All values given on these pages are for planning purposes only.



**NOTE:** "Base Location" is storage location (may change seasonally); "Mobe Time" is time to get it out of storage, prepare it for operation, and make it ready to travel (concurrent for all equipment); "Deploy Time" is time to make it operational for its intended use at the spill site. These times do not include travel time from base to spill site, which may have multiple components (see Tactic L-3).

**EQUIPMENT AND PERSONNEL**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Divert Tank or Facility Oil Slop Tank	Operating fields	Oil recovery or storage	1	—	0.5 hr	—
Vacuum Truck or Fastank	All	Liquid transport	1	1	1 hr	0.5 hr
Snow Melter	EOA, APC, Alpine	Snow melting	1	2	2 hr	2 hr
Recycling Facility	See above	Liquid recycling	1	1	—	—
Disposal Facility	See above	Liquid disposal	1	1	—	—

**TOTAL STAFF 3**

**SUPPORT**

Decisions about waste management are made by the asset environmental staff and, in a major incident, the Environment or Waste Management Unit Leader.

Support activities may include:

- Construction and management of temporary storage areas
- Transportation (tanker trucks, dump trucks, vacuum trucks, loaders)
- Manifesting and document control

**ASSET CONTACTS FOR WASTE MANAGEMENT**

LOCATION	CONTACT	PHONE
Kuparuk River Unit	Environmental Coordinator	659-7242
Greater Prudhoe Bay Area	Environmental Advisor	659-4789
Milne Point Unit	Environmental Advisor	670-3473
Endicott	Environmental Advisor	670-3473
Badami	Environmental Advisor	670-3473
Alpine	Environmental Coordinator	670-4200
Alyeska PS-1	Environmental Specialist	278-1611 x4185 or x4485

*NOTE: All values given on these pages are for planning purposes only.*



**CAPACITIES FOR PLANNING**

- Liquid processing capacity of recycling and disposal facilities is facility- and incident-specific, and the asset environmental staff should be contacted in the event of an incident.
- Vacuum trucks travel at 35 mph and the average storage capacity is 300 bbl.

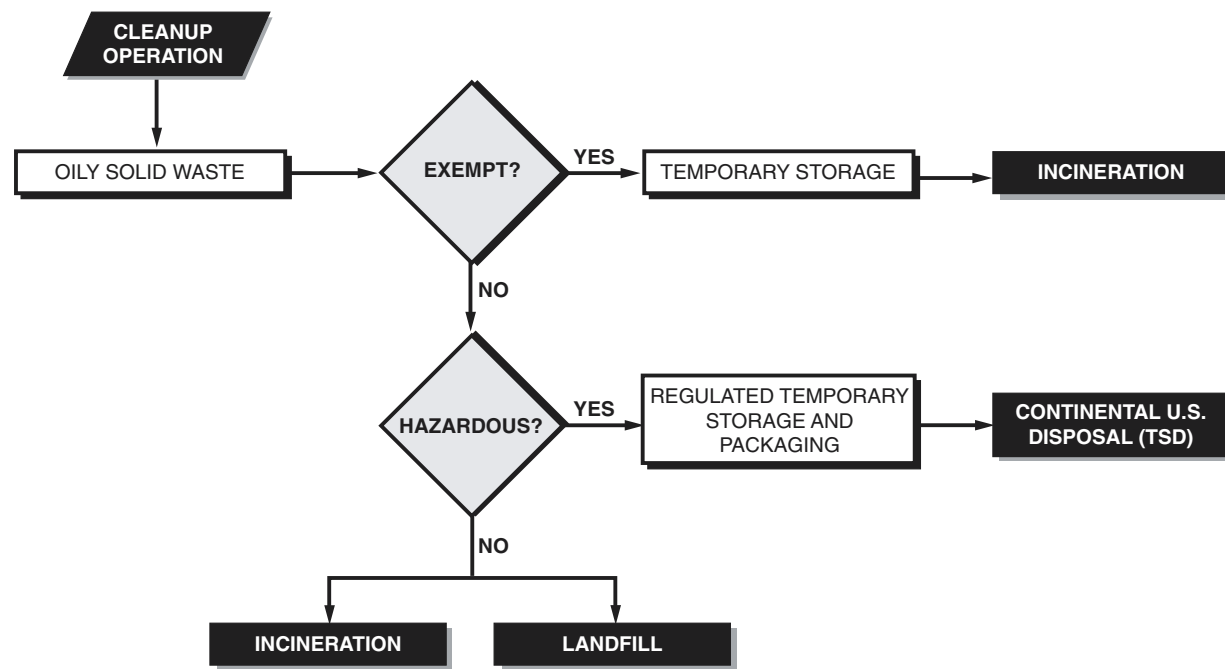
**TECHNICAL CONSIDERATIONS**

- Spills at production facilities may be collected in facility sumps and, if appropriate, hard-piped directly to the process location. Otherwise, fluids are generally delivered to the facilities by tanker truck and offloaded to a designated dirty water tank or slop oil tank.
- In most cases, hydrocarbons are separated and routed to the production stream, while aqueous fluids are sent to EOR or disposal wells. Water-handling capacity is facility-specific. Alyeska ultimately determines how much aqueous fluid may be co-mingled with crude in the Trans-Alaska Pipeline System (TAPS).
- Fluid disposal or recycling rates are affected by:
  - Hauling capacity (number of available tanker trucks)
  - Offloading rate at facilities (limited by pump capacity, solids content)
  - Storage capacity
  - Facility processing/injection rates
- The most critical factors are hauling capacity and offloading rates. Receiving facilities usually have intake screens that become plugged by excess solids or oversized materials. Pre-screening and solids separation may be required.
- Each disposal/recycling facility has operational and legal restrictions that affect what can be accepted:
  - Physical limitations (particle size, solids content, offloading rate, capacity)
  - Safety considerations (flash point, pH)
  - Permit/regulatory restrictions (waste classification, storage requirements)
  - Ballot agreements or other legal stipulations (may exclude certain users)
  - Operating procedures (site-specific paperwork and training requirements)
- Facility personnel have the authority to reject any material that does not meet their operational and safety criteria.

**ENVIRONMENTAL CONSIDERATIONS**

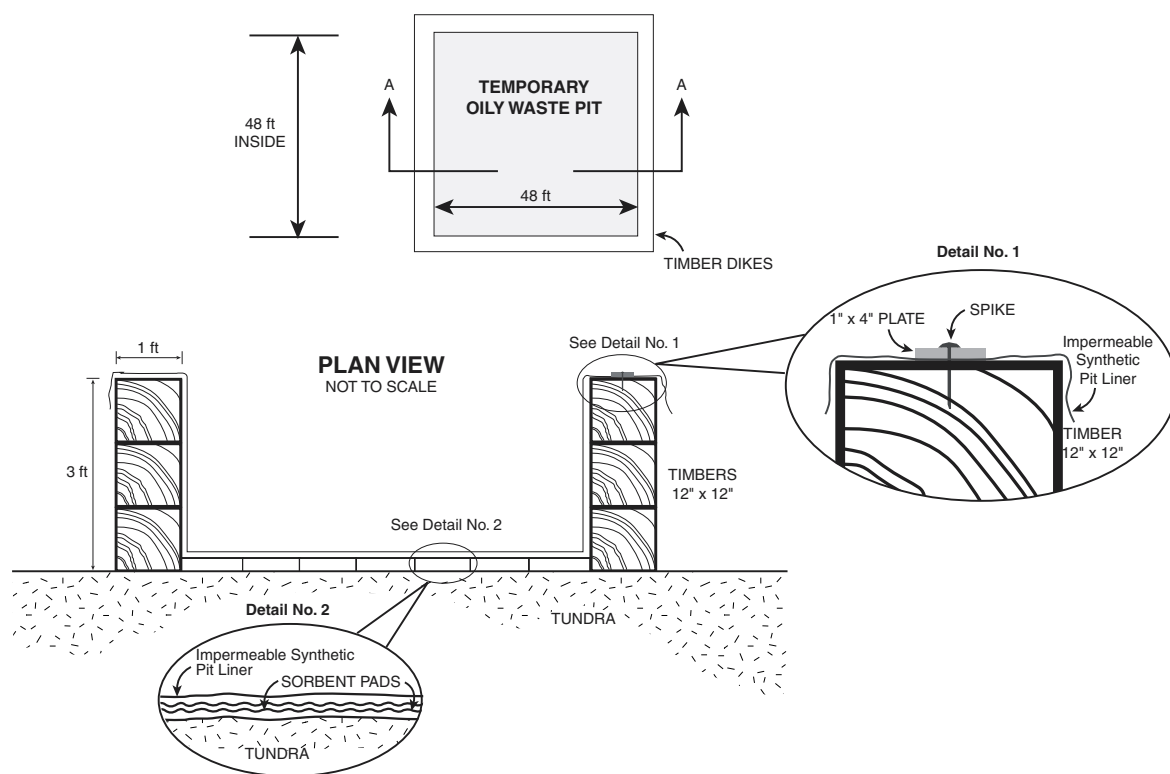
- These guidelines apply to all recovery, storage, transfer, and disposal operations.
  - Maintain communications with ICS Environment Unit staff who determine how wastes will be managed.
  - Make sure all necessary permits and approvals are in place for storage, transportation, and disposal, and that stipulations are understood by response personnel.
  - Manage recovery and storage operations as necessary to contain secondary spills, minimize contact with precipitation and runoff, and protect uncontaminated areas.
  - Segregate wastes of different types to the extent possible.
  - Do not discharge any wastes to land, tundra, or water without explicit approval.

*NOTE: All values given on these pages are for planning purposes only.*



**TEMPORARY ABOVE-GROUND STORAGE PIT FOR NON-LIQUID OILY WASTES (TYPICAL DESIGN)**

NOTE: A cover may be required to keep precipitation out of the pit.



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**CLASSIFICATION OF OILY SOLID WASTES**

Oily solid wastes include oiled clothing and personal protective equipment, used sorbent material, discarded response equipment, and construction materials (liner, timbers). Oiled animal carcasses may also be present. Offshore recovery operations may generate mousse patties, asphalt patches, and tarballs. Contaminated gravel is discussed in a separate tactic.

Solid wastes must be classified by qualified personnel and segregated until classification is confirmed. Representative samples may be required for hazardous waste characterization. The environmental staff will set up the sampling program. Contaminated solids generally have the same classification as the material that was spilled, and are managed accordingly.

**COLLECTION METHODS**

Oily solids are typically collected in plastic bags and leakproof bulk storage containers (Fastanks, lined dumpsters, plastic totes, drums). A limited number of oily waste dumpsters can be provided by the North Slope Borough (NSB); these can be supplemented by tiger tanks, collapsible tanks, fabricated containers, or barges.

Plastic bags and other containers are labeled or otherwise coded for sorting. Follow the labeling and coding scheme developed for each incident. In general:

- Use clear "oily waste" bags with yellow stripes for the NSB incinerator. NSB restrictions include:
  - No free liquid
  - No hazardous waste
  - No gravel
  - Maximum size for cut-up pit liner and other bulky objects
- Use colored bags for heavily oiled solids that are not suitable for NSB incineration.

**PERMIT REQUIREMENTS**

Temporary storage areas may be constructed of soil, snow, ice, or timbers in conjunction with liners providing adequate secondary containment and runoff control. This tactic is intended to be a pre-approved method of oily waste storage for emergency response. Confirm requirements with the Environment Unit. The following steps must be taken:

- Wastes must be stored in covered, leakproof containers that are constructed of impermeable materials or constructed containment fully lined with an impermeable synthetic liner.
- Before implementation of this tactic, ADEC must be notified of the storage method selected by contacting the State On-Scene Coordinator and the Department's Exploration, Production and Refineries Section with the following information:
  - (a) The location of the spill, type of product involved, estimated quantity spilled, and estimated quantity of oily waste generated.
  - (b) The reason temporary storage is necessary.
  - (c) A description of the storage method(s) planned and the location(s) of storage.
  - (d) The anticipated length of time temporary storage will be necessary.
  - (e) A description of the method(s) planned for transportation of oily waste to an approved disposal site.
  - (f) The planned method(s) for ultimate disposal of recovered waste.
- Storage is pre-approved for a maximum of 60 days. This period of time may be extended with ADEC approval based upon a showing of good cause and absence of harm to the environment. A written request must be submitted two weeks prior to expiration of the 60-day period.
- Where possible, temporary storage structures must be located at least 100 feet away from water bodies.
- During periods of temporary storage, waste storage structures must be visually monitored on a routine basis to ensure no leakage is occurring. If leakage is detected, then ADEC's Exploration, Production and Refineries Section must be notified immediately.
- No physical construction of temporary containment structures that may result in environmental damage is allowed under this approval, unless prior consent is obtained from appropriate federal and state authorities.
- Any environmental damage resulting from storage operations must be repaired.

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**NOTE:** "Base Location" is storage location (may change seasonally); "Mobe Time" is time to get it out of storage, prepare it for operation, and make it ready to travel (concurrent for all equipment); "Deploy Time" is time to make it operational for its intended use at the spill site. These times do not include travel time from base to spill site, which may have multiple components (see Tactic L-3).

**EQUIPMENT AND PERSONNEL**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Front End Loader with Forks	All	Placement of timbers	1	1	1 hr	0.5 hr
Pit Liner* (varying sizes)	All operating areas, Deadhorse	Storage liner	1	Size-dependent	1 hr	1 hr
Timbers (8"x8" or 12"x12")	All operating areas, Deadhorse	Non-liquid storage	Variable	2 for setup	1 hr	1 hr
Tanks (Tiger, inflatable, collapsible, Fast)	All operating areas, Deadhorse	Non-liquid storage	1	2 for setup	1 hr	1 hr
Open-Top Drum	All operating areas, Deadhorse	Non-liquid storage	1	1 for setup	0.5 hr	0.5 hr
Oily Waste Bags	All operating areas, Deadhorse	Non-liquid storage and disposal	Variable	—	0.5 hr	0.5 hr
Lined Dumpsters	All operating areas, Deadhorse	Non-liquid storage	1	2 to install liner	0.5 hr	0.5 hr
RCRA Storage Container	All operating areas, Deadhorse	Non-liquid hazardous material disposal	1	—	0.5 hr	0.5 hr

**TOTAL STAFF FOR SETUP** ≥3

**TOTAL STAFF TO SUSTAIN OPERATIONS** 0

\*Pit and bed liner 8218 LTA polyester fabric with 18 ounce per square yard finished coat weight and -67 degrees Fahrenheit cold crack, and compatible with crude oil.

**SUPPORT**

Decisions about waste management are made by the asset environmental staff and, in a major incident, the Environment or Waste Management Unit Leader.

**ASSET ENVIRONMENTAL CONTACTS FOR WASTE MANAGEMENT**

LOCATION	CONTACT	PHONE
Kuparuk River Unit	Environmental Coordinator	659-7242
Greater Prudhoe Bay Area	Environmental Advisor	659-4789
Milne Point Unit	Environmental Advisor	670-3473
Endicott	Environmental Advisor	670-3473
Badami	Environmental Advisor	670-3473
Alpine	Environmental Coordinator	670-4200
Alyeska PS-1	Environmental Specialist	278-1611 x4185 or x4485

Within developed operating areas, oily waste can be transported to storage areas by front-end loaders and end dumps. Rolligon or helicopter transport may be used for remote sites. Offshore operations require marine transportation.

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**PERMIT REQUIREMENTS (Cont'd)**

Incineration is the primary disposal method for oily solid wastes other than gravel. The NSB incinerator has limited capacity and may not be able to handle the volumes generated during a major spill. Portable incineration units must be pre-approved by ADEC and must comply with applicable operating restrictions. Oily wastes are not to be burned by response personnel without appropriate agency approvals or permits. Open burning is approved by ADEC and other agencies on a case-by-case basis by permit.

Oily solids that cannot be managed on the North Slope are shipped to approved disposal facilities in Alaska or the continental United States.

Oiled wildlife must be handled as directed by agency personnel. It may be necessary to store carcasses in freezers for future examination. Disposal will usually be by incineration at approved facilities.

**CAPACITIES FOR PLANNING**

Portable pit-type incinerators burn approximately 8 to 14 tons/hr. The average end dump on the North Slope can hold 20 cu. yd and travels at 35 mph.

**TECHNICAL CONSIDERATIONS**

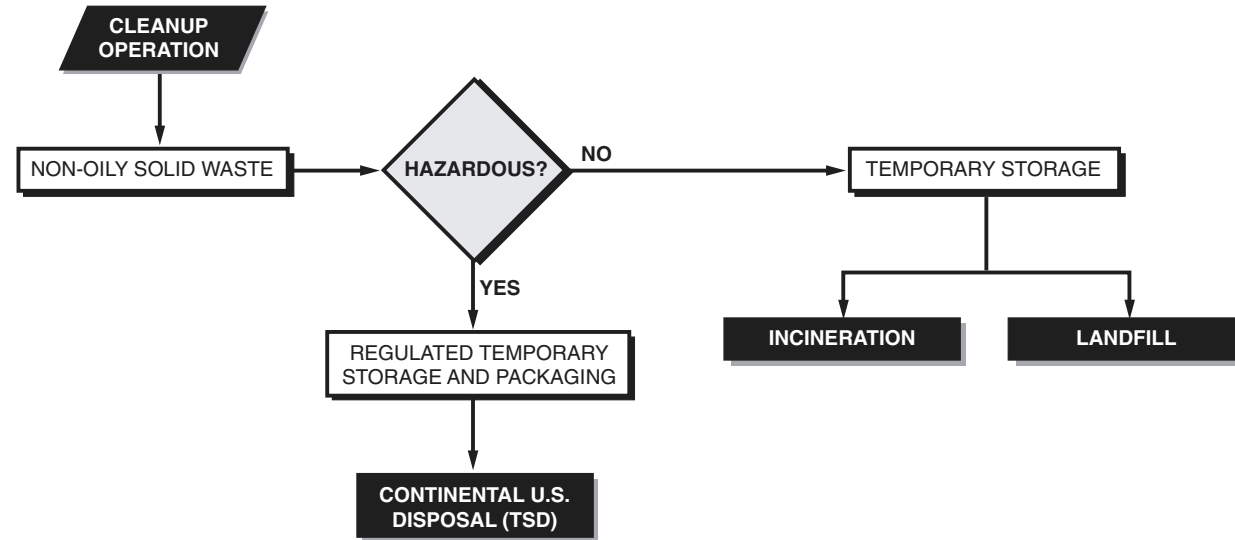
- Each disposal/recycling facility has operational and legal restrictions that affect what can be accepted:
  - Physical limitations (particle size, solids content, offloading rate, capacity)
  - Safety considerations (flash point, pH)
  - Permit/regulatory restrictions (waste classification, storage requirements)
  - Ballot agreements or other legal stipulations (may exclude certain users)
  - Operating procedures (site-specific paperwork and training requirements).
- Facility personnel have the authority to reject any material that does not meet their operational and safety criteria.

**ENVIRONMENTAL CONSIDERATIONS**

- These guidelines apply to all recovery, storage, transfer, and disposal operations:
  - Maintain communications with Environment Unit staff who determine waste management.
  - Make sure all necessary permits and approvals are in place for storage, transportation, and disposal, and that stipulations are understood by response personnel.
  - Manage recovery and storage operations as necessary to contain secondary spills, minimize contact with precipitation and runoff, and protect uncontaminated areas.
  - Segregate wastes of different types to the extent possible.
  - Do not discharge any wastes to land, tundra, or water without explicit approval.

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**SOLID WASTES**

Non-oily solid waste includes garbage, paper products, Styrofoam food containers, plastics, glass, metals, and construction debris. General disposal guidelines are provided in the *North Slope Environmental Field Handbook*.

Solid wastes must be classified by qualified personnel, and segregated accordingly. Non-oily solid wastes will generally fall into the following categories:

- **Recyclable materials:** Recycling stations may be established for paper, styrofoam food containers, and wood. (No treated or contaminated wood is accepted at these stations.)
- **Scrap metal:** Scrap metal bins or collection points may be set up for non-oily scrap iron, pipe, copper, aluminum, stainless steel, metal cable, plate steel, and metal valves.
- **Burnable waste:** Designated dumpsters or other containers will be provided for food waste and other non-oily trash. Loose trash must be bagged or covered to prevent dispersal by wind. All food waste must be controlled to avoid attracting wildlife. Material that exceeds the NSB incinerator capacity will be burned in other approved incinerator units or landfilled at designated facilities.
- **Non-burnable waste:** Designated dumpsters or other containers will be provided for bulky non-hazardous waste that cannot be incinerated. Non-burnable waste may include empty cans, tires, construction debris, and liner material. Oversized material may have to be cut or crushed to meet landfill restrictions.
- **Hazardous waste:** Temporary storage areas will be established as needed for hazardous waste and managed by trained personnel. Cleanup-related hazardous waste may include batteries (lithium, mercury, or ni-cad), light bulbs with screw-in bases, aerosol cans with product or propellant inside, various chemicals, and laboratory wastes. Hazardous waste determinations will be made by qualified personnel.

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Wastes can be transferred to disposal facilities by truck or, as needed, Rolligons. Offshore operations require marine vessel support. The nearest solid waste disposal facilities are the NSB Oxbow Landfill and the NSB Deadhorse incinerator. However, due to the limited capacity of these facilities and potential long-term liability issues, other disposal options will be considered on a case-by-case basis. These options may include municipal landfills and incinerators elsewhere in Alaska, or approved disposal facilities in the Lower 48.

**LIQUID WASTES**

Domestic sewage and graywater are generated at crew support facilities. Sources include toilets, laundries, shower facilities, and kitchens. Treated wastewater may not be discharged to water, land, or tundra without a valid permit.

Options for disposal include:

- Existing wastewater treatment plants in each operating area (depending on available capacity)
- Class I injection (sewage and graywater are RCRA-exempt)
- EOR (currently approved for domestic wastewater at MPU and KRU; other assets require case-by-case agency approval)
- North Slope Borough wastewater treatment plant in Deadhorse
- Supplemental land- or barge-based treatment units (brought in for a specific incident)

Domestic wastewater plants cannot process wastewater that is heavily contaminated with oil, solvents, or other chemicals. Contaminated washwaters from laundries should be segregated and managed by underground injection or other appropriate methods.

**HAZARDOUS WASTES**

Hazardous waste liquids may include solvents, laboratory wastes, and unusable methanol or chemical products.

Hazardous waste, by definition, exhibits specific characteristics or is explicitly listed as hazardous waste by EPA. There are no facilities in Alaska for disposal of hazardous waste. Storage, packaging, transportation, and disposal are regulated by RCRA.

Hazardous waste must not be mixed with other wastes, and it must remain in the operating area where it is generated until transported to a regulated disposal facility in the continental U.S. Locations for temporary storage of hazardous waste will be established and managed by the asset environmental staff.

Any potentially hazardous waste must be segregated from other wastes until classification is confirmed by qualified personnel. Locations for temporary storage of hazardous waste liquids will be established and managed by the asset environmental staff. Hazardous waste must remain in the operating area where it is generated until transported to a regulated disposal facility.

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**NOTE:** "Base Location" is storage location (may change seasonally); "Move Time" is time to get it out of storage, prepare it for operation, and make it ready to travel (concurrent for all equipment); "Deploy Time" is time to make it operational for its intended use at the spill site. These times do not include travel time from base to spill site, which may have multiple components (see Tactic L-3).

**EQUIPMENT AND PERSONNEL**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Front-End Loader and/or Bobcat	Loader: All Bobcat: ACS, EOA, KRU	Waste transport	1	1	1 hr	0.5 hr
Shovel	All operating areas, Deadhorse	Waste transport	≥1	1	0.5 hr	0
Plastic Totes or Trash Bins	All operating areas, Deadhorse	Non-liquid storage	1	—	1 hr	0
Lined Dumpsters	All operating areas, Deadhorse	Non-liquid storage	1	2 to install liner	0.5 hr	0.5 hr
RCRA Storage Container	WOA, EOA, MPU, KRU, Endicott, Deadhorse	Non-liquid hazardous material disposal	1	—	0.5 hr	0.5 hr
Portable Incinerator or Burn Barrel	Deadhorse	Incineration	1	2	12 hr	6 hr
Dump Truck	WOA, EOA, KRU	Waste transport	1	1	1 hr	0
Physical-Chemical Package Plants	Deadhorse	Wastewater treatment	1	3	1 hr	1 hr
Extended Aeration Package Plants	Deadhorse	Wastewater treatment	1	3	1 hr	1 hr
Rotating Biological Package Plants	Deadhorse	Wastewater treatment	1	3	1 hr	1 hr

**SUPPORT**

Decisions about waste management are made by the asset environmental staff and, in a major incident, the Environment or Waste Management Unit Leader.

Front-end loaders and end dumps transport non-oily solid waste. Water trucks and vacuum trucks transport liquid waste. The North Slope Borough Landfill, North Slope Borough Wastewater Treatment Plant and the North Slope Borough Incinerator are final disposal sites for non-hazardous, non-oily waste. A helicopter transports the portable incinerator to the remote site. Plastic totes and drums assist transport of waste to a dumpster or an on-site incinerator.

**ASSET ENVIRONMENTAL CONTACTS FOR WASTE MANAGEMENT**

LOCATION	CONTACT	PHONE
Kuparuk River Unit	Environmental Coordinator	659-7242
Greater Prudhoe Bay Area	Environmental Advisor	659-4789
Milne Point Unit	Environmental Advisor	670-3473
Endicott	Environmental Advisor	670-3473
Badami	Environmental Advisor	670-3473
Alpine	Environmental Coordinator	670-4200
Alyeska PS-1	Environmental Specialist	278-1611 x4185 or x4485

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**CAPACITIES FOR PLANNING**

The average end dump on the North Slope holds 20 cubic yards and travels at 35 mph.

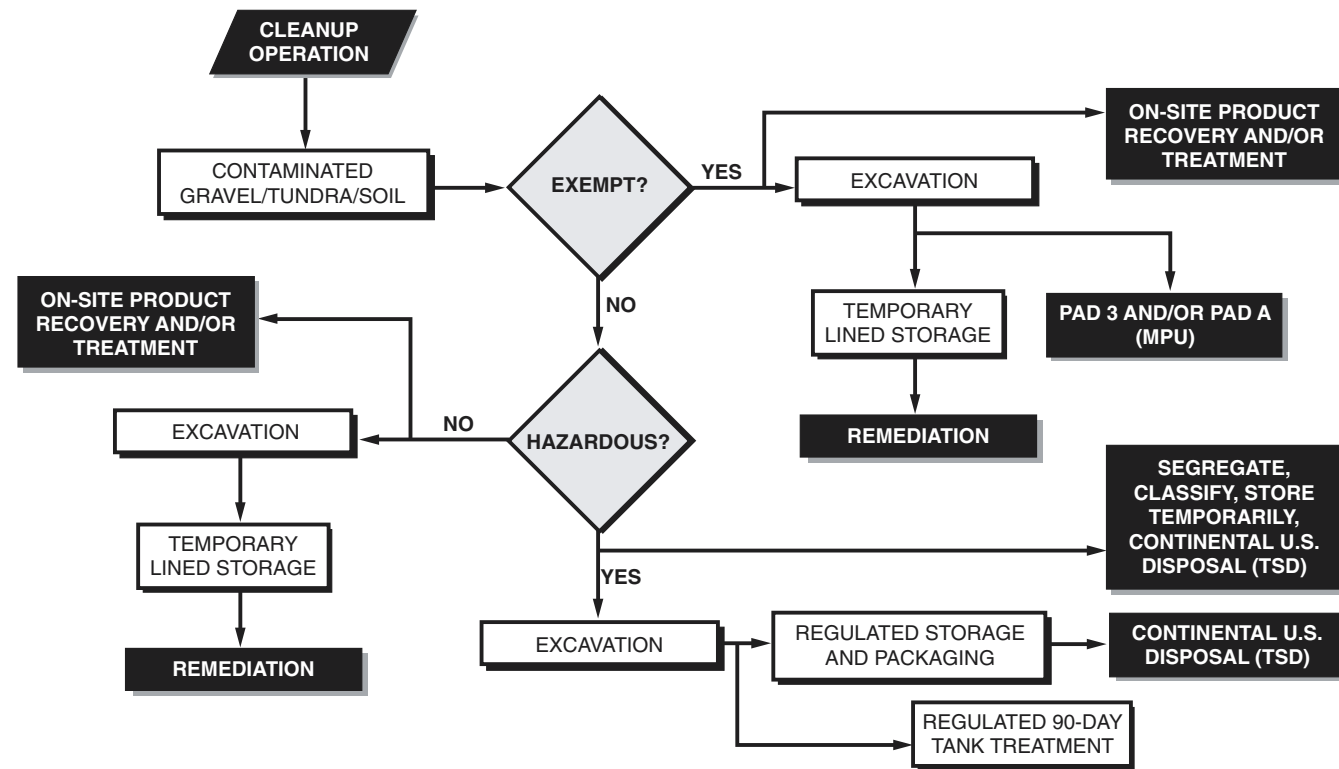
**TECHNICAL CONSIDERATIONS**

- Each disposal/recycling facility has operational and legal restrictions that affect what can be accepted:
  - Physical limitations (particle size, solids content, offloading rate, capacity)
  - Safety considerations (flash point, pH)
  - Permit/regulatory restrictions (waste classification, storage requirements)
  - Ballot agreements or other legal stipulations (may exclude certain users)
  - Operating procedures (site-specific paperwork and training requirements)
- Facility personnel have the authority to reject any material that does not meet their operational and safety criteria.

**ENVIRONMENTAL CONSIDERATIONS**

- These guidelines apply to all recovery, storage, transfer, and disposal operations.
  - Maintain communications with Environment Unit staff who determine waste management.
  - Make sure all necessary permits and approvals are in place for storage, transportation, and disposal, and that stipulations are understood by response personnel.
  - Manage recovery and storage operations as necessary to contain secondary spills, minimize contact with precipitation and runoff, and protect uncontaminated areas.
  - Segregate wastes of different types to the extent possible.
  - Do not discharge any wastes to land, tundra, or water without explicit approval.

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Contaminated gravel is excavated and stockpiled for processing, or left in place for treatment, with agency approval. Supplemental storage areas are constructed and maintained in accordance with applicable permits, approvals, and regulations. Containment areas are constructed from synthetic pit liner and timbers (see Tactic D-2). The following table lists existing storage areas for contaminated gravel. Pre-approval from the asset environmental staff is required.



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**CONTAMINATED GRAVEL STORAGE AREAS**

LOCATION	FACILITY	TYPICAL RESTRICTIONS	GRAVEL STORAGE CAPACITY (CU. YDS)
Kuparuk River Unit	DS 1-H	Non-hazardous or exempt KRU solids only. Manifest required.	12,230
Prudhoe Bay Unit - Eastern Operating Area	Pad 3, West Pit	Non-hazardous or exempt PBU solids only. Pad 3 manifest required.	1,500 (lightly contaminated gravel)
	Pad 3, Cell 2	Class II PBU solids only. Pad 3 manifest required.	51,550 (exempt and non-exempt)
	DS-16	Class II solids only - minimal fluid content. DS-16 storage manifest required.	4,000 (temporary storage of Class II solids)
Prudhoe Bay Unit - Western Operating Area	T Pad	Non-hazardous or exempt PBU solids only.	13,300
	Santa Fe Pad (bins)	Non-hazardous or exempt PBU solids only.	3 each; total storage = 15
Milne Point Unit	D-Pad	Non-hazardous or exempt MPU solids only.	Variable; temporary pits built as needed; contact MPU Environmental Technician
Endicott	MPI storage pit	Non-hazardous or exempt solids only.	356
	Storage bins (2 bins)	Non-hazardous or exempt solids only.	18 each; total storage = 36
Badami	Badami ball mill temporary storage pit	Non-hazardous or exempt solids only.	1,282
	Storage bins (6 bins)	Non-hazardous or exempt solids only.	18.5 each; total storage = 111. More storage can be constructed if needed.
Alyeska PS-1	Temporary stockpiles	Follow Alyeska stockpile plan.	100,000

**EQUIPMENT AND PERSONNEL**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Front-End Loader and/or Bobcat	Loader: All Bobcat: ACS, EOA, KRU	Gravel transport	1	1	1 hr	0.5 hr
Shovel	All	Gravel transport	≥1	1	0.5 hr	0
D-8 Bulldozer	WOA, EOA, KRU, Peak	Gravel removal	1	1 hr	1 hr	0.5 hr
Dump Truck	WOA, EOA, KRU	Waste transport	1	1	1 hr	0
Pit Liner (varying sizes)	All	Storage liner	1	Size-dependent	1 hr	1 hr
Timbers	All	Non-liquid storage	Variable	2 for setup	1 hr	1 hr



**SUPPORT**

Decisions about waste management are made by the asset environmental staff and, in a major incident, the Environmental or Waste Management Unit Leader.

**ASSET ENVIRONMENTAL CONTACTS FOR WASTE MANAGEMENT**

LOCATION	CONTACT	PHONE
Kuparuk River Unit	Environmental Coordinator	659-7242
Greater Prudhoe Bay Area	Environmental Advisor	659-4789
Milne Point Unit	Environmental Advisor	670-3473
Endicott	Environmental Advisor	670-3473
Badami	Environmental Advisor	670-3473
Alpine	Environmental Coordinator	670-4200
Alyeska PS-1	Environmental Specialist	278-1611 x4185 or x4485

Contaminated gravel is moved at the response site by shovels, Bobcats, loaders and dozers. Front-end loaders and end dumps transport gravel to designated storage or treatment areas. Contaminated gravel at remote sites may be staged in lined areas until freeze-up, when tundra travel is permitted, then hauled overland by Rolligon or ice road. Contaminated gravel that has frozen will have to be broken up with a trimmer or by other means. This process is likely to tear up the pit liner also, and laborers will have to separate the liner fragments from the gravel. Barge support may be used for contaminated shoreline response.

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**TECHNICAL CONSIDERATIONS**

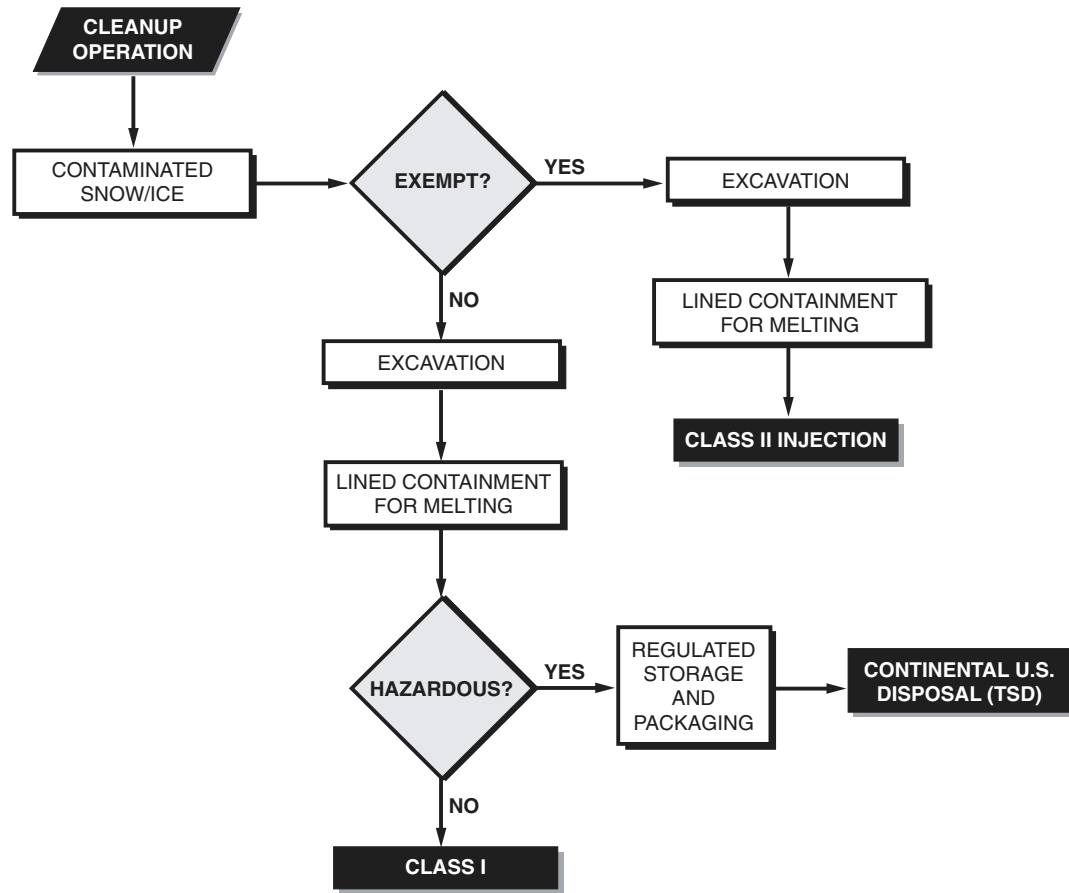
- Each disposal/recycling facility has operational and legal restrictions that affect what can be accepted:
  - Physical limitations (particle size, solids content, offloading rate, capacity)
  - Safety considerations (flash point, pH)
  - Permit/regulatory restrictions (waste classification, storage requirements)
  - Ballot agreements or other legal stipulations (may exclude certain users)
  - Operating procedures (site-specific paperwork and training requirements)
- Facility personnel have the authority to reject any material that does not meet their operational and safety criteria.

**ENVIRONMENTAL CONSIDERATIONS**

- These guidelines apply to all recovery, storage, transfer, and disposal operations.
  - Maintain communications with Environment Unit staff who determine waste management.
  - Make sure all necessary permits and approvals are in place for storage, transportation, and disposal, and that stipulations are understood by response personnel.
  - Manage recovery and storage operations as necessary to contain secondary spills, minimize contact with precipitation and runoff, and protect uncontaminated areas.
  - Segregate wastes of different types to the extent possible.
  - Do not discharge any wastes to land, tundra, or water without explicit approval.

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Temporary storage and stockpile areas are constructed and managed in accordance with applicable regulations, permits, and approvals. With asset approval, contaminated snow and ice may be brought to existing solid waste storage areas (see tactic on contaminated gravel).

Contaminated snow or ice is collected in bulk containers, or stockpiled in designated storage areas as directed by asset environmental personnel.

Contaminated snow generally has the same classification as the spilled material (reusable product, exempt, non-exempt, non-hazardous, or hazardous), and is managed accordingly.

Snow and ice are either allowed to thaw naturally or are processed in a snow melter. In either case, the snow is subsequently managed as a liquid. (See tactic on processing of recovered liquids).

**EXAMPLES OF INTERIM STORAGE SITES FOR OIL-CONTAMINATED SNOW AND ICE**

LOCATION	FACILITY	DISTANCE FROM PM-2 AT WEST DOCK	STORAGE CAPACITY
West Dock Staging Area	West Dock	2.3 miles	Appx. 30 acres
Put 23 Mine Site Staging Area	South Put River boat launch	8.1 miles	Appx. 200 acres
OSP Staging Area	North of FS 1	9.9 miles	Appx. 25 acres
Pad 3, Cell 2, West Pit	Pad 3	14.0 miles	Cell 2: 51,500 yd <sup>3</sup> W. Pit: 1,500 yd <sup>3</sup>

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**EQUIPMENT AND PERSONNEL**

- Assume that snow melters operate 10 hr in 12-hr shift; 2 shifts per day.

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Snow Melter	EOA, APC	Snow melting	1	3	2 hr	2 hr

**CAPACITIES FOR PLANNING**

	TYPICAL LIQUID PROCESSING CAPACITY
Snow Melter	<ul style="list-style-type: none"> <li>30 cu. yd/hr of lightly oiled snow and 30 bbl/hr of resulting liquids</li> <li>30 cu. yd/hr of heavily oiled snow and 70 bbl/hr of resulting oil</li> </ul>

**SUPPORT**

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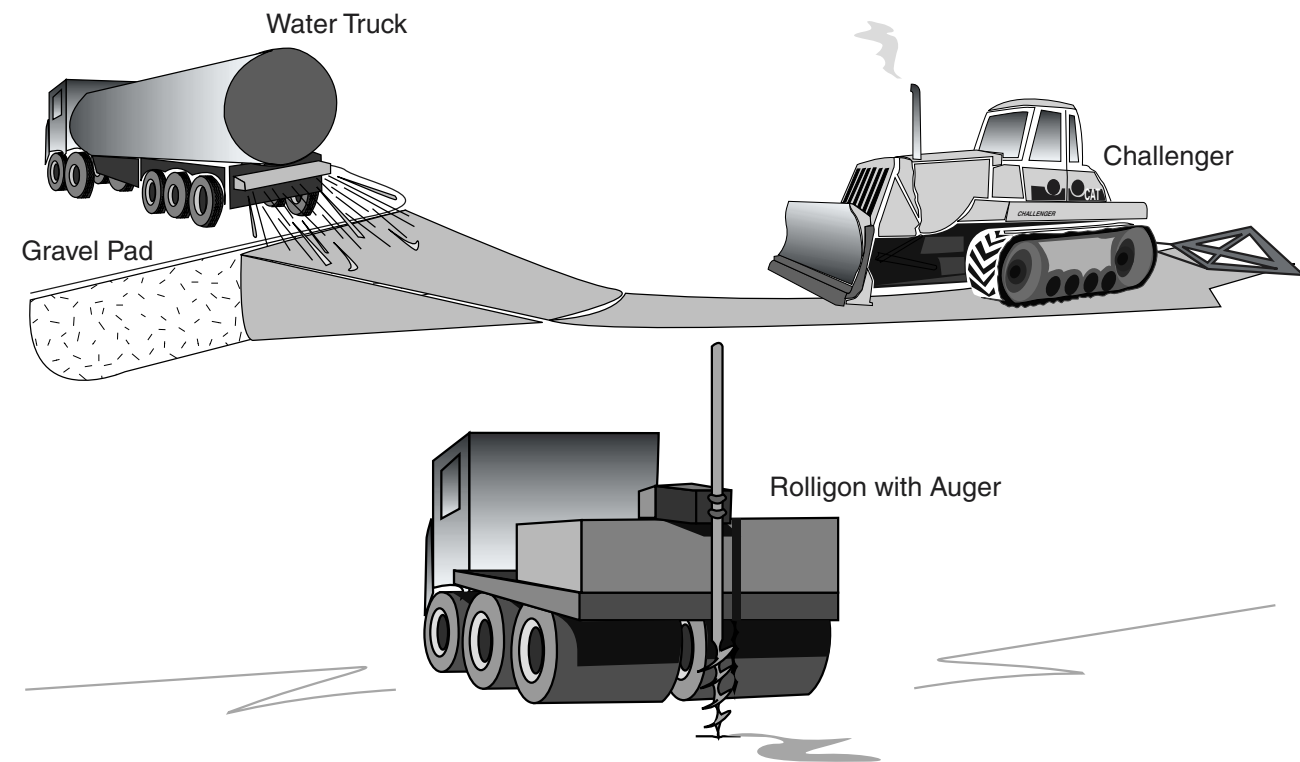
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  - Ballot agreements or other legal stipulations (may exclude certain users)
  - Operating procedures (site-specific paperwork and training requirements).
- Facility personnel have the authority to reject any material that does not meet their operational and safety criteria.

**ENVIRONMENTAL CONSIDERATIONS**

- These guidelines apply to all recovery, storage, transfer, and disposal operations.
  - Maintain communications with ICS Environment Unit staff who determine waste management.
  - Make sure all necessary permits and approvals are in place for storage, transportation, and disposal, and that stipulations are understood by response personnel.
  - Manage recovery and storage operations as necessary to contain secondary spills, minimize contact with precipitation and runoff, and protect uncontaminated areas.
  - Segregate wastes of different types to the extent possible.
  - Do not discharge any wastes to land, tundra, or water without explicit approval.

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An ice road is built by spraying water from a water truck onto the surface of a lake, the tundra, or the sea. The water is allowed to freeze in place, while layers are continually added. Thickness of the ice road depends on equipment that will be traveling over it and on the terrain. The water truck tank is insulated to keep the water from freezing, and truck exhaust is normally routed through the box containing the pump to keep the pump from freezing. An ice ramp is constructed to gain access off the pad or road, and requires a greater thickness than the road itself. An alternate source of water is accessed by drilling holes into the sea ice or a lake.

Methods of building ice roads include the following:

- Water trucks in conjunction with either a loader pulling a drag, a Challenger pulling a drag, or a grader smoothing out the surface. All of these combine lifts of snow with the water.
- Rolligons may be used on sea ice for flooding purposes.

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**EQUIPMENT AND PERSONNEL**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Water Truck	All	Ice road construction	≥2	≥2	2 hr	0.5 hr
Challenger Dozer with Drag	EOA, KRU, Alpine, Western Geophysical, Caribou Construction*	Ice road construction	1 (3 are available on the Slope)	1	1 hr	0.5 hr
or Rolligon with Auger	CATCO, AIC	Ice road construction	6	6	6 hr	2 hr
Roto Trimmer	KRU, WOA, EOA	Ice mining and ice road thickening	1	1	1 hr	0.5 hr
Grader	All	Smoothing ice road	1	1	2 hr	0.5 hr
Dump Trucks	KRU, WOA, EOA, Peak, AIC	Work with roto trimmer	≥2	≥2	1 hr	0.5 hr
Front-End Loader	All	Load dump truck	1	1	1 hr	0.5 hr

**TOTAL STAFF ≥7**

\* Alpine and Western Geophysical have 1 Challenger with blade and Caribou Construction has 6. Western Geo and Caribou Challengers are normally out with seismic crews in winter and would not be available for at least 24 hours.

**SUPPORT**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Semi and Trailer	EOA, WOA, KRU	Transport Challenger	1	1 driver	1 hr	0
Hose	All	Spraying water	1	1	1 hr	0
Pumps	All	Transferring water	≥1	1	1 hr	1 hr
Light Plant	All	Illumination	≥1	2 for initial setup, and 1 to check and fuel occasionally.	1 hr	0.5 hr
Fuel Truck	All	Fuel heavy equipment	1	Once per shift	1 hr	0.5 hr
Lube Truck	All, except Badami	Provide fluids to heavy equipment	1	Once per shift	1 hr	0.5 hr
Mechanic Truck	All, except Badami	Support equipment	1	1	1 hr	0.5 hr

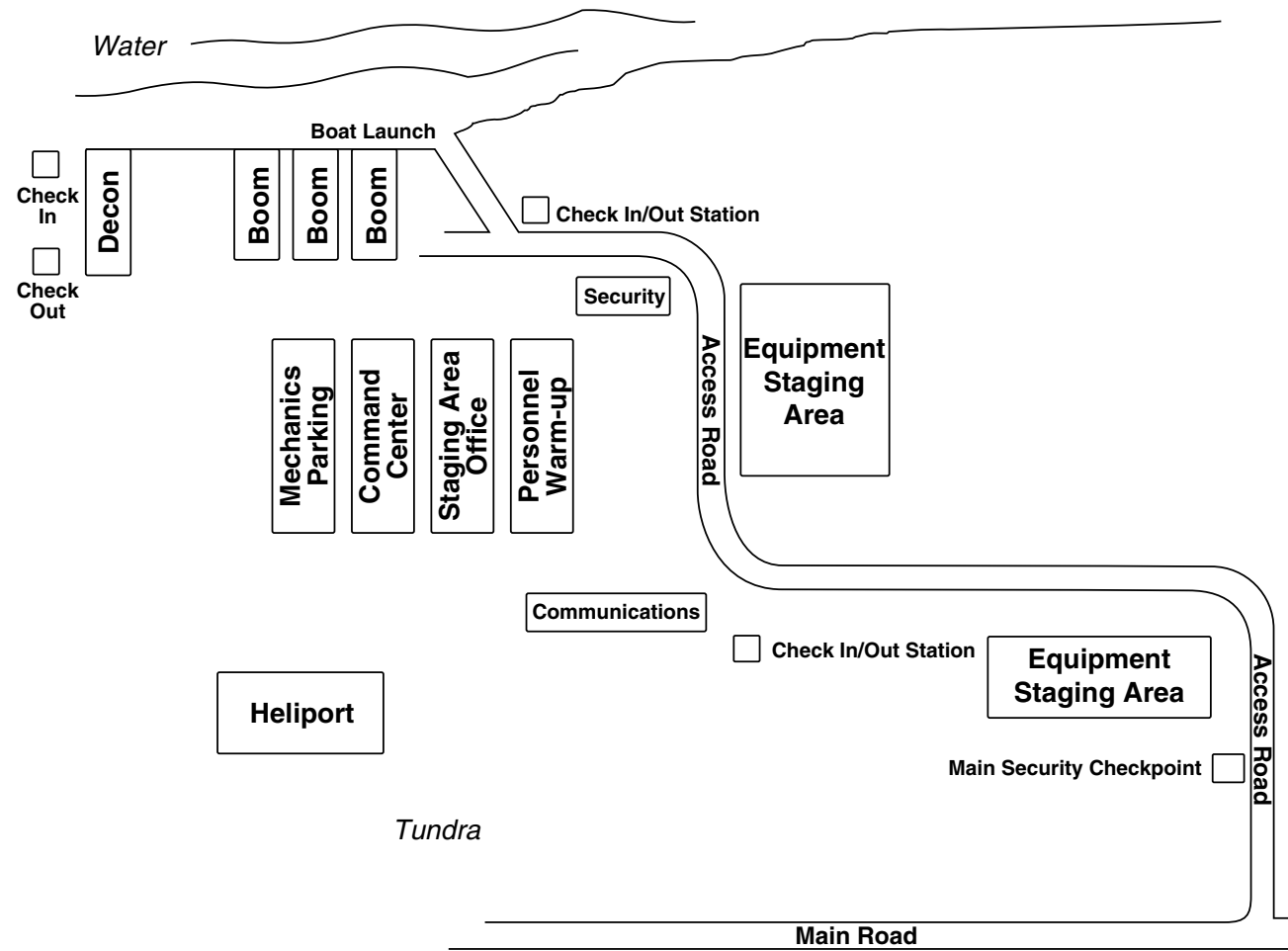
**CAPACITIES FOR PLANNING**

- Ice road construction around the largest tank spill on the Slope would use two 12-hr shifts, while ice ramp construction would use three 12-hr shifts, for usable ice road.
- One lift = 6 inches of ice on ice road (4 inches on sea ice).
- One lift is made in one 12-hr shift.
- It takes 48 hr to build a serviceable ice road with fresh water and air temperatures less than 0°F.
- Distance of 6-inch-lift a water truck can lay: ≤1,760 ft in 12 hr (for 1 water truck and 1 loader with drag)
- Distance of 4-inch-lift a Rolligon can lay: ≤3,000 ft in 12 hr
- See Tactic R-1 for capacities of dump trucks available on the North Slope.

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- When working with equipment around or near flowlines, add a spotter to each front-end loader and Challenger.
- Ice road construction around the spill allows heavy equipment, including end dumps, to access the spill, and protects the underlying tundra.
- An ice road provides containment of any oil melting out during breakup.
- Ice-road construction rates are temperature-dependent.
- A water withdrawal permit may be needed.

NOTE: All values given on these pages are for planning purposes only.



A staging area is a location where personnel and equipment are temporarily placed for tactical deployment during an oil spill response. The staging area provides a system for receiving, tracking and documenting all personnel, equipment, and supplies coming into and out of the staging area from North Slope and out-of-region locations.

The staging area provides a security checkpoint, a field command post, portable toilets, break room, decontamination, communications, and a safety officer. The staging area may also include a heliport and wildlife trailer.

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**EQUIPMENT AND PERSONNEL**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Staging Area Manager's Office	KRU, WOA, EOA	Office duties	1	4 for setup	1 hr	0.5 hr
SRT Command Center	WOA, KRU, EOA, ACS	SRT Lead	1	—	1 hr	0.5 hr
Generator	All	Power	2	—	1 hr	0.5 hr
966 Loader	All	Misc. support	2	2	1 hr	0.5 hr
Bobcat with Forks	KRU, EOA, ACS	Staging area organization	1	1	1 hr	0.5 hr
Semi and Trailer	EOA, WOA, KRU	Transfer of equipment and supplies	1	1 driver	1 hr	0.5 hr
Pickup Trucks	All	Expediting & misc. support	6	6	0.5 hr	0.5 hr
Envirovac	EOA, WOA	Staff needs	1	—	1 hr	1 hr
Communications Center	ACS	Communications	1	2 for setup	1 hr	1 hr
Weatherport Buildings (12x20)	EOA, WOA, Endicott, ACS, KRU	Staging area shelter/working area	2	—	1 hr	1 hr
Port-a-Potties*	KRU, WOA, EOA, ACS	Staff needs	2	—	1 hr	0.5 hr
Breakroom	KRU, WOA, EOA	Staff needs	1	—	1 hr	1 hr
Wet or Dry Decon Unit	KRU, WOA, EOA	Decontamination	1	See Tactic S-6	1 hr	1 hr
Mechanic Truck	All, except Badami	Support equipment	1	1	1 hr	0.5 hr

**TOTAL STAFF FOR OFFSHORE STAGING AREA 24**

**TOTAL STAFF FOR ONSHORE STAGING AREA 20**

\*1 portable toilet for every 10 people

- Additional personnel may be required: Staging Area Manager, Documentation Coordinator, Communications Coordinator, and Resource Coordinator.

**OPTIONAL EQUIPMENT AND PERSONNEL**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Heliport	KRU, WOA, EOA	Helicopter support	1	2 for setup	1 hr	1 hr
Light Plant	All	Illumination	≥1	2 for initial setup, and 1 to check and fuel occasionally	1 hr	0.5 hr
Wildlife Trailer	EOA, KRU	Wildlife support	1	2	1 hr	1 hr
Tioga Heaters	All	Heat	≥1	1 for initial setup	1 hr	0.5 hr
Freighter Air Boats	ACS, KRU, Alpine	Equipment and personnel transport	2	8	1 hr	0

- Additional personnel may be required: Beach Master, Heliport Manager, and Check In / Check Out Coordinator.

NOTE: All values given on these pages are for planning purposes only.



### DEPLOYMENT CONSIDERATIONS AND LIMITATIONS

- Several existing gravel pads across the North Slope may be available as staging areas for major cleanup operations. Permission may be obtained from Phillips, BPXA, their contractors and/or others for use of the gravel pad space.
- Approval from the Operations Section Chief is required for any vehicle tundra travel (off-road or off-pad), which must be in accordance with ACS' emergency tundra travel permit (See Tactic A-3). Any excavations in tundra or any tundra damage must be reported to the Operations Section Chief. All on-tundra activity must be documented and reported to the Planning Section for reporting to ensure permit compliance. Avoid archeological sites and biologically sensitive habitats. Travel across tundra with tracked vehicles, heavy equipment, and even foot traffic can seriously damage the vegetative mat, induce thermokarst, and cause structure disturbance. Using sheets of plywood as a traveling surface and minimizing trips with equipment greatly reduce disturbance of the tundra.

NOTE: All values given on these pages are for planning purposes only.



### CHECKLIST FOR STAGING AREAS

- **Purposes for Staging Areas:**
  - Location where incident personnel and equipment are available for tactical deployment
  - Can serve as a check-in location for equipment and personnel reporting to the incident
- **Guidelines for Staging Areas:**
  - Designated by Operations Section Chief
  - Qualified staging area manager assigned to each staging area
  - Resources in staging area must be ready for assignment within time specified by Operations Section Chief
  - Should be in easily accessible locations within reasonable distance of incident site
- **Logistical Needs for Staging Areas:**
  - Open area for maneuverability of equipment
  - Electric power, phone and fax service
  - Radio communication with Operations Section Chief and ICP Communications Center
  - Office trailer or building on site or nearby
  - Supplies and consumables for personnel and equipment (food, fuel, water, sanitation)
  - Medical plan and appropriate emergency medical supplies for personnel
  - Security needs, depending upon location and other available security control
- **Number and Type of Resources Assembled at a Staging Area:**
  - Determined by Operations Section Chief based on what is considered an appropriate reserve to meet expected contingencies
  - Can change based on existing or changing operational or other conditions
  - Must be evaluated based on comparison of cost and operational benefits of maintaining equipment at staging area versus at more central warehousing facility
  - May depend upon main purpose of staging area (i.e., whether to serve as *resource pool* for available equipment or as *check-in area* for incoming resources)
- **Staging Area Manager Should be Assigned Whenever a Staging Area is Established, Especially When:**
  - Staging area becomes “permanent” for duration of incident response
  - Staging area is large, with numerous equipment items assigned
- **Staging Area Manager's Duties Include:**
  - Obtain a briefing from Operations Section Chief
  - Proceed to staging area and establish staging area layout
  - Determine support needs for equipment, feeding, sanitation and security
  - Establish check-in process as appropriate, including communications to ICP
  - Post areas for identification and traffic control
  - Request maintenance service for equipment at staging area as appropriate
  - Respond to requests for resource assignments
  - Obtain and issue receipts for supplies distributed and received
  - Report resource status changes as required
  - Maintain staging area in an orderly condition
  - Demobilize staging area in accordance with incident demobilization plan
  - Maintain Unit Log

NOTE: All values given on these pages are for planning purposes only.





The transport of equipment and personnel to a spill site will be primarily by vehicle or vessel. Rotary- and fixed-wing aircraft may also be used depending on the circumstances of the spill. The following tables provide travel times for the various modes of transport. The individual tactics in this manual provide the times to mobilize equipment so that it is ready for transport and the times to deploy specific pieces of equipment once they arrive on scene.

**TABLE 1  
TRAVEL TIME FOR LIGHT-TRANSPORT FIXED-WING AIRCRAFT  
AT A PLANNING SPEED OF 150 MPH (HOURS)**

	Anchorage	Badami	Barrow	Barter Island	Bullen Point	Deadhorse/ Prudhoe Bay	Fairbanks	Kenai	Kuparuk	Nuiqsut/Alpine	Oliktok Point	Seattle	Valdez
Anchorage		4.3	4.8	4.3	4.5	4.3	1.9	0.5	4.3	4.4	4.5	9.7	0.8
Badami	4.3		1.6	0.6	0.0	0.2	2.4	5.0	0.4	0.6	0.4	14.0	4.2
Barrow	4.8	1.6		2.1	1.6	1.3	3.5	5.1	1.3	1.1	1.1	14.5	5.3
Barter Island	4.3	0.6	2.1		0.6	0.8	2.7	5.6	1.0	1.2	1.0	14.0	4.3
Bullen Point	4.5	0.0	1.6	0.6		0.2	2.4	5.0	0.4	0.7	0.5	14.2	4.6
Deadhorse/Prudhoe Bay	4.3	0.2	1.3	0.8	0.2		2.7	4.8	0.2	0.4	0.2	14.0	4.3
Fairbanks	1.9	2.4	3.5	2.7	2.4	2.7		2.4	2.8	2.8	2.9	9.9	1.6
Kenai	0.5	5.0	5.1	5.6	5.0	4.8	2.4		5.0	5.2	5.0	9.6	1.2
Kuparuk	4.3	0.4	1.3	1.0	0.4	0.2	2.8	5.0		0.2	0.1	14.1	4.5
Nuiqsut/Alpine	4.4	0.6	1.1	1.2	0.7	0.4	2.8	5.2	0.2		0.2	14.4	4.5
Oliktok Point	4.5	0.4	1.1	1.0	0.5	0.2	2.9	5.0	0.1	0.2		14.2	4.6
Seattle	9.7	14.0	14.5	14.0	14.2	14.0	9.9	9.6	14.1	14.4	14.2		8.9
Valdez	0.8	4.2	5.3	4.3	4.6	4.3	1.6	1.2	4.5	4.5	4.6	8.9	

Transit time may be greater during winter whiteouts, break-up, foggy conditions, or other adverse weather.

Airstrip lengths:

- Badami 5,100 ft
- Kuparuk 6,000 ft x 130 ft
- Deadhorse 6,500 ft x 150 ft
- Alpine 5,900 ft

The Deadhorse airstrip can support C-5A Galaxy cargo aircraft. Badami, Kuparuk, and Alpine airstrips (all gravel) can support 727, 737, and C-130 cargo aircraft.



**TABLE 2  
TRAVEL TIME FOR HEAVY TRANSPORT FIXED-WING AIRCRAFT  
AT PLANNING SPEED OF 300 MPH (HOURS)**

	Anchorage	Badami	Barrow	Barter Island	Bullen Point	Deadhorse/Prudhoe Bay	Fairbanks	Kenai	Kuparuk	Nuiqsut/Alpine	Oliktok Point	Seattle	Valdez
Anchorage		2.2	2.4	2.1	2.3	2.1	0.9	0.3	2.2	2.2	2.3	4.8	0.4
Badami	2.2		0.8	0.3	0.0	0.1	1.2	2.5	0.2	0.3	0.2	7.0	2.1
Barrow	2.4	0.8		1.1	0.8	0.7	1.7	2.5	0.7	0.5	0.6	7.2	2.7
Barter Island	2.1	0.3	1.1		0.3	0.4	1.3	2.8	0.5	0.6	0.5	7.0	2.1
Bullen Point	2.3	0.0	0.8	0.3		0.1	1.2	2.5	0.2	0.3	0.2	7.1	2.3
Deadhorse/Prudhoe Bay	2.1	0.1	0.7	0.4	0.1		1.3	2.4	0.1	0.2	0.1	7.0	2.2
Fairbanks	0.9	1.2	1.7	1.3	1.2	1.3		1.2	1.4	1.4	1.5	4.9	0.8
Kenai	0.3	2.5	2.5	2.8	2.5	2.4	1.2		2.5	2.6	2.5	4.8	0.6
Kuparuk	2.2	0.2	0.7	0.5	0.2	0.1	1.4	2.5		0.1	0.0	7.0	2.3
Nuiqsut/Alpine	2.2	0.3	0.5	0.6	0.3	0.2	1.4	2.6	0.1		0.1	7.2	2.3
Oliktok Point	2.3	0.2	0.6	0.5	0.2	0.1	1.5	2.5	0.0	0.1		7.1	2.3
Seattle	4.8	7.0	7.2	7.0	7.1	7.0	4.9	4.8	7.0	7.2	7.1		4.4
Valdez	0.4	2.1	2.7	2.1	2.3	2.2	0.8	0.6	2.3	2.3	2.3	4.4	

Transit time may be greater during winter whiteouts, break-up, foggy conditions, or other adverse weather.



**TABLE 3  
TRAVEL TIME FOR HELICOPTERS AT PLANNING SPEED OF 100 MPH (HOURS)**

Anchorage	6.6	7.2	6.4	6.8	6.4	6.5	Production Island	Fairbanks	Kenai	Kuparuk Central Production Facilities #1	Kuparuk River Staging Area West	Liberty Production Island	Milne Point Central Facilities Pad	Northstar Production Island	Nuiqsut/Alpine	Oliktok Point	Pump Station #4	West Dock
Badami	6.6	2.4	0.9	0.1	0.3	0.2	Deathorse	Endicott Main Production Island	Endicott Satellite Drilling Island Launch	Endicott Main Production Island Launch	Endicott Main Production Island Launch	Endicott Main Production Island Launch	Endicott Main Production Island Launch	Endicott Main Production Island Launch	Endicott Main Production Island Launch	Endicott Main Production Island Launch	Endicott Main Production Island Launch	Endicott Main Production Island Launch
Barrow	7.2	2.4	3.2	0.9	1.2	2.1	Barter Island	Barter Island	Barter Island	Barter Island	Barter Island	Barter Island	Barter Island	Barter Island	Barter Island	Barter Island	Barter Island	Barter Island
Barter Island	6.4	0.9	3.2	0.9	1.2	2.1	Barter Island	Barter Island	Barter Island	Barter Island	Barter Island	Barter Island	Barter Island	Barter Island	Barter Island	Barter Island	Barter Island	Barter Island
Bullen Point	6.8	0.1	0.9	0.4	0.4	0.3	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse
Deathorse	6.4	0.3	2.0	0.4	0.4	0.3	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse
Endicott Main Production Island	6.5	0.2	2.1	0.3	0.1	0.1	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse
Fairbanks	2.8	3.6	4.0	3.7	4.0	4.1	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse
Kenai	0.8	7.5	7.6	7.6	7.2	7.3	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse
Kuparuk Central Production Facilities #1	6.5	0.6	2.0	0.7	0.3	0.4	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse
Kuparuk River Staging Area West	6.5	0.5	2.1	0.5	0.2	0.2	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse
Liberty Production Island	6.6	0.1	1.0	0.2	0.2	0.3	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse
Milne Point Central Facilities Pad	6.6	0.6	1.4	0.6	0.2	0.4	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse
Northstar Production Island	6.6	0.4	2.0	0.4	0.2	0.2	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse
Nuiqsut/Alpine	6.6	1.0	1.6	1.0	0.7	0.7	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse
Oliktok Point	6.8	0.6	1.7	0.7	0.4	0.4	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse
Pump Station #4	5.0	1.4	2.5	1.5	1.4	1.5	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse
West Dock	6.5	0.3	2.0	0.4	0.1	0.1	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse	Deathorse

Transit time may be greater during winter whiteouts, break-up, foggy conditions, or other adverse weather.



**TABLE 4  
TRAVEL TIME FOR VESSELS AT PLANNING SPEED OF 5 KNOTS (HOURS)**

ARCO Boat Launch, Sagavanirktok River	5.8	2.9	6.9	12.4	0.5	1.6	1.5	1.8	3.6	5.1	4.5	3.3	4.0	8.4	2.2	2.7
Badami	5.8	6.5	10.9	16.4	6.4	6.0	4.4	4.0	2.2	8.4	8.5	1.8	6.5	11.6	5.8	6.0
Base of West Dock Causeway Launch	2.9	6.5	3.8	9.3	3.5	1.6	2.9	3.3	5.1	2.2	1.3	4.5	1.3	5.5	1.6	0.5
Central Creek Mouth	6.9	10.9	3.8	5.5	7.5	5.3	6.5	6.9	8.7	3.3	2.4	8.4	3.1	2.0	5.3	4.2
Colville River Delta	12.4	16.4	9.3	5.5	12.9	10.7	12.0	12.4	14.2	8.7	7.8	13.8	8.5	3.5	10.7	9.6
Deathorse River Access	0.5	6.4	3.5	7.5	2.2	2.2	2.0	2.4	4.2	6.0	5.1	3.8	4.5	8.9	2.7	3.3
East Dock	1.6	6.0	5.3	10.7	2.2	2.2	1.6	2.0	3.8	3.8	2.9	3.5	2.4	7.3	0.7	1.1
Endicott Main Production Island Launch	1.5	4.4	6.5	12.0	2.0	1.6	0.4	0.4	2.2	5.1	4.2	1.8	2.9	8.5	2.2	2.4
Endicott Satellite Drilling Island Launch	1.8	4.0	3.3	6.9	2.4	2.0	0.4	0.4	1.8	5.5	4.5	1.5	3.3	8.9	2.5	2.7
Kadleroshilik River Delta	3.6	2.2	8.7	14.2	4.2	3.8	2.2	1.8	7.3	7.3	6.4	1.1	5.1	10.7	4.4	4.5
Kuparuk River Launch	5.1	8.4	3.3	8.7	6.0	3.8	5.1	5.5	7.3	0.9	0.9	6.9	2.0	5.3	3.8	2.7
Kuparuk River Delta	4.5	8.5	2.4	7.8	5.1	2.9	4.2	4.5	6.4	0.9	6.0	1.1	4.4	4.4	2.9	1.8
Liberty Production Island	3.3	1.8	8.4	13.8	3.8	3.5	1.8	1.5	1.1	6.9	6.0	4.7	10.4	4.0	4.0	4.2
Northstar Production Island	4.0	6.5	3.1	8.5	4.5	2.4	2.9	3.3	5.1	2.0	1.1	4.7	4.9	2.4	1.6	1.3
Oliktok Point Launch	8.4	11.6	2.0	3.5	8.9	7.3	8.5	8.9	10.7	5.3	4.4	10.4	4.9	7.3	6.5	5.6
Putuigayuk River Launch (east & west)	2.2	5.8	5.3	10.7	2.7	0.7	2.2	2.5	4.4	3.8	2.9	4.0	2.4	7.3	0.7	1.1
West Beach State Boat Launch	2.2	6.5	4.5	10.0	2.7	0.5	2.2	2.5	4.4	3.1	2.2	4.0	1.6	6.5	0.7	0.4
West Dock Launch 2	2.7	6.0	0.5	4.2	9.6	3.3	1.1	2.4	2.7	2.4	1.8	4.2	1.3	5.6	1.1	0.4

Transit time may be greater during winter whiteouts, break-up, foggy conditions, or other adverse weather.



**TABLE 5  
TRAVEL TIME FOR VEHICLES AT PLANNING SPEED OF 35 MPH (HOURS)**

	Anchorage	ARCO Base Camp	Badami Pipeline tie-in at Endicott Causeway	BPX Base Operations Camp	Deadhorse	Endicott Main Production Island	Fairbanks	Heald Pt.	Kuparuk Central Production Facilities #1	Kuparuk Central Production Facilities #2	Kuparuk River Staging Area	Milne Point Central Production Facility	Niiskiki	Oliktok Pt.	Pump Station #1	Valdez	West Dock
Anchorage		24.0	24.4	24.2	23.9	24.5	10.2	24.2	24.8	25.0	24.4	25.0	4.3	25.3	24.1	8.7	24.4
ARCO Base Camp	24.0		0.3	0.3	0.1	0.5	13.8	0.2	1.0	1.1	0.5	1.1	28.3	1.4	0.2	24.2	0.3
Badami Pipeline tie-in at Endicott Causeway	24.4	0.3		0.6	0.4	0.2	14.1	0.4	1.3	1.4	0.8	1.4	28.6	1.7	0.5	24.5	0.6
BPX Base Operations Camp	24.2	0.3	0.6		0.3	0.9	14.0	0.5	0.6	0.8	0.2	0.8	28.5	1.1	0.1	24.4	0.3
Deadhorse	23.9	0.1	0.4	0.3		0.6	13.7	0.3	0.9	1.1	0.5	1.0	28.2	1.3	0.1	24.1	0.4
Endicott Main Production Island	24.5	0.5	0.2	0.9	0.6		14.3	0.7	1.5	1.7	1.1	1.6	28.8	1.9	0.7	24.7	1.0
Fairbanks	10.2	13.8	14.1	14.0	13.7	14.3		14.0	14.6	14.8	14.2	14.7	14.5	15.1	13.9	10.4	14.1
Heald Pt.	24.2	0.2	0.4	0.5	0.3	0.7	14.0		1.2	1.3	0.7	1.3	28.5	1.6	0.4	24.4	0.5
Kuparuk Central Production Facilities #1	24.8	1.0	1.3	0.6	0.9	1.5	14.6	1.2		0.2	0.4	0.4	29.1	0.5	0.7	25.0	0.8
Kuparuk Central Production Facilities #2	25.0	1.1	1.4	0.8	1.1	1.7	14.8	1.3	0.2		0.6	0.6	29.3	0.5	0.9	25.2	1.0
Kuparuk River Staging Area	24.4	0.5	0.8	0.2	0.5	1.1	14.2	0.7	0.4	0.6		0.6	28.7	0.9	0.3	24.6	0.4
Milne Point Central Production Facility	25.0	1.1	1.4	0.8	1.0	1.6	14.7	1.3	0.4	0.6	0.6		29.3	0.9	0.9	25.1	0.9
Niiskiki	4.3	28.3	28.6	28.5	28.2	28.8	14.5	28.5	29.1	29.3	28.7	29.3		29.6	28.4	13.0	28.7
Oliktok Pt.	25.3	1.4	1.7	1.1	1.3	1.9	15.1	1.6	0.5	0.5	0.9	0.9	29.6		1.2	25.5	1.3
Pump Station #1	24.1	0.2	0.5	0.1	0.1	0.7	13.9	0.4	0.7	0.9	0.3	0.9	28.4	1.2		24.3	0.3
Valdez	8.7	24.2	24.5	24.4	24.1	24.7	10.4	24.4	25.0	25.2	24.6	25.1	13.0	25.5	24.3		24.5
West Dock	24.4	0.3	0.6	0.3	0.4	1.0	14.1	0.5	0.8	1.0	0.4	0.9	28.7	1.3	0.3		

Transit time may be greater during winter whiteouts, break-up, foggy conditions, or other adverse weather.

Dalton Highway legal weight limits: Endicott Causeway legal weight limit: 80 tons gross, 40 tons per axle

• 2 axle 38,000 lb West Dock Causeway legal weight limit: 130 tons gross

• 3 axle 42,000 lb

• 4 axle 50,000 lb



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**IDENTIFICATION OF AIRCRAFT, VESSELS, AND OTHER MEANS TO TRANSPORT EQUIPMENT AND PERSONNEL**

**AIRCRAFT**

TYPE	QUANTITY	OWNERSHIP	AVAILABILITY	OBLIGATION
Bell 206L Helicopter	1	Air Logistics	Stationed at PS4 on long-term contract to Alyeska	Through Mutual Aid Agreement
Twin Otter	1	Phillips	Stationed at Kuparuk	Through Mutual Aid Agreement
C-130 Hercules	2	Lynden	Stationed out of Anchorage	On 4-hour standby to Alyeska
B-737	2	BP/Phillips	Stationed in Anchorage to conduct regular crew changes to/from the North Slope	Through Mutual Aid Agreement
Casa	1	Yute Air	Stationed at Deadhorse	Phillips Contract

Additional aircraft are available through contracts maintained by ACS with major Alaskan air carriers.

**VESSELS**

TYPE	NO.	(L x W x Depth, ft)	LIQUID CAP. (bbl)	DECK CAP.	LIGHT DRAFT	LOADED DRAFT	OWNER	AVAILABILITY	OBLIGATION
Arctic Endeavor (A1 classification, Class C)	1	205x90x15	18,000	4,300 s/f	3'	12' 5"	Crowley	Stationed at Prudhoe Bay	ACS Master Services Agreement
200 Series Barges (A1 classification)	2	200x60x12	5,500	2,750 s/f	1' 8"	12' 5"	Crowley	Stationed at Prudhoe Bay	ACS Master Services Agreement
River Class Tug (1,100 hp)	4	—	—	—	—	3'	Crowley	Stationed at Prudhoe Bay	ACS Master Services Agreement
Point Class Tug (2,110 hp)	4	90x32x11.5	—	—	—	8' 6"	Crowley	Stationed at Prudhoe Bay	ACS Master Services Agreement
Beaufort 23 Class Deck Barge	1	147x34x8	—	650 tons	1' 9.5"	6'	Beaufort Marine	Stationed at Prudhoe Bay	ACS Master Services Agreement
Beaufort 20/21 Deck/Tank Barge (ABS Ice Class 1-AA, double bottom and double hull)	1	202x60x12	11,200	2,200 long tons	2' 9"	9' 10"	Beaufort Marine	Stationed at Prudhoe Bay	Under contract to ACS
Arctic Tern Class Tug (730 hp, 48-ft, shallow-draft)	1	—	—	—	—	3' 6"	Beaufort Marine	Stationed at Prudhoe Bay	ACS Master Services Agreement

In addition, ACS and the North Slope operators own 58 vessels in a variety of sizes and types that can be used for transport of personnel and equipment (see Tactic L-6).

NOTE: All values given on these pages are for planning purposes only.



**ROAD TRANSPORTATION**

TYPE	QUANTITY	OWNERSHIP	AVAILABILITY	OBLIGATION
Buses	Minimum of 20	BP, Phillips, Alyeska, Peak, APC	Used on a daily basis throughout the North Slope oil fields	Owned by BP, Phillips, Alyeska or available through ACS Master Services Agreement
Lowboys	Minimum of 20	BP, Phillips, Alyeska, VECO, H.C. Price, APC, Peak	Used on a daily basis throughout the North Slope oil fields	Owned by BP, Phillips, Alyeska or available through ACS Master Services Agreement
Hi-deck Trailers	Minimum of 20	BP, Phillips, Alyeska, VECO, H.C. Price, APC, Peak	Used on a daily basis throughout the North Slope oil fields	Owned by BP, Phillips, Alyeska or available through ACS Master Services Agreement
Tractors	Minimum of 20	BP, Phillips, Alyeska, VECO, H.C. Price, APC, Peak	Used on a daily basis throughout the North Slope oil fields	Owned by BP, Phillips, Alyeska or available through ACS Master Services Agreement

**AIR-CUSHION VEHICLES**

TYPE	QUANTITY	OWNERSHIP	CAPACITY	MOBE TIME
LACV 30	2 at Deadhorse	Alaska Hovercraft	30-ton payload	72 hr from cold standby

NOTE: All values given on these pages are for planning purposes only.





ACS communications capabilities consists of the Deadhorse telecommunications center and transportable remote-area communications systems. The following describes these systems, their coverage, how they are used, and how they are deployed.

## DEADHORSE TELECOMMUNICATIONS CENTER

### Alaska Clean Seas Internal Radio and Telephone Communication

The telecommunication center houses equipment that supports day-to-day ACS operations and spill response management. A PABX telephone switch supports 90 internal extensions in the ACS offices, telecommunications center, and warehouse; nine local telephone utility trunks; and six trunks directly connected to Phillips, BPXA and Alyeska Pipeline extensions via the private digital microwave system. A VHF repeater system at the center provides ACS with a wide-area radio system for day-to-day operations, as well as for Slope-wide logistical support. A radio dispatch center is located in the administrative office. Additional dispatchers can be located elsewhere in the ACS facility. The radio dispatchers can access 17 oil spill radios located in the production and pipeline corridor and operated by ACS and its member companies. A logging recorder makes a permanent record of radio and telephone traffic. Antennas for those radios located at the center are mounted on a 120-foot tower. Uninterruptible power supplies in the communication center power all critical equipment for up to one hour during AC power failures. A manual-start backup generator then takes over from the UPS for extended utility power failures.

### Common Remote Control System for Permanent VHF Oil Spill Repeaters

A remote radio control system is installed in the telecommunications center. Remote control circuits for 14 permanent VHF repeaters and marine coast stations, installed at strategic locations in the production and pipeline corridor, are routed via private microwave circuits into the system. Additional HF, VHF and UHF radios located at the center are also wired into the system. Additional dispatch consoles are installed at Alyeska Pump Station 1, Phillips GKA, BPXA BOC, and BPXA PBOC, giving these companies access to all of the oil spill emergency radio systems. Other connections to specific radios in this network can be made using individual remote control stations. This network is the only wide area emergency communication system shared by operating companies on the North Slope.

### Storage and Maintenance Facility

The telecommunication center serves as a storage and maintenance facility for all fixed and transportable communication assets owned by ACS. Test equipment, maintenance tools, documentation, and spare installation and maintenance parts are maintained at the center.



## TRANSPORTABLE REMOTE AREA COMMUNICATION SYSTEMS

ACS maintains the following transportable communication systems at the Deadhorse Spill Response Center. These systems can be used to increase communication channel capacity in the production and pipeline corridor, or to extend communication links to remote areas of the North Slope extending between the Canadian Border and Barrow.

### Portable Radios, Dial Radiotelephone Links, and Satellite Telephone Links

ACS owns approximately 200 VHF and UHF handheld radios, 10 base and mobile stations, 13 VHF and UHF portable repeaters, and seven portable UHF dial-radiotelephone links. Two portable towers and two winterized communication shelters with integral DC power and AC generators are available when deploying repeaters to remote sites. Two single-phone-line INMARSAT systems are available for offshore installation on vessels.

### Mobile Response Center (MRC)

ACS has constructed an MRC consisting of two shelters (20 ft x 8 ft). Shelter One contains a variety of phone and radio communication links, and Shelter Two contains an office work area. The shelters can be deployed together or independently anywhere in Alaska to be used as a forward command center at the site of a remote emergency. The communication systems consist of two INMARSAT-based phone lines, two dial-radiotelephone phone lines, and a variety of HF, VHF, and UHF two-way radios and repeaters. It also contains a small PABX and a logging recorder to make a permanent record of all radio and telephone traffic.

### C-Band Transportable Earth Station (CTES)

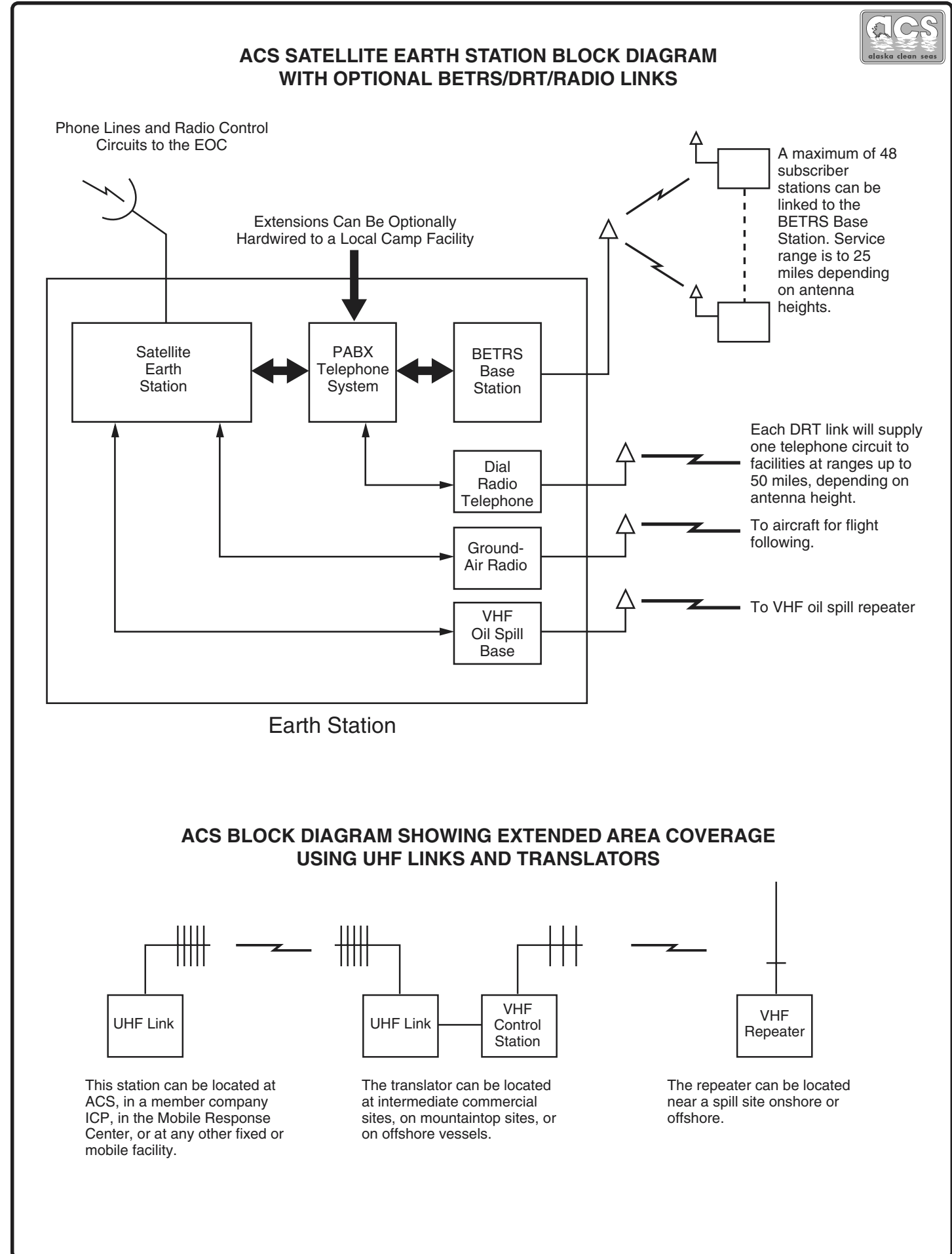
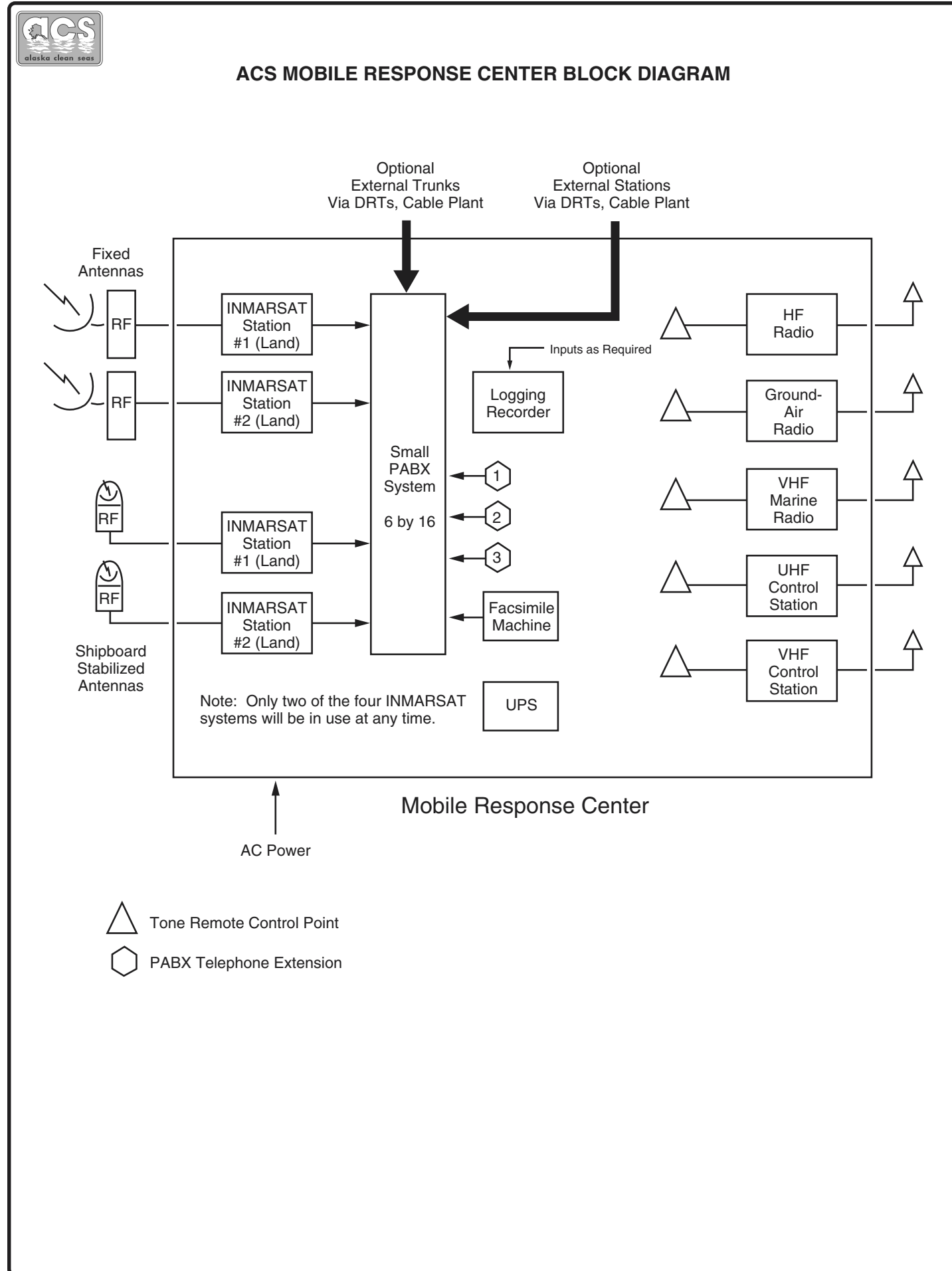
The CTES is a remote-area, six-line, satellite-based emergency telephone system. It consists of a 6,000-pound 2.5-meter-by-5 meter C-band satellite antenna mounted on a skid, and two small transit cases that house all of the necessary electronics. Not including transit time, it can be mobilized anywhere in Alaska, set up and made operational in three hours, and provides Anchorage dialtone on each six telephone trunks (expandable to 16).

### Basic Exchange Telephone Radio System (BETRS)

The BETRS radio system provides a simple wireless telephone distribution service between the earth station and subscribers located up to 25 miles away. The system is equipped for 12 subscribers, but can be expanded to a maximum of 48 by purchasing additional equipment. It can also be used independently of the C-Band earth station, anywhere that two to six telephone trunks are available at a central location.

## DEPLOYMENT CONSIDERATIONS AND LIMITATIONS

- The existing permanently installed Slope-wide systems should be all that is needed to respond to smaller spills. When a spill of a magnitude requiring the activation of the IMT occurs, the Communications Unit Leader will determine the most effective portable systems to be deployed and will develop a communications plan to suit the response.
- Proper communications procedures will optimize communications and must be maintained.
- Due to deployment/transit times, less effective but quickly deployed systems should be considered until more functional systems arrive on scene and are operational.
- Communications equipment operators must be properly trained if communications are going to be successful.
- Member company communications personnel should be fully utilized to speed deployment of portable systems.

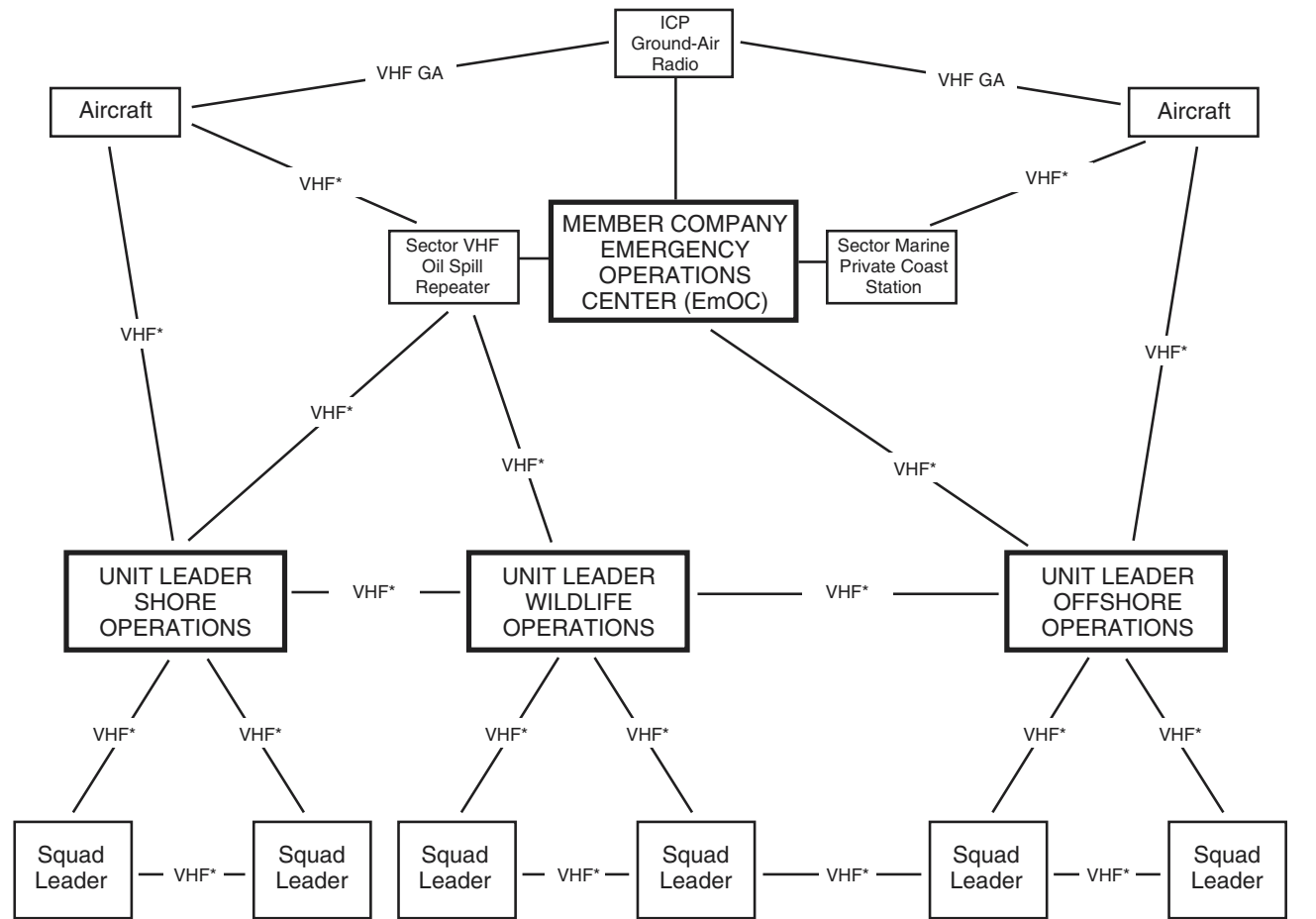


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**ACS BLOCK DIAGRAM OF EMERGENCY OPERATIONS CENTER (EmOC)  
COMMUNICATIONS CHANNELS  
FOR SPILLS IN DEADHORSE PRODUCTION CORRIDOR**



**Onshore and River Cleanup Activities**  
Any number of Unit Leaders  
Five Squads/Unit Leader

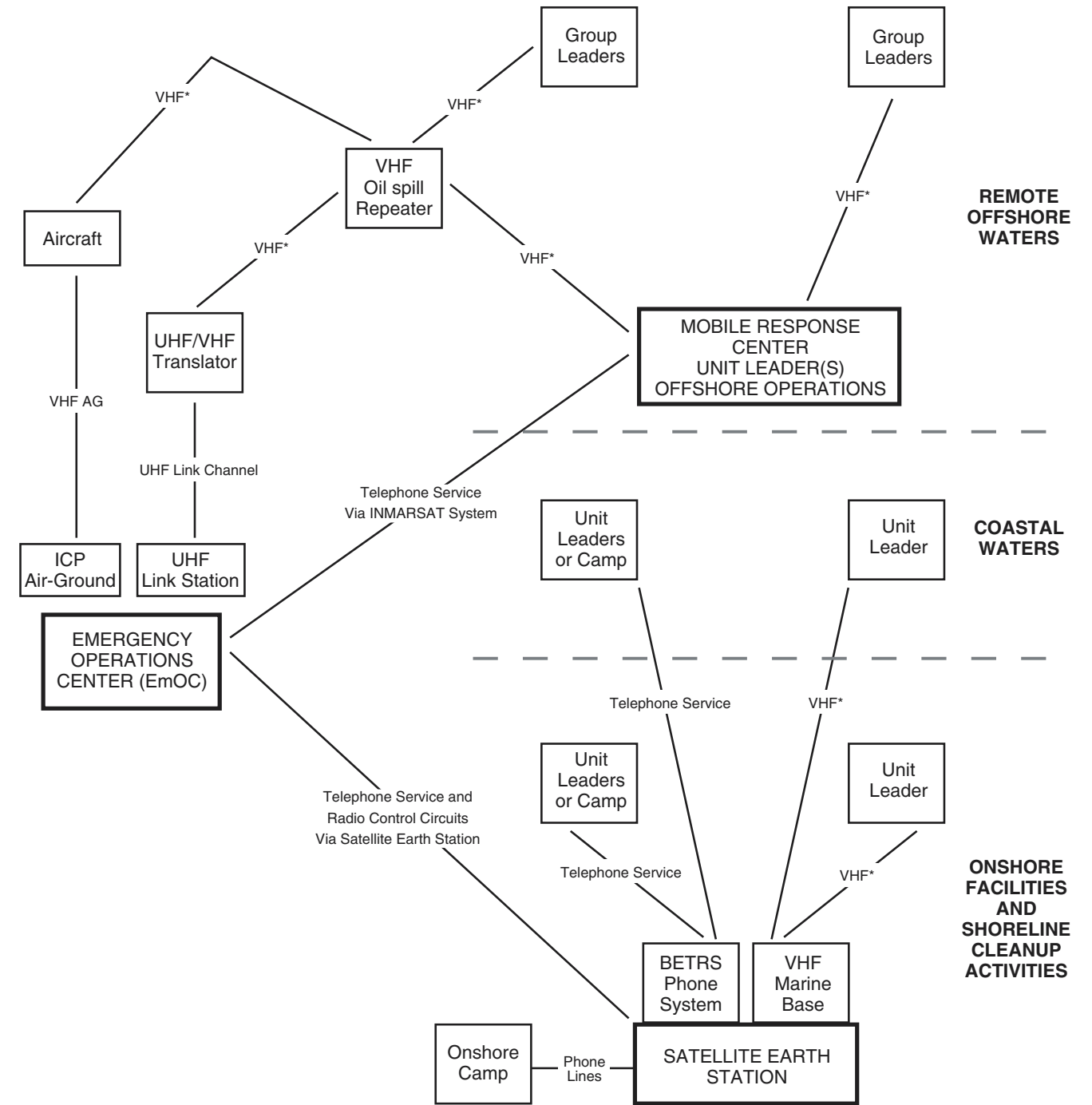
**Coastal Water Cleanup Activities**  
Any number of Squads Leaders/Vessels

- NOTES:  
1. "VHF\*" channel assignments are dependent on location of the spill.  
2. "VHF GA" denotes use of 122.85 ground-air frequency (a backup channel).

NOTE: All values given on these pages are for planning purposes only.



**ACS BLOCK DIAGRAM OF EMERGENCY OPERATIONS CENTER (EmOC)  
COMMUNICATIONS CHANNELS  
FOR REMOTE OFFSHORE EXPLORATION SPILLS**



This is one of many possible configurations to support offshore or coastal spills.

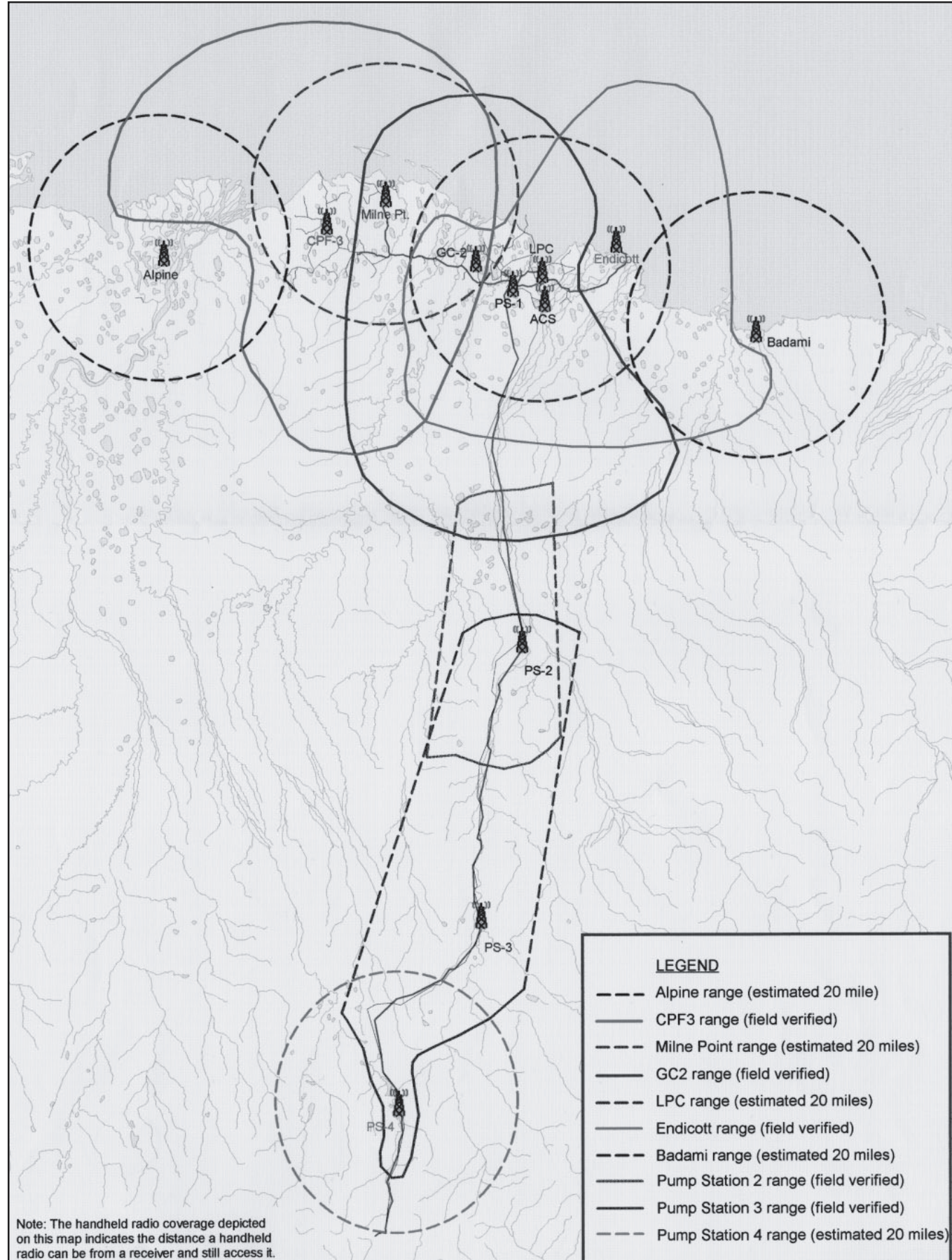
- NOTES:  
1. "VHF\*" channel assignments are dependent on location of the spill.  
2. "VHF AG" denotes use of 122.85 ground-air frequency.

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**NORTH SLOPE HAND-HELD RADIO COVERAGE**



NOTE: All values given on these pages are for planning purposes only.



**NORTH SLOPE RADIO CHANNEL ASSIGNMENTS**

CHANNEL DESIGNATOR	LOCATION/ AREA	USE	TRANSMIT (MHz)	RECEIVE (MHz)
<b>Tactical Channels Statewide</b>				
OS-29		Tactical Net	173.225	173.225
OS-30		Tactical Net	173.275	173.275
OS-31		Tactical Net	173.325	173.325
OS-32		Tactical Net	173.375	173.375
<b>ACS Fixed VHF Repeater/Talk Around Channels North Slope</b>				
OS-33	Phillips/Alpine	Oil Spill Repeater	159.585	161.235
OS-34	Talk Around (33)	Tactical	159.585	159.585
OS-35	Phillips/Kuparuk	Oil Spill Repeater	154.585	150.980
OS-36	Talk Around (35)	Tactical	150.980	150.980
OS-37	BP/WOA	Oil Spill Repeater	158.445	159.480
OS-38	Talk Around (37)	Tactical	159.480	159.480
OS-39	Phillips/Lisburne	Oil Spill Repeater	158.325	153.485
OS-40	Talk Around (39)	Tactical	153.185	153.185
OS-41	BP/Endicott	Oil Spill Repeater	161.235	159.586
OS-42	Talk Around (41)	Tactical	159.585	159.585
OS-43	BP/Badami	Oil Spill Repeater	154.585	15.980
OS-44	Talk Around (43)	Tactical	150.983	150.980
OS-45	Future Use Far East	Oil Spill Repeater	161.325	159.705
OS-46	Talk Around (45)	Tactical	159.705	159.705
OS-47	Pump #2 Alyeska	Oil Spill Repeater	161.325	159.705
OS-48	Talk Around (47)	Tactical	159.705	159.705
OS-49	Pump #3 Alyeska	Oil Spill Repeater	161.235	159.585
OS-50	Talk Around (49)	Tactical	159.585	159.585
OS-51	Pump #4 Alyeska	Oil Spill Repeater	154.585	150.980
OS-52	Talk Around (51)	Tactical	150.980	150.980
<b>Portable VHF Repeater/Talk Around Channels Statewide</b>				
OS-53	Portable # 1	Oil Spill Repeater	160.530	150.815
OS-54	Talk Around (53)	Tactical	150.815	150.815
OS-55	Portable # 2	Oil Spill Repeater	160.590	150.830
OS-56	Talk Around (55)	Tactical	150.830	150.830
OS-57	Portable # 3	Oil Spill Repeater	160.650	150.950
OS-58	Talk Around (57)	Tactical	150.950	150.950
OS-59	Portable # 4	Oil Spill Repeater	160.725	150.965
OS-60	Talk Around (59)	Tactical	150.965	150.965
OS-61	Portable # 5	Oil Spill Repeater	160.785	159.525
OS-62	Talk Around (61)	Tactical	159.525	159.525
OS-63	Portable # 6	Oil Spill Repeater	160.860	159.795
OS-64	Talk Around (63)	Tactical	159.795	159.795
<b>ACS Logistics VHF Repeater/Talk Around Channels North Slope</b>				
OS-65	(ACS) DH Spill Response Ctr	Logistics Repeater (DH)	161.160	159.630
OS-66	Talk Around (65)	Tactical	159.630	159.630
OS-67	Phillips/Kuparuk (CPF3)	Logistics Repeater (Kuparuk)	161.160	159.750
OS-68	Talk Around (67)	Tactical	159.750	159.750
<b>Emergency Channel Statewide</b>				
OS-69	North Slope Emergency	Tactical	152.420	152.420
<b>Marine Channels Statewide</b>				
OS-70	BP (GC2) (Gwydyr Bay)	Coast Station - Ch 09	156.450	156.450
OS-71	BP/Endicott	Coast Station - Ch 10	156.500	156.500
OS-72	(ACS) DH Spill Response Ctr	Coast Station - Ch 11	156.550	156.550
OS-73	Calling and Safety	Coast Station - Ch 16	156.800	156.800
OS-74	Phillips/KRU (Harrison Bay)	Coast Station - Ch 18	156.900	156.900
OS-75	Spare Coast Station	Coast Station - Ch 80A	157.025	157.025
OS-76	Portable	Coast Stn Repeater - Ch 85	157.275	161.875

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This tactic describes ACS's and the North Slope Operator's owned and contracted oil discharge containment, control, cleanup, storage, and transfer equipment. The objective is to fulfill for existing facilities the regulatory contingency planning requirements in 18 AAC 75.425 (e)(3)(F) Response Equipment and 18 AAC 75.445 (g) Response Equipment.

Other *Technical Manual* tactics descriptions outline the operational characteristics of the response equipment and mobilization and deployment planning times. For example, Tactic L-7, Realistic Maximum Response Operating Limitations identifies equipment operating limitations. Specific response tactics identify critical information on mobilization and deployment times, as well as key planning parameters for specific equipment.

**PREVENTIVE MAINTENANCE**

Dedicated spill response equipment for both ACS and the North Slope Operators (except Alyeska) is maintained on a planned preventive maintenance schedule maintained by ACS. The exact maintenance conducted and the frequency interval vary based on the type of equipment, seasonal applicability, manufacturers' recommendations, and the amount of use the equipment receives. Preventive maintenance requirements and scheduling are managed through a computerized database called "Response Program.™" This database also captures the maintenance history of all dedicated oil spill response equipment. ACS has the ability to print out the maintenance records of any piece of equipment maintained in the database. This information is available upon request.

Non-dedicated equipment available from contractors is maintained by the contractors.

**EQUIPMENT INVENTORY LIST**

All dedicated North Slope oil spill response equipment (ACS and the North Slope Operators) is tagged with a unique identifier number and tracked as to its location, ownership, and maintenance history in Response Program.™ A comprehensive inventory of response-dedicated equipment is listed in ACS's Master Equipment List (MEL), which is generated by Response Program.™

ACS updates the Response Program™ daily. Response Program™ is updated as equipment is moved from one location to another, purchases are made, equipment is surplus or equipment goes in or out of service. The MEL can be sorted to provide a variety of reports including by equipment type, tag number, location, owner, and in/out of service. Copies of the MEL are available from ACS upon request.

A summary of the dedicated oil spill response equipment available on the North Slope is provided in the tables on the next pages.

**OUT-OF-SERVICE EQUIPMENT**

ACS provides written notification to the Alaska Department of Environmental Conservation (ADEC) when a major piece of equipment goes out of service and a planholder's response planning standard (RPS) cannot be met. The equipment may become out of service for a planned or an unplanned event. A notice is submitted to ADEC at least 10 days in advance before the equipment goes out of service for scheduled maintenance of greater than 24 hours duration. A notice is submitted within 24 hours following the identification of equipment going out of service on an unscheduled basis. This notification protocol fulfills the regulatory requirement in 18 AAC 75.475, Notification of Nonreadiness.

**NON-DEDICATED EQUIPMENT**

ACS and the North Slope Operators have access to additional equipment to meet the RPS for each planholder. The additional equipment is listed in Table 9. North Slope equipment is available from contractors through written agreements held by ACS and the planholders. The equipment is not dedicated to spill response, but provides spill response services when called on. Vessels- and barges-of-opportunity are deployed on spill responses with their typical staff and equipment.

NOTE: All values given on these pages are for planning purposes only.



**TABLE 1  
BOOM SUMMARY**

TYPE	NOTE	QUANTITY (FEET)
Open Water (36" or greater)	Ro-Boom and Nordan boom require blower units that are prepackaged with the boom	12,299
Light Ocean (27" to 35")	—	24,859
Harbor (20" to 26")	—	23,352
Protected Water (10" to 14")	—	62,350
Fast Water (14")	—	145,750
Shore Seal	Requires air blower and pumps that are prepackaged with the boom	19,200
Fire (20")	—	7,614
Fire (30")	—	7400
Fire (42")	—	4050

**TABLE 2  
VESSEL SUMMARY**

TYPE	LENGTH (ft)	WORKING DRAFT (ft)	WORKING ENVIRONMENT	CAPABILITIES	QUANTITY
Skiffs	9 - 18	0.5 - 1.5	Inland	Transport	31
Hovercraft	12	0	Inland	Transport	2
Airboat	16 - 30	0.5	Inland, nearshore	Transport, boom deployment	19
Workboat (A)	18 - 23	0.5 - 2	Inland, nearshore	Transport, boom deployment	30
Workboat (B)	24 - 29	1 - 3	Nearshore	Transport, boom towing	7
Workboat (C)	24 - 29	1 - 3	Offshore	Transport, boom towing	6
Workboat (D)	32 - 42	2.5 - 3	Offshore	Transport, boom towing, skimmer deployment, mini-barge towing	7
Workboat (E)	45 - 55	2 - 3.5	Offshore	Transport, skimmer deployment	2

*Workboats D and E can deploy the Desmi 250 and Lori LSC-3 skimmers. Lori LSC-3 availability for the workboats is: Workboat D — 1 skimmer for a 32' workboat and 1 skimmer for a 42' workboat. Workboat E — 2 skimmers; skimmers can be deployed off each side of a workboat or one skimmer per workboat.*

**TABLE 3  
PUMP SUMMARY**

DESCRIPTION	SIZE	QUANTITY	NAMEPLATE PUMPING CAPACITY (gpm)
Diaphragm, Air	1"	9	20 - 100
Diaphragm, Air	3 - 4"	17	260
Diaphragm, Diesel	2"	3	86
Diaphragm, Diesel	3"	20	100 - 250 depending upon manufacturer
Diaphragm, Electric	3"	2	200
Diaphragm, Gas	3"	23	80
Submersible, DOP 160	3"	1	136
Submersible, DOP 250	6"	17	440
Submersible, Air	3"	9	100
Trash, Diesel	2"	14	220
Trash, Diesel	3"	20	340
Trash, Diesel	4"	24	340 - 750 depending upon manufacturer
Trash, Gas	1 - 3"	16	150 - 200 gpm
Peristaltic	2"	4	115

NOTE: All values given on these pages are for planning purposes only.



**TABLE 4  
HOSE SUMMARY**

HOSE SIZE	QUANTITY (FT) OF DISCHARGE HOSE	QUANTITY (FT) OF SUCTION HOSE
2"	400	2,785
3"	8146	6,797
4"	3,900	3,365
6"	2,144	696

**TABLE 5A  
SKIMMER SUMMARY**

DESCRIPTION	MODEL	PACKAGE	QUANTITY	NAMEPLATE PUMPING CAPACITY (GPM)
Disc	MI-11/24	A	7	28
Disc	12K MkII	A	9	52
Disc	MI-2	A	1	4
Disc	MI-30	A	6	100
Disc	30K	A	9	132
Disc	Mini	B	1	77
Disc	Seaskimmer 50	A	1	132
Disc	Ocean	A	1	220
Disc	T-54	A	3	238
Drum	Drum/Brush	A	3	97
Drum	TDS-118	A	4	50
Drum	TDS-136	A	1	90
Brush	Lori	A*	8	190
Trans-Vac	Diesel	A	3	350
Rope Mop	Foxtail V.A.B. 4-9	A	1	174
Rope Mop	Foxtail V.A.B. 2-9	A	1	138
Rope Mop	MW62	A	2	20
Rope Mop	Z14-E	A	37	10
Weir	Desmi 250 (Ocean)	A	1	440
Weir	Desmi 250 (Hbr)	A	3	308
Weir	Destroil	A	2	110
Weir	Fasflow	A	2	440
Weir	Mini-fasflo	A	4	100
Weir	Manta Ray (rigid)	B	12	24
Weir	Manta Ray (flexible)	B	73	38
Weir	Slurp	B	10	44
Weir	Alum	B	1	100
Weir	Seavac	A	1	656
Weir	Transrec 250	A	1	1,100
Weir	Walosep W-1	A	1	175
Weir	Walosep W-4	A	1	396

A. These skimmers come in packages that include the skimmer head, power pack, hoses (hydraulic, discharge, suction), fittings, and spare parts. \*Lori skimmers can be run with vessel hydraulics or with an independent system.

B. A variety of pumps can be used to operate these skimmers.

NOTE: All values given on these pages are for planning purposes only.



**TABLE 5B  
OPERATIONAL CHARACTERISTICS AND LIMITATIONS OF SKIMMERS**

Skimmer Type	Operational Characteristics	Limitations
Weir	<ul style="list-style-type: none"> <li>Use in calm water and a thick layer of oil where the edge of the weir is at the water/oil interface.</li> <li>Small floating weir skimmers most stable in calm water or a gentle swell.</li> <li>Generally good for recovery of light- and medium-viscosity oils; not effective with heavy lubricating oils, highly weathered crudes, water-in-oil emulsion, or Bunker C.</li> <li>Small floating weirs are easily transported. Maintenance for most is limited to debris removal during operation and post-cleanup cleaning.</li> </ul>	<ul style="list-style-type: none"> <li>On some models, skimming, or "cut," depth is manually pre-set and adjusted for slick thickness; continual adjustment of cut depth and pumping rate can result in large amounts of water being collected with the oil.</li> <li>Are likely to be clogged by highly viscous oils.</li> <li>Conventional floating weir skimmers may become obstructed by debris.</li> <li>Floating weir skimmers affected by waves.</li> <li>Recovery rates limited only by pumping rate in a thick layer of oil.</li> <li>For most small weir skimmers, pumping rate is decreased to increase oil/water collection ratio.</li> <li>Transportability of larger devices mounted to boats may be limited by size and characteristics of boat.</li> </ul>
Rope mops	<ul style="list-style-type: none"> <li>Versatility allows effective use in a variety of wave conditions.</li> <li>Generally have high recovery efficiency.</li> <li>Generally most effective in light- to medium-viscosity oils.</li> <li>Can recover heavy oils, but not non-flowing products.</li> <li>Can operate in very shallow water, amid debris or mixed ice.</li> <li>Can be used in swift rivers or under ice. Recover a wide range of products, are not fouled by debris, and can be maneuvered easily by adjusting the pulley system.</li> </ul>	<ul style="list-style-type: none"> <li>Viscous oil tends to gum up the rope mop and slow down oil wringers.</li> <li>Smaller diameter mops work well on viscous oil.</li> <li>Effective on small amounts of oil, but slow for large quantities.</li> <li>Generally work better in warmer temperatures (60°F and above).</li> <li>Setups may be more difficult to construct and require more operator attention than some other mechanisms.</li> <li>Oil may drip on shore as rope is drawn from water.</li> <li>Rope wears quickly when used in rough areas.</li> <li>Rope may twist in rough currents.</li> </ul>
Disc	<ul style="list-style-type: none"> <li>Larger disc skimmers equipped with vanes to protect collection mechanism from debris.</li> <li>Vanes also permit collection in light ice conditions.</li> <li>Smaller disc skimmers can be used as floating skimmers for spills inland or at industrial sites.</li> <li>Can recover slicks as thin as 1 mm while maintaining efficiency up to 97%.</li> <li>Recovery rate depends on slick thickness and disc-rotation rate.</li> <li>Generally most effective with medium-viscosity oils.</li> <li>Maintenance needs are generally low and involve periodic cleaning and/or replacement of scrapers.</li> </ul>	<ul style="list-style-type: none"> <li>Often expensive, complicated, vulnerable to obstruction by debris, and more likely to break down than other recovery devices.</li> <li>Do not work well on viscous oil or oil laden with debris.</li> <li>Large skimmers may be difficult to transport.</li> <li>Heavy oils adhere readily and may cause clogging.</li> <li>Light oils do not adhere to the discs well, but can be recovered.</li> </ul>
Drum	<ul style="list-style-type: none"> <li>Perform in a broad range of oil viscosities. Are likely to handle debris better than disc skimmers.</li> <li>Recovery rates generally high, especially for larger drum skimmers.</li> </ul>	<ul style="list-style-type: none"> <li>Small drum skimmers are not effective in rough seas.</li> <li>Recovery efficiency may decrease in slicks less than a few millimeters thick.</li> </ul>
Brush	<ul style="list-style-type: none"> <li>Recovery rates likely to be very high.</li> <li>For drum brush skimmers, tolerance to debris and broken ice is good.</li> <li>Range of oil recovery is broad for drum brush skimmers, with brushes working well on any viscosity oil that can be transported out of the water on the brush heads.</li> <li>Standard chain brush size allows effective recovery of products ranging from #2 fuel oil to weathered crude and #6 fuel oil.</li> <li>Chain brush systems are not readily affected by debris.</li> </ul>	<ul style="list-style-type: none"> <li>Transport of large drum brushes may be cumbersome.</li> </ul>

SOURCE: Schulze, R. (ed.). 1991. *World Catalog of Oil Spill Response Products*, Third Edition, pp. 217-223 (weir skimmers), 225-227 (rope mop skimmers), 228-229 (disc skimmers), 229-230 (drum skimmers), 238-240 (brush skimmers).

NOTE: All values given on these pages are for planning purposes only.



**TABLE 6  
STORAGE**

TYPE	VOLUME (GAL)	QUANTITY
Mini-barge*	5,376	2
Mlni-barge*	10,458	12
Tank (air berm)	1,000	1
Tank (air berm)	2,000	2
Tank (air berm)	3,000	2
Tank bladder	500	25
Tank bladder	5000	15
Tank bladder	1,450	15
Tank bladder	1500	10
Tank bladder	2,250	20
Tank bladder	2,500	2
Tank bladder	4,400	4
Tank bladder	250	15
Tank bladder	25,000	2
Tank bladder (liftable)	250	1
Tank bladder (liftable)	500	19
Tank bladder (liftable)	1320	20
Tank bladder (pillow)	250	2
Tank bladder (pillow)	5000	6
Tank bladder (pillow)	6000	2
Tank (fast)	500	15
Tank (fast)	600	7
Tank (fast)	1000	1
Tank (fast)	1500	17
Tank (fast)	2000	2
Tank (fast)	2400	40
Tank (fast)	2500	12
Tank (storage)	600	1
Tank (storage)	1000	1
Tank (storage)	350	2
Tank (storage)	16,800	3

\*The maximum draft of the mini-barges is 4 ft.

NOTE: All values given on these pages are for planning purposes only.



**TABLE 7  
BURNING EQUIPMENT**

EQUIPMENT	QUANTITY
Heli-torch (55 gal.)	6
Heli-torch (300 gal.)	2
Heli-torch Surefire gel	1200 lbs.
Air depolyable igniters	1480
Heli-torch batch gel mixers	2

**TABLE 8  
LOGISTICS EQUIPMENT**

TYPE	QUANTITY
4x4 all terrain vehicles	19
6-wheelers	4
8x8 Argos	4
Bobcat loaders	3
Challengers	3
Dozers (350 Case)	2
Snow machines	30
Chainsaws	41
Ice Augers	31

Tactic L-5 describes the communication equipment inventory.

Tactic L-4 describes equipment available to transport equipment and personnel.

NOTE: All values given on these pages are for planning purposes only.



**TABLE 9  
EQUIPMENT AVAILABLE THROUGH AGREEMENTS WITH CONTRACTORS**

EQUIPMENT TYPE	QUANTITY OR CAPACITY	OWNERSHIP	OBLIGATION
Vac Trucks	18 available on the Slope; Variable capacity, minimum of 300 bbl.	APC, Peak, APSC	Mutual Aid Agreement or ACS Master Services Agreement
Rolligons	7 @ 30 tons 1 @ 20 tons 4 @ 15 tons 9 @ 5 tons	CATCO, Phillips, Kuparuk	Mutual Aid Agreement or ACS Master Services Agreement
Dump Trucks	40 (see Tactic R-1)	APC, Peak, VECO, AIC, Phillips, BP	Mutual Aid Agreement or ACS Master Services Agreement
Loaders	24 each	Phillips, BP, APSC, Veco, Peak and APC	Mutual Aid Agreement or ACS Master Services Agreement
Trimmers	3 each	Peak and APC	Mutual Aid Agreement or ACS Master Services Agreement
Ice Miners	3 each	Peak and APC	Mutual Aid Agreement or ACS Master Services Agreement
Backhoes	3 each	APC, Peak, APSC, BP, Phillips, Alyeska	Mutual Aid Agreement or ACS Master Services Agreement
Graders	3 each	Peak, APSC	Mutual Aid Agreement or ACS Master Services Agreement
Challengers with Blades	7	Western Geophysical (1), Caribou Construction (6)	—
Vessels and Barges	—	—	See Tactic L-4

See Tactic L-9 for a list of contact names and phone numbers for the referenced contractors.

NOTE: All values given on these pages are for planning purposes only.



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NOTE: All values given on these pages are for planning purposes only.





Environmental conditions can sometimes limit response work. Some limitations are based on safety, while others concern equipment effectiveness. Tables 1A and 1B list the percentages of time that some variables reduce effectiveness of response for planning purposes.

**TABLE 1A**

**EXAMPLES OF CONDITIONS THAT COULD REDUCE EFFECTIVENESS OF MECHANICAL RESPONSE ARRANGED BY THE LIMITING VARIABLE**

*Table lists percentage of time that response effectiveness may be reduced.*

OPERATING LIMIT	WINTER November 1 to May 15		BREAKUP May 15 to June 30		SUMMER AND FALL June 30 to September 30		FREEZE-UP, MEDIAN PERIOD October 1 to October 31	
Daily Mean Temperature <-35° F <sup>1</sup>	4%	Avg. 3.3 occurrences; avg. 2.6 days duration	-	-	-	-	-	-
Daily Mean Winds 15 kt <sup>1</sup> (Typically w/ith gusts >20 kt)	20%	Avg. 21 occurrences; avg. 2 days duration.	8%	Avg. 2.5 occurrences; avg 1.4 days duration	16%	Avg. 7 occurrences; avg. 2.4 days duration	14%	Avg. 1 occurrence; avg. 4.6 days duration
Daily Mean Visibility <1 mi. <sup>1</sup>	3%	6 occurrences; avg. <1 day; up to 2 days <sup>5</sup>	0%	NOAA's summary charts for Deadhorse report zero occurrences in 1995, 1996, and 1997.	4%	Avg. 4 occurrences; avg. 1 day duration <sup>1,5</sup>  July shoreline sites records show percentages of time: 18%, some fog; <5%, fog with visibility <.5 nm.; 10% ,visibility <.5 nm.; 20%, low cloud ceiling <300 ft and visibility <1 nm. <sup>3</sup>  July offshore records show 22% of time visibility <.5 nm. <sup>3</sup>	-	-
Daily Mean Wind Chill <-35° F <sup>1</sup>	37%	Avg. 11 occurrences; avg. 7 days duration	<1%	None in last 5 years	-	-	-	-
Flight Cancellations <sup>6</sup>	5%	Some on 2 days per mo. avg.	5%	Some on 1 day per mo. avg.	5%	Some on 3 days per mo. avg.	5%	Some on 2 days per mo. avg.
White-out	5%	-	-	-	-	-	-	-
Broken ice coverage >10% and <100%	0%	-	100%	Depends on location <sup>2</sup> ; when encountered by containment boom, limits recovery – Tactics R-16 to R-20	10%	Depends on location <sup>2</sup> ; when encountered by containment boom, limits recovery – Tactics R-16 to R-20	80%	When encountered by containment boom, limits recovery – Tactics R-16 to R-20
Bottom Fast River Ice Lagoon Ice and Moving Floes	-	-	20% to 40%	Sag. River: July 7 for 9 days; Kuparuk River: July 7 for 19 days; Colville River: July 1 for 13 days <sup>7</sup>	-	-	-	-

NOTE: All values given on these pages are for planning purposes only.



**TABLE 1A (CONT'D)**

OPERATING LIMIT	WINTER November 1 to May 15		BREAKUP May 15 to June 30		SUMMER AND FALL June 30 to September 30		FREEZE-UP, MEDIAN PERIOD October 1 to October 31	
Over-Ice Flow	-	-	30%	Sag. River: May 29 for 7 days; Kuparuk River: May 31 for 13 days; Colville River: May 30 for 12 days <sup>7</sup>	-	-	-	-
High Water Flows	-	-	30%	Sag. River: May 23 for 12 days; Kuparuk River: May 29 for 14 days; Colville River: May 27 for 15 days <sup>7</sup>	-	-	-	-
Shallow Coastal Water	-	-	0%	-	0%	-	-	-
Storm Surges Flooding Roads and Stranding Vessels	-	-	<1%	-	<1%	-	-	-
Wave Height >3 feet	-	-	-	-	<5%	Up to 2 occurrences per mo.; 8 hour median <sup>1,4</sup>	-	-
Atmospheric Icing	20%	Up to 5 days per mo. no flying; Avg. 3 additional days partial flight restrictions <sup>5</sup>	-	-	20%	Up to 5 days per mo. no flying; Avg. 3 additional days partial flight restrictions <sup>5</sup>	20%	Up to 5 days per mo. no flying; Avg. 3 additional days partial flight restrictions <sup>5</sup>
Spine Road to Kuparuk and Milne Pt. Facilities Washed Out or Closed	-	-	33%	Avg. Kuparuk River Floods: May 31 through June 13 <sup>7</sup>	-	-	-	-
Darkness <sup>3</sup>	50%	-	0%	-	27%	-	40%	-
Sea Ice Load Bearing Capacity:	40%	-	100%	-	-	-	100%	-
Heavy Equipment	20%	-	0%	-	-	-	100%	-
Light Equipment	-	-	-	-	-	-	-	-

<sup>1</sup> Based on Deadhorse records for 1995, 1996 and 1997 from NOAA Global Summary of the Day Web Page, www.ncdc.noaa.gov/cgi-bin/gwod\_xmgr  
<sup>2</sup> D.F. Dickins and Associates Ltd., Vaudrey and Associates, S.L. Ross Environmental Research Ltd., December 2000. Oil Spills in Ice Discussion Paper. Prepared for Alaska Clean Seas.  
<sup>3</sup> Baldwin, R.G., Brower, W.A. Jr., Leslie, L.D., Williams, C.N. Jr., Wise, J.L. 1988. Climatic Atlas of the Outer Continental Shelf Waters and Coastal Regions of Alaska; Volume III; Chukchi-Beaufort Sea. National Oceanic and Atmospheric Administration, U.S. Minerals Management Service, Naval Oceanography Command.  
<sup>4</sup> Personal conversation with Peter Gadd August 20, 1998 and 1  
<sup>5</sup> Personal conversation with Robert Glover, Era Helicopters, Deadhorse, Alaska  
<sup>6</sup> Personal communication, Prudhoe Bay Airport, 1997  
<sup>7</sup> U.S. Army Corps of Engineers, Alaska District. 1989. Endicott Environmental Monitoring Program Final Report, Ice Breakup/Freezeup.

NOTE: All values given on these pages are for planning purposes only.



TABLE 1B

EXAMPLES OF CONDITIONS THAT COULD REDUCE EFFECTIVENESS OF MECHANICAL RESPONSE ARRANGED BY TYPE OF RECOVERY RESOURCE

Table lists percentage of time that response effectiveness may be reduced.

These values are provided to meet ADEC contingency planning purposes [18 AAC 75.425(e)(3)(D)]. In an actual spill response, operating limits will be determined by on-site personnel.

RESOURCE	OPERATING LIMIT	WINTER	BREAKUP	SUMMER & FALL	FREEZE-UP
		November 1 to May 15	May 15 to June 30	June 30 to September 30	Median Dates October 1 to October 31
Hydraulics and Cables	Temperature -35° F	4%	—	—	—
Personnel	Wind Chill -35° F	37%	<1%	—	—
Hoists and Lifts	15 kt with 20 kt gusts	20%	8%	16 %	14%
Vehicles	White out, visibility restricted to a few feet, 10 to 20 ft above ground	5%	—	—	—
	Over ice flow restricts passage	—	30%	—	—
	Storms from the west can flood roads	—	<1%	<1%	—
Flight Cancellations	Visibility	5%	5%	<5%	<5%
Booms	Moving ice restricts booming	—	20% to 40%	—	—
	High water flow	—	30%	—	—
	Broken ice coverage >10% and <100%	0%	100%	10%	80%
Recovery with Vessels	Some open leads - recovery and trajectory uncertain	100%	100%	—	50%
	Storm from the east can lower coastal water and strand vessels	—	<1%	<1%	—
	Over ice flow restricts	—	30%	—	—
	Waves 3 feet	—	—	<5%	—
	Broken ice coverage >10% and <100%	0%	100%	10%	80%; when encountered by containment boom, limits recovery —Tactics R-16 to R-20
Helicopter	Visibility < 0.5 nm	5%	5%	5%	5%
	Atmospheric icing	3%	—	—	3%

The master of the vessel determines the wave heights that the boat will operate in. The wave heights at which vessels typically operate are affected by several variables, including the experience of the crew, the wind speed, and the direction of the wind relative to the vessel and to the adjacent shoreline.

NOTE: All values given on these pages are for planning purposes only.



TABLE 2

THRESHOLD LIMIT VALUES FOR WORK AND WARM-UP SCHEDULE FOR FOUR-HOUR SHIFT

Wind chill limits workers' outdoor efforts. Workers in wind chill temperatures between -25°F and -40°F take more break time indoors. When wind chill is colder than -45°F, non-emergency work ceases. See Table 2.

AIR TEMPERATURE - SUNNY SKY		NO NOTICEABLE WIND		5 MPH WIND		10 MPH WIND		15 MPH WIND		20 MPH WIND	
° C	° F	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks
-26° to -28°	-15° to -19°	Normal	1	Normal	1	75 min.	2	55 min.	3	40 min.	4
-29° to -31°	-20° to -24°	Normal	1	75 min.	2	55 min.	3	40 min.	4	30 min.	5
-32° to -34°	-25° to -29°	75 min.	2	55 min.	3	40 min.	4	30 min.	5	Non-emergency work should cease	
-35° to -37°	-30° to -34°	55 min.	3	40 min.	4	30 min.	5	Non-emergency work should cease			
-38° to -39°	-35° to -39°	40 min.	4	30 min.	5	Non-emergency work should cease					
-40° to -42°	-40° to -44°	30 min.	5	Non-emergency work should cease							
-43° & below	-45° & below	Non-emergency work should cease									

Source: American Conference of Governmental Industrial Hygienists, Inc. 1994-1995. *Threshold Limit Values, Chemical Substances and Physical Agents and Biological Exposure Indices.*

Note: Schedule applies to 4-hour work period with moderate to heavy work activity, with warm-up periods of ten minutes in a warm location and with an extended break (e.g., lunch) at the end of the 4-hour work period in a warm location.

GUIDE FOR ESTIMATING WIND VELOCITY

- 5 mph - Light flag moves
- 10 mph - Light flag fully extended
- 15 mph - Raises newspaper sheet
- 20 mph - Blowing and drifting snow

PHASE 1, 2, OR 3 WEATHER CONDITIONS

- Phase 1: Caution - Reduced Visibility.** Travel on the field is permitted using extreme caution. Reduce speed and be certain all equipment (radio, lights, etc.) is operating properly. Arctic gear is required.
- Phase 2: Restricted - Convoy Only Travel in the Field.** Travel is permitted in convoys of two or more vehicles only. Radio communication between vehicles in the convoy is required.
- Phase 3: Closed - Critical or Emergency Travel Only.** Travel will be by heavy equipment convoy only.

OFFICIAL TEMPERATURE INFORMATION SOURCES

- Prudhoe Bay Operations Center airport tower weather recording 5:30 am to 5:30 pm (Phone 5888)
- Phillips' Channel 5, 5:30 am to 5:30 pm
- Prudhoe Bay WOA - BPXA's Channel 5
- Kuparuk Operation NSK's Security (Phone 7997)

NOTE: All values given on these pages are for planning purposes only.



### SEA ICE BEARING CAPACITY

Loads borne on sea ice sheets generally are a simple function of the square of the ice thickness (e.g., Gold, 1971). Vaudrey (1977) calculated the thickness of sea ice to support a load based on additional factors, including ice temperature, time of load application, and the physical properties of ice as an engineering material.

Figure 1 shows curves of recommended sea ice thicknesses vs. load. If an abnormally warm period intervenes winter, the spring load curve applies temporarily if internal ice temperatures rise above 23°F. Ice temperatures are measured with a thermistor drilled into an ice core between one and two feet below the solid ice surface.

Figure 1 applies to operations on a continuous free-floating ice sheet with no free edges, working cracks or man-made trenches and slots. Random small surface cracks commonly occur due to thermal stresses, and are particularly noticeable whenever the snow cover is removed. These features usually have a negligible effect on ice strength. Exceptions are wet "active" cracks where they join to form a wedge and the risk of breaking through becomes acute. Doubts about the character or influence of cracks or slots cut in the sheet on bearing capacity means suspension of vehicle operations until the integrity of the ice is determined. Travel over unprepared sea ice incurs risks due to the nature of the material and unpredictable environmental factors (e.g., unusually warm temperatures, currents under the ice, hidden cracks). Vehicles have gone through the ice with little or no warning, even when operating within conservative guidelines. An experienced field ice technician accompanies vehicles traveling over unprepared sea ice.

Figure 1 applies to moving loads and/or short term parking up to about five hours. Thicknesses shown in Figure 1 are not adequate for extended storage of heavy loads. Curves are based on recommended bearing capacities developed for wheeled vehicles and aircraft. Tracked and terra-tired vehicles may be able to operate safely over thinner ice sheets early in the winter by distributing the load over a greater area. See Table 3 for examples of heavy vehicles and aircraft borne by winter sea ice in the Prudhoe Bay area. Table 4 provides guidelines for the minimum sea ice thickness for various weights of moving vehicles.

Approximately 20 inches of sea ice is recommended as a starting thickness to begin conventional vehicle operations with wheeled vehicles such as small trucks. Lighter equipment such as Ditchwitches and snowmachines can operate on ice 12 to 20 inches thick, as long as the sheet is continuous and stable and operators accept the increased risk. Workers should not be sent out on the ice until it reaches 12 inches in thickness.

Early season operations involve strict safety measures, continuous ice monitoring and evacuation plans. Strong winds can lead to rapid breakup of young sea ice. Heavy equipment operations on ice less than 20 inches thick is limited to areas inside the barrier islands with shallow water less than four feet in depth.

Freshwater ice supports heavier loads than sea ice. See Figure 2.

#### IMPORTANT NOTE

- When working on ice, make sure the thickness is known.
- Be conservative in using the graphics in this tactic.

NOTE: All values given on these pages are for planning purposes only.



FIGURE 1

### RECOMMENDED SEA ICE THICKNESSES VS. LOAD

20 inches is starting thickness in early winter. Curves are for moving vehicles or short term parking. Wheeled vehicle operations halt when the internal ice temperature at 1 to 2 ft depth rises above 26.6 °F.

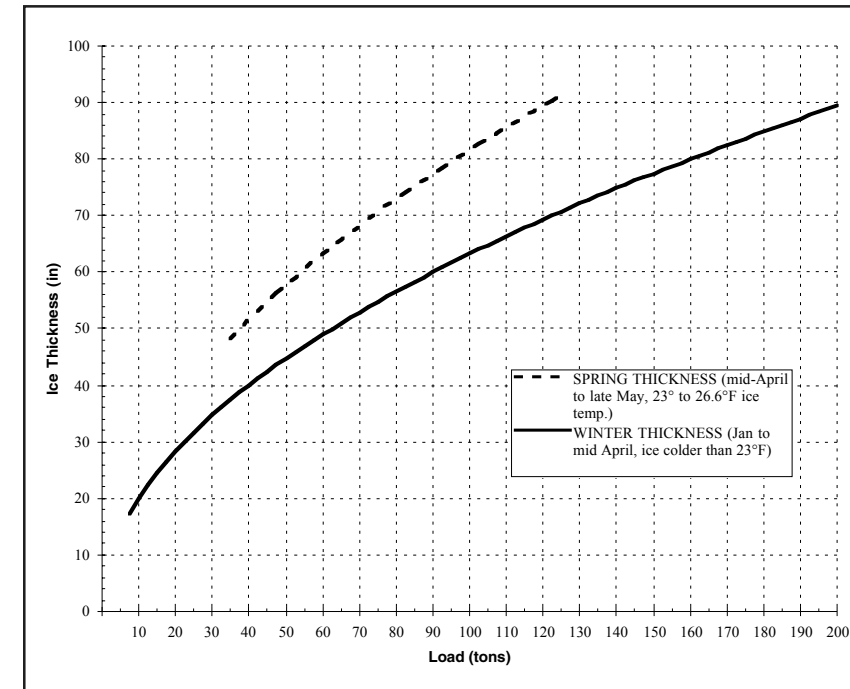
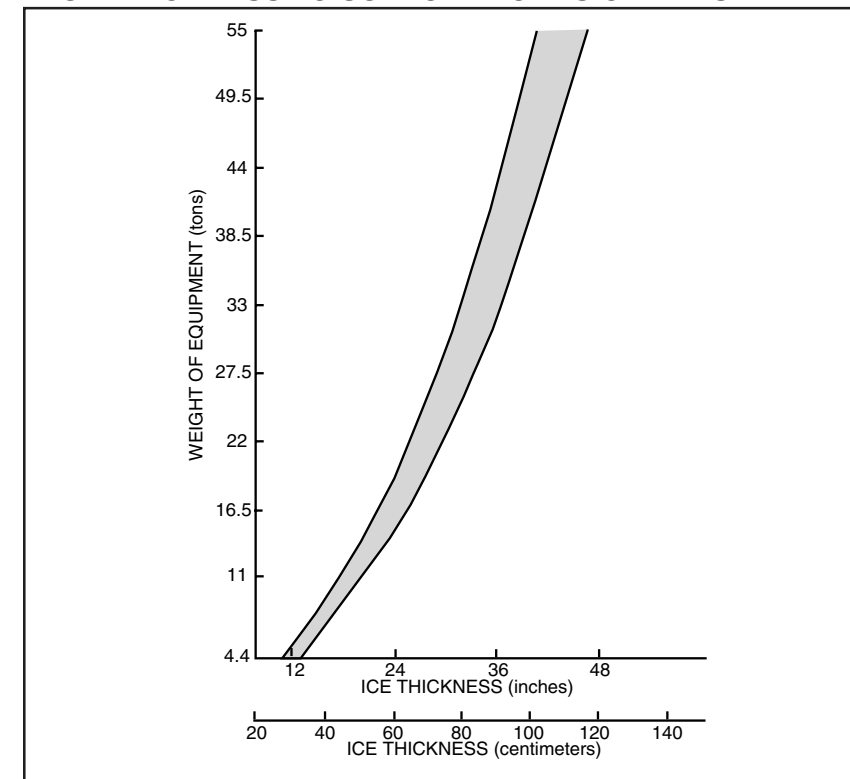


FIGURE 2

### MINIMUM THICKNESS TO SUPPORT LOADS ON FRESHWATER ICE



NOTE: All values given on these pages are for planning purposes only.



**TABLE 3**  
**WEIGHTS FOR SELECTED VEHICLES AND HEAVY EQUIPMENT**

	GROSS WEIGHT INCLUDING PAYLOAD (LB)	ESTIMATED PAYLOAD (LB)
Cat D-8	71,000	N/A
CATCO RD-85	56,000	30,000
Kenworth 953A	121,000	60,000
Grader 12G	29,000	N/A
DHC Twin Otter	12,500	4,500
C130H Hercules	155,000	51,000
Bell 212	11,000	5,000
Bell 214	17,500	8,000
Boeing Chinook	51,000	28,000
B-70	240,000	90,000
BV-107	19,000	11,500
Bobcat w/Trimmer	8,900	N/A
Bobcat w/Auger	7,900	N/A
Crew Cab Pickup	7,500	400
Ditch Witch	5,000	N/A
Snowmachine w/Sled	545	200
966 Loader	47,000	10,000

NOTE: Actual weights may vary with different options and model numbers.

**TABLE 4**  
**MINIMUM ICE THICKNESS AND SPACING BETWEEN VEHICLES OR LOADS ON SEA ICE**  
*(for uncracked ice)*

MOVING VEHICLE WEIGHT		PARKED VEHICLE (OR LOAD) WEIGHT		MINIMUM ICE THICKNESS		MINIMUM SPACING BETWEEN VEHICLES	
LBS	TONS	LBS	TONS	INCHES	METERS	FEET	METERS
20,000	10	10,000	5	20	0.51	145	44
30,000	15	15,000	7.5	25	0.64	170	52
40,000	20	20,000	10	28	0.71	180	55
50,000	25	25,000	12.5	32	0.81	200	61
60,000	30	30,000	15	35	0.89	220	67
80,000	40	40,000	20	40	1.02	240	73
100,000	50	50,000	25	45	1.14	260	79
140,000	70	70,000	35	53	1.35	300	91
200,000	100	100,000	50	63	1.6	340	102
250,000	125	125,000	62.5	71	1.8	370	113
300,000	150	150,000	75	78	2.0	390	120

**IMPORTANT NOTES:**

- (1) Near wet cracks, use half the weights indicated.
- (2) If these are intersecting wet cracks, suspend operations until cracks are repaired.
- (3) Use extreme care if weather is extremely cold after warm period or warm after cold period.
- (4) Control speed in shallow water to avoid flexural waves.

NOTE: All values given on these pages are for planning purposes only.



**TECHNICAL LIMITATIONS**

- When working on ice, make sure the thickness is known.
- Be conservative in using the graphics in this tactic.

**REFERENCES**

Alaska Clean Seas Winter Spill Operations - Module 1.

American Conference of Governmental Industrial Hygienists, Inc. 1994-1995. *Threshold Limit Values, Chemical Substances and Physical Agents and Biological Exposure Indices.*

Gold, L.W. 1971. Use of Ice Covers for Transportation. Canadian Geotechnical Journal. No. 8:170-181.

Vaudrey, K.D. 1977. Ice Engineering - Study of Related Properties of Floating Sea Ice Sheets and Summary of Elastic and Viscoelastic Analyses. Navy Civil Engineering Lab. Technical Report R860.

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**NORTH SLOPE MUTUAL AID**

The North Slope Operators have signed an agreement to provide mutual aid for spill response in the event of a Level II or Level III spill. This agreement extends to both personnel and equipment. A brief description of North Slope spill levels is provided below.

SPILL LEVEL	CHARACTERIZATION
I	A small oil spill, the response to which can be provided by an Operator's and ACS's on-scene equipment and/or personnel, as determined by the field manager of the field in which the spill occurs.
II	A larger oil spill, the response to which requires equipment and/or trained personnel located in other operating areas of the North Slope in addition to the Operator's and ACS's on-scene equipment and personnel, as determined by the field manager of the field in which the spill occurs.
III	A major oil spill, the response to which requires equipment and/or trained personnel to be brought to the North Slope, in addition to the equipment and personnel located on the North Slope and on-scene by the Operator, as determined by the field manager of the field in which the spill occurs.

**TERMS AND CONDITIONS OF MUTUAL AID**

1. Providing Entity shall make available, at Receiving Entity's request, any North Slope Spill Response Team (NSSRT) personnel and dedicated spill response equipment to the extent such resources are:
  - Deemed necessary and requested by Receiving Entity,
  - In service, and
  - Not already committed to another spill response.

NSSRT personnel shall be provided until relieved by appropriately trained replacement personnel or until the response is completed. Personnel and equipment shall be utilized for spill response only and not for operation of production or transportation facilities.

2. Providing Entity may make available, at Receiving Entity's request, any additional response personnel and response equipment to the extent such resources are:
  - Deemed necessary and requested by Receiving Entity,
  - In service,
  - Not already committed to another spill response, and
  - Not otherwise required for operation of the Providing Entity's operation.

Additional personnel shall be provided until relieved by appropriately trained replacement personnel or until the response is completed. Personnel and equipment shall be utilized for spill response only, and not for operation of production or transportation facilities.

3. All costs with the provision of manpower or equipment will be charged to the Receiving Entity.
4. In the event of a Level III callout, Providing Entity shall notify and mobilize off-shift NSSRT personnel at Receiving Entity's request.

**NORTH SLOPE SPILL RESPONSE TEAM (NSSRT) PERSONNEL**

The numbers of NSSRT personnel are identified below. Minor discrepancies of approximately 15% may occur due to vacations, sick leave, or off-site training. As new fields are developed, additional facilities or units may also join and ratify the Mutual Aid Agreement.

FACILITY/UNIT	ACS PERSONNEL	EMPLOYEES/CONTRACTORS
Kuparuk River Unit	2	24
Milne Point Unit	1	6
Prudhoe Bay Unit (WOA)	2	30
Prudhoe Bay Unit (EOA)	2	30
Alyeska Pipeline Service Company	—	6
Duck Island Unit (Endicott)	—	6
Badami Unit	—	—
Northstar Unit	—	—
Alaska Clean Seas (Deadhorse)	6	—

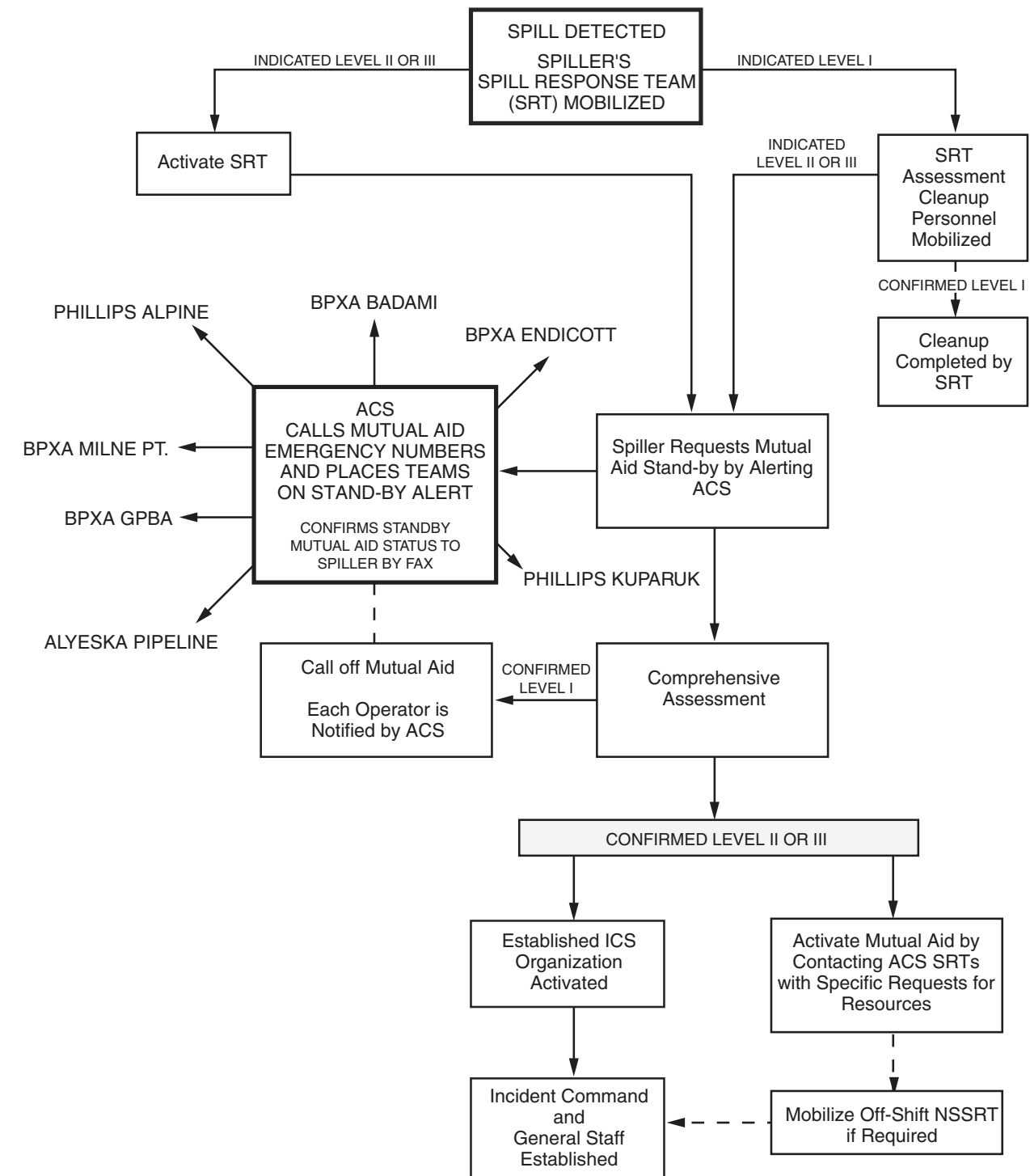
NOTE: All values given on these pages are for planning purposes only.



**RESPONSE EQUIPMENT**

The spill response equipment that can be provided under this mutual aid comprises two categories: dedicated spill response equipment and heavy equipment that is utilized in day-to-day operations. See tactic on equipment.

**CALLOUT PROCEDURES FOR MUTUAL AID**



NOTE: All values given on these pages are for planning purposes only.



**ACS MASTER SERVICE AGREEMENTS**

ACS has implemented a number of Master Service Agreements with a range of contractors whose services may be required in a spill response. The agreements are:

1. Assignable to ACS member companies.
2. Valid until such time as one party cancels.
3. Comprised of three parts:
  - Generic work scope
  - Compensation issues
  - General provisions (insurance/indemnification)
4. Specific work to be performed will be covered under a contract work authorization.
5. Contact point for implementation of ACS Master Services Agreements is:  
 Manager Logistics  
 Alaska Clean Seas  
 Deadhorse, AK

A summary list of the Master Service Agreements applicable for use in a spill response follows.

MA NUMBER	SERVICE CATEGORY	CONTRACTOR	PHONE	FAX
AP92040	Aviation Support Services	Evergreen Helicopters of Alaska	(907)276-2454	(907)279-6816
AP93041	Aviation Support Services	ERA Aviation, Inc.	(907)248-4422	(907)266-8383
AU93112	Aviation Support Services	Northern Air Cargo	(907)243-3331	(907)249-5190
JN93107	Aviation Support Services	Cape Smythe Air	(907)852-8333	(907)852-8332
MA92045	Aviation Support Services	Air Logistics of Alaska	(907)452-1197	(907)452-4539
MR93087	Aviation Support Services	Arctic Circle Air Service	(907)243-1380	(907)248-0042
SE95165	Aviation Support Services	Security Aviation, Inc.	(907)248-2677	(907)248-6911
MR93078	Casual Labor & Equipment/Spill Response	VECO, Operations, Inc.	(907)277-5309	(907)264-8810
AU95163	Casual Labor & Equipment/Spill Response	CCI, Inc.	(907)258-5755	(907)258-5766
MR93079	Casual Labor & Equipment/Spill Response	Peak Oilfield Services	(907)561-3200	(907)562-5860
AP92037	Communications Services	Alaska Telecom, Inc.	(907)344-1223	(907)344-1612
DE91024	Communications Services	North Slope Telecom, Inc.	(907)562-4693	(907)562-0818
MR93090	Environmental Consulting	Linda Perry Dwight	(907)345-6278	(907)345-6278
DE91003	Environmental Engineering	ENSR Corporation	(907)561-5700	(907)273-4555
FE94122	Environmental Engineering	Dames & Moore & Associates	(907)562-3366	(907)562-1297
JA95171	Environmental Support Services	Philip Environmental, Inc.	(907)272-9007	(907)272-6805
MA92044	Environmental Engineering	S.L. Ross and Associates, Ltd.	(613)232-1564	(613)232-6660
MA97202	Environmental Support Services	IT Alaska, Inc.	(907)562-3452	(907)563-2814
MA93092	Mapping/GIS Support Services	Resource Data, Inc.	(907)563-8100	(907)561-0159
MR93085	Mapping/GIS Support Services	AEROMAP U.S., Inc.	(907)272-4495	(907)274-3265

NOTE: All values given on these pages are for planning purposes only.



SE95164	Mapping/GIS Support Services	F. Robert Bell & Associates	(907)274-5257	(907)272-7531
MR93123	Marine Ecology Services	LGL Alaska Research Associates	(907)562-3339	(907)562-7223
AP92039	Marine Support Services	Beaufort Marine J.V.	(907)279-7501	(907)279-8690
AP93089	Oilspill Response Service	URS Greiner Woodward-Clyde	(907)561-1020	(907)563-3198
JN93106	Casual Labor & Equipment	Alaska Petroleum Contractors	(907)349-4827	(907)267-3190
AU94137	Safety Consulting Services	Decision Point Associates, Inc.	(303)443-7624	(303)443-3919
MR93082	Security Support/Spill Response Services	NANA Management Services	(907)265-4333	(907)265-4133
MA93101	Soils Testing & Analytical Services	Analytica Alaska, Inc.	(907)258-2155	(907)258-6634
FE92031	Spill Management Consultant	Spiltec	(206)869-0988	(206)869-7881
JA95148	Spill Management Consultant	W.J. Mackie & Associates	(604)659-4797	(604)656-4797
MR92033	Survival/Safety Training Services	LTR Systems, Inc.	(907)248-5010	(907)563-9185
MR93080	Thermoremediation Services	Alaska Interstate Construction	(907)562-2792	(907)562-4179
SE94125	Veterinary Services	International Wildlife Research	(409)740-4528	(409)740-5001
SE94141	Veterinary Services	Wildlife Response Team, Inc.	(206)884-3253	(206)884-2018
NV92069	Weather & Ice Forecasting	Fairweather Forecasting	(907)258-9165	(907)258-9167
AP92036	Wildlife Response Services	IBRRC - International Bird Rescue Research Center	(510)841-9086	(510)841-9089
AU96184	Temporary Personnel Services	Chugach North Technical Services	(907)561-4321	(907)563-7926
MA99252	Village Response Team Manpower Services	Arctic Services Inc.	(907)852-6767	(907)852-4147
MA99205	Marine Support Services	Crowley Alaska Inc.	(907)278-4978	(907)257-2828
NV98235	Legal Services	Delaney, Wiles, Hayes Gerety, Ellis & Young, Inc. Attys. at Law	(907)279-3581	(907)279-1545
AU97209	Causal Labor & Equipment/Spill Response	Forty-Niner Remediation & Oilspill Group	(907)344-8623	(907)522-8623
JU98227	Village Response Team Training Support & Services	Ilisagvik College	(907)852-3333	(907)852-2729
JN99255	Marine Hardhat Diving Services	Offshore Divers	(907)563-9060	(907)563-9061
MA98215	Village Response Team Manpower Services	Kuukpik Corporation	(907)480-6220	(907)480-6126
FE92032	Technical Writing Services	Lukin Publications Management	(907)563-8364	(907)563-8370
JA00267	Network Support Services	MicroAge Tech Support Services	(907)762-9112	(907)762-9173
AU99262	Casual Labor & Equipment/Spill Response	PENCO (Pacific Environmental Inc.)	(907)562-5420	(907)562-5426
FE99242	Environmental Consulting	Polaris Applied Sciences Inc.	(206)842-2951	(206)842-2861
AP99247	Casual Labor & Equipment/Spill Response	R&K Industrial Inc.	(907)283-3777	(907)283-6427
JA00276	Spill Management Consultant	Vanderkooy & Associates	(430)239-5145	(430)239-5145

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**OIL SPILL RESPONSE COOPERATIVES**

The Association of Petroleum Industry Co-op Managers (APICOM) has a mutual aid agreement to provide equipment and personnel to members on an as-available basis. Co-ops are under no obligation to provide resources. Resource availability may be restricted by either a co-op's member companies or regulatory obligations. A list of APICOM members is provided below.

**APICOM MEMBERS**

Cooperative	Location	Phone	Fax
Burrard Clean Operations	Vancouver, BC	(604) 985-0855	(604) 985-0955
Chadux Corporation	Anchorage, AK	(907) 278-3365	(907) 278-3330
CISPRI*	Kenai, AK	(907) 776-5129	(907) 776-2190
Clean Bay Incorporated	Concord, CA	(925) 685-2800	(925) 825-2203
Clean Caribbean Cooperative	Ft. Lauderdale, FL	(305) 983-9880	(305) 987-3001
Clean Casco Bay, Inc.	Portland, ME	(207) 828-4511	(207) 828-4516
Clean Channel Assoc., Inc.	Houston, TX	(713) 676-1318	(713) 676-2571
Clean Coastal Waters, Inc.	Long Beach, CA	(310) 432-1415	(310) 437-1510
Clean Gulf Associates	New Orleans, LA	(504) 593-6724	(504) 593-6725
Clean Harbors Cooperative	Edison, NJ	(908) 225-2301	(908) 417-3921
Clean Islands Council	Honolulu, HI	(808) 528-4449	(808) 521-7049
Clean Rivers Cooperative	Portland, OR	(503) 220-2040	(503) 295-3660
Clean Seas	Carpinteria, CA	(805) 684-3838	(805) 684-2650
Clean Sound Cooperative, Inc.	Edmonds, WA	(206) 744-0948	(206) 771-3244
COPIM St-Laurent LTEE	Levis, Quebec	(418) 833-8989	(418) 833-9649
Corpus Christi Area Oil Spill Control Assoc.	Corpus Christi, TX	(512) 882-2656	(512) 880-3299
Delaware Bay & River	Lewes, DE	(302) 645-7861	(302) 645-4006
Humbolt Bay Oil Spill	Eureka, CA	(707) 445-3002	(707) 445-4306
LOOP	New Orleans, LA	(504) 368-5667	(504) 363-9284
M.I.R.G.	MIRG	(504) 394-0893	(504) 392-2467
MSRC Gulf Region	Lake Charles, LA	(318) 437-9600	(318) 433-9678
MSRC Northeast Region	Edison, N.J.	(908) 417-0500	(908) 417-1314
MSRC Northwest Region	Seattle, WA	(206) 774-6772	(206) 774-7770
MSRC South Region	Port Hueneme, CA	(805) 986-8384	(805) 986-8388
MSRC Southeast Region	Miami, FL	(305) 375-8410	(305) 577-8523
Oil Spill Service Centre	Southampton, G.B.	011-44-703-331551	011-44-703-331972
PIER Atlantic, Ltd.	Dartmouth, NS	(902) 461-9170	(902) 461-9590
PIMEC	Ontario, Canada	(416) 492-5713	(416) 492-5713
SEAPRO	Ketchikan, AK	(907) 225-7002	(907) 247-1117
SERVS*	Valdez, AK	(907) 835-6902	(907) 835-6944

\* Both CISPRI and SERVS maintain fishing vessel charter contracts for response in the event of a spill in their respective areas. Under contracts, vessel operators and deck hands are trained in spill response activities such as booming, skimming, and mini-barge operations. These vessels can be made available through either the APICOM mutual aid agreement or provisions in the specific fishing vessel contracts.

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**ACCESSING STATE OF ALASKA RESOURCES**

State of Alaska resources may be made available in a spill response when a compelling need can be demonstrated, such as a greatly enhanced response. The State will consider the availability of private sector resources prior to committing equipment.

The point of contact for accessing state resources is the State On-Scene Coordinator (SOSC).

The spiller will be responsible for all costs associated with mobilization, activation and/or use of State of Alaska equipment.

**ACCESSING FEDERAL GOVERNMENT RESOURCES**

Federal resources may be made available in a spill response when a compelling need can be demonstrated, such as a greatly enhanced response. The Federal Government will consider the availability of private sector resources prior to committing equipment.

The point of contact for accessing federal resources is the Federal On-Scene Coordinator (FOSC).

The spiller will be responsible for all costs associated with mobilization, activation and/or use of federal government equipment.

**ACCESSING RESOURCES FROM OTHER C-PLAN HOLDERS**

The SOSC can authorize the release of response equipment from other facilities in Alaska operating under a state-approved contingency plan. On the North Slope, these facilities are located in the villages.

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Alaska Department of Environmental Conservation regulations require that an oil discharge prevention and contingency plan must provide for the use of best available technology [18 AAC 75.425(e)(4)]. Each plan must identify technologies applicable to the operation that are not subject to response planning or performance standards specified in the regulations, include a written justification that the technology proposed to be used is the best available for the applicant's operation, and for each such technology identify all available technologies and include a written analysis of each technology,

The technologies that must be covered in the BAT analysis include, at a minimum:

- (i) for all contingency plans: communications described under 18 AAC 75.425(e)(1)(D); source control procedures to stop the discharge at its source and prevent its further spread described under 18 AAC 75.425(e)(1)(F)(i); trajectory analyses and forecasts described under 18 AAC 75.425(e)(1)(F)(iv); and wildlife capture, treatment, and release programs described under 18 AAC 75.425(e)(1)(F)(xi);
- (ii) for a terminal, a crude oil transmission pipeline, or an exploration and production contingency plan: cathodic protection or another approved corrosion control system if required by 18 AAC 75.065(h)(3); a leak detection system for each tank if required by 18 AAC 75.065(h)(4); any other prevention or control system approved by the department under 18 AAC 75.065(i)(1)(D); a means of immediately determining the liquid level of bulk storage tanks as specified in 18 AAC 75.065(j)(3) and (4); maintenance practices for buried steel piping containing oil as required by 18 AAC 75.080(b); protective wrapping or coating and cathodic protection if required by 18 AAC 75.080(b)(1)(A); and corrosion surveys required by 18 AAC 75.080(b)(2)(A);
- (iii) for a tank vessel contingency plan: measures to assure prompt detection of an oil discharge as required by 18 AAC 75.027(d); operation of a tank vessel under escort in a manner that permits an escort vessel to be available immediately to provide the intended assistance to the tank vessel as required by 18 AAC 75.027(e); tow lines as required by 18 AAC 75.027(f); and escort vessels;
- (iv) for a crude oil transmission pipeline contingency plan: leak detection, monitoring, and operating requirements for crude oil pipelines that include prompt leak detection as required by 18 AAC 75.055(a); and
- (v) for a barge contingency plan: measures to assure prompt detection of an oil discharge as required by 18 AAC 75.037(d) and means to recover a barge that breaks free of its towing vessel as required by 18 AAC 75.037(f);

The table on the next page shows the evaluation criteria that must be used for the alternative technology analysis. Following the table are the required BAT analyses for the ACS tactics/equipment that are used by ACS member companies:

- Communications.
- Trajectory analyses and forecasts.
- Wildlife capture, treatment, and release programs.

BAT analysis to address the other technologies listed above must be provided in the oil discharge prevention and contingency plans for individual facilities.

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**SAMPLE BAT ANALYSIS TABLE**

NOTE: The number of alternatives evaluated depends on the particular technology. In addition, the analysis table should be supplemented by a summary of the evaluation and the reasons for selecting the chosen technology.

BAT EVALUATION CRITERIA	SELECTED TECHNOLOGY	ALTERNATIVE 1	ALTERNATIVE X
AVAILABILITY: Whether technology is best in use in other similar situations or is available for use by applicant			
TRANSFERABILITY: Whether each technology is transferable to applicant's operations			
EFFECTIVENESS: Whether there is a reasonable expectation each technology will provide increased spill prevention or other environmental benefits			
COST: The cost to the applicant of achieving BAT, including consideration of that cost relative to the remaining years of service of the technology is use by the applicant.			
AGE AND CONDITION: The age and condition of technology in use by the applicant			
COMPATIBILITY: Whether each technology is compatible with existing operations and technologies in use by the applicant			
FEASIBILITY: The practical feasibility of each technology in terms of engineering and other operational aspects			
ENVIRONMENTAL IMPACTS: Whether other environmental impacts of each technology, such as air, land, water pollution, and energy requirements, offset any anticipated environmental benefits			

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The ACS communications system incorporates most available communications technologies, including UHF and VHF portable and base radios, HF SSB station, Inmarsat, C Band satellite telephone system, and UHF radiotelephone equipment. The communications system includes separate logistics and operations networks to better control communications traffic. The ACS system is fully compatible with the systems maintained by all North Slope operators and thus provides the best way to assure maximum coordination of effort. The system also provides access to the worldwide telephone network for voice and data communications.

**BEST AVAILABLE TECHNOLOGY ANALYSIS  
MOBILE RESPONSE COMMUNICATIONS (MRC) CENTER**

BAT EVALUATION CRITERIA	CURRENT METHOD: ACS MRC	ALTERNATIVE: ON-SITE INSTALLATION
AVAILABILITY: Whether technology is best in use in other similar situations or is available for use by applicant	The ACS MRC is the model by which all other Mobile Response Centers on the North Slope have been built, and is BAT.	Equipment is available for on site installation, but installation/response time would be on the order of weeks rather than hours.
TRANSFERABILITY: Whether each technology is transferable to applicant' s operations	No change.	Could be transferred.
EFFECTIVENESS: Whether there is a reasonable expectation each technology will provide increased spill prevention or other environmental benefits	No change.	No change.
COST: The cost to the applicant of achieving BAT, including consideration of that cost relative to the remaining years of service of the technology is use by the applicant.	No change.	ACS has approximately \$500,000 invested in its MRC. Similar costs could be expected to install on site equivalent equipment.
AGE AND CONDITION: The age and condition of technology in use by the applicant	Current equipment ranges from new to 5 years old. Equipment is in excellent condition due to an aggressive preventive maintenance program, and will provide several more years of use.	N/A
COMPATIBILITY: Whether each technology is compatible with existing operations and technologies in use by the applicant	N/A	Compatible.
FEASIBILITY: The practical feasibility of each technology in terms of engineering and other operational aspects	N/A	Feasible but costly, and unnecessary.
ENVIRONMENTAL IMPACTS: Whether other environmental impacts of each technology, such as air, land, water pollution, and energy requirements, offset any anticipated environmental benefits	No change.	The ACS MRC was engineered to use minimal power and has mated systems. Significant engineering would be required to provide the same benefits with current off-the-shelf equipment.

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**BEST AVAILABLE TECHNOLOGY ANALYSIS  
TECHNOLOGY: TWO WAY RF COMMUNICATIONS**

BAT EVALUATION CRITERIA	CURRENT METHOD: VHF/UHF RADIO	ALTERNATIVE: VHF/UHF TRUNKING
AVAILABILITY: Whether technology is best in use in other similar situations or is available for use by applicant	VHF/UHF radio has proven itself BAT in the North Slope environment (taking terrain and topography into account).	Trunking systems are available, provide better penetration, but tend to be blocked under heavy load.
TRANSFERABILITY: Whether each technology is transferable to applicant' s operations	No change.	Could be transferred.
EFFECTIVENESS: Whether there is a reasonable expectation each technology will provide increased spill prevention or other environmental benefits	No change.	Less effective in a spill response situation.
COST: The cost to the applicant of achieving BAT, including consideration of that cost relative to the remaining years of service of the technology is use by the applicant.	No change.	Considerable at this time. ACS has several years use left in its current systems. Transferring to a trunking system would mean scrapping our current system, and a multi-million-dollar investment in trunking equipment to provide coverage to the area currently covered.
AGE AND CONDITION: The age and condition of technology in use by the applicant	Current equipment ranges from new to 5 years old. Equipment is in excellent condition due to an aggressive preventive maintenance program, and will provide several more years of use.	N/A
COMPATIBILITY: Whether each technology is compatible with existing operations and technologies in use by the applicant	N/A	Not compatible with current ACS Remote Control System.
FEASIBILITY: The practical feasibility of each technology in terms of engineering and other operational aspects	N/A	In order to provide coverage without blocking, many more repeaters would be necessary than are in use with The current equipment. This would be cost-prohibitive.
ENVIRONMENTAL IMPACTS: Whether other environmental impacts of each technology, such as air, land, water pollution, and energy requirements, offset any anticipated environmental benefits	No change.	More repeaters; greater power requirements.

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**BEST AVAILABLE TECHNOLOGY ANALYSIS  
SATELLITE EARTH STATION**

BAT EVALUATION CRITERIA	CURRENT METHOD: "C" BAND EARTH STATION	ALTERNATIVE: "KU" BAND EARTH STATION
AVAILABILITY: Whether technology is best in use in other similar situations or is available for use by applicant	Based on satellite look angles, "C" band systems are more viable than "KU" band systems on the North Slope.	Less viable because of look angles.
TRANSFERABILITY: Whether each technology is transferable to applicant's operations	No change.	Could be transferred.
EFFECTIVENESS: Whether there is a reasonable expectation each technology will provide increased spill prevention or other environmental benefits	No change.	No change.
COST: The cost to the applicant of achieving BAT, including consideration of that cost relative to the remaining years of service of the technology is use by the applicant.	No change.	Comparable to "C" systems.
AGE AND CONDITION: The age and condition of technology in use by the applicant	The ACS system is essentially new.	N/A
COMPATIBILITY: Whether each technology is compatible with existing operations and technologies in use by the applicant	N/A	Compatible.
FEASIBILITY: The practical feasibility of each technology in terms of engineering and other operational aspects	N/A	Not feasible because of look angles.
ENVIRONMENTAL IMPACTS: Whether other environmental impacts of each technology, such as air, land, water pollution, and energy requirements, offset any anticipated environmental benefits	No change.	No change.

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**BEST AVAILABLE TECHNOLOGY ANALYSIS  
REMOTE TELEPHONE SERVICE**

BAT EVALUATION CRITERIA	CURRENT METHOD: SINGLE/MULTI-LINE DIAL RADIO TELEPHONES	ALTERNATIVE: SPREAD SPECTRUM TECHNOLOGY
AVAILABILITY: Whether technology is best in use in other similar situations or is available for use by applicant	Considering cost, ease of setup, and RF interference, current method is BAT.	Although spread spectrum provides more capability, it is susceptible to interference if used on the North Slope because of similar systems in wide use in the area.
TRANSFERABILITY: Whether each technology is transferable to applicant's operations	No change.	Could be transferred.
EFFECTIVENESS: Whether there is a reasonable expectation each technology will provide increased spill prevention or other environmental benefits	No change.	Would provide data connectivity unavailable now.
COST: The cost to the applicant of achieving BAT, including consideration of that cost relative to the remaining years of service of the technology is use by the applicant.	No change.	Costs of spread spectrum Systems are 10 times the cost of DRT's. Current systems have several years of service left. Changeover would be prohibitive.*
AGE AND CONDITION: The age and condition of technology in use by the applicant	Current equipment ranges from new to 5 years old. Equipment is in excellent condition due to an aggressive preventive maintenance program, and will provide several more years of use.	N/A
COMPATIBILITY: Whether each technology is compatible with existing operations and technologies in use by the applicant	N/A	Compatible.
FEASIBILITY: The practical feasibility of each technology in terms of engineering and other operational aspects	N/A	Feasible, but costly.
ENVIRONMENTAL IMPACTS: Whether other environmental impacts of each technology, such as air, land, water pollution, and energy requirements, offset any anticipated environmental benefits	No change.	No change.

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Simple vector calculations would be used based on wind speed and currents at the time. Computer-based trajectory models are less effective for the nearshore environment, and are not useful for spills of non-persistent products such as diesel.

Surveillance of winter spills is carried out by observation from aircraft and on the surface. In addition, infrared videotapes of the spill site may be made from the Phillips Twin Otter for viewing at the command center. On the ground, spill responders find the oiled areas by sight and mark them with lathe and flagging.

Forecasting of oil movement is applicable to spills to water rather than winter spills to frozen surfaces. Oil falling to snow-covered ground and sea ice is absorbed by the snow and does not move. The regulations for contingency plan contents call for information on procedures and methods for real time surveillance and tracking of discharged oil on open water [18 AAC 75.425(e)(1)(F)(iv)], as listed in the Department of Environmental Conservation's May 30, 1997, Draft Guidelines for Best Available Technology. Discharges of oil to snow and ice are to surfaces rather than to open water.

BAT EVALUATION CRITERIA	ALTERNATIVE 1: NOAA OSSM	ALTERNATIVE 2: HAND CALCULATIONS	ALTERNATIVE 3: OILMAP	ALTERNATIVE 4: OSP2
AVAILABILITY: Whether technology is best in use in other similar situations or is available for use by applicant	The NOAA HazMat division staff provides a verbal trajectory forecast within 1/2 to 1 hour of notification. A model run is available within 2 to 3 hours. NOAA's staff is always available. The HazMat division's digital On-Scene Spill Model (OSSM) models oil as discrete particles affected by wind and water speed and direction (as does all such software). Input information includes time, location, and quantity of spill. Advantages: <ul style="list-style-type: none"> <li>• NOAA is the source of most meteorological data input into any modeling software.</li> <li>• NOAA understands the limitations of the data and depicts these using uncertainty bounds.</li> <li>• NOAA uses three computer models to calculate water current speed and direction.</li> </ul>	Oil's direction and speed are calculated from water current and wind vector data. This approach assumes that wind pushes oil at 3% of wind speed. Vector calculations performed on scene may provide the primary trajectory forecasting available during the initial response. The calculations are likely to be used in conjunction with the results of computer modeling.	The OILMAP software can be purchased for use by anyone and runs on Windows. Use is limited by the number of licenses purchased from Applied Science Associates (ASA). OILMAP is widely used and accepted by the oil industry, and hindcast analysis has been performed by ASA to confirm its effectiveness. Access to some data may be limited. For example, although meteorological data can be obtained from NOAA, current data used in the ASA OILMAP model are previously calculated by ASA from NOAA data. The model does allow for integration of data from a variety of data formats, such as GIS.	OSP2 is a two-dimensional, menu-driven computer model that provides both trajectory tracking and probability analysis; however, the model is appropriate only for open seas, not for areas inside barrier islands. This model therefore is not considered appropriate for North Slope operations.
TRANSFERABILITY: Whether each technology is transferable to applicant's operations	Entirely transferable.	Entirely transferable.	Transferable with procedural and equipment changes.	N/A

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BAT EVALUATION CRITERIA	ALTERNATIVE 1: NOAA OSSM	ALTERNATIVE 2: HAND CALCULATIONS	ALTERNATIVE 3: OILMAP	ALTERNATIVE 4: OSP2
EFFECTIVENESS: Whether there is a reasonable expectation each technology will provide increased spill prevention or other environmental benefits	NOAA provides new forecasts daily during spill response. Thus, if wind or current direction changes, spill equipment can be moved beforehand to protect sensitive areas. NOAA also works directly with the U.S. Coast Guard to support response efforts. Updated data on spill location and movement will be obtained through radio reports from aerial observers, infrared aerial videotapes, and from tracking buoys such as those used in the Orion system. These data can be incorporated in the NOAA model to provide more accurate model results.	Vector calculations performed on scene may provide the primary trajectory forecasting available during the initial response. The calculations are likely to be used in conjunction with the results of computer modeling. Updated data on spill location and movement will be obtained through radio reports from aerial observers, infrared aerial videotapes, and from tracking buoys such as those used in the Orion system. As changes in spill movement occur, these data can be incorporated in the calculations to provide more accurate results.	Use of this model would improve spill response capabilities under ideal conditions; however, the accuracy depends on the experience of the modeler. Updated data on spill location and movement will be obtained through radio reports from aerial observers, infrared aerial videotapes, and from tracking buoys such as those used in the Orion system. As changes in spill movement occur, these data can be incorporated in the OILMAP model to provide more accurate model results.	Not effective for North Slope operations inside barrier islands.
COST: The cost to the applicant of achieving BAT, including consideration of that cost relative to the remaining years of service of the technology is use by the applicant.	No cost to the applicant.	No significant cost to the applicant.	Cost varies with number of users and the amount of data. The average cost per license is \$10,000 to \$20,000, which covers somewhat limited data without a lot of detail.	No cost for using this model for spills outside the barrier islands.
AGE AND CONDITION: The age and condition of technology in use by the applicant	The model and data are kept up to date.	N/A	Data used in this model may not be as up to date as data used by NOAA.	N/A
COMPATIBILITY: Whether each technology is compatible with existing operations and technologies in use by the applicant	The only compatibility issues is availability of telecommunications equipment needed to communicate with NOAA. Applicant's reliance on NOAA's model minimizes potential conflict with the results of other models.	Compatible with existing operations and technologies.	Compatible with existing operations and technologies with changes to procedures and equipment. Use of the technology requires training personnel.	N/A
FEASIBILITY: The practical feasibility of each technology in terms of engineering and other operational aspects	Has been used by spill responders in Alaska and the rest of the U.S. Might require minimal procedural changes, but would require no major engineering or operational changes.	Has been used successfully by spill responders throughout Alaska and the rest of the U.S. No procedural revisions are necessary.	Used successfully by spill responders throughout the U.S. It would require procedural revisions to implement, but would require no substantial engineering changes.	N/A
ENVIRONMENTAL IMPACTS: Whether other environmental impacts of each technology, such as air, land, water pollution, and energy requirements, offset any anticipated environmental benefits	N/A	N/A	N/A	N/A

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The wildlife protection plan in Tactics W-1 through W-5 can be considered best available technology because it is based on the guidelines published by the wildlife trustee agencies and involves the use of Alaska Clean Seas' stabilization center. ACS designed this center in consultation with recognized experts in the field, including the International Bird Rescue and Research Center. Furthermore, a doctor of veterinary medicine will be available to assist in decisions regarding oiled wildlife.

ACS worked with government agencies to develop the wildlife protection strategy. ACS brought together a joint industry/agency task force for the project. As a starting point, the task force used the "Wildlife Guidelines for Alaska" in the *Alaska Region Oil and Hazardous Substances Pollution Contingency Plan* produced by the Alaska Regional Response Team. These guidelines identify the three-tier strategy in the ACS plan. The tertiary strategy is the handling of oiled animals. The ACS wildlife capture and stabilization center was designed for this purpose and was based on the recommendations of Jan White, DVM, then Operations Manager of the International Bird Rescue and Research Center (IBRRC).

The design for the ACS stabilization center has been used by Alyeska Pipeline Service Company for Prince William Sound and by Cook Inlet Spill Prevention and Response, Inc. in Cook Inlet.

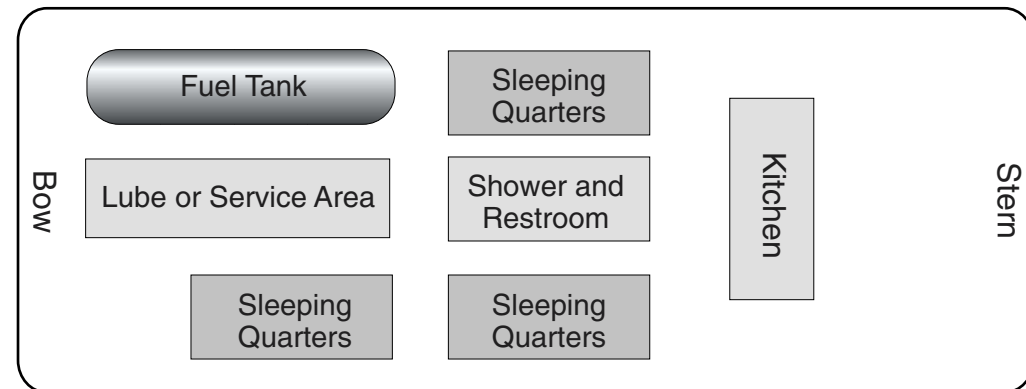


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**FLEXI-FLOAT BARGE  
LAYOUT #1**



A self-propelled Flexi-Float barge is utilized for support operations during a spill. A fuel tank, lube truck, and sleeping and dining facilities will be placed on the barge deck. The facilities will be able to handle a minimum of 12 people.

A second barge may be used to support the first with fresh water, food, fuel and hauling away gray water and garbage.

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NOTE: "Base Location" is storage location (may change seasonally); "Mobe Time" is time to get it out of storage, prepare it for operation, and make it ready to travel (concurrent for all equipment); "Deploy Time" is time to make it operational for its intended use at the spill site. These times do not include travel time from base to spill site, which may have multiple components (see Tactic L-3).

**EQUIPMENT AND PERSONNEL**

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MOBE TIME	DEPLOY TIME
Flexi-Float Barge	West Dock (Ice Services)	Support	2	6	18 hr	0
Fuel Tank	Colville	Fuel	1	0	0	0
Lube Truck	All	Lubrication	1	1	2 hr	0
Sleeping Quarters	Western Geophysical	Personnel berthing	3	1	0	0
Kitchen	Western Geophysical	Personnel dining	1	2	0	0
Shower/Restroom	Western Geophysical	Support	1	0	0	0

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- Western Geophysical currently has two Flexi-Float barges set up for geophysical work. These may be used for additional personnel support.

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**INITIAL ACTIONS**

**SITE SAFETY AND CONTROL**

- Health Hazards:** Respiratory/dermal/ingestion/exposure levels/PPE
- Fire/Explosion:** LEL's/explosion proof equipment
- Air Monitoring:** Suggested priority action that should continue as required throughout the response
- Biological Hazards:** Environmental and chemical
- Unsafe Conditions:** Weather, heavy equipment, adequate lighting, etc.
- Medical Emergency:** Medical plan and on-site first-aid capability

**NOTIFICATIONS**

- Corporate:** Have the appropriate corporate notifications been made?
- Local:** Has North Slope Borough and/or local communities been notified?
- State:** Have the proper State of Alaska notifications been made?
- Federal:** Have the proper Federal notifications been made?

**SPILL ASSESSMENT**

- Characterization:** Access control/hazard evaluation/PPE requirements/site description

**SOURCE CONTROL**

- Salvage**
- Relief Well**
- Flow Control/Mitigation**
- Repair**

**RESPONSE**

**STAGING AREAS**

- Location:** Best location to support remote operations in area outside contaminated areas
- Control:** Establish check-in/check-out system for personnel and equipment
- Space:** Make sure there's enough room

**CONTAINMENT**

- Booming:** Ensure you're using right boom for the job
- Earth/Snow Berms:** May be special permit requirements

**MECHANICAL RECOVERY**

- Skimming:** Skimmer requirements will change as oil weathers and emulsifies
- Heavy Equipment**

**BURNING**

- Burn Plan:** Who, what, where, when, why?
- Containment:** Oil needs to be >2mm to sustain combustion.
- Ignition System:** Heli-torch, hand-held igniters, or igniter of opportunity
- Permit:** FOSC and ADEC approval required to burn

**DECONTAMINATION**

- Personnel:** Required immediately for first responders as well as longer term
- Heavy Equipment:** What, when, how?
- Boom:** What, when, how?
- Skimmer:** What, when, how?
- Vessel:** What, when, how?
- Small Equipment/Tools:** What, when, how?

**SURVEILLANCE/TRACKING**

- Modelling:** If offshore, use hand calculations supplemented with NOAA model
- Aerial Surveillance:** Should be done at least daily to track oil and ground-truth model

- Tactical Surveillance:** Critical to have aerial surveillance to position resources in the field
- Mass Balance Calculations:** Be as accurate as possible before releasing information

**SHORELINE PROTECTION**

- Sensitive Habitat Identification:** Identify sensitive habitat to prioritize protection
- Prioritization Plan:** Develop plan

**SHORELINE CLEANUP**

- Assessment:** Form Shoreline Cleanup Assessment Teams (SCAT)
- Identify Beach Type:** Characterize and map beach types and oiled areas
- Identify Cleanup Techniques:** Determine correct techniques for each beach type and implement cleanup

**WASTE DISPOSAL**

- Liquid Oily Waste:** Where, when, how?
- Solid Oily Waste:** Where, when, how?
- Domestic Waste:** Where, when, how?
- Hazardous:** Where, when, how?
- Transport:** Where, when, how?
- Storage:** Temporary or long-term/impermeable
- Disposal:** Identify options
- Permits:** Ensure permits are in place

**COMMUNICATIONS**

- Radio (air-ground, etc.):** Need to establish as soon as possible and have ability to expand as needed

**ENVIRONMENTAL**

**ENVIRONMENTAL SENSITIVITY ID:** Identify and prioritize: cultural, archaeological, environmental

- Sensitive Wildlife Habitat:** Identify and prioritize
- Cultural/Archaeological:** Identify; confidentiality issues may arise

**WILDLIFE RESPONSE**

- Hazing:** Use only qualified personnel
- Capture:** Capture of terrestrial animals to be done by ADF&G
- Stabilization:** Ensure wildlife facility is operational
- Treatment:** Use licensed DVM
- Release:** Negotiate location and timing with trustee agencies

**NRDA**

- Survey:** Initiate as soon as practical
- Documentation**

**ANCILLARY ACTIVITIES**

**PUBLIC RELATIONS:** Initiate as soon as practical

**SECURITY**

**LAND OWNERSHIP ISSUES:** Ensure you have permission to enter native allotments

**SPILL PROJECT CLOSURE**

**DEMOBILIZATION:** Commence planning as soon as possible

**SITE RESTORATION**

- Material removal:** Will cause a disposal problem
- Revegetation:** Anticipate multi-year program
- Bioremediation:** Anticipate multi-year program

**CLAIMS**

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**AGENCY REPORTING REQUIREMENTS FOR OIL SPILLS**

AGENCY	SPILL SIZE	VERBAL REPORT	PHONE NUMBER	ALASKA CONTACT	WRITTEN REPORT
National Response Center Notifies all appropriate federal agencies	See specific federal agency below for guidance on reportable spill size	Immediately	(800) 424-8802 (24 hr)	24 hour line	Not required as form is completed during phone notification process.
U.S. Environmental Protection Agency	Any size to navigable waters of the U.S. (includes tundra) or to land that may threaten navigable waters	Immediately	(907) 271-5083, M-F, 8 to 5 (206) 553-1263 (907) 271-3424 (FAX) (M-F, 8 to 5)	Carl Lautenberger Seattle office, 24-hour EPA fax number	For facility requiring SPCC Plan if spill is 1000 gallons or more or if it is second spill in 12 months.
U.S. Coast Guard	Any size in or threatening navigable waters	Immediately	(907) 271-6700 (24 hr) (907) 271-6751 (FAX)	Marine Safety Office USCG fax number	Not required but requested.
U.S. Department of Transportation	Any size from a regulated pipeline	Immediately	(800) 424-8802	24 hour line	Required within 30 days on DOT Form 7000-1 (see form for details).
U.S. Department of Interior, USFWS	Any size that poses a threat to fish and wildlife	Immediately	(907) 271-2797	---	---
U.S. Department of the Interior, MMS	All spills into marine waters	Immediately	(907) 271-6065 (24-hour) (907) 271-6504 (FAX)	Jeff Walker	Copies of any reports submitted to ADEC as soon as possible.
Pipeline Corridor Office (SPLO/DOT) - Anchorage, AK	Any size from a regulated pipeline	Immediately	(907) 271-4373	---	---
ADEC	WATER Any Spill LAND >55 gallons (outside impermeable area) >55 gallons (inside impermeable area)	Immediately Immediately 48 hours	(907) 451-2121 (907) 451-2362 (FAX) and (800) 478-9300 (M-F after 5, Sat, Sun)	Ed Meggett ADEC fax number or Alaska State Troopers	Within 15 days of end of cleanup for spills greater than 10 gallons.
ADNR	10 to 55 gallons 1-10 gallons	48 hours None	(907) 451-2678 (907) 451-2751 (FAX)	Spill Report Number ADNR fax number	Monthly written record of any discharge, including a cumulative discharge, of oil solely to land for spills between 1 and 10 gallons.
AOGCC	All spills from wells or involving any crude loss	Immediately	(907) 279-1433 (24 hr) 276-7542 (FAX) (907) 659-3607 659-2717 (FAX)	Dave Johnston	Within 5 days of loss
North Slope Borough	All spills	>55 gallons as soon as possible (no verbats <55 gallons)	(907) 852-0440 (Barrow) (907) 852-5991 (FAX)	Permitting and Zoning Ralph Davis, OSEA After hours for both	Copy of any reports submitted as requested.

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The following tables identify pre-approved permits that have been issued to ACS and that are available to ACS' member companies. Each permit has its own reporting requirements and renewal dates. Check with the ACS Planning Manager for the latest information on these permits.

**EMERGENCY USE PERMITS**

PERMIT	NUMBER	AGENCY
Land Use Permit, Emergency Use	LAS 22375	Alaska Department of Natural Resources
Title 16 Fish Habitat Permit, Emergency Use	FG94-III-0218	Alaska Department of Fish and Game
Bird Hazing	FG94-III-01H Amendment 2	Alaska Department of Fish and Game
Mammal Hazing	FG94-III-02H Amendment 2	Alaska Department of Fish and Game
Mammal Stabilization, Transport, and Disposal	FG94-III-03H Amendment 2	Alaska Department of Fish and Game
Development Permit, Emergency Use	NSB 99-033	North Slope Borough
Capture, Salvage, and Rehabilitation of Migratory Birds and Raptors	MB772518-1	U.S. Fish and Wildlife Service
Information Use Agreement (gives access to Alaska Heritage Resources Survey information)	3140-4 AHRS	Alaska Department of Natural Resources

**NON-EMERGENCY USE PERMITS**

PERMIT	NUMBER	AGENCY	PURPOSE
Land Use	LAS 22374	Alaska Department of Natural Resources	Oil spill training
Title 16 Fish Habitat	FG99-III-0002	Alaska Department of Fish and Game	Boom pre-deployment
Title 16 Fish Habitat	FG92-III-0212	Alaska Department of Fish and Game	Summer oil spill containment and recovery training
Title 16 Fish Habitat	FG92-III-0213	Alaska Department of Fish and Game	Winter oil spill containment and recovery training
Open Burn Approval	Y002-N0108	Alaska Department of Environmental Conservation	Fire training at ACS fire-training site
USACE Permit	2-2000-0919 Beaufort Sea 444	U.S. Army Corps of Engineers	Upgrade of boat-launch facilities

**DEPLOYMENT CONSIDERATIONS AND LIMITATIONS**

- Geographical area of coverage: All state land owned between the west bank of the Colville River and the west bank of the Canning River north of 68° N. latitude.
- Emergency use permits allow activities outside normal permit stipulations if the activities would result in a significantly increased rate of oil spill cleanup.
- Permits are assignable to ACS member companies and may be accessed by taking the following steps:  
Notification to the relevant agency(ies) that permit(s) are being activated, including the name of the member company and the primary point of contact.
- Member companies should notify ACS when activating the permit.
- Users of the permits are responsible for any registered site restoration as a result of their activities.
- Permit users are required to meet reporting requirements associated with all the permits. These requirements are identified in the permits.

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ACS provides spill response training for their own personnel as well as the North Slope Spill Response Team (NSSRT) and Incident Management Team (IMT). This training includes both regulatory required training and training specific to various response positions and activities. ACS has developed five labor categories for the NSSRT. Each of these categories has minimum requirements for qualifications. ACS also maintains the response training records for all ACS staff, NSSRT and IMT members.

The five labor categories and criteria identified for NSSRT members are as follows.

**General Laborer**

- Current 24 Hour HAZWOPER certification
- Current HAZWOPER Medical Exam
- Current Respirator Fit Test

**Skilled Technician**

- Must meet the General Laborer training requirements
- Must have an additional 16 hours of training in a combination of response equipment, tactics or management or an equivalent amount of actual response time in skimmers, pumps and storage devices

**Team Leader**

- Must meet the Skilled Technician training requirements
- Must have a current HAZWOPER Supervisor certification

**Vessel Operator – Nearshore**

- Must meet the General Laborer training requirements
- Must have completed either the ACS Captain and Crew Training or a minimum of 40 hours of vessels operations in specific areas, or must possess an Uninspected Passenger Vessel Inland or larger license

**Vessel Operator – Offshore**

- Must meet the General Laborer training requirements
- Must have completed either the ACS Captain and Crew Training or a minimum of 40 hours of vessels operations in specific areas, or must possess a 25 Ton Near Coastal or larger license



**SPILL RESPONSE TRAINING COURSES**

Alaska Clean Seas provides a wide variety of response-related training courses to the NSSRT. These courses are divided into three basic categories: general courses that are taught on an as-needed basis, short courses that are taught regularly, and equipment proficiency checks that are also taught regularly.

Below is a representative list of the various courses that ACS provides to the NSSRT members.

COURSE #	COURSE TITLE	COURSE #	COURSE TITLE
100	Basic Oil Spill Response (Summer)	309	Management and Leadership during an Oil Spill Response
137	Comprehensive Rigging	312	Oil Under Ice - Exercise
138	HAZWOPER - 24 Hour	313	Behavior of Oil in Broken Ice Conditions
201	H2S - Hydrogen Sulfide	314	ICS Basic Radio Voice Procedures
204	CPR and Standard First Aid	315	Environmental, Safety, Bear and Rabies Awareness
207	Arctic Cold Weather Survival	318	Skimmers - Types and Applications
208	Arctic Ocean Water Survival	319	Snow Machine, ARGO and ATV Operation
209	HAZWOPER Supervisor	320	Weather Port and Survival Equipment
212	Winter Spill Operations	321	Staging Area Management
213	Summer Spill Operations	324	Oil Spill In-situ Burning Techniques
214	Summer Spill Operations - Offshore	325	Fastank and Bladders
224	Bird Collection and Stabilization	326	Wildlife Stabilization Facility Orientation
225	Oil Spill Burning Operations	329	Oil Spill Volume Estimation
228	Wildlife Hazing	330	Winter Oil Spill Operations
234	Helicopter Slings Operations	331	Near shore Operations
242	Vessel Training - Captain/Crew	332	Basic Hydraulics for Responders
243	Module 1 - Captain - Vessel Familiarization	333	SRT Wildlife Hazing
244	Module 2 - Captain - Vessel Operation & Navigation	336	Response Safety and Personnel Monitoring
245	Module 3 - Crew - Mini Barge Towing & Maneuvering	337	Tundra/Lake Spill Clean-up Techniques
246	Module 4 - Crew - Boom Deployment, Towing & Anchor.	338	Deckhand/Knot Tying
247	Module 5 - Crew - Skimmer Ops & Tactics	339	Charting & Mapping
300	Airboat Operations	340	Fate and Behavior of Oil
301	Boat Safety and Handling (classroom)	341	Winter Response Tactics
302	Boat Safety and Handling (practical)	471	Bear Deterrence
303	Boom Construction and Design	100150	Barge Crewman Training
304	Boom Deployment on Rivers	100170	Basic Oil Spill Response (Winter)
306	Decontamination Procedures	100292	Tactical Manual Review
307	Detection of Oil in Winter - Exercises	100363	Echo Tec - Basic
308	Global Positioning System (GPS)	Various	ACS has approx. 100 Proficiency Checks on Various Equipment



**INCIDENT MANAGEMENT TEAM TRAINING**

ACS provides training courses and facilitates exercises and drills for the North Slope Incident Management Team. ACS also maintains a matrix of recommended training based upon each IMT position.

Below is a representative list of the various courses that ACS provides to the IMT members.

COURSE #	COURSE TITLE
2493	IMS Overview
2571	Site Control
2573	Site Management
2575	Site Safety
2578	Getting Organized
2580	Communications
2495	Development of Tactical Worksheet
2498	Development of Initial Incident Briefing Form
2500	Field Reports and Field Team Organization
2502	Resource Ordering and Tracking
2504	Initial Incident Briefing (201)
2506	Mapping
2510	Information Management, Situation Status
2508	Information Management, Resource Status
2512	Operational Planning Worksheet & Situation Reports
2514	Operational Planning Worksheet for Next Operational Period
2516	Assessment Meetings
2518	Preparation of Tactical Objectives
2524	Shift Change Briefing
2528	Environmental Unit Training
2530	Documentation Unit Training
2532	Safety Officer Training
2534	Table-Top Talk-Around
2538	Integrated Table-Top Exercise

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**ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION  
DIVISION OF SPILL PREVENTION AND RESPONSE**

**OIL SPILL PRIMARY RESPONSE ACTION CONTRACTOR  
REGISTRATION**

NAME: Alaska Clean Seas  
 ADDRESS: Pouch 340022  
 CITY, STATE, ZIP: Prudhoe Bay, Alaska 99734-0022

APPLICATION OF  
Alaska Clean Seas  
 FOR REGISTRATION AS AN OIL SPILL PRIMARY RESPONSE ACTION CONTRACTOR IN THE  
North Slope  
 REGION(S) OF THE STATE OF ALASKA IS:

(XX) APPROVED FOR THREE YEARS  
 EFFECTIVE FROM: November 30, 1999  
 REGISTRATION NUMBER: 09-01-99-334  
 EXPIRATION DATE: December 31, 2002

OIL SPILL PRIMARY RESPONSE ACTION CONTRACTORS REGISTERED AND APPROVED BY THE  
 DEPARTMENT MUST COMPLY WITH THE MINIMUM REGISTRATION STANDARDS OF 18 AAC 75.560

NO LATER THAN JANUARY 31 OF EACH YEAR, AN OIL SPILL PRIMARY RESPONSE ACTION  
 CONTRACTOR REGISTERED BY THE STATE OF ALASKA SHALL PROVIDE TO THE DEPARTMENT A  
 COMPLETE LIST OF OIL DISCHARGE PREVENTION AND CONTINGENCY PLANS IN WHICH THE  
 CONTRACTOR HAS AGREED IN WRITING TO BE LISTED AS A PRIMARY RESPONSE ACTION  
 CONTRACTOR.

18 AAC 75.510(b)): REGISTRATION OF AN OIL SPILL PRIMARY RESPONSE ACTION CONTRACTOR BY  
 THE DEPARTMENT OF ENVIRONMENTAL CONSERVATION DOES NOT CONSTITUTE AN ASSURANCE  
 BY THE DEPARTMENT OF THE QUALIFICATIONS OR ABILITIES OF THAT CONTRACTOR OR THAT THE  
 CONTRACTOR WILL ADEQUATELY RESPOND TO A RELEASE OR THREATENED RELEASE OF OIL, NOR  
 DOES IT PROVIDE A DEFENSE TO LIABILITY UNDER STATE LAW.

SIGNED,  
  
 Christopher J. Pace  
 Contractor Registration Program

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U.S. Department  
of Transportation

United States  
Coast Guard



Commanding Officer  
National Strike Force  
Coordination Center

1461 US Hwy 17 North  
Elizabeth City, NC 27909  
Staff Symbol: (ops)  
Phone: (919) 331-6000

RECEIVED  
8/27/96

16471/1  
96-089  
AUG 20 1996

Mr. Richard Ranger  
Alaska Clean Seas  
Pouch 340022  
Prudhoe Bay, AK 99734-0022

Dear Mr. Ranger:

Your application for classification as an Oil Spill Removal Organization (OSRO) has been reviewed and processed as outlined in the Coast Guard OSRO Classification Guidelines dated 28 December 1995.

Enclosures (1) and (2) to this letter provide a summary of your interim classifications by environment and COTP zone, and a summary of the resource totals for Temporary Storage Capacity (TSC), Effective Daily Recovery Capacity (EDRC) and boom used to determine these classifications. A copy of this letter with enclosures (1) and (2) should be provided to your current and potential clients. A complete listing of all of your resources can be downloaded from the RRI Bulletin Board System at (919) 331-6039/6042 or, if you prefer, we can mail a printout to you upon request.

You will be contacted in the near future to schedule a resource verification visit. Final classification will be issued following completion of resource verification. If you have any questions regarding your classification, please contact LTJG George Ganoung of my staff at (919) 331-6000, ext 3041.

Sincerely,

D. B. PASCOE  
Captain, U. S. Coast Guard  
Commanding Officer

Encl: (1) OSRO Classification Information  
(2) Classifications by COTP Zone

Copy: COMDT (G-MOR)  
Seventeenth Coast Guard District (m)  
MSO Anchorage  
Pacific Strike Team



#### OSRO CLASSIFICATION INFORMATION

The purpose of the Coast Guard OSRO Classification Program is to provide a tool for vessel and facility response plan holders to aid them in meeting their requirements for response planning under 33 CFR 154 and 155. It is a voluntary program that provides a general indicator of an OSRO's capabilities based on the amount, type and geographic location of response resources they control. OSRO Classifications are only intended to be a general planning tool and do not relieve vessel and facility planholders of their responsibility to determine whether an OSRO meets their specific response planning needs under 33 CFR 154 and 155. Planholders desiring to use Coast Guard Classified OSROs should contact the individual OSROs they wish to use to insure that they will be able to meet their specific needs.

OSROs receive classifications (A, B, C, D and E) in four different operating environments (Rivers/Canals, Inland, Great Lakes and Oceans) in up to 47 COTP zones based on minimum equipment standards (outlined in the Coast Guard OSRO Classification Guidelines, dated 28 December 1995) for:

- (1) Boom totals in feet;
- (2) Effective Daily Recovery Capacity (EDRC) in barrels per day;
- (3) Temporary Storage Capacity (TSC) in barrels;

and AMPD, MMPD and WCD Tier 1, 2 and 3 response times as outlined in 33 CFR 154 and 155.

Response times for Rivers/Canals, Inland and Great Lakes environments are calculated by measuring the straight line (great circle distance on a globe) between the Latitude and Longitude of an OSRO's individual resource sites and the Latitude and Longitude of a designated city within each COTP zone (the Latitude and Longitude of the CG MSO within each COTP is used as a default). The time it would take to cover that distance is then calculated using 35 mph over land and 5 kts via water.

Response times in the Oceans environment are calculated to a point 12 nautical miles seaward of the COTP city (or alternate city) for AMPD response times, and 50 nautical miles seaward of the COTP city (or alternate city) for MMPD and WCD response times.

The A-E letter classifications are not inclusive. Each classification stands alone and indicates that the OSRO was able to meet the planning criteria outlined in the Coast Guard OSRO Classification Guidelines for a Specific classification, environment and COTP zone. In general, "A" classifications indicate the fastest response times, but the least amount of total equipment. "E" classifications indicate the slowest response times, but the greatest amount of total equipment. B-D classifications fall in the middle. Planholders desiring to use Coast Guard Classified OSROs are highly encouraged to review their own resource requirements and the specifics of OSRO Classifications before determining the level(s) of capability they specifically need.

Detailed information on an OSRO's equipment is available by dialing into the Coast Guard's Response Resources Inventory (RRI) Database at (919) 331-6039/6042. For more information on the OSRO Classification Program and the RRI Database, contact the NSFCC at (919) 331-6000 or email: OSRO/NSFCC@cgsmtp.uscg.mil.

ENCL ( 1 )



Printed: August 17, 1996

OSRO 0089 - Alaska Clean Seas (Head Office)  
Classification Summary Sheet

COTP Zone: WESTERN ALASKA High Volume Port: No

Classifications are based on response times to Prudhoe Bay, AK 99734

Latitude : 70° 22' 0"  
Longitude: 148° 42' 0"

If an Ocean's rating has been requested, this classification will be based on response times to Homer, AK instead of Prudhoe Bay, AK 99734.

Latitude : 59° 37' 30"  
Longitude: 151° 31' 30"

If High Volume Port = Yes, classifications will be calculated using response times for High Volume Ports as outlined in the OSRO Classification Guidelines and 33 CFR 154 and 155.

Interim Classification

Environments	Facility Classification Levels					Vessel Classification Levels				
	A	B	C	D	E	A	B	C	D	E
River/Canal	X	X	X	X	X	X	X	X	X	X
Inland	X	X	X	X		X	X	X	X	
Ocean				X					X	
Great Lakes										

X - an indicator that you have received a classification(s) for a specific environment

Classifications are not inclusive

- A = Average Most Probable Discharge (AMPD)
- B = Maximum Most Probable Discharge (MMPD)
- C = Worst Case Discharge Tier 1 (WCD Tier 1)
- D = Worst Case Discharge Tier 2 (WCD Tier 2)
- E = Worst Case Discharge Tier 3 (WCD Tier 3)

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Printed: August 17, 1996

OSRO 0089 - Alaska Clean Seas (Head Office)  
Classification Detailed Amounts Per Rating Category

COTP Name: WESTERN ALASKA

Environment	Facility	Vessel
River/Canal	A 189479 93131 65218	A 208613 101049 66414
	B 208613 101049 66414	B 208613 101049 66414
	C 208613 101049 66414	C 208613 101049 66414
Inland	A 71475 93131 65218	A 71475 93131 65218
	B 73651 101049 66414	B 73651 101049 66414
	C 73651 101049 66414	C 73651 101049 66414
Ocean	A 41733 55090 66414	A 41733 55090 66414
	B 41733	B 41733
	C 41733	C 41733
Great Lakes	A 41733 55090 66414	A 41733 55090 66414
	B 41733	B 41733
	C 41733	C 41733

Note: The amounts listed under each alphabetic rating are totals that you received under each environment per rating time requirements. If the minimum amounts needed for a rating was met for all three categories, then you received a rating in that environment. For an Ocean's environment, the minimum amounts in four categories must be met.

The amounts under EDRC and TSC are a combination of your dedicated and non-dedicated resources. If the resource is not checked as dedicated equipment, you will only receive 1/2 of the actual calculation.

For an A classification in the Ocean's environment, 2000 ft of boom must be able to reach a point 12 miles from the COTP City. For classifications B - E, specific amounts of containment boom must be able to be on scene 50 miles seaward of the COTP City. These amounts of boom are inclusive in the total amounts of boom under classifications B - E.

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