Alaska Clean Seas Technical Manual

Volume 1
Tactics Descriptions

Revision 12, Jan 2015

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.

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.

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

FOREWORD

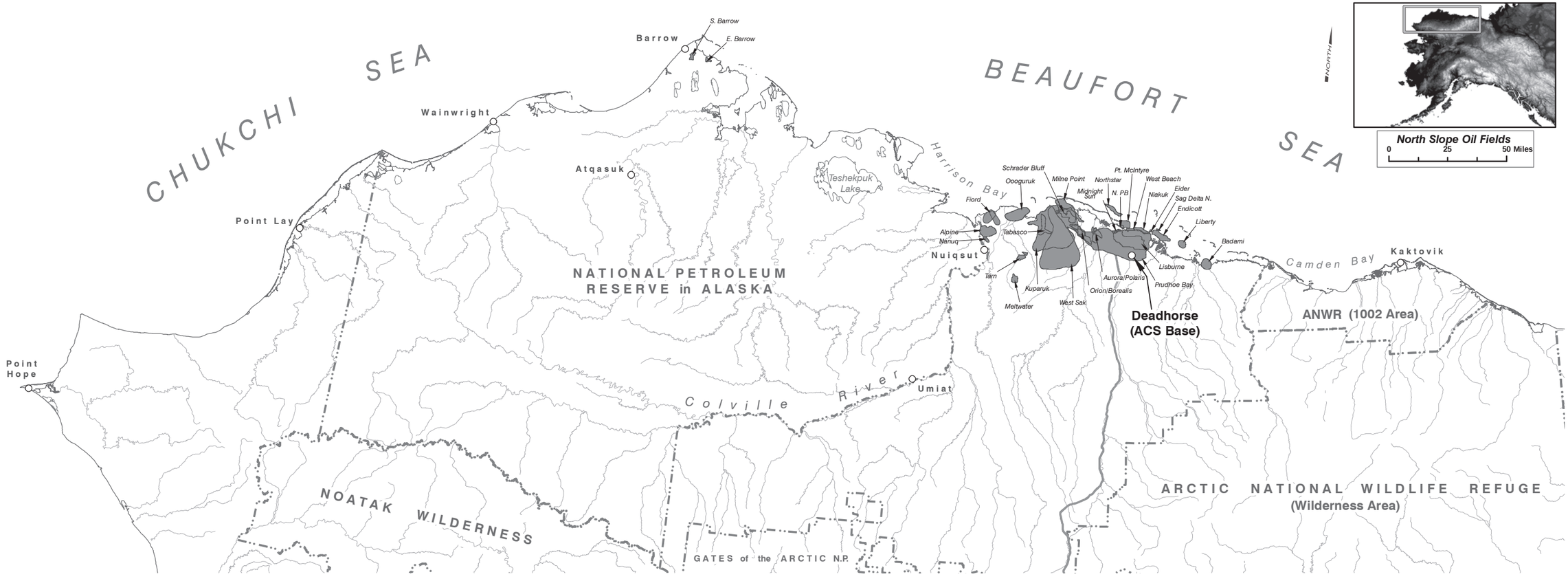
This tactics manual is the first volume of two manuals that make up the *Alaska Clean Seas Technical Manual* providing ACS member companies with a unified response plan for spills both onshore and offshore across the North Slope of Alaska from the Chukchi Sea eastward to the Canadian border and inland from Pump Station 1 to Pump Station 4 (Milepost 167) of the Trans-Alaska Pipeline System:

Volume 1: *Tactics Descriptions*
Volume 2: *Map Atlas*

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
Special Projects and Development Coordinator
Pouch 340022
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Phone: 907-659-3207
Fax: 907-659-2616

Tactic: _____

Change: _____

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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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME

SUPPORT

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME

CAPACITIES FOR PLANNING

DEPLOYMENT CONSIDERATIONS AND LIMITATIONS

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

The purpose of the ACS *Technical Manual* is to provide comprehensive response information in a uniform, user-friendly format accessible to both operations planning staff and regulatory agency C-Plan reviewers. This information is designed to be the basic building blocks upon which member company planners develop facility-specific C-Plans.

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

- Safety
- Containment
- Recovery and Storage
- Tracking and Surveillance
- Burning
- Dispersants
- 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 any additional information unique to the specific tactic. Planning capactities for calculating the volume recovered by commonly-used equipment in the ACS' and member-companies' inventories is located in Tactic L-6.

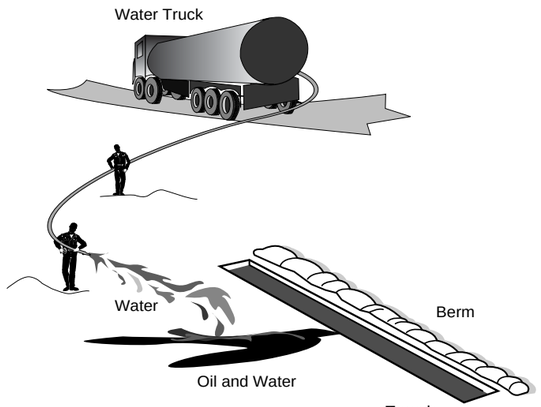
SAMPLE TACTICS DESCRIPTION

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

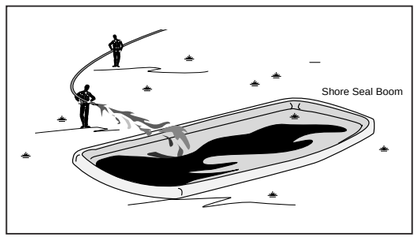
Note that travel time is not included in the mobe and deploy times indicated in the "Equipment and Personnel" and "Support" tables, since travel time depends on the location of the spill and the mode of transportation. "Travel time" is how long it takes to transport equipment from the base location (after 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.

TACTIC R-4 Flushing of Oil on Tundra Surface

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



FLOATING OIL WITHIN SHORE SEAL BOOM



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

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.

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

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

- 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
or	Upright Tank (400 bbl)	KRU, Alpine	Water source	1	2	2 hr	1 hr
	Ice Auger	WOA, EOA, KRU, ACS, Endicott, Alpine	Water source	1		1hr	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.

"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.

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 agency guidelines.

Various operational and environmental considerations are presented here.

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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 necessary ADEC requirements [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.

TABLE 3
OIL RECOVERY CAPACITY

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

TABLE 4
LIQUID HANDLING CAPABILITY

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

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

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
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
bph	Barrels per hour
BPXA	BP Exploration (Alaska) Inc.
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
GPB	Greater Prudhoe Bay
gpm	Gallons per minute
GPS	Global positioning system
H_2S	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
ISB	In-situ burning
KRU	Kuparuk River Unit
LEL	Lower explosive limit

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Acronyms

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)
OSRB	Offshore recovery barge
OSRV	Offshore recovery vessel
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
RPS	Response Planning Standard (State of Alaska)
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
WCD	Worst Case Discharge (Federal)
WOA	Western Operating Area (Prudhoe Bay Field)

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

Tactic		Rev. Date
SAFETY		
S-1	Site Entry Procedures	Revised 01/15
S-2	Site Safety Plan Form	Revised 03/12
S-3	Identifying Required Personal Protection	Revised 03/12
S-4	Site Layout	Revised 03/12
S-5	Air Monitoring for Personal Protection	Revised 01/15
S-6	Decontamination	Revised 03/12
S-7	Gross Decontamination of Vessels	Revised 03/12
S-8	Safety During Operations in Overflood Conditions	Revised 03/12
CONTAINMENT		
C-1	Containment Using Snow Berm	Revised 07/13
C-2	Deflection Booming at a Culvert	Revised 03/12
C-3	Culvert Blocking	Revised 03/12
C-4	Barriers on Land	Revised 07/13
C-5	Deflection or Exclusion Booming on Lake or Tundra	Revised 03/12
C-6	Underflow Dam	Revised 07/13
C-7	Deadarm Trench on River Bank	Revised 07/13
C-8	Deflection Booming in Stream	Revised 03/12
C-9	Exclusion Booming on River	Revised 03/12
C-10	Containment Using Ice-Road Ring	Revised 01/15
C-11	Containment on Ice with Trenches and Sumps	Revised 07/13
C-12	Trenching Ice to Direct Flow to a Containment Point	Revised 07/13
C-13	Deflection Booming in Open Water	Revised 03/12
C-14	Exclusion Booming in Open Water	Revised 03/12
C-15	Intertidal Booming	Revised 03/12
C-16	Anchored W Deflection Boom	Revised 03/12
C-17	Containment Using U-Boom	Revised 03/12
C-18	Containing Light Layer of Oil on Snow Using Water Spray	Revised 07/13
C-19	Containing Oiled Snow Using Snow Fence	Revised 03/12
C-20	Containment of Pipeline Leak over Water	Original 07/13
RECOVERY AND STORAGE		
R-1	Mechanical Recovery of Lightly Oiled Snow	Revised 01/15
R-1A	Use of Snow Blower to Remove Lightly Misted Snow	Revised 01/15
R-2	Manual Recovery of Lightly Oiled Snow	Revised 03/12
R-3	Recovery of Oil-Saturated Snow	Revised 01/15
R-4	Flushing of Oil on Tundra Surface	Revised 07/13
R-5	Recovery of Embedded Oil	Revised 07/13
R-6	Recovery by Direct Suction	Revised 07/13
R-6A	Ground Thaw with Direct Suction	Original 01/15
R-7	Recovery from Pit or Trench	Revised 03/12
R-8	Use of Portable Skimmers with Pumps (River and Lake)	Revised 03/12
R-9	Use of Sorbents	Revised 03/12
R-10	Fairchild Gate Weir Collection System	Revised 07/13
R-11	Decanting Separated Water in River	Revised 03/12

Tactic		Rev. Date
RECOVERY AND STORAGE (CONT'D)		
R-12	Aggressive Breakup in River	Revised 03/12
R-13	Cutting Ice Slots for Recovery	Revised 03/12
R-14	Recovery of Oil under Ice	Revised 03/12
R-15	Anchored V-Boom to Skimmer	Revised 01/15
R-16	Hook Boom to Skimmer and Storage	Revised 01/15
R-17	J-Boom to Skimmer and Mini-Barge	Revised 01/15
R-18	U-Boom to Skimmer and Mini-Barge	Revised 01/15
R-19	J-Boom to Large Barge or OSRV	Revised 01/15
R-19A	Use of J-Booms in Broken Ice	Revised 01/15
R-20	U-Boom with Open Apex to Skimming System	Revised 01/15
R-21	Hot-Water, High-Pressure Washing of Solid Surfaces	Revised 03/12
R-22	Temporary Storage Options	Revised 01/15
R-23	Tank on Trailer (Fuel Tanker)	Revised 01/15
R-24	Hoses and Pumps in Series	Revised 07/13
R-25	Freighter Boat with Tank	Revised 01/15
R-26	Excavation and Storage of Oiled Gravel	Revised 01/15
R-27	Damaged Tank Transfer Procedures	Revised 01/15
R-28	Lightering/Offloading	Revised 03/12
R-29	Ice Mining	Revised 07/13
R-30	Recovery Using Diamond Boom for Subsea Pipeline Break	Revised 01/15
R-31	Free Skimming	Revised 01/15
R-32A	Single Boom-Arm Skimming	Revised 01/15
R-32B	Double Boom-Arm Skimming	Revised 01/15
R-33	Swift Water Recovery – Harbour Buster	Revised 03/12
TRACKING AND SURVEILLANCE		
T-1	Delineation of Oiled Snow or Tundra	Revised 03/12
T-2	Mapping and Surveillance of Spill on Land	Revised 07/13
T-3	Detection and Delineation of Under-Ice Oil	Revised 01/15
T-4	Discharge Tracking in Open Water	Revised 01/15
T-4A	Discharge Tracking in Ice	Revised 03/12
T-5	Trajectory Calculations	Revised 03/12
T-6	Blowout Modeling	Revised 03/12
T-7	Spill Volume Estimation	Revised 03/12
BURNING		
B-1	In-Situ Burning Plan	Revised 03/12
B-1A	In-Situ Burn Plan and Application Form	Revised 03/12
B-2	Burning Oily Vegetation	Revised 03/12
B-3	In-Situ Burning with Heli-torch and Other Igniters	Revised 03/12
B-4	Deployment and Use of Fire Containment Boom	Revised 01/15
B-5	Burning Oil Pools on Any Solid Surface	Revised 01/15
B-6	Burn Residue Recovery	Revised 03/12
B-7	Burn Extinguishment on Water	Revised 03/12

Tactic		Rev. Date
DISPERSANTS		
DT-1	Dispersant Application Via Vessel	Revised 03/12
DT-2	Dispersant Application Via Aircraft	Revised 03/12
DT-3	Dispersant Application Via Helicopter	Revised 03/12
SHORELINE CLEANUP		
SH-1	Shoreline Assessment	Revised 03/12
SH-2	Natural Recovery of an Oiled Shoreline	Revised 03/12
SH-3	Shoreline Cleanup Using Flooding and Flushing	Revised 03/12
SH-4	Shoreline Cleanup Using Steam Cleaning or Sand Blasting	Revised 03/12
SH-5	Shoreline Cleanup Using Manual Removal and Vacuum Methods	Revised 03/12
SH-6	Shoreline Cleanup Using Mechanical Removal	Revised 07/13
SH-7	Shoreline Cleanup Using Sorbents and Vegetation Cutting	Revised 03/12
SH-8	Shoreline Cleanup Using Mechanical Tilling/Aeration	Revised 07/13
SH-9	Shoreline Cleanup Using Sediment Reworking and Surf Washing	Revised 03/12
SH-10	Shoreline Cleanup Using Burning	Revised 03/12
SH-11	Biological/Chemical Shoreline Response Tactics	Revised 03/12
SH-12	Summary of Potential Impact of Shoreline Cleanup Techniques	Revised 03/12
WILDLIFE AND SENSITIVE AREAS		
W-1	Wildlife Protection Strategy and Permits	Revised 03/12
W-1A	RRT Hazing Checklist	Revised 03/12
W-1B	RRT Capture/Transportation/Stabilization/Treatment Checklist	Revised 03/12
W-1C	RRT Contact Information for Wildlife Resource Agencies	Revised 03/12
W-2	Wildlife Hazing Equipment	Revised 03/12
W-2A	Mammal Hazing	Revised 03/12
W-2B	Bird Hazing	Revised 03/12
W-3	Wildlife Capture and Rehabilitation	Revised 01/15
W-4	Salvage of Dead Wildlife	Revised 03/12
W-5	Deployment of ACS Mobile Wildlife Stabilization Center	Revised 03/12
W-6	Identifying and Protecting Sensitive Areas	Revised 03/12
DISPOSAL		
D-1	Processing Recovered Liquids	Revised 07/13
D-2	Storage and Disposal of Non-Liquid Oily Wastes	Revised 07/13
D-3	Disposal of Non-Oily Wastes	Revised 07/13
D-4	Stockpiling Oiled Gravel	Revised 07/13
D-5	Processing of Contaminated Snow/Ice	Revised 07/13

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

Tactic		Rev. Date
LOGISTICS AND EQUIPMENT		
L-1	Ice Road Construction for Access to Winter Tundra Spill	Revised 01/15
L-2	Staging Areas	Revised 01/15
L-3	Deployment Strategies	Revised 01/15
L-4	Logistical Support	Revised 01/15
L-5	Communications	Revised 07/13
L-6	ACS Response Equipment Specifications	Revised 01/15
L-6A	Shell Response Equipment Specifications	Revised 03/12
L-7	Realistic Maximum Operating Limitations	Revised 01/15
L-8	North Slope Mutual Aid	Revised 03/12
L-9	Accessing Contract Resources	Revised 01/15
L-10	Accessing Non-Obligated Resources	Revised 01/15
L-11	Best Available Technology Analysis	Revised 03/12
L-11A	BAT Analysis: ACS Communications	Revised 03/12
L-11B	BAT Analysis: Trajectory Analyses	Revised 03/12
L-11C	BAT Analysis: Wildlife Protection	Revised 03/12
L-12	Logistical Support for On-Water Operations	Revised 03/12
ADMINISTRATION		
A-1	Emergency Action Checklist	Revised 03/12
A-2	Spill Reporting Procedures	Revised 03/12
A-3	ACS Pre-Approved Permits	Revised 03/12
A-4	Training Requirements for Response Personnel	Revised 03/12
A-5	ACS Certifications	Revised 01/15

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

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.***

LIMITS TO ENTRY

- ***No entry is authorized if the percentage of LEL exceeds 10% on a calibrated direct-reading explosive gas meter.***
- ***No entry is authorized if the oxygen percentage exceeds 23.5%.***
- ***In all cases, physical hazards of entry must be considered along with health hazards.***

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).

**The PEL is 5 mg/m^3 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.*

PRE-ENTRY SAFETY

The decision as to whether of not any given entry shall be attempted is ultimately the responsibility of the On Scene Commander with advice and guidance from:

- The Site Safety Officer (safety professional or experienced responder)
- The Emergency Response Leader
- The Environmental Team Leader

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 Site Safety Officer makes a preliminary evaluation of a site's characteristics (hazards) before site entry.

The Site 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."
- 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).

SITE ENTRY

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.

Below are three levels of protection for entry into varying conditions listed in descending order of protection. It is required to consult with a "competent person" for job specific PPE requirements. (Note: The recommended levels below reflect a 12-hour shift. All employees must have had the necessary training pertaining to their tasks prior to entering any site. In addition, these guidelines are for crude oil and petroleum spills; other criteria apply to hazmat spills).

1. Entry by one or more workers with SCBA and a single backup observer also equipped with SCBA is allowed under the following conditions:
   - Oxygen atmospheric concentration is less than 23.5%.
   - LEL percentage is less than 10% as measured by a calibrated direct-reading hand-held instrument.
2. Entry with full-face air purifying respirator and organic vapor cartridges is allowed by any number of workers without backup observers under all of the following conditions:
   - Oxygen atmospheric concentration is between 19.5% and 23.5%.
   - LEL percentage is less than 3%.
   - Total hydrocarbon concentration is less than 500 ppm.
   - H_2S air concentration is less than 10 ppm.
   - Benzene air concentration is less than 15 ppm.
   - Normal natural or mechanical ventilation is available.
   - No visible mist or fog of oil present.

3. Entry with half-face air purifying respirator and organic vapor cartridges is allowed by any number of workers without backup observers under all of the following conditions:

   - Oxygen atmospheric concentration is between 19.5% and 23.5%.
   - LEL percentage is less than 3%.
   - Total hydrocarbon concentration is less than 500 ppm.
   - H_2S air concentration is less than 10 ppm.
   - Benzene air concentration is less than 3 ppm.
   - Normal natural or mechanical ventilation is available.
   - No visible mist or fog of oil present.

4. Entry without respiratory protection is allowed for any work required under all of the following conditions:

   - Oxygen atmospheric concentration is between 19.5% and 23.5%.
   - LEL percentage is less than 3%.
   - Total hydrocarbon concentration is less than 50 ppm.
   - H_2S air concentration is less 10 ppm.
   - Benzene air concentration is less than 0.3 ppm.
   - Normal natural or mechanical ventilation is available.
   - No visible mist or fog of oil is present.

Note: In environments with excess dust and debris, an organic vapor / particulate filter is recommended (OV/HEPA)

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.

IF A PROFESSIONAL OPINION IS NEEDED CALL THE IH OR SAFETY REPRESENTATIVE

- A trained person using properly calibrated equipment must conduct air monitoring.
- If permissible entry conditions change outside of allowable criteria during entry, the entry must be terminated.
- If a worker is splashed with crude oil, remove clothing and wash affected skin area.
- If eyes are splashed rinse for at least 15 minutes and get medical attention.

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

NORTH SLOPE SITE HEALTH & SAFETY PLAN

Incident Name:	Date Prepared:
Incident Location:	Time Prepared:
Site Safety Officer:	On-Scene Commander:

(1) TYPE OF INCIDENT

- ☐ Personal Injury/Medical
- ☐ Explosion
- ☐ Spill
- ☐ Collision
- ☐ Other
- ☐ Fire
- ☐ Gas Release
- ☐ Well Control
- ☐ Terrorism
- ☐ Planned Event

(2) ENTRY OBJECTIVES (Refer To ICS-201, 202)

- ☐ Isolate and Control Entry
- ☐ Rescue Victims/Evacuation or Shelter in Place
- ☐ Spill Cleanup
- ☐ Account for Personnel
- ☐ Source Control
- ☐ Reconnaissance
- ☐ Fire Suppression
- ☐ Special Procedures
- ☐ _____
- ☐ _____

(3) HAZARD IDENTIFICATION/EVALUATION (Refer to ICS-204S)

Chemical Properties

Name:
Est. Amount:
State (Liquid, Gas, Solid)
Spec. Gravity/Vapor/Density
Water Soluble?
MSDS on Hand?

Hazards

- ☐ Flammable? FP: ____ LEL Range: _____ %
- ☐ Explosive?
- ☐ Toxic? IDLH: PEL:
- ☐ Corrosive? DOT/UN#
- ☐ Reactive? DOT Hazard Guide #
- ☐ Carcinogen? Threat To: _____
- ☐ Human Health at Risk?
- ☐ Environmental Sensitive Areas at Risk?

Physical (Energy Sources Involved)

- ☐ Electrical
- ☐ Pressure
- ☐ Momentum/Gravity
- ☐ Residual/Stored Energy
- ☐ Special
- ☐ High Temperature
- ☐ Energy Isolation and Control Verified? YES/NO
- ☐ Vibration
- ☐ Noise
- ☐ Heat or Cold Stress

Biological

- ☐ Blood Borne Pathogen Prevention Plan Implemented?
- ☐ Wildlife Control Implemented?
- ☐ Special Health/Medical Issues?

Special

- ☐ Confined Space Entry
- ☐ Elevated Area
- ☐ Limited Access
- ☐ Below Grade (pit, trench)
- ☐ Offshore Structure
- ☐ Land Structure

(4) SITE INFORMATION (Refer to ICS-201-5)

Safe Access Route to the Site:
Command Post Location:
Medical Located:
Site Control:
Site Org. Level: (ICS-204) YES/NO

Site Control Zones Established on ICS-201 Site Map.
Exclusion Zone Line:
Contamination Reduction Zone Line:
Support Zone Line:
Traffic Pattern Established? YES/NO

(5) WEATHER/ENVIRONMENTAL

Current

Air Temp: Wind Speed: /mph Humidity:
Precipitation: Wind Direction:

Forecast Time: Date:

Air Temp: Wind Speed: /mph Humidity:
Precipitation: Wind Direction:

Sea/Water Conditions

Sea State 1-2-3-4-5-6 Feet. Maximum Average Wave Height: Feet.
Currents: Y - N Current Speed: knots Current Direction:
Forecast:

(6) SAFETY PROCEDURES

SPECIAL ENTRY PROCEDURES (Refer to ICS-206)

Pre-Entry Vitals Taken by Medical
Post-Entry Vitals Taken by Medical
Comments:

(7) ROUTE OF EXPOSURE

- ☐ Inhalation _____
- ☐ Ingestion _____
- ☐ Eye Contact _____
- ☐ Dermal _____

(8) MONITORING

Area

	Frequency
Oxygen	Y/N
Flam. Gas	Y/N
H2S	Y/N
Benzene	Y/N
CO2	Y/N
Hydrocarbon	Y/N
_____	Y/N

Safety or Industrial Hygienist:

Sign:

(9) TRAINING

- ☐ Response Training Requirements Have Been Identified?

Comments:

(10) PERSONAL PROTECTIVE EQUIPMENT (PPE)

Exclusion Zone (Hot)

	Head/Eye	Respiratory	Body	Gloves	Foot	PFD
☐ A						
☐ B						
☐ C						
☐ D						

☐ Contamination Reduction Zone (WARM) (See Section 19, Decon)

Prepared By: _____ (Site Safety Officer) _____ (Date/Time) **Approved By:** _____ (On-Scene Commander) _____ (Date/Time)

(11) COMMUNICATIONS RADIO

- ☐ Radio Communication Plan Implemented?

Command Channel: _____
Tactical Channel(s): ____/____/____

- ☐ Emergency Call: (Band Aid - Band Aid - Band Aid)
- ☐ Bull Horns
- ☐ SCBA Communication
- ☐ In-Suit Communication

(12) VISUAL/SIGNS

- ☐ Entry Team Briefing Conducted
- ☐ Buddy System
- ☐ Leader/Team Site Rules Established
- ☐ Emergency Signals Verified with All Team Members
- ☐ Other:

(13) HAND SIGNALS

(14) SITE EMERGENCY EQUIPMENT

List special equipment required

Equipment	Location
☐ _____	_____
☐ _____	_____
☐ _____	_____
☐ _____	_____
☐ _____	_____
☐ _____	_____
☐ _____	_____

(15) RESCUE/MEDICAL

List Special Rescue or Medical

Equipment/Unit	Location
☐ _____	_____
☐ _____	_____
☐ _____	_____
☐ _____	_____
☐ _____	_____
☐ _____	_____
☐ _____	_____

(16) ESCAPE/EVACUATION

- ☐ Safe Refuge Area Established for Exclusion Zone & for Location:
- ☐ Escape/ Evacuation Alarm/Signal:
- ☐ Entry Team Escape Route:
- ☐ Criteria for Required Evacuation Established? (wind change, IDLH conditions, etc.)

(17) DECONTAMINATION (CORRIDOR)

- ☐ Decontamination Plan Established?
- ☐ Decon Solution _____
- ☐ Decontamination Control Marked on ICS-201 Site Map?

Standard Decontamination Layout? **Y/N**

- ☐ Emergency Decon Procedure (Gross Flushing)

(18) DECON WORKER PPE LEVEL

	Head/Eye	Respiratory	Body	Gloves	Foot	PFD
☐ A						
☐ B						
☐ C						
☐ D						

NOTE: Decon personnel to be protected at the same level or one level below Exclusion Zone entry personnel.

(19) ORGANIZATIONAL PLAN & INITIAL BRIEFING

- ☐ Organizational Plan/Position Designations Complete? (Refer to ICS-201, 203, 204)
- ☐ Incident Action Plan Established? (Refer to ICS-Forms, I.A.P.)
- ☐ All Positions Track and Record Actions (Refer to ICS-214) Unit Log

(20) ATTACHMENTS (ICS Forms, Maps, Photos, etc.)

☐ _____	☐ _____
☐ _____	☐ _____
☐ _____	☐ _____
☐ _____	☐ _____
☐ _____	☐ _____
☐ _____	☐ _____
☐ _____	☐ _____

(21) DEMOBILIZATION

- ☐ Demobilization Safety Procedures Established?

(22) ADDITIONAL COMMENTS:

Prepared By: _____ (Site Safety Officer) _____ (Date/Time) **Approved By:** _____ (On-Scene Commander) _____ (Date/Time)

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

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.

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

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

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

GUIDELINES FOR PPE

RESPIRATORY:

A NIOSH approved air purifying respirator with an organic vapor cartridge may be used under conditions where airborne concentrations are expected to exceed permissible exposure limits. All employees need to be fit tested for the particular brand and model they will be expected to use.

A Respiratory Protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant a respirator's use.

SKIN:

The use of gloves impervious to the specific material handled is advised to prevent skin contact, possible irritation, absorption, and skin damage.

Recommended Use: Depending on conditions the use of aprons and or arm covers may be necessary.

Note: *These are just recommendations; each company may purchase and use their PPE of choice. Below is a simple guideline for petroleum PPE selection. It is still necessary for a "competent person" to determine PPE usage for each specific response incident. Surgical grade gloves are not a recommended substitution for industrial use chemical protective gloves. Read the manufacturers recommended application before using any product.*

GLOVE MATERIAL	GENERAL USES
Butyl	Offers the highest resistance to permeation by most gases and water vapor. Especially suitable for use with esters and ketones. Poor for aliphatic, aromatic hydrocarbons, halogenated hydrocarbons, and gasoline.
Neoprene	Good for acids and bases, peroxides, fuels, hydrocarbons, alcohols, phenols. Poor for halogenated and aromatic hydrocarbons
Nitrile	Excellent general duty glove. Provides protection from a wide variety of solvents, oils, petroleum products, and some corrosives. Excellent resistance to cuts, snags, punctures, and abrasions
PVC	Provides excellent abrasion resistance and protection from most fats, acids, and petroleum hydrocarbons. Poor for most organics (consult a competent person prior to use).
PVA	Highly impermeable to gases. Excellent protection from aromatic and chlorinated solvents. Cannot be used in water or water-based solutions.
Viton	Exceptional resistance to chlorinated and aromatic solvents. Good resistance to cuts and abrasions.
Silver Shield	Resists a wide variety of toxic and hazardous chemicals. Provides the highest level of overall chemical resistance.
4H	Same as Silver Shield, but offers better dexterity.
Natural (Latex) rubber	Good for very dilute acids and bases. Poor for organics (consult a competent person prior to use).

EYE/FACE:

Approved eye protection to safeguard against potential eye contact, irritation, or injury is recommended. Depending on conditions the use of a face shield over safety glasses or goggles may be necessary.

OTHER PROTECTIVE EQUIPMENT:

It is recommended that protective clothing be worn when skin contact is possible such as:

- Tyvek (light duty clean up)
- Saranex
- Dupont level "B"

It is required to consult with a "competent person" for job specific PPE requirements. Eye wash and quick drench shower facilities should be available in the work area. Thoroughly clean shoes and wash contaminated clothing before reuse.

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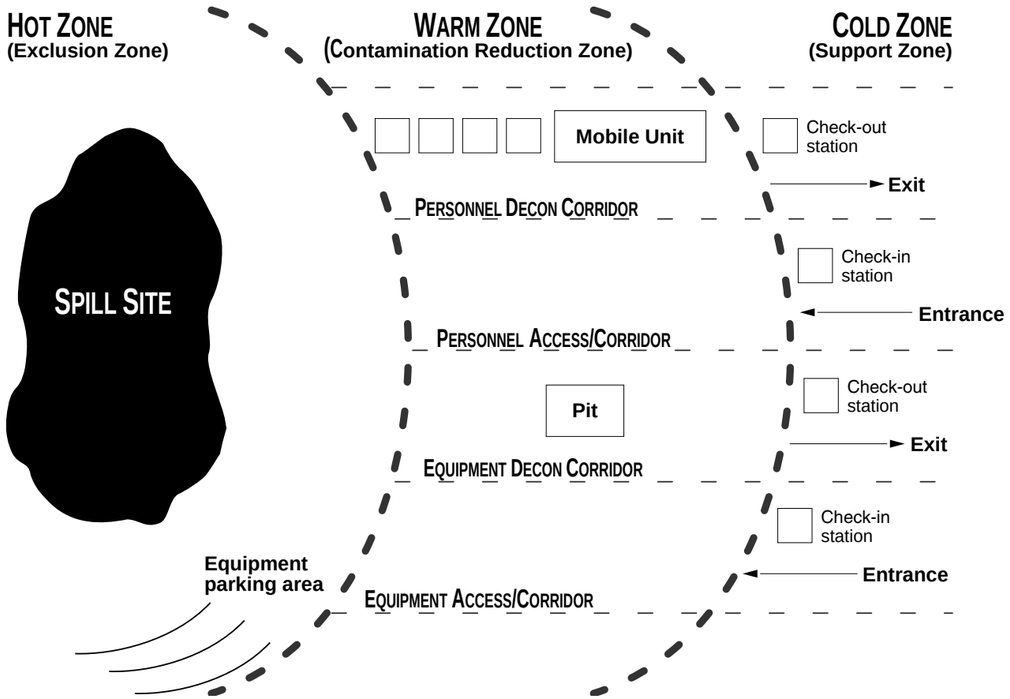


Control boundaries must be established for any spill site to ensure that people are not exposed to the spilled substance:

- **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.

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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Dry Decon Unit	All	Decontamination	1	4	1 hr	1 hr
Wet Decon Unit	GPB, KRU, Alpine	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	# STAFF PER 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.

COLORIMETRIC TUBE

CHIP MEASUREMENT SYSTEM (CMS) METER

PERSONAL MONITOR BADGE

PHOTOIONIZATION DETECTOR (PID)

MULTI-GAS INSTRUMENT

SINGLE-GAS INSTRUMENT

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_2S and carbon monoxide
2. Single gas instrument — e.g., H_2S
3. Chip measurement system (CMS) meter

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

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.

ACS has a calibration, inspection, and maintenance program for the above equipment.

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	# STAFF PER 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, except Badami	Testing	1	1	0.5 hr	0.5 hr
Portable GC	All, except Badami	Testing	1	1	1 hr	1 hr

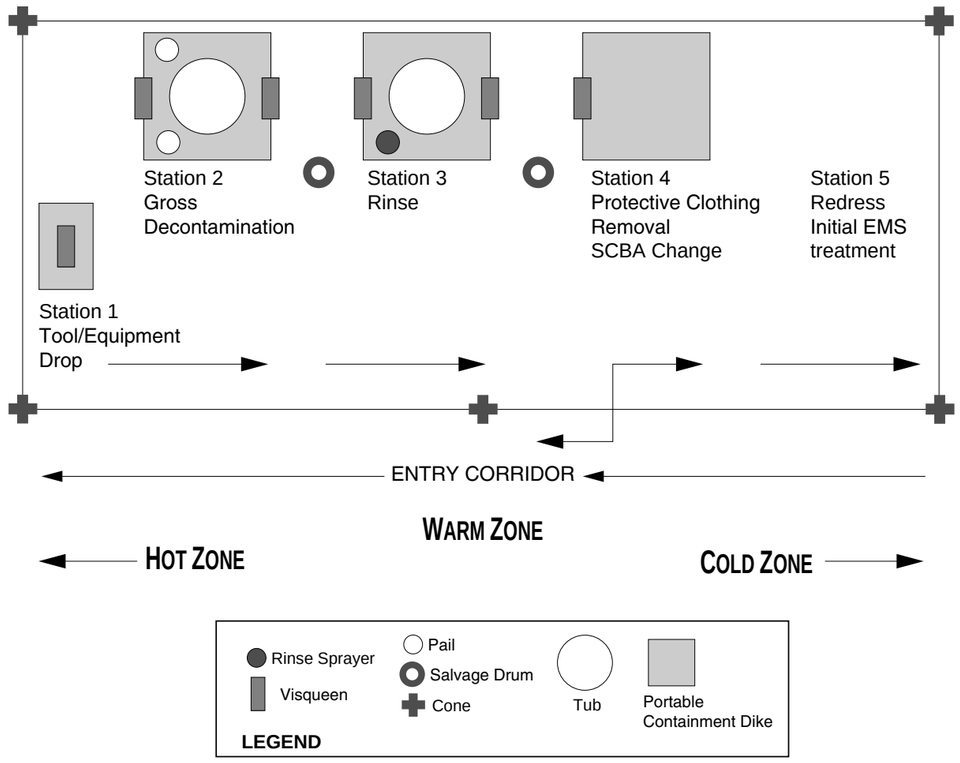
TOTAL STAFF **≥1, increasing incrementally with the size of the incident**

DEPLOYMENT CONSIDERATIONS AND LIMITATIONS

MONITORING EQUIPMENT	HAZARD	LEVEL	ACTION
Oxygen Meter	No O_2 or too much O_2	<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_2S Meter	Presence of H_2S	>10 ppm	Use SCBA and have emergency escape breathing apparatus (5 min. minimum).
PID	Total Hydrocarbons	≥500 ppm	SCBA required.
		≥50 to <500ppm	Air-purifying respirator with organic vapor cartridges.
PID	Benzene	≥10 ppm	SCBA required.
		<15 ppm	Full-face air-purifying respirator with organic vapor cartridges.
		<3 ppm	Half-face air-purifying respirator with organic vapor cartridges.
		<0.3 ppm	Continue monitoring with caution.
PID or Colorimetric Tubes	Xylene	>100 ppm	Full-face air-purifying respirator with organic vapor cartridges.
		<100 ppm	Continue monitoring with caution.
Colorimetric Tubes	Methanol	>200 ppm	SCBA required.
		<200 ppm	Continue monitoring with caution.
Colorimetric Tubes or CMS Meter	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 oil field chemicals. Examples include scale inhibitor and corrosion inhibitor.

EXAMPLE DECONTAMINATION AREA



Decontamination involves the removal of oil or other contaminants from personnel or equipment after they leave the spill zone. The purposes of decontamination are to:

- Minimize worker contact with contaminants.
- Prevent spread of contaminants to clean areas and exposure to personnel there.
- Remove contaminants from equipment to allow its reuse.

Site classification zones (cold, warm, hot) must be established prior to setting up the decon area. A decon area must be established before response personnel enter the exclusion zone (hot zone). Decon methods should be determined according to the contaminant, PPE used, and environmental conditions at the time (temperature, location, etc.). An appropriate level of PPE should be worn by decon personal to avoid contaminating themselves. All decontamination areas will provide an effective method of decon such as:

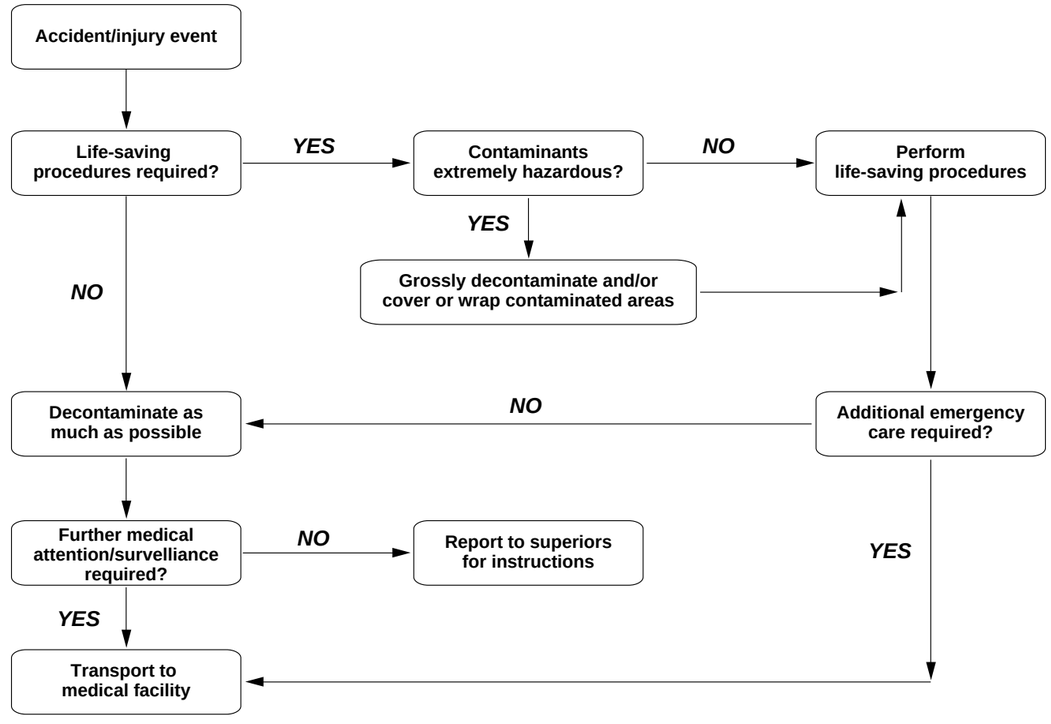
- Dilution
- Absorption
- Chemical degradation
- Isolation and disposal

The decontamination plan must be part of the site health and safety plan.

The decontamination zone is the control point for personnel entering and leaving the spill area. Important issues for decon setup include the following:

- Containment, collection, disposal of contaminated solutions and wastes generated from decon.
- Separate decon setups for heavy equipment and machinery to prevent cross-contamination of personnel.
- Separation of decon stations to prevent personnel cross-contamination.
- Distinct entry and exit points, and physically separated entry paths into contaminated area from clean area and vice versa.
- Procedures for minimum decon for restroom use and medical emergencies.
- Location of medical/first aid stations to avoid exposure to contaminants.

DECISION CHART FOR EMERGENCY DECONTAMINATION



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EQUIPMENT AND PERSONNEL

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER 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	# STAFF PER 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

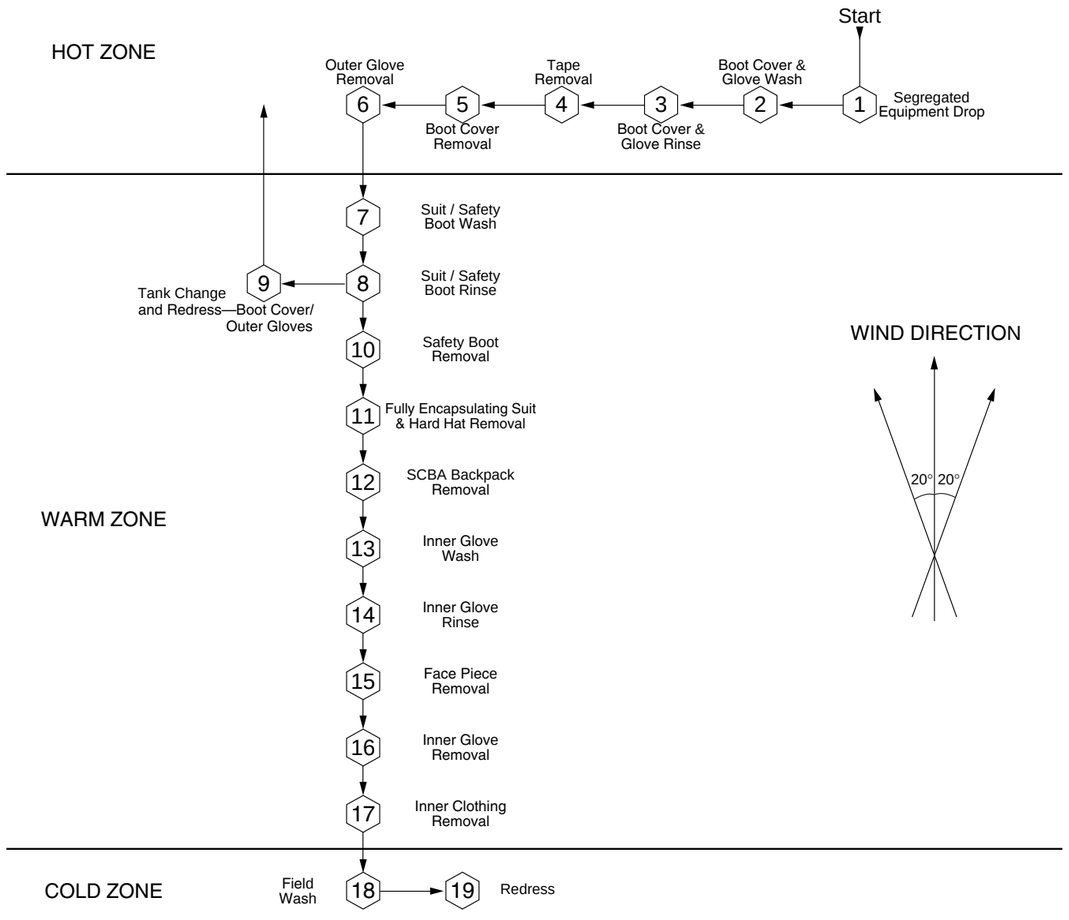
Establish decon work practices to minimize contact with hazardous materials:

- 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 overpack 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.

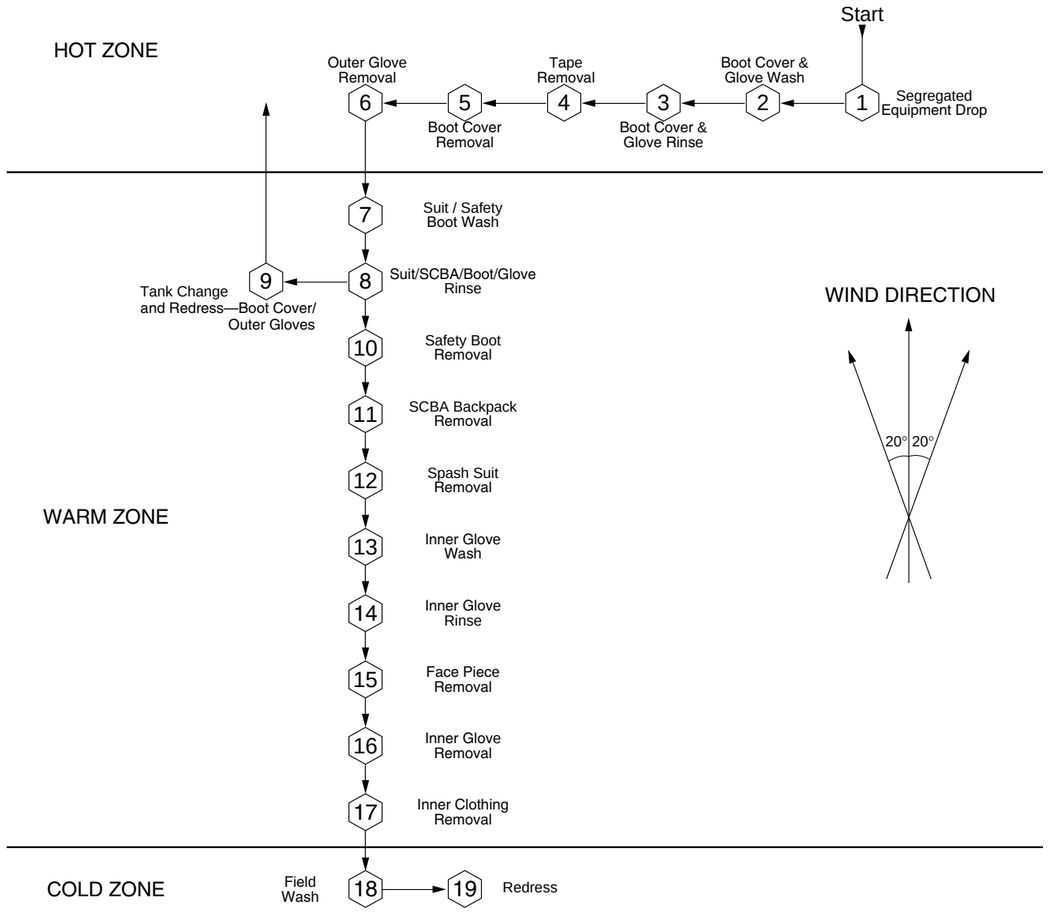
Resources required for decon and decon setup will depend on the following:

- 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

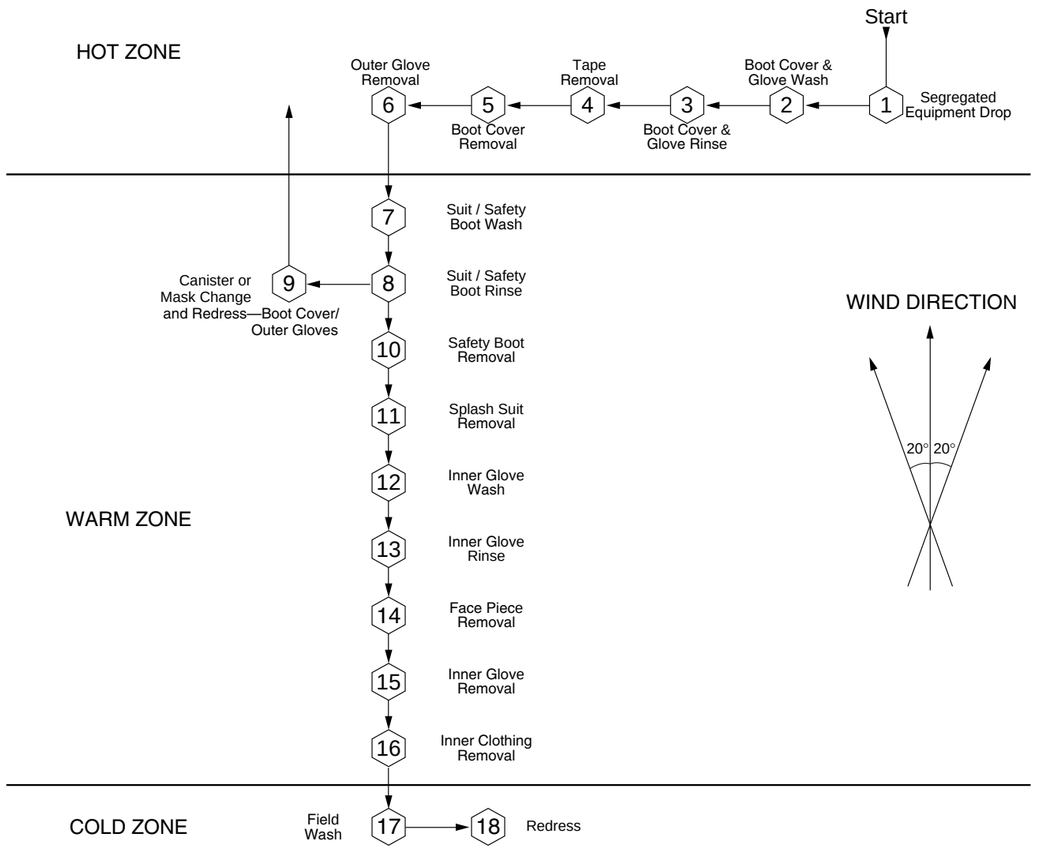


LEVEL B DECON



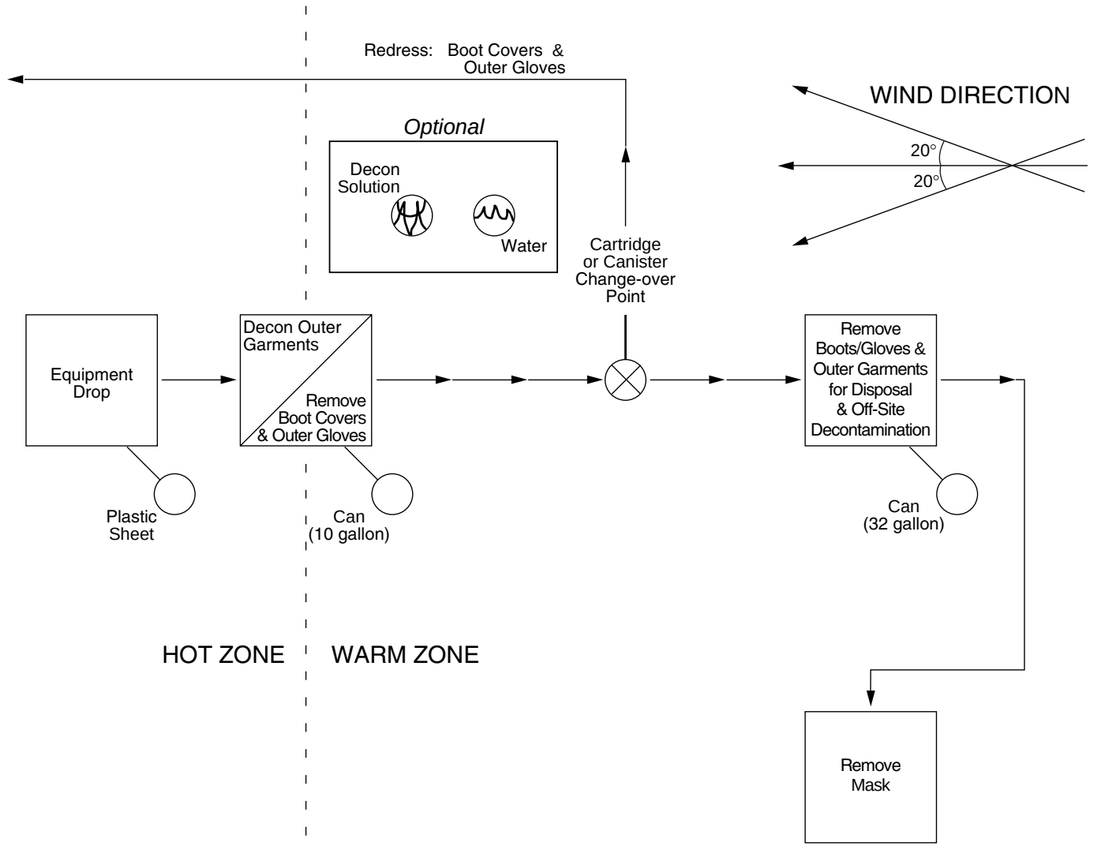
NOTE: All values given on these pages are for planning purposes only.

LEVEL C DECON



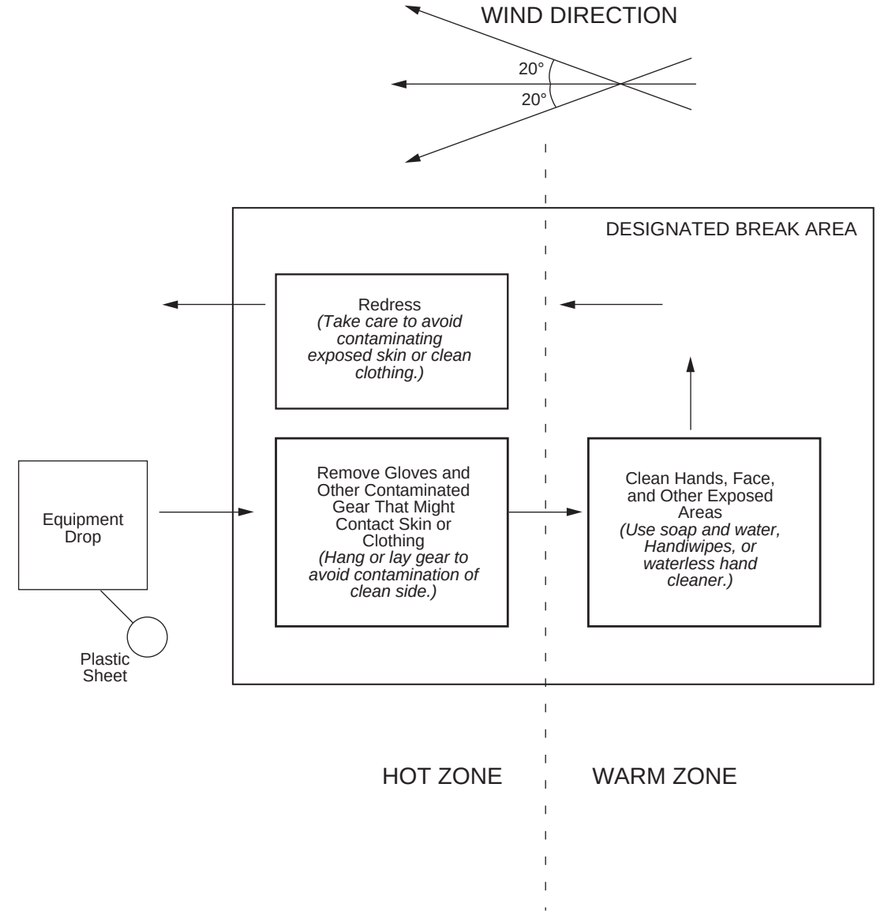
NOTE: All values given on these pages are for planning purposes only.

LEVEL C — MINIMUM DECON



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

LEVEL C AND D — PARTIAL DECON



It is not feasible for workers to fully decontaminate each time they take a break from work activity. However, it is necessary that certain gear be removed so that contamination is not spread to clean areas. Hands and other exposed skin must be cleaned so the contamination is not ingested or spread to protected parts of the body or clothing.

Before eating, taking a break, or similar activities, workers should move to the designated break area and partially decontaminate. During the break, take extra care to prevent contamination of unprotected clothing and skin.

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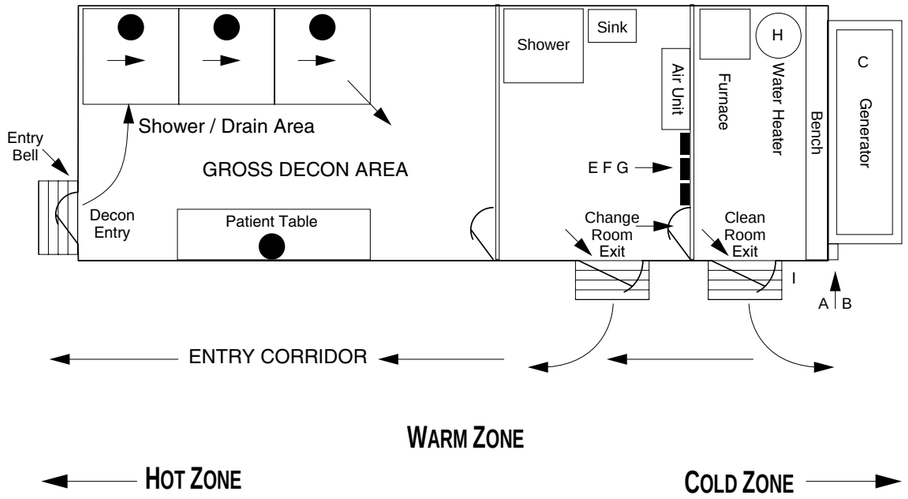
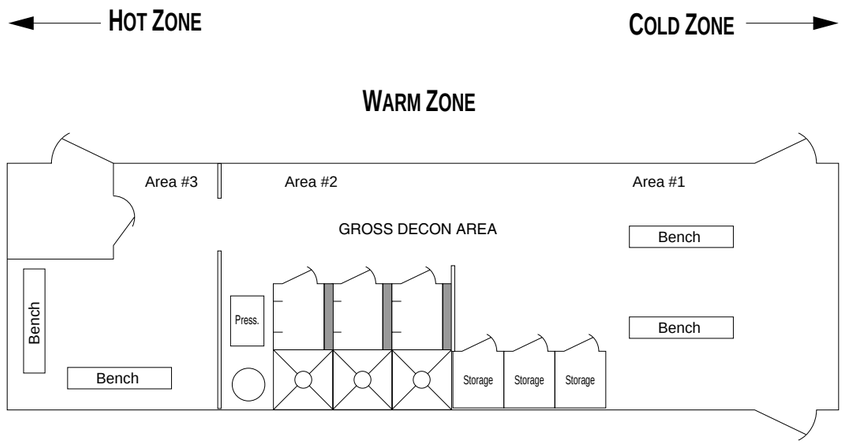
PRUDHOE BAY EOA DECON

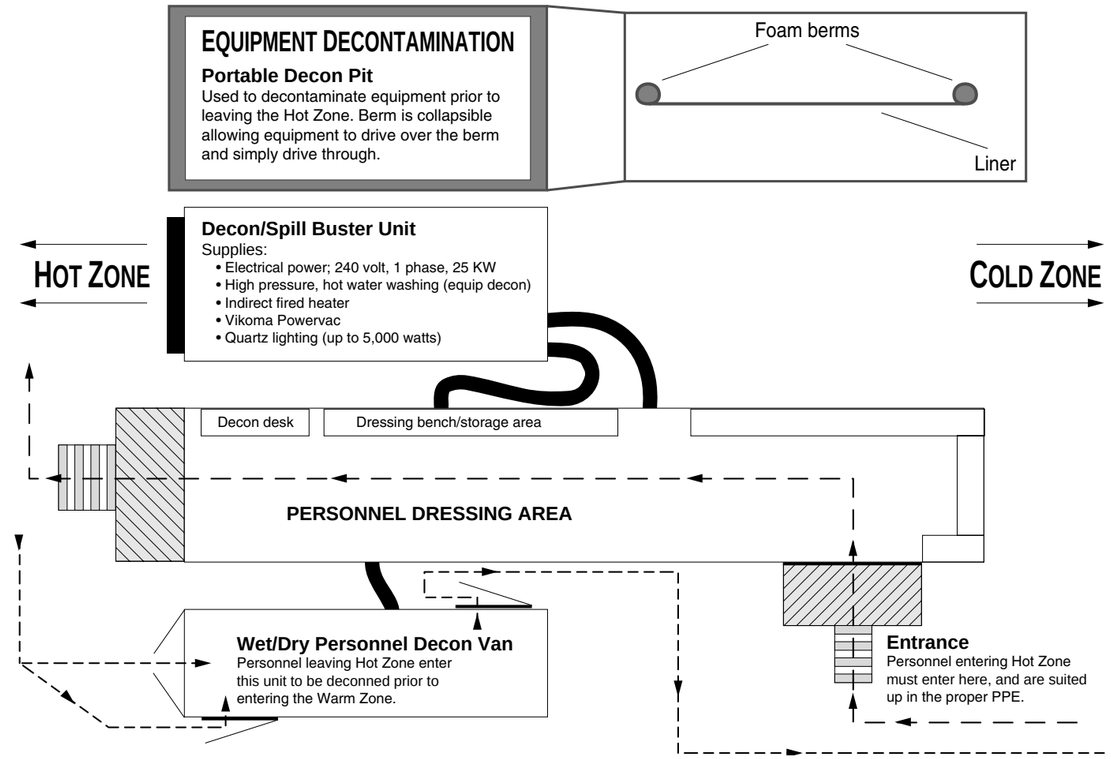


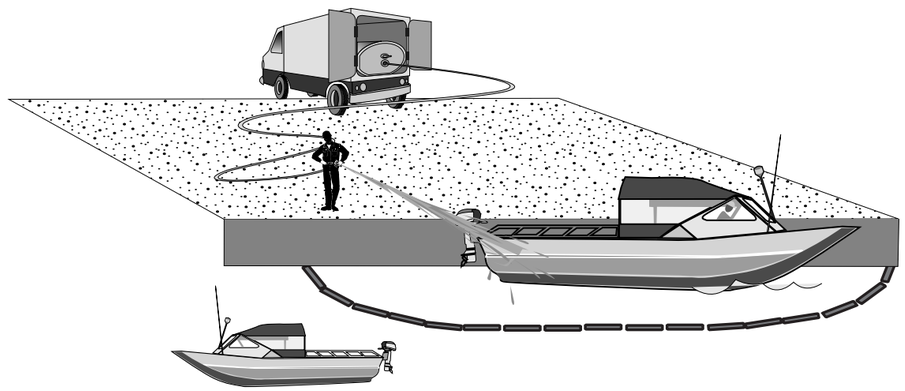
ACS DECON



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

KUPARUK DECON





If required, vessels leaving a work site may be decontaminated. Vessel decontamination at remote sites may be performed adjacent to a floating platform. Sufficient length of boom to surround the vessel being decontaminated is deployed prior to the decontamination process. Boom and absorbent material are used to contain the oil. Decontaminating procedures may include vacuuming, pressure washing or hand-wiping the vessel's hull. Source water may be used to rinse the vessel's hull. As necessary, the decontamination procedures may be repeated to assure a clean hull and deck.

Whenever possible, hand wiping should be conducted as the initial gross decontamination procedure. Efforts should be made to minimize impacts to the environment by limiting, where possible, the use of decontamination methods that result in the re-introduction of oil and/or introduction of rinsate into the water.

A citrus-based cleaning agent approved by ADEC may also be used. Prior to using a specific cleaning agent, for the gross decontamination of vessels on water, where there is potential for introduction of the agent into the water, a Material Safety Data Sheet (MSDS) for that product must be provided to ADEC for review and approval.

Remaining oily residues may be absorbed with sorbents or a recovery system. All recovered oil is stored in suitable containers.

All waste from the decontamination process is transported to a permitted disposal facility. The disposal facility is designated in the incident waste management plan.

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EQUIPMENT AND PERSONNEL

	EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
	Water Truck	All	Water source	2	2	2 hr	0.5 hr
or	Upright Tank	KRU, Alpine	Water Source	1	2	2 hr	1 hr
	Steam Cleaning Unit		Removing oil	1	2	1 hr	1 hr
	Sorbents, oily waste bags, cleaning agents, etc.	All	Removing oil	Variable	2	1 hr	0.5 hr
	Trash Pump (2-inch)	All	Flushing oil	1	2	1 hr	1 hr
	Suction Hose (2-inch)	All	Flushing oil	≥20 ft	—	2 hr	1 hr
	Discharge Hose (3-inch)	All	Flushing oil	>20 ft	—	2 hr	1 hr
	Workboat	All	Tend and deploy boom; serve as work platform	1	2	1 hr	1 hr
	Boom	All	Surround vessel being decontaminated	Variable	—	1 hr	1 hr
				TOTAL STAFF	**6**		

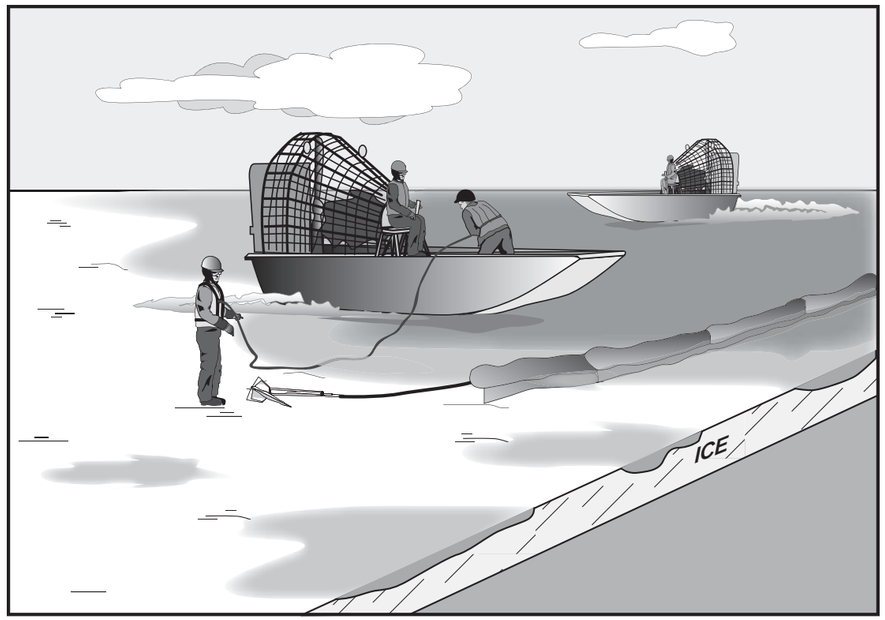
SUPPORT

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER 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

Resources required for decon and decon setup 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).



Each spring, the nearshore Beaufort Sea in the area of ACS operations experiences a phenomenon called “overflood” at the mouths of the major streams. As the ice in the upper reaches of the streams thaws before the lower reaches, water from these streams flows out over the nearshore landfast ice This condition can be hazardous to personnel trying to conduct spill response operations from airboats. The ice under the overflood can be unstable under the weight of the water.

During overflood conditions, personnel should make every attempt to conduct spill response operations while staying onboard the vessels. If it is absolutely necessary for personnel to be on the ice, the following controls should be considered:

- Ice conditions evaluated by a *competent individual* approved by the On-Scene Commander (A *competent individual* is someone who through knowledge, training, and experience has the ability to identify existing and predictable hazards relating to deteriorating ice conditions.)
- Evaluation of weather conditions
- Experienced people only, as approved by the On-Scene Commander
- Lightweight dry suits
- Personal flotation devices
- Harness with tether (man in boat tending line)
- Appropriate footwear (as dictated by specific conditions)
- At least two vessels in the immediate vicinity
- Post-immersion care facility immediately available (warm area, blankets, etc.)
- Emergency medical assistance immediately available
- An immerse evacuation plan will be communicated to all personnel.

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EQUIPMENT AND PERSONNEL

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Lightweight Dry Suit	ACS	Body protection	≥6	—	1 hr	0.5 hr
Personal Flotation Device	All	Life saving	≥6	—	1 hr	0.5 hr
Harness with Tether	All	Life saving	≥6	—	1 hr	0.5 hr
Footwear	ACS	Traction and foot protection	>6 pair	—	1 hr	0.5 hr
Airboat	All	Transportation and safety	>2	2-3 per boat	1 hr	1 hr

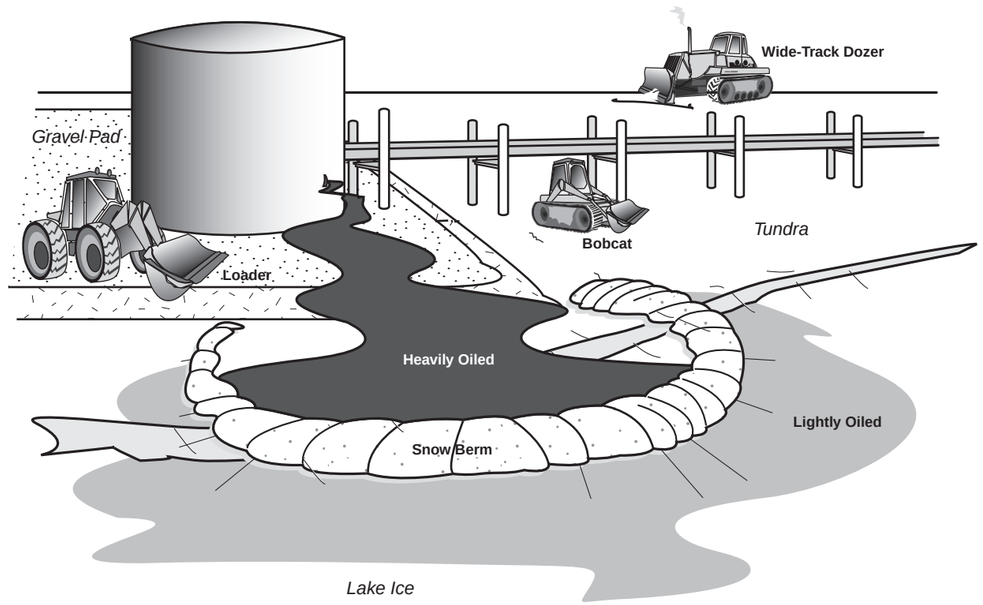
SUPPORT

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Shelter	ACS, GPB, Endicott, Alpine, Kuparuk	Warmup/break	2	2 initial*	1 hr*	1 hr
Heater	All	Heat	≥1	1 initial	1 hr	0.5 hr
Light Bank	All	Illumination	>1	1 initial	1 hr	0.5 hr
Fuel Truck	All	Fuel	1	Once per shift	1 hr	0.5 hr
Medical Equipment	All	Life saving	1	—	1 hr	0.5 hr

**Warmup trailers require 2 staff to set up and 0.5 hr to deploy; Weatherports required 3 staff to set up and 1 hour to deploy.*

DEPLOYMENT CONSIDERATIONS AND LIMITATIONS

- The use of cleated footwear. and dry work suits is recommended.



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 rubber tracked, wide-track dozer 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 wide-track dozer cannot reach.

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EQUIPMENT AND PERSONNEL

	EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
	Wide-Track Dozer	All	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	ACS, EOA, KRU, Alpine	As needed	1	1	1 hr	0.5 hr
				TOTAL STAFF	**1**		

SUPPORT

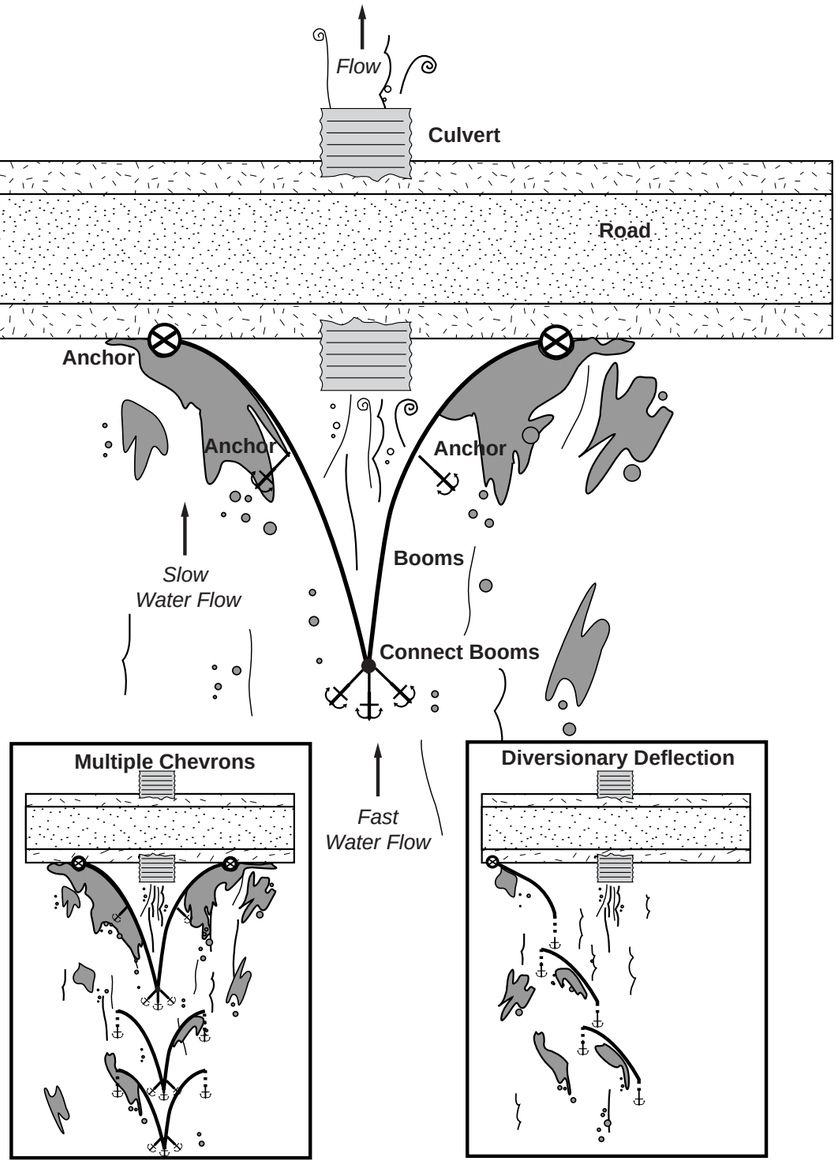
EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Semi and Trailer	GPB, KRU, Alpine	Transport wide-track dozer	1	1 driver	1 hr	0
Heaters	All	Heat	≥1	1 (initial)	1 hr	0.5 hr
Fuel Truck	All	Fuel heavy equipment	1	Once per shift	1 hr	0.5 hr
Mechanic Support	All	Support equipment	1	1	1 hr	0.5 hr
Lube Truck	All except Badami	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 wide-track dozer 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 wide-track 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 snow for the wide-track dozer.
- When working with equipment around or near flowlines, add a spotter to each front-end loader and wide-track dozer.
- 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.



Boom is deployed in either chevron or diversionary 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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Work Boat	All	Containment	2	6	1 hr	3 hr
or 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		

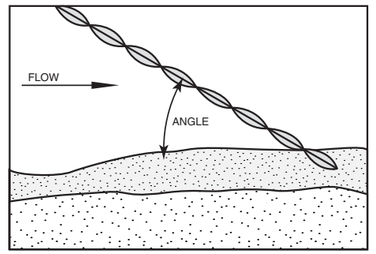
SUPPORT

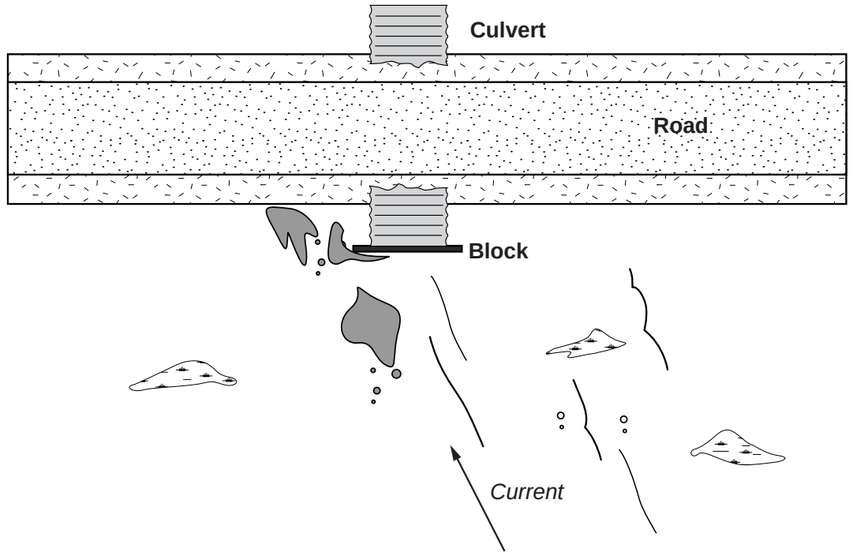
EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Bed Truck	All	Transport equipment	1	1	1 hr	0
Avgas Trailer	ACS, GPB, KRU, Badami, Alpine	Airboat fuel	1	1 (initial)	1 hr	0.5 hr

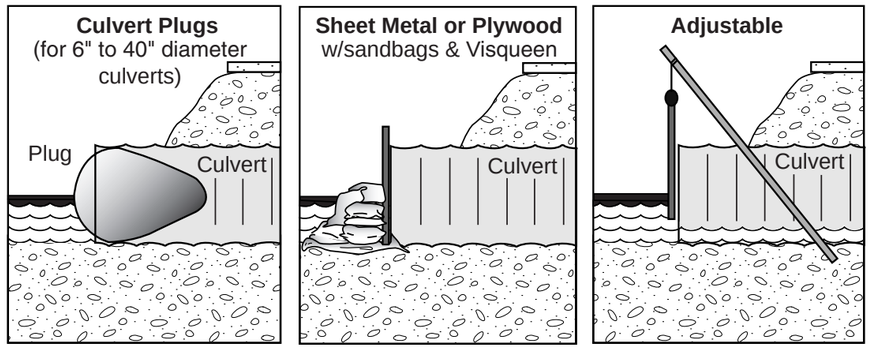
DEPLOYMENT CONSIDERATIONS AND LIMITATIONS

- 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°







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.

A MegaSecure dam may also be used if water depth is shallow enough.

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EQUIPMENT AND PERSONNEL

	EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
	Visqueen	All	Containment	≥10 ft	2	1 hr	1 hr
	Inflatable Culvert Plugs	ACS, WOA, Alpine	Containment	1	2	1 hr	2 hr
or	Sheet Metal or Plywood Barriers	All	Containment	1	2	2 hr	2 hr
or	Sandbags	ACS, GPB, KRU, Alpine	Containment	>10	>6*	2 hr	2 hr
or	Gravel	—	Containment	—	—	—	—
or	MegaSecure Dam	ACS/Alyeska	Containment	1	2	1	1
			TOTAL STAFF FOR SETUP		**≥2****		

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

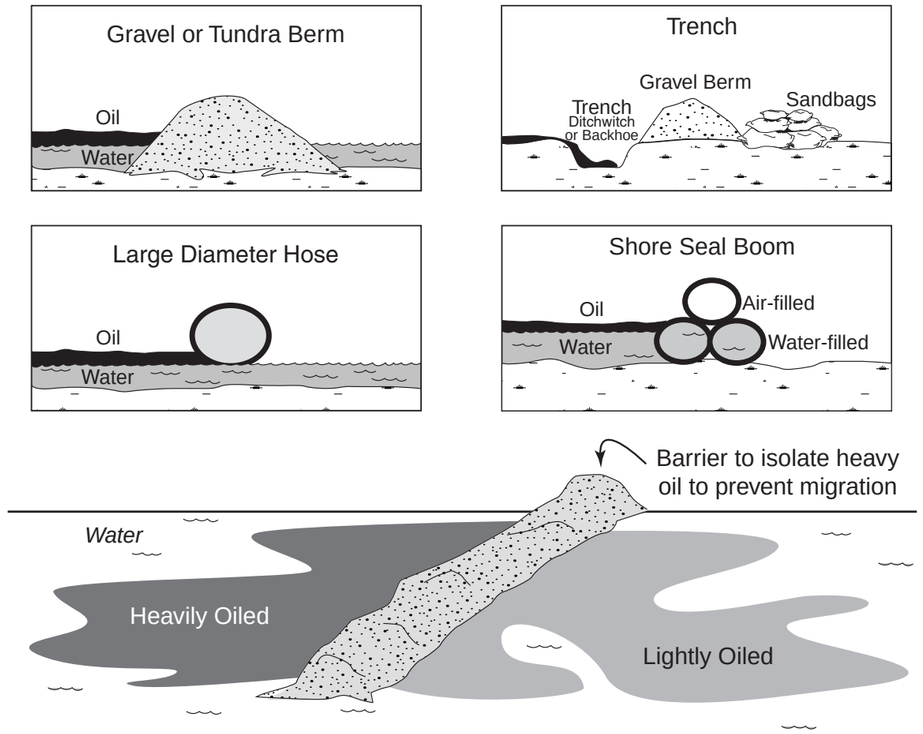
***The recovery team would conduct monitoring and sustain operations.*

SUPPORT

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER 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 wide-track 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.

A MegaSecure dam may also be used.

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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
	Visqueen	All	Containment	≥10 ft	2	1 hr	1 hr
	Backhoe	GPB, KRU, Peak, AIC, Alpine	Trenching	1	1	2 hr	0.5 hr
or	Bobcat w/Trencher	ACS, KRU, Alpine	Trenching	1	1	1 hr	0.5 hr
or	Front-End Loader w/Bucket	All	Build Berms	1	1	1 hr	0.5 hr
or	Hose (5-inch)	KRU, Alpine	Berm/Contain	≥1 ft	2	2 hr	1 hr
or	Shore Seal Boom	ACS, KRU, MPU, Alpine	Berm/Contain	>50 ft	>4	1 hr	1 hr
or	Sandbags	ACS, KRU, GPB, Alpine	Berm/Contain	>10	>6*	2 hr	2 hr
or	MegaSecure Dam	ACS/Alyeska	Containment	1	2	1	1
			TOTAL STAFF FOR SETUP		**≥3****		

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

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

SUPPORT

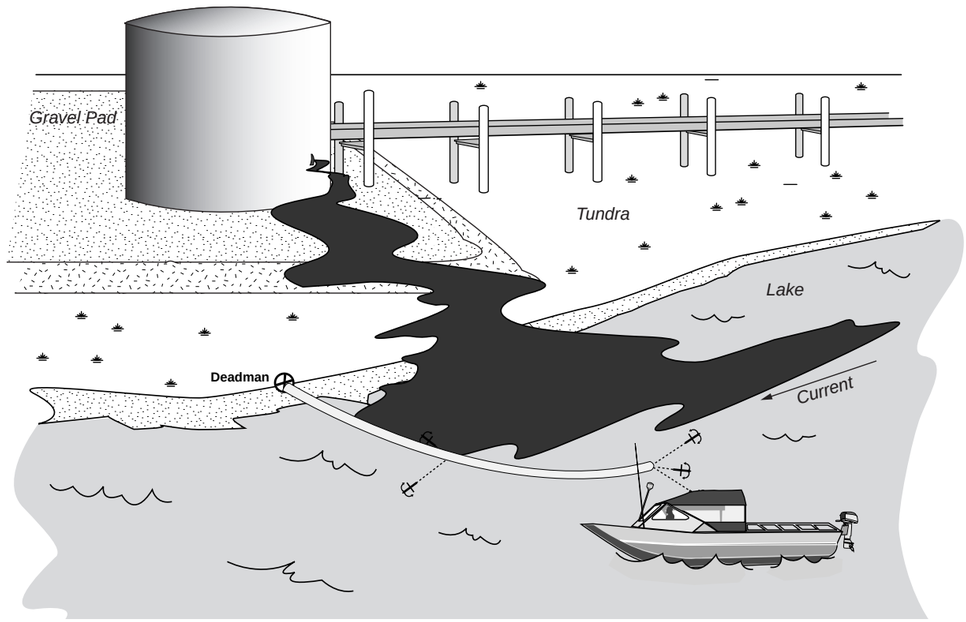
EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Semi and Trailer	GPB, KRU, Alpine	Transport backhoe	1	1 driver	1 hr	0
Fuel Truck	All	Fuel equipment	1	Once per shift	1 hr	0.5 hr
Lube Truck	All except Badami	Provide fluids to heavy equipment	1	Once per shift	1 hr	0.5 hr
Mechanic Support	All	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, Alpine	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.

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 leases.



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.

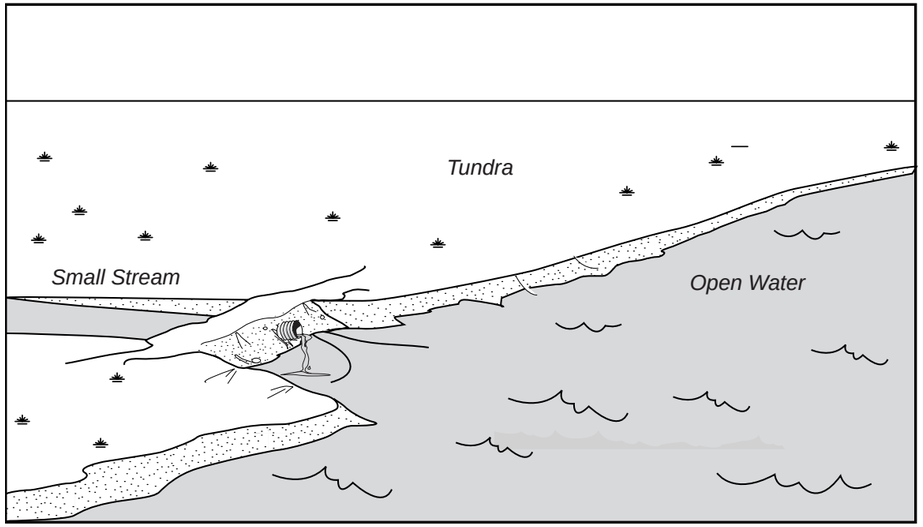
EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Boom	All	Deflection booming	≥50 ft	3	1 hr	3 hr
Work Boat	All	Booming support	1		1 hr	
Anchor System	All	Anchoring boom	Variable	3	1 hr	
			TOTAL STAFF	**3**		

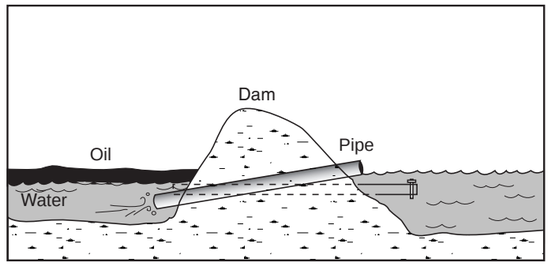
SUPPORT

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Avgas Trailer	ACS, GPB, KRU Badami, Alpine	Airboat fuel	1	1 (initial)	1 hr	0.5 hr
Mechanic Support	All	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. A MegaSecure dam may also be used if water depth is shallow enough.

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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
	Wide-Track Dozer	All	Dam construction	1 (3 available on Slope)	1	1 hr	0.5 hr
or	Front-End Loader (with bucket and forks)	All	Dam construction	1	1	1 hr	0.5 hr
or	MegaSecure Dam	ACS/Alyeska	Containment	1	2	1	1
or	Sandbags (bulk bags may be used)	ACS, KRU, GPB, Alpine	Dam	Minimum quantity of fill	≥6*	2 hr	2 hr
or	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.*

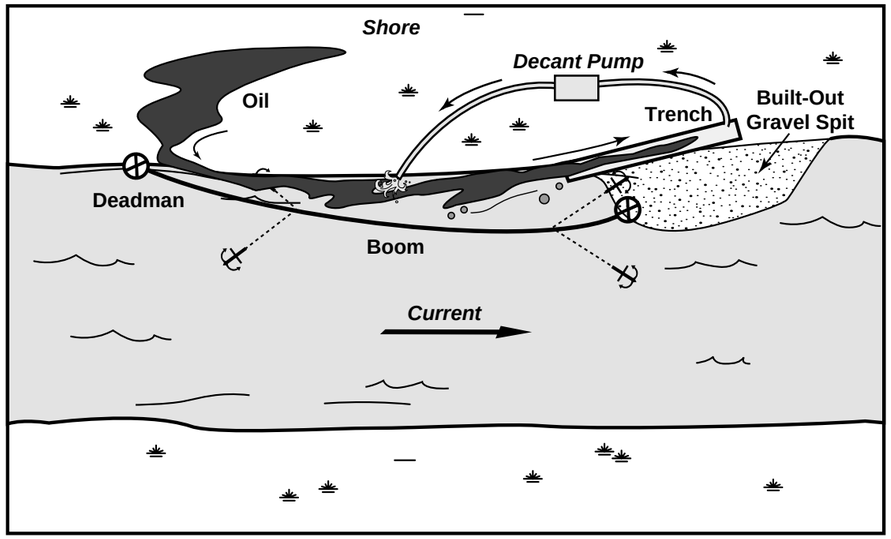
***The recovery team would conduct monitoring and sustain operations.*

SUPPORT

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Semi and Trailer	GPB, KRU, Alpine	Transport wide-track dozer	1	1 driver	1 hr	0
Mechanic Support	All	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 except Badami	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. Remove dams immediately when 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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Boom	All	Diversion	≥50 ft	3	1 hr	3 hr
Work Boat	All	Booming support	1		1 hr	
Backhoe	GPB, KRU, Peak, Alpine	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**

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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).*

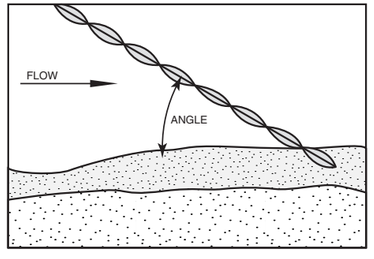
SUPPORT

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Semi and Trailer	GPB, KRU, Alpine	Haul backhoe	1	1	1 hr	0
Avgas Trailer	ACS, GPB, KRU, Badami, Alpine	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 except Badami	Provides fluids to heavy equipment	1	Once per shift	1 hr	0.5 hr
Mechanic Support	All	Support equipment	1	1	1 hr	0.5 hr

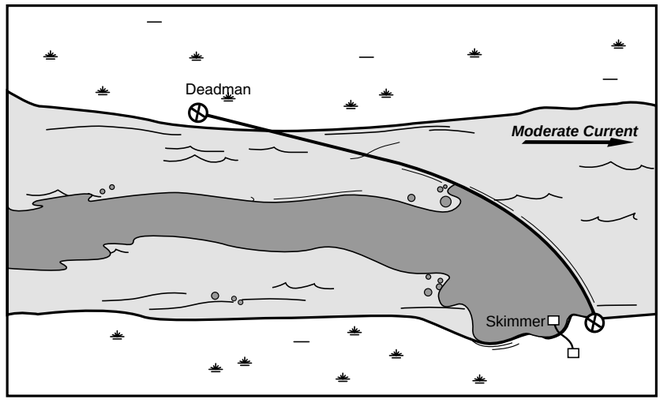
DEPLOYMENT CONSIDERATIONS AND LIMITATIONS

- 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.

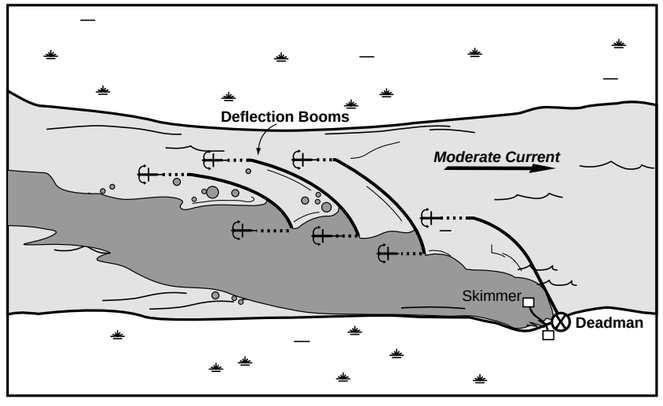
CURRENT (knots)	CURRENT (ft/second)	BOOM ANGLE RELATIVE TO CURRENT REQUIRED TO KEEP COMPONENT OF CURRENT <3/4 KNOT
1.5	2.5	30° to 42°
1.75	2.9	25° to 35°
2.0	3.4	22° to 30°
2.25	3.8	19° to 26°
2.5	4.2	17° to 24°
2.75	4.6	16° to 21°
3.0	5.0	15° to 19°



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.

Diversionary (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.

Diversionary (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.

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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	# STAFF PER 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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Avgas Trailer	ACS, GPB, KRU, Badami, Alpine	Airboat fuel	1	1 (initial)	1 hr	0.5 hr
Mechanic Support	All	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°
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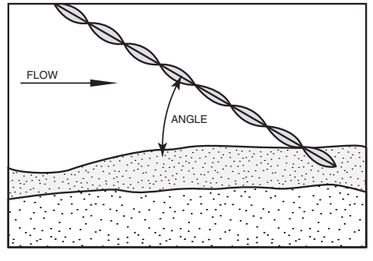
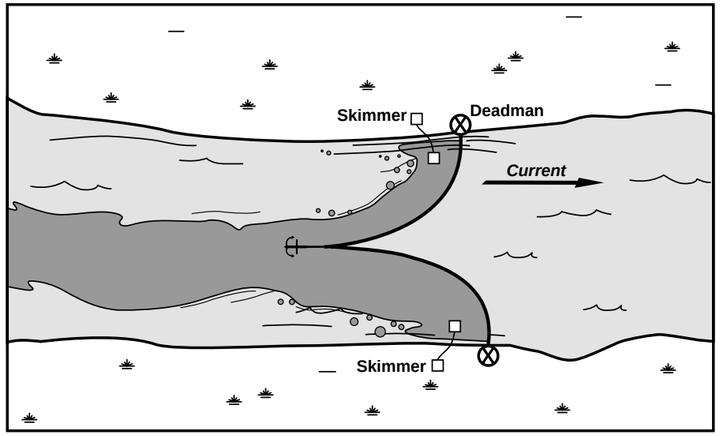
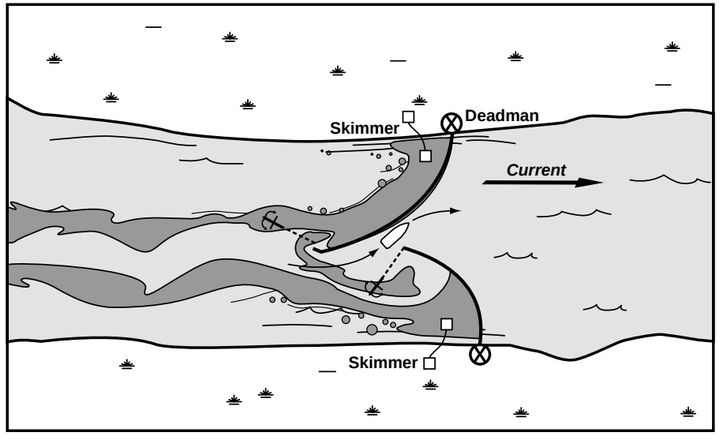


CLOSED CHEVRON



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	# STAFF PER 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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Avgas Trailer	ACS, GPB, KRU, Badami, Alpine	Airboat fuel	1	1 (initial)	1 hr	0.5 hr
Mechanic Support	All	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.

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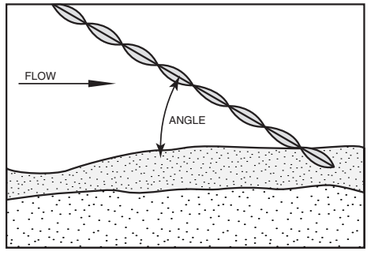
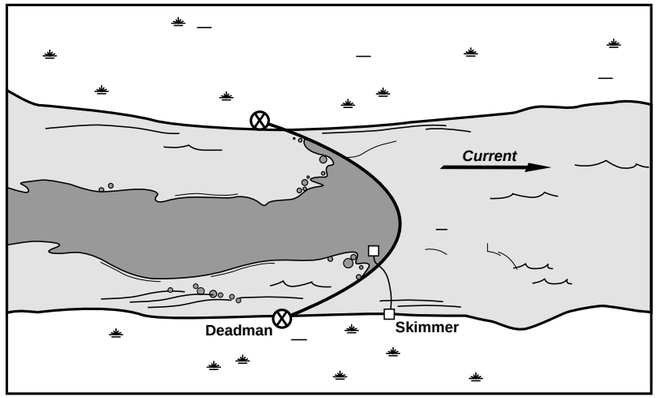
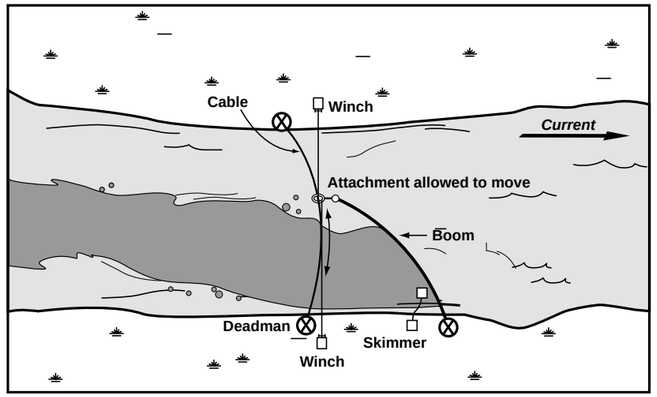


CATENARY



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	# STAFF PER 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, GPB, Alpine	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).*

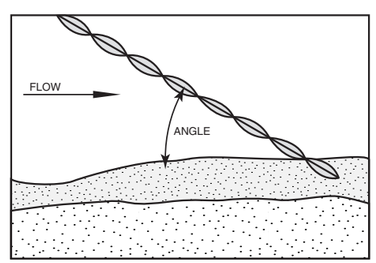
SUPPORT

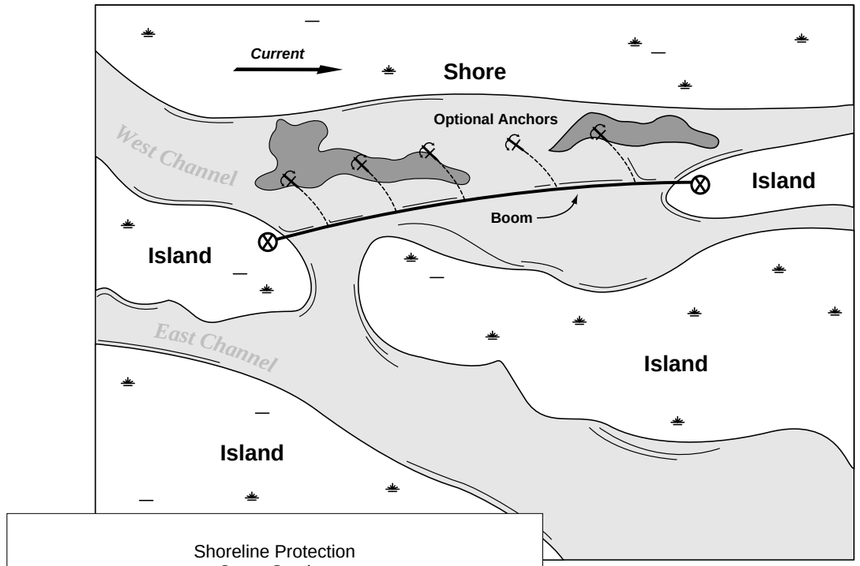
EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Avgas Trailer	ACS, GPB, KRU, Badami, Alpine	Airboat fuel	1	1 (initial)	1 hr	0.5 hr
Mechanic Support	All	Support equipment	1	1	1 hr	0.5 hr

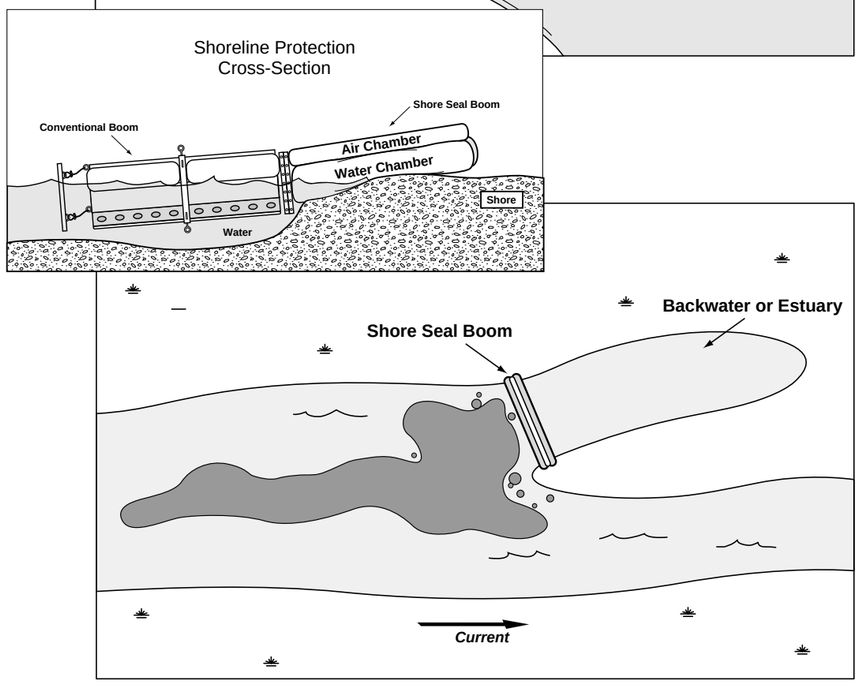
DEPLOYMENT CONSIDERATIONS AND LIMITATIONS

- 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°







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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
	Boom	ACS, GPB, KRU, Endicott, Alpine	Exclusion booming	≥50 ft	3	1 hr	3 hr
and/or	Shore Seal Boom	ACS, KRU, MPU, Alpine	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, Alpine	Shore Seal inflation	1		1 hr	1.5 hr
	Anchor System	All	Anchoring boom	Variable	2	1 hr	3 hr

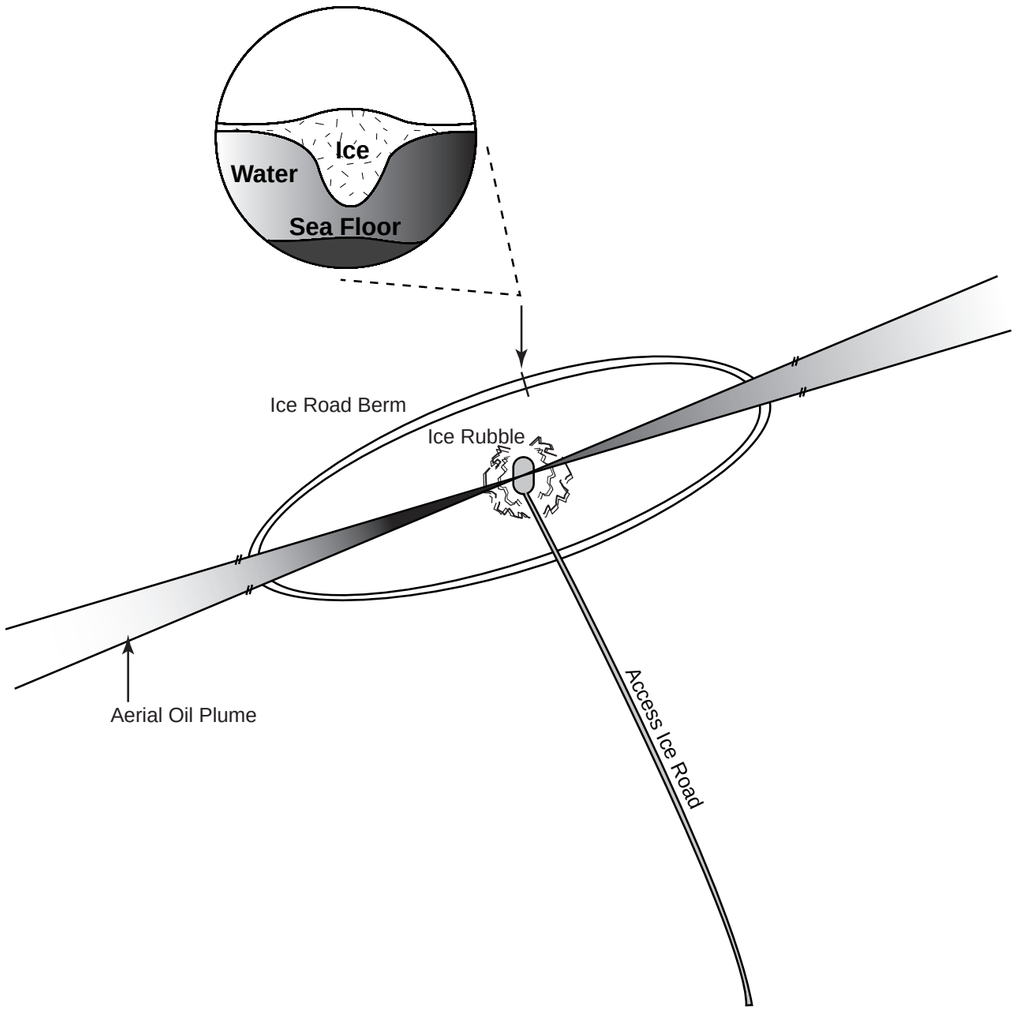
TOTAL STAFF FOR SETUP ≥5

SUPPORT

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Avgas Trailer	ACS, GPB, KRU, Badami, Alpine	Airboat fuel	1	1 (initial)	1 hr	0.5 hr
Mechanic Support	All	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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
	Rolligon w/Auger	AES, Peak	Ice road construction	≥2	≥2	6 hr	1 hr
or	Water Truck	All	Ice road construction	≥2	≥2	2 hr	
	Front-End Loader w/Drag	Peak	Ice road construction	>1	>1	1 hr	
or	Grader w/Wing Blade	Peak, AIC, GPB, KRU	Ice road construction	>1	>1	2 hr	

TOTAL STAFF TO SUSTAIN OPERATIONS ≥3

SUPPORT

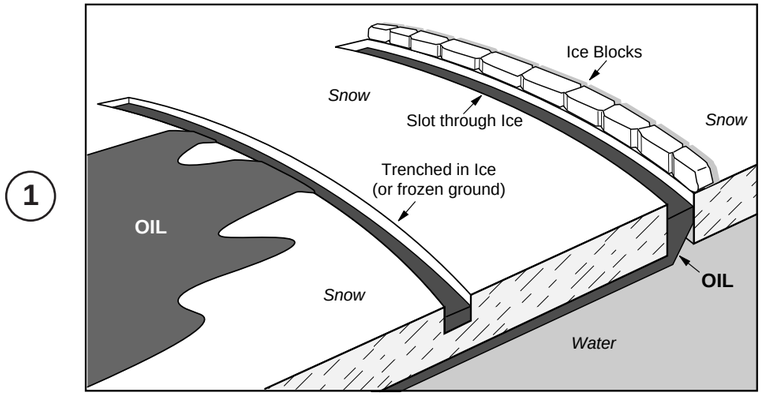
EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Fuel Truck	All	Fuel heavy equipment	1	Once per shift	1 hr	0.5 hr
Lube Truck	All except Badami	Provide fluids to heavy equipment	1	Once per shift	1 hr	0.5 hr
Mechanic Support	All	Support equipment	1	1	1 hr	0.5 hr
Light Plant	All	Illumination	≥1	2 for initial setup, and 1 to check and fuel occasionally	1 hr	0.5 hr
Heater	All	Equipment support	1	1 initial setup	1 hr	0.5 hr

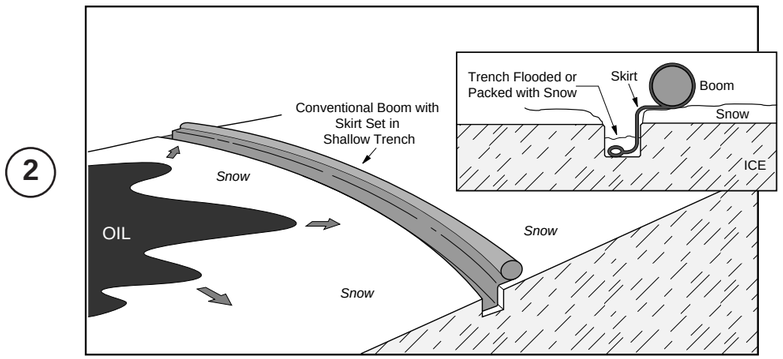
CAPACITIES FOR PLANNING

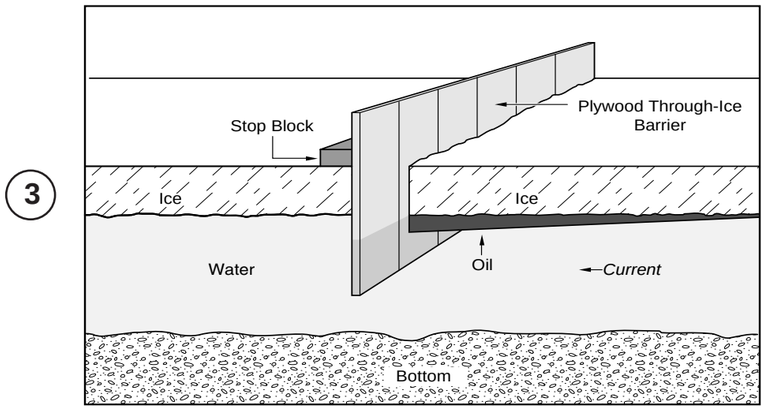
- A loader with a drag and a water truck hauling fresh water can make approximately one-third mile of ice road 6 inches thick in 12 hours. If the ice is already thick enough to support activities, 6-inch lifts would not be necessary, and the length of ice road completed in 12 hours would increase.
-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







Various techniques that are used on land can also be used on solid ice. (1) Partial trenches or through-ice slots can be dug in the ice surface with a trencher 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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
	Trencher	Rental	Trenching	1	2	3 hr	2 hr
or	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	
or	ATVs	ACS, GPB, END, KRU, Alpine	Snow berm construction	2	2	1 hr	
or	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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
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 Support	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
Heater	All	Equipment support	1	1 initial setup	1 hr	0.5 hr

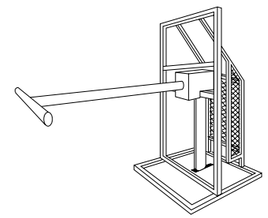
CAPACITIES FOR PLANNING

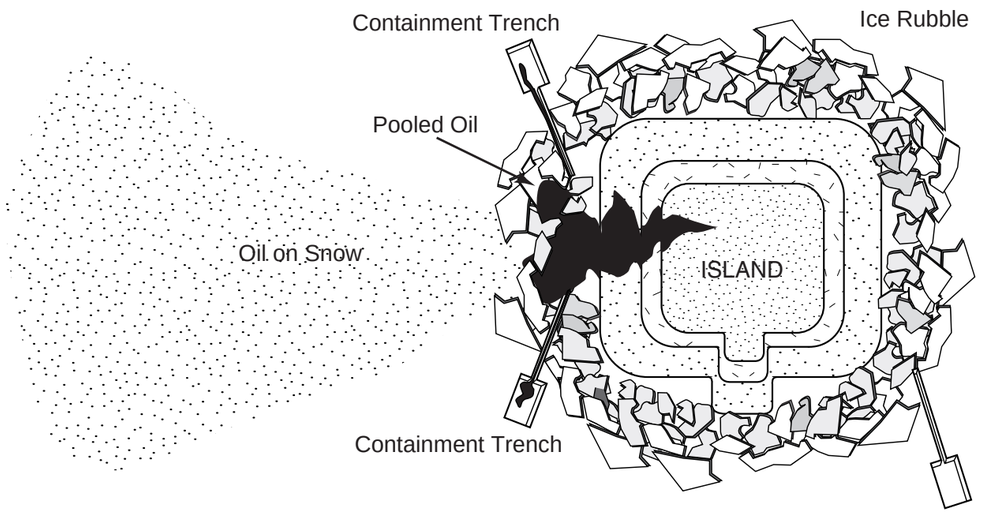
- A trencher with a 6-ft bar can cut approximately 100 ft of trench per hour through ice 6 ft deep. Cutting in frozen ground is much slower.

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 trencher.

ACS Rube Witch





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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Trencher	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	GPB, KRU, Peak, Alpine	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).*

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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Semi and Trailer	GPB, KRU, Alpine	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
Heater	All	Heat	1	1 initial setup	1 hr	0.5 hr
Mechanic Support	All	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 except Badami	Provide fluids to heavy equipment	1	Once per shift	1 hr	0.5 hr

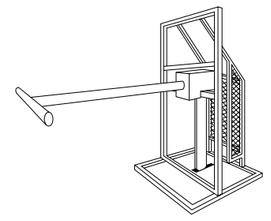
CAPACITIES FOR PLANNING

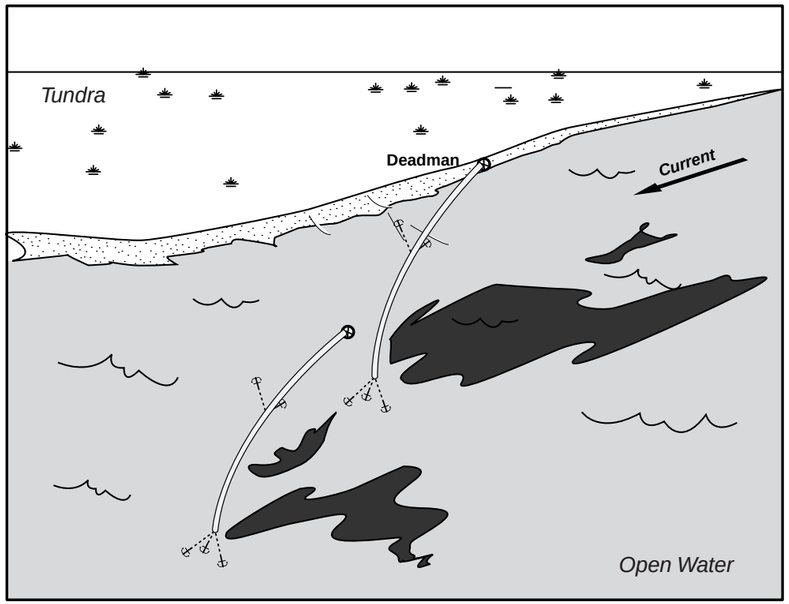
- A trencher with a 6-ft bar can cut approximately 100 ft of trench per hour through ice 6 ft deep. Cutting in frozen ground is much slower.

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 trencher.
- 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.

ACS Rube Witch





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.

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	# STAFF PER 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)**		

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).*

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

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

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Avgas Trailer	ACS, GPB, KRU, Badami, Alpine	Airboat fuel	1	1 (initial)	1 hr	0.5 hr

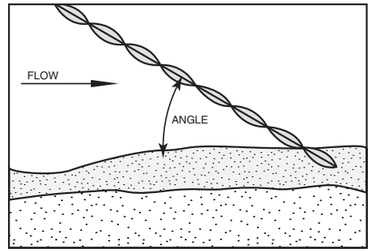
CAPACITIES FOR PLANNING

- One response team 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.

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°



- 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.
- In extreme shallow water conditions, sheet metal may be used in lieu of boom in the apex. Use 36 pieces of metal and 37 stakes per 100 ft.
- 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.
- Below are boom towing limitations for airboats during overflood conditions in the nearshore Beaufort Sea (based on 2005 ACS seasonal recovery testing):

ICE CONDITIONS	FIRE BOOM (20 lb/linear ft)	FIRE BOOM (7 lb/linear ft)	FIRE BOOM (6 lb/linear ft)	DELTA BOOM
Groundfast or Shorefast Ice (with overflood)	100 ft	300 ft	350 ft	750 ft
Broken Ice: Large, Dense, First-Year, Afloat	100 ft	300 ft	350 ft	750 ft
Broken Ice: Smaller, Less Dense, Rotted	200 ft	600 ft	700 ft	1,000 ft

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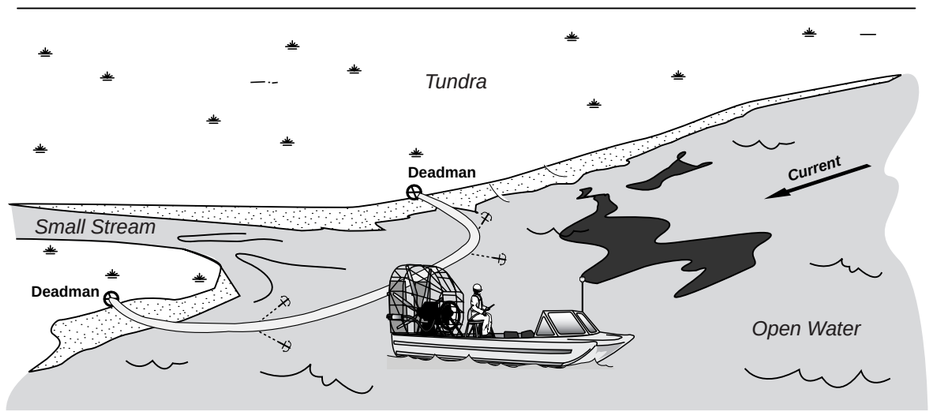

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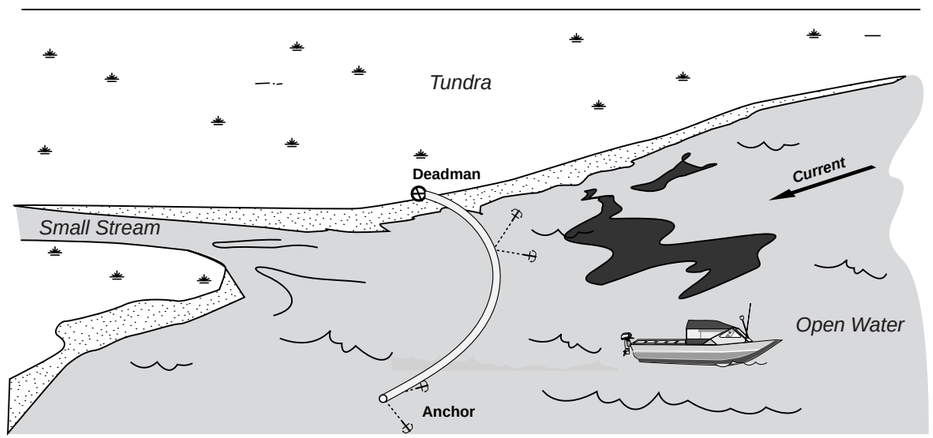


Boom is placed across small inlets and creek mouths identified as sensitive areas. Exclusion booming is used where currents are less than 3/4 knot and breaking waves are less than 0.5 foot in height. The boom is either (1) anchored from shore to shore across the mouths of streams or (2) at an angle to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

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

- 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	# STAFF PER 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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Avgas Trailer	ACS, KRU, GPB, Alpine, Badami (300 gal)	Airboat fuel	1	1 initial	1 hr	0.5 hr

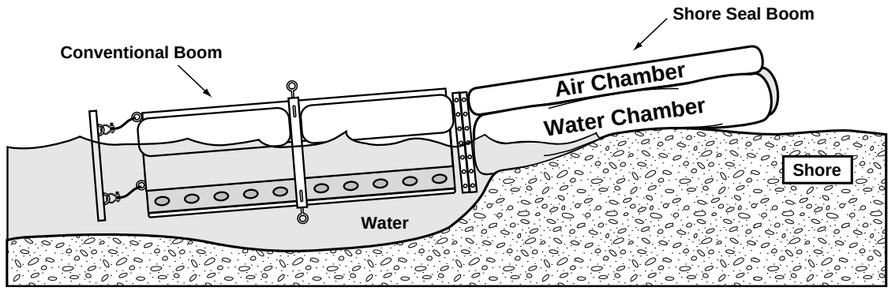
CAPACITIES FOR PLANNING

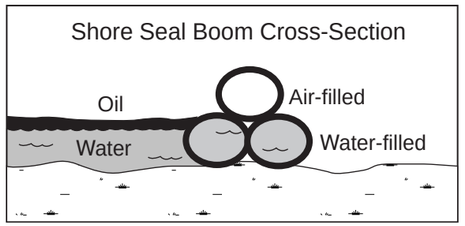
- One tactical unit can deploy and tend up to 4,000 ft of boom in a 12-hour shift along 2 miles of shoreline (assumes 10 working hours in a 12-hour shift).

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.
- Below are boom towing limitations for airboats during overflood conditions in the nearshore Beaufort Sea (based on 2005 ACS seasonal recovery testing):

ICE CONDITIONS	FIRE BOOM (20 lb/linear ft)	FIRE BOOM (7 lb/linear ft)	FIRE BOOM (6 lb/linear ft)	DELTA BOOM
Groundfast or Shorefast Ice (with overflood)	100 ft	300 ft	350 ft	750 ft
Broken Ice: Large, Dense, First-Year, Afloat	100 ft	300 ft	350 ft	750 ft
Broken Ice: Smaller, Less Dense, Rotted	200 ft	600 ft	700 ft	1,000 ft





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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Shore Seal Boom	ACS, KRU, MPU, Alpine	Oil exclusion	≥50 ft	4	1 hr	1.5 hr
Floating Pump and Blower	ACS, KRU, MPU, Alpine	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.

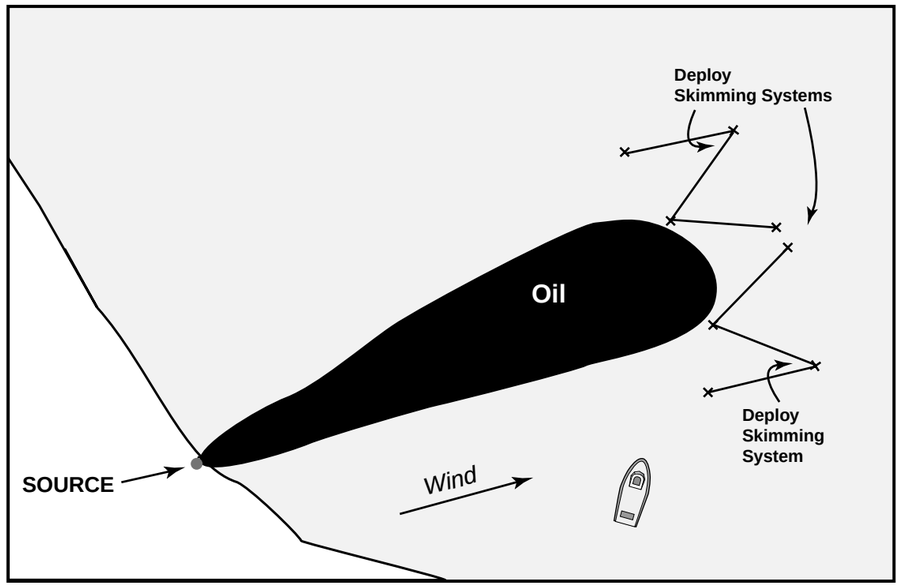
EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Avgas Trailer	ACS, GPB, KRU, Badami, Alpine	Airboat fuel	1	1 initial	1 hr	0.5 hr

CAPACITIES FOR PLANNING

- One response team can deploy and tend up to 1,000 ft of Shore Seal boom 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.

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

- 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	# STAFF PER 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.

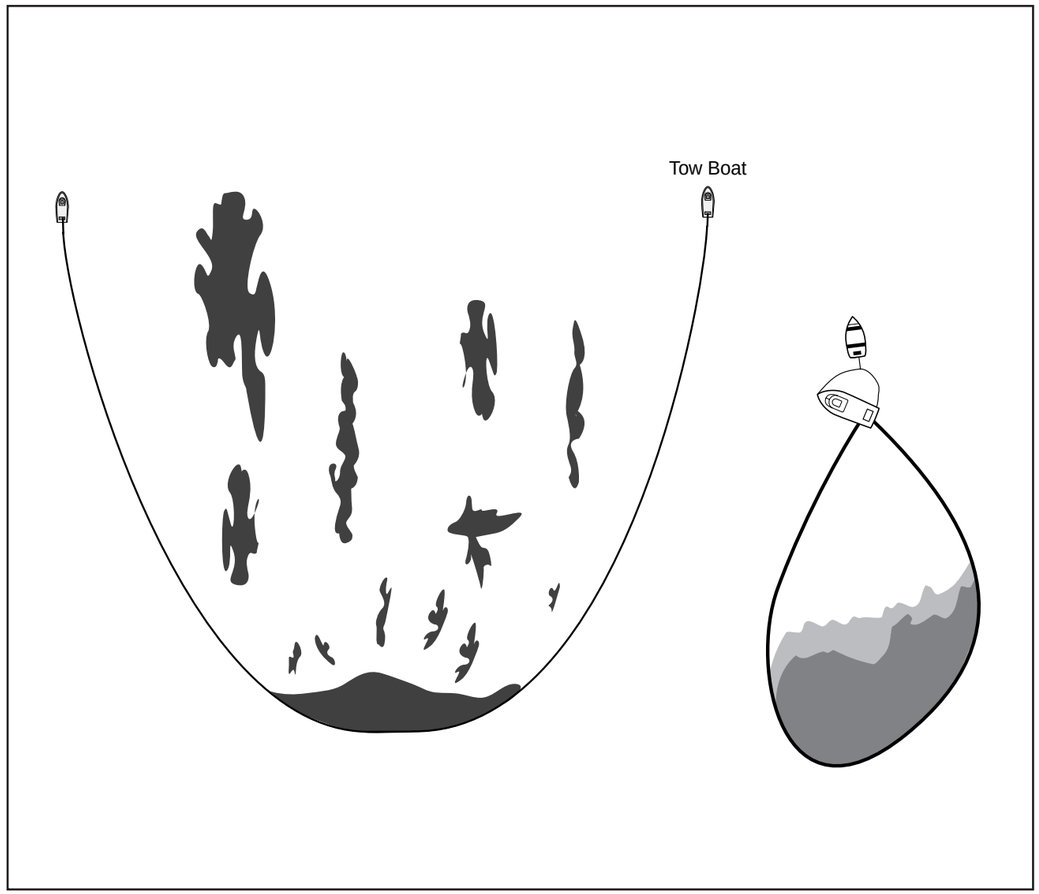
EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Avgas Trailer	ACS, GPB, KRU, Badami, Alpine	Airboat fuel	1	1 (initial)	1 hr	0.5 hr
Mechanic Support	All	Support equipment	1	1	1 hr	0.5 hr
Fuel Truck	All	Fuel	1	Once per shift	1 hr	0.5 hr

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 conditions change.
- See recovery tactics for information on recovery equipment used with this tactic.



The containment 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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Work Boat	All	Tow boom	2	6	1 hr	2 hr
Boom	All	Containment	Variable	—	1 hr	
			TOTAL STAFF	**6**		

SUPPORT

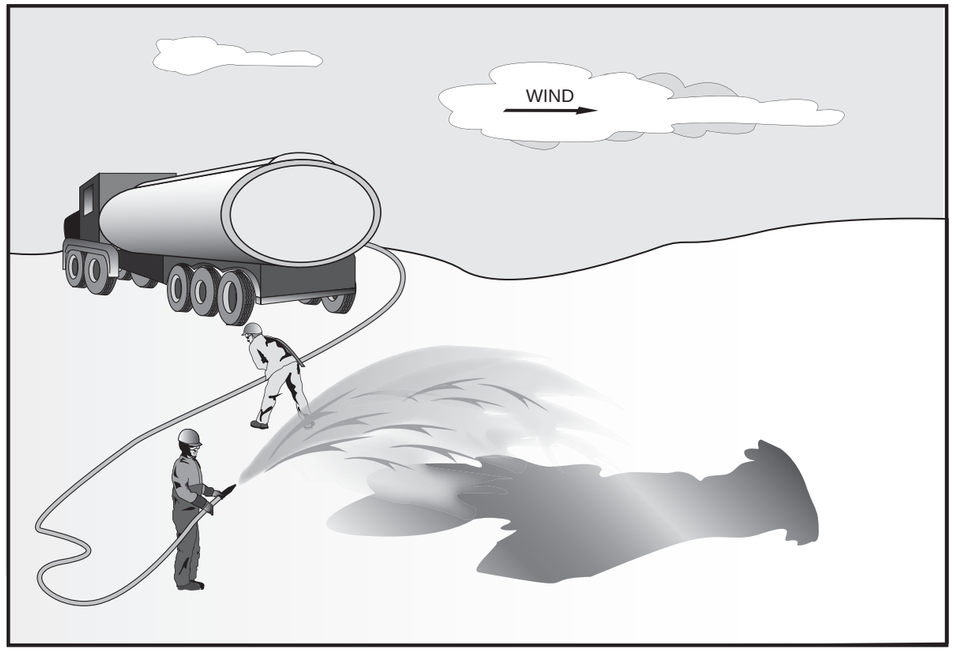
- An aircraft tracks the oil from above and coordinates the on-water task forces (preferably twin-engined aircraft or single-engined aircraft on floats).

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.



An area of lightly oiled snow can be stabilized for recovery by spraying a light water mist onto the contaminated snow to coat it with a thin layer of ice.

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EQUIPMENT AND PERSONNEL

- The number of staff to erect snow fencing depends on the size of the contaminated area.

	EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
	Water Truck	All	Water source	1	2	2 hr	0.5 hr
or	Upright Tank (400 bbl)	KRU, Alpine	Water source	1	2	2 hr	1 hr
or	Ice Auger (when appropriate)	All	Water source	1	2	1 hr	0
	Trash Pump (2-inch)	All	Spraying system	1	2	1 hr	1 hr
	Suction Hose (2-inch)	All	Spraying system	≥20 ft		2 hr	1 hr
	Discharge Hose (1- or 2-inch)	All	Spraying system	>50 ft		1 hr	1 hr
	Spray Nozzle	ACS	Spraying system	>1		1 hr	1 hr

TOTAL STAFF 4 to 6*

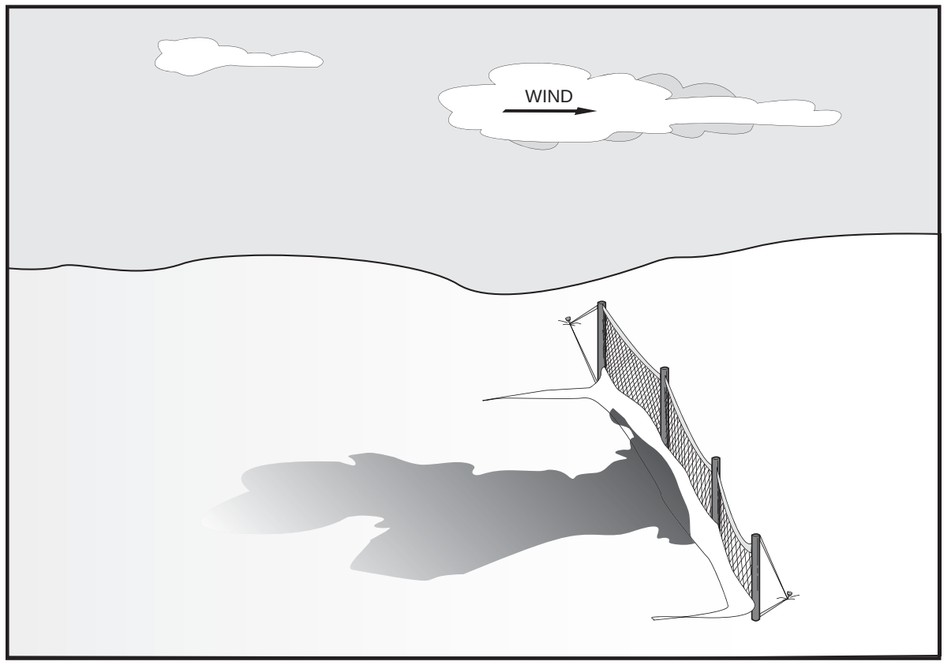
**If an ice auger is used to obtain water from a surface water source, 2 staff are needed to operate the auger.*

SUPPORT

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Heater	All	Support heavy equipment	≥1	1 initial setup	1 hr	0.5 hr
Mechanic Support	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

DEPLOYMENT CONSIDERATIONS AND LIMITATIONS

- Covering lightly oiled snow with a thin layer of ice is a viable option only when air temperatures permit.
- A "Y" valve may be used to operated two nozzles at the same time.
- A fire truck can be used to replace the equipment systems identified above since the fire truck contains the water source and spray equipment. Personnel, mobe time, and deploy time would remain the same.



A snow fence can be erected on the downwind side of lightly oiled snow to keep the wind from spreading the contaminated snow before being recovered.

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EQUIPMENT AND PERSONNEL

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Snow Fencing	ACS, KRU	Containment	Varies	≥2*	2 hr	Varies
T-Post Driver	ACS, KRU	Support fence	Varies			
T-Posts	ACS, KRU	Support fence	Varies			
Wire Ties	ACS, KRU	Support fence	Varies			

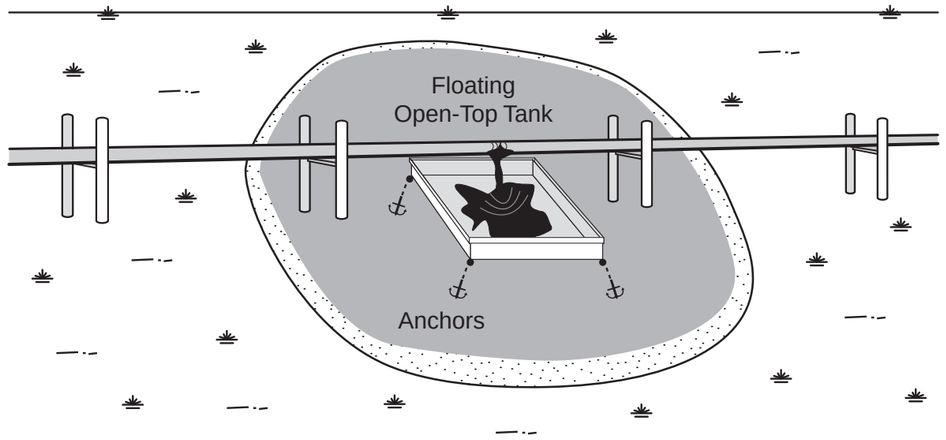
*The number of staff to erect snow fencing depends on the size of the contaminated area.

SUPPORT

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Snow machine or ATV with trailer	All	Haul equipment	Varies	2	0.5 hr	Varies

DEPLOYMENT CONSIDERATIONS AND LIMITATIONS

- A temporary snow fence can be as long as needed to effect containment. The fence should be placed far enough downwind of the spill to collect drifting and migrating oiled snow. The fence should be at least 4 ft high, but can be made up to 8 ft high by double-stacking ACS' plastic 4-ft fence. The fencing itself should have at least 50% porosity. Tighten the fence as much as possible, and use T-posts, rebar, or survey lath for temporary fence posts.
- This tactic is based on information from *Controlling Blowing and Drifting Snow with Snow Fences and Road Design.* Prepared by Ronald D. Tabler, Tabler and Associates, Niwot, CO, for the National Cooperative Highway Research Program, Transportation Research Board of the National Academy. August 2003.



A floating open-top tank is deployed and anchored in place under a leaking pipeline over a body of water. This tactic is utilized mostly for leaks such as produced water, etc. It can also be utilized over tundra in conjunction with proper tundra protection.

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EQUIPMENT AND PERSONNEL

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Floating Open-Top Tank	KRU	Containment	1	4	1 hr.	2 hrs.
Anchors	All	Securing tank	8			
Flat Boat	All	Tank deployment	1			
Support Boat	All	Tank deployment	1			
			TOTAL STAFF	**4**		

SUPPORT

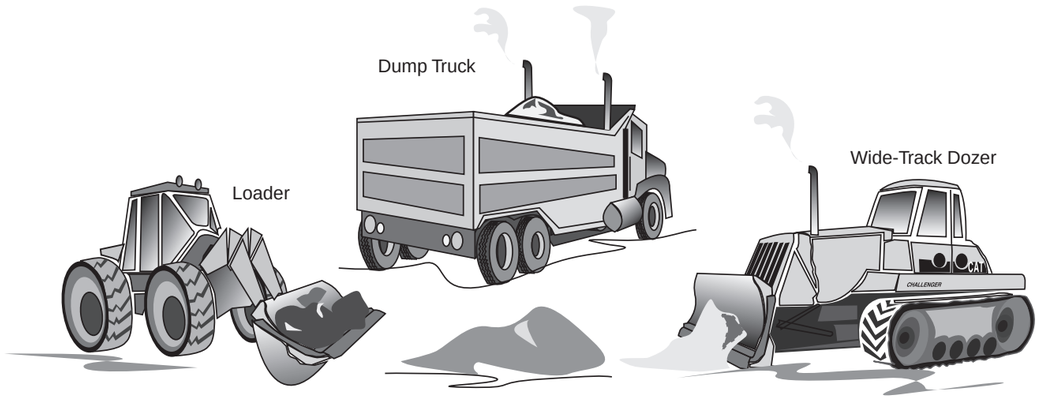
EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Rig Mats	All	Tundra protection	4	2	1 hr.	2 hrs.
3/8" Line	All	Anchoring	300 ft.			
1/4" Chain	All	Anchoring	24 ft.			

CAPACITIES FOR PLANNING

- Floating open-top tank capacity is 50 barrels.
- Time to fill to maximum capacity is dependent on the leak rate.
- Faster rates of leakage may require continual oversight.

DEPLOYMENT CONSIDERATIONS AND LIMITATIONS

- Material can be recovered using tactic R-6, R-23 or R-24.
- Minimum pipeline height above the water or tundra is 12 inches.
- May require wind wall under high wind conditions.
- May require activation of tundra permit from tactic C-4, C-3.
- Approval of State-on-Scene Coordinator and ADF&G is necessary in anadromous fish streams, etc.



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 wide-track dozer 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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Wide-Track Dozer	All	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 Truck	GPB, KRU, Peak, CH2M Hill, Alpine	Transfer oiled snow to disposal site	≥2*	≥2	1 hr	0.5 hr

Number of dump trucks depends on distance to disposal area.* **TOTAL STAFF **≥5 (includes 1 spotter that works with equipment to protect tundra)**

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SUPPORT

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Semi and Trailer	GPB, KRU, Alpine	Transport wide-track dozer	1	1 driver	1 hr	0
Heater	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 Support	All	Support heavy equipment	1	1	1 hr	0.5 hr
Lube Truck	All except Badami	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

- 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 wide-track dozer 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. See Tactic L-6, Table 9A, for capacities of dump trucks available on the North Slope.
- 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:

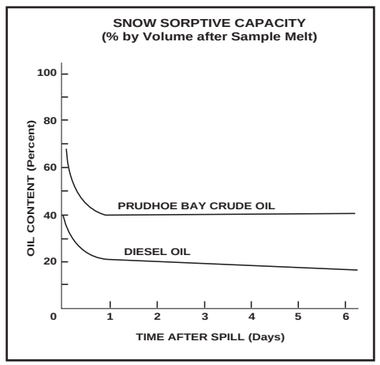
T_c = *Truck Capacity*

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

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

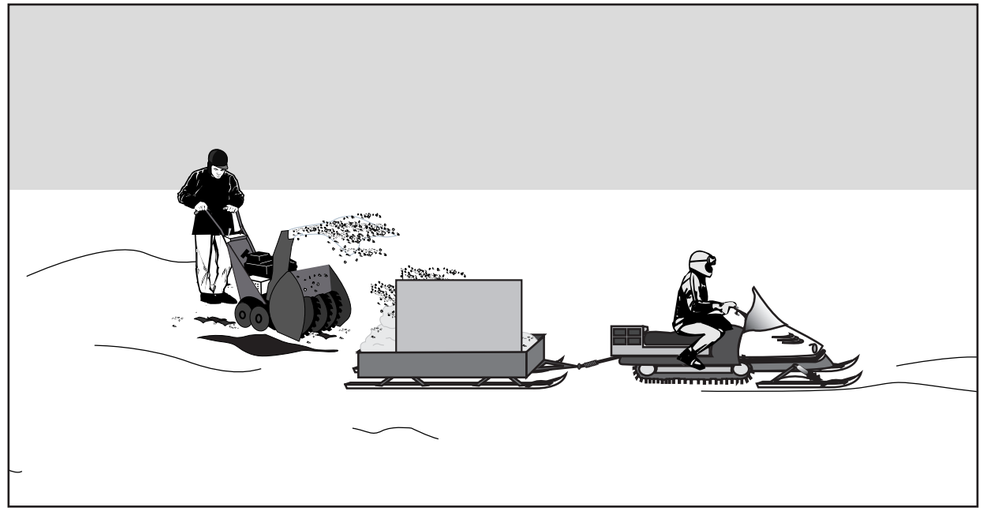
T_t = *Travel Time* $\left(\frac{\text{miles to disposal} * 2}{35 \text{ mph}}\right)$

The ratio of dump trucks to loaders to fill trucks without delay = 1 / (0.17 hr + 0.114 hr + 0.08 hr) = 1 / (0.364) = 2.7 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 or wide-track dozer.
- An ice road allows dump trucks into recovery sites on tundra.



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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Shovel and Broom	All	Recovery	Variable	—	0.5 hr	0.5 hr
Snow Machine with Trailer	All	Transfer	3	3	1 hr	
Snow Blower	ACS, Badami, Northstar, Alpine	Recovery	1	1	1 hr	
Front-End Loader (8-cubic-yd)	All	Transfer	1	1	1 hr	
Dump Truck	GPB, KRU, CH2M Hill, Peak, AIC, Alpine	Transfer	≥2	≥2	1 hr	

TOTAL STAFF ≥7

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SUPPORT

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER 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	Fuel	1	1 for initial setup	1 hr	

CAPACITIES FOR PLANNING

- 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.

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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Shovel and Broom	All	Recovery	6	6	0.5 hr	0.5 hr
Snow Machine or ATV	All	Transfer	3	3	1 hr	
Front-End Loader	All	Transfer	1	1	1 hr	
Dump Truck	GPB, KRU, Peak, AIC, CH2M Hill, Alpine	Transfer	1	1	1 hr	
			TOTAL STAFF	**11 (10 if dump-truck operator loads truck)**		

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).*

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	# STAFF PER 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

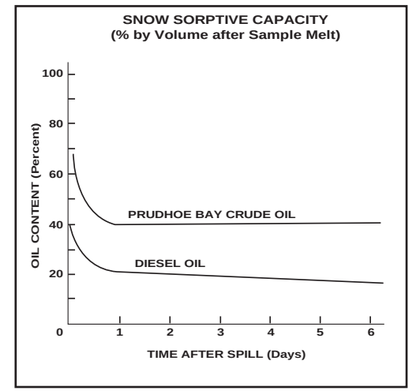
CAPACITIES FOR PLANNING

- 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.

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

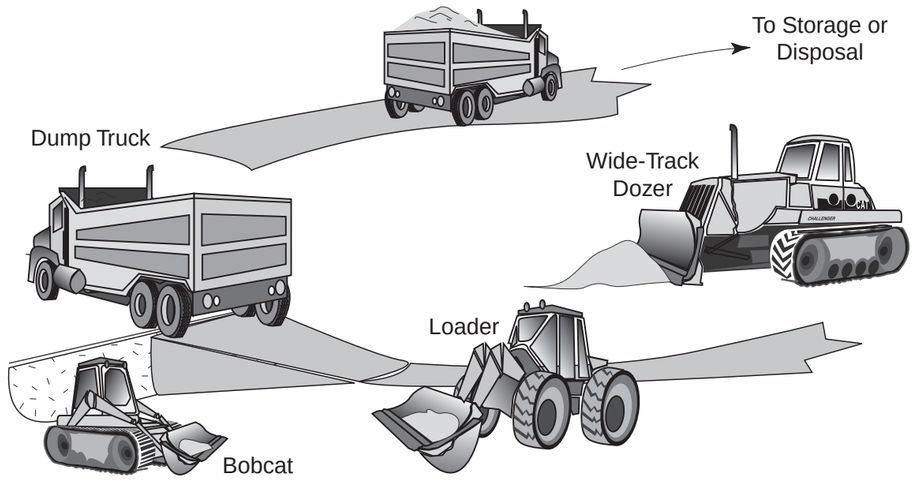
$$3 \text{ cubic yd liquids} \times \frac{27 \text{ cubic ft}}{1 \text{ cubic yd}} \times \frac{1 \text{ bbl}}{5.6 \text{ cubic ft}} = 14.5 \text{ bbl liquids}$$

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



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.
- 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 14.5 bbl/hr of water, plus the oil.
- Warm-up areas are needed for responders.



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, ATVs, 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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
	Wide-Track Dozer	All	Piling oiled snow	1	1	1 hr	0.5 hr
	Front-End Loader	All	Transfer oiled snow into dump trucks	1	1	1 hr	
or	Bobcat	ACS, EOA, KRU, Alpine	Transfer oiled snow to loaders	1	1	1 hr	
	Dump Truck	GPB, KRU, Peak, AIC, Alpine	Transfer oiled snow to disposal site	2	2	1 hr	
	Snowmelter	EOA, Alpine	Melt snow	2	8	2 hr	
	Sorbent	All	Recovery	Variable	Variable	0.5 hr	
				TOTAL STAFF	**11 (includes 1 spotter that works with equipment to protect tundra)**		

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SUPPORT

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Semi and Trailer	GPB, KRU, Alpine	Transport wide-track dozer	1	1 driver	1 hr	0
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 Support	All	Support equipment	1	1	1 hr	0.5 hr
Lube Truck	All except Badami	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

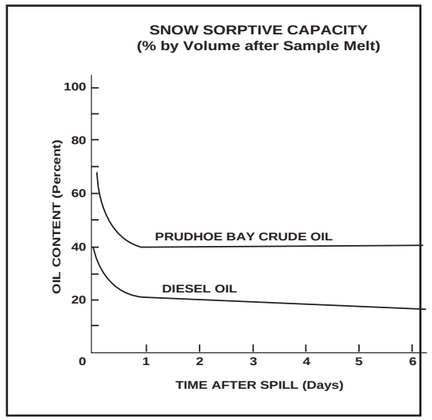
- A front-end loader with an 8-cubic-yd snow bucket can fill a dump truck in 10 minutes and move 500 cubic yd of snow per hour. The dump trucks available on the Slope typically have 10-, 20-, or 25-cubic-yd capacity. Because the front-end loaders fill dump trucks as fast as they pull into position, dump trucks are the bottleneck.
- A snow melter can process 30 yd³/ hour of heavily oiled snow resulting in 70 bbls/hour of recovered oil.
- One cubic yard of oil-saturated snow contains up to 2.4 bbl of oil.
- Following is an example of recovery of oiled snow for one 20-cubic-yd dump unit:

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

Example: 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 $\left(\frac{\text{miles to disposal} * 2}{35 \text{ mph}}\right)$

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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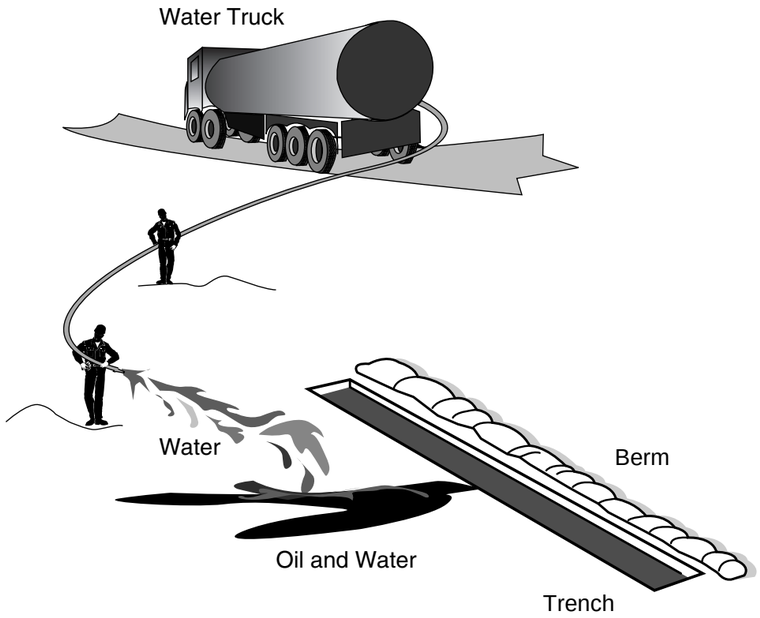
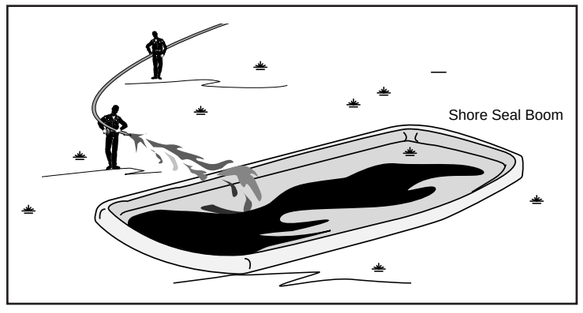


FLOATING OIL WITHIN SHORE SEAL BOOM



In spring or fall, flushing is used to concentrate oil into pits or trenches, where it 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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
	Water Truck	All	Water source	1	2	2 hr	0.5 hr
or	Upright Tank (400 bbl)	KRU, Alpine	Water source	1	2	2 hr	1 hr
	Ice Auger	All	Water source	1		1hr	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

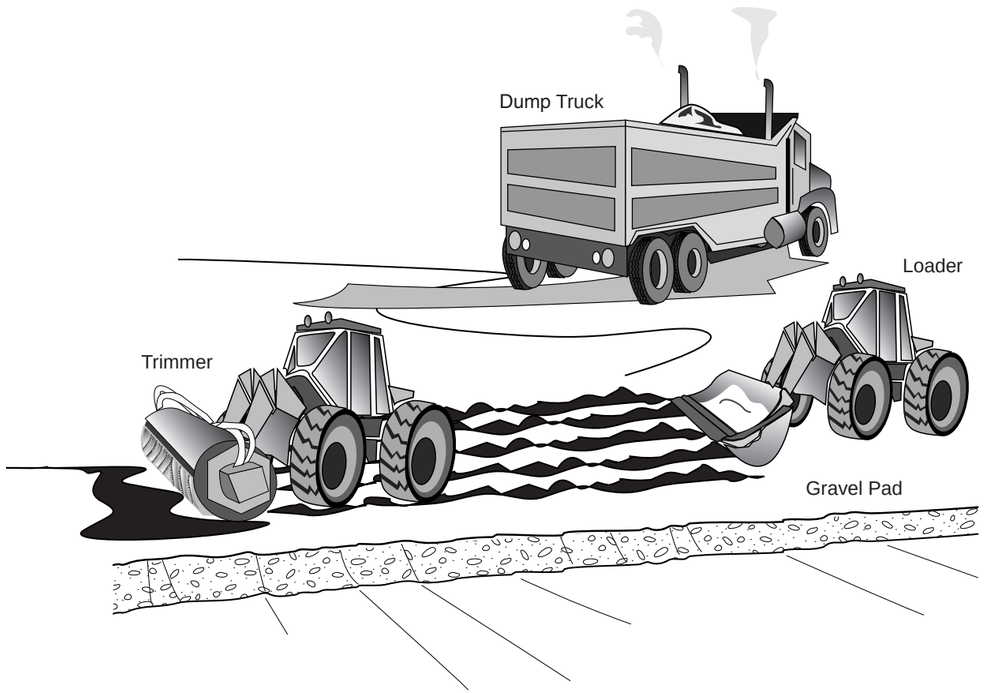
EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Heater	All	Support heavy equipment	≥1	1 initial setup	1 hr	0.5 hr
Fuel Truck	All	Fuel heavy equipment	1	Once per shift	1 hr	0.5 hr
Mechanic Support	All	Support equipment	1	1	1 hr	0.5 hr
Lube Truck	All except Badami	Provide 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

- Recovery capacity depends on the nature of the spill, the size of the concentration area, and terrain features.

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 or 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.



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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
	Trimmer (Loader-mounted, 10-ft wide)	Peak	Recovery of frozen surface material	1	1	2 hr	0.5 hr
or	Trimmer (Bobcat-mounted, 2-ft wide)	ACS, KRU, Alpine	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	GPB, KRU, Peak, AIC, Alpine	Recovery of frozen surface material	1	1	2 hr	0.5 hr
or	Super Sucker	Peak, CH2M Hill, Alpine	Recovery of frozen surface material	1	2	1 hr	0.5 hr
	Dump Truck	GPB, KRU, Peak, AIC, Alpine	Transfer oiled snow to disposal site	≥2	≥2	1 hr	0.5 hr
			TOTAL STAFF		**≥4**		

SUPPORT

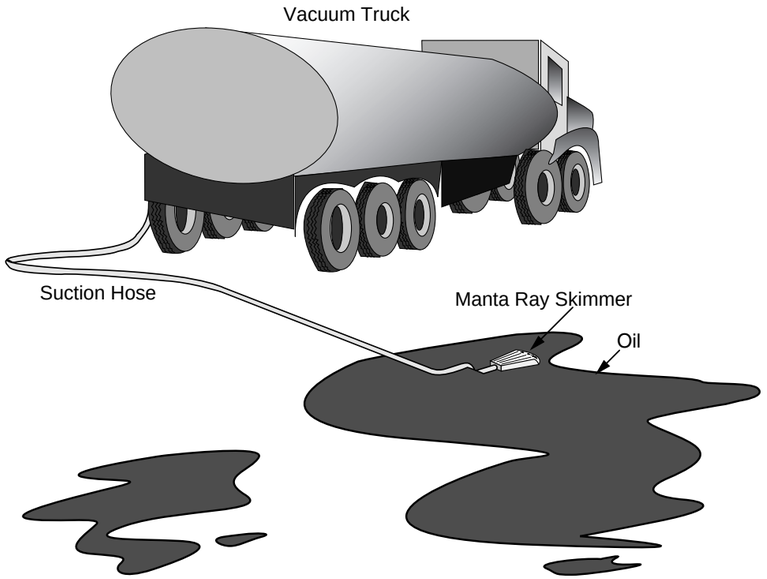
EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Semi and Trailer	GPB, KRU, Alpine	Transport heavy equipment	1	1 driver	1 hr	0
Heater	All	Support heavy equipment	≥1	1 initial setup	1 hr	0.5 hr
Fuel Truck	All	Fuel heavy equipment	1	Once per shift	1 hr	0.5 hr
Mechanic Support	All	Support equipment	1	1	1 hr	0.5 hr
Lube Truck	All except Badami	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

- A front-end loader can fill a dump truck in 30 minutes. The average dump truck available on the Slope has a 20-cubic-yd capacity.
- 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.



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.

Archimedes screw 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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
	Vacuum Truck	All	Direct suction	1	2	1 hr	0.5 hr
or	Archimedes Screw Pump	ACS	Direct suction	1	2	1 hr	0.5 hr
or	Trash Pump (4-inch)	ACS, GPB, Alpine	Direct suction	1	2	1 hr	0.5 hr
	Suction Hose (4-inch)	ACS, WOA, Alpine	Transfer	≥20 ft	2 for setup	2 hr	0
	Discharge Hose (4-inch)	ACS, WOA, KRU, Alpine	Transfer	>50 ft	—	1 hr	0
	Manta Ray Skimmer Head (optional)	GPB, KRU, ACS,MPU, Alpine	Direct suction	1	—	0.5 hr	0
	Upright Tank (400 bbl)	KRU, Alpine	Store fluids	1	1 initial	2 hr	1 hr
				TOTAL STAFF	**≥3**		

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SUPPORT

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
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 Support	All	Support heavy equipment	1	1	1 hr	0.5 hr
Lube Truck	All except Badami	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

- 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:

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

T_C = *Vac Truck Capacity (bbl)*

S_t = *Suction Rate = 150 bbl/hr of oil in winter; 200 bbl/hr of oil in summer (and for diesel)*

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

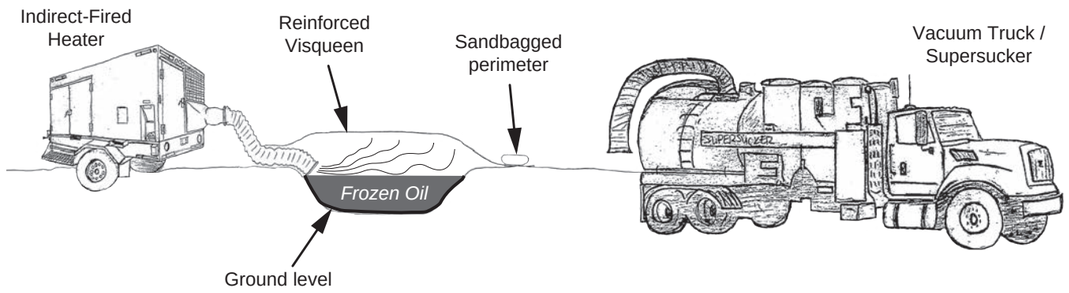
$$T = \left(\frac{10\ mi * 2}{35\ mph}\right) + 2\left(\frac{300\ bbl}{150\ bph}\right) = 4.6\ hr$$

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 an Archimedes screw 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.

Use of direct heat to thaw frozen ground for access and removal of surface materials. There are several uses for ground thaw including removal of surface materials or to access buried pipes and trench boxes. The heat source is usually some type of indirect fired heater and the heat is ducted under some type of plastic membrane that is held in place with sand bags. Rate ofthaw is variable and is dependent on exhaust temperature from indirect fired heater and ambient air temp.

Care must be taken to ensure that the use of this tactic does not create a potentially hazardous atmosphere if flammable or toxic materials are involved.



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EQUIPMENT AND PERSONNEL

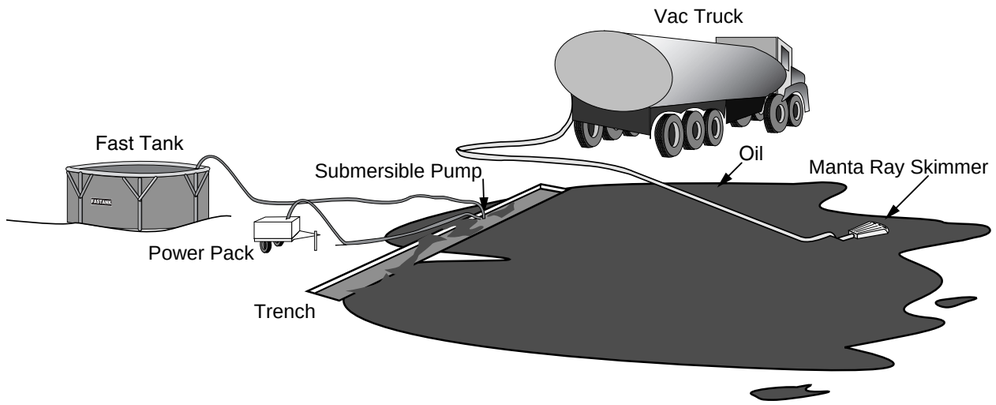
EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Loader	All	Place thaw mat	1	1	1 hr	1 hr
Thaw Unit	KRU, DH	Ground thaw	2	2	1 hr	1 hr
Super Sucker	All	Recover material	1	2	1 hr	1 hr
Visqueen	All	Ground cover	1	2 for setup	1 hr	1 hr
Sand Bags	All	Anchors	1 per 4'	2 for setup	1 hr	1 hr

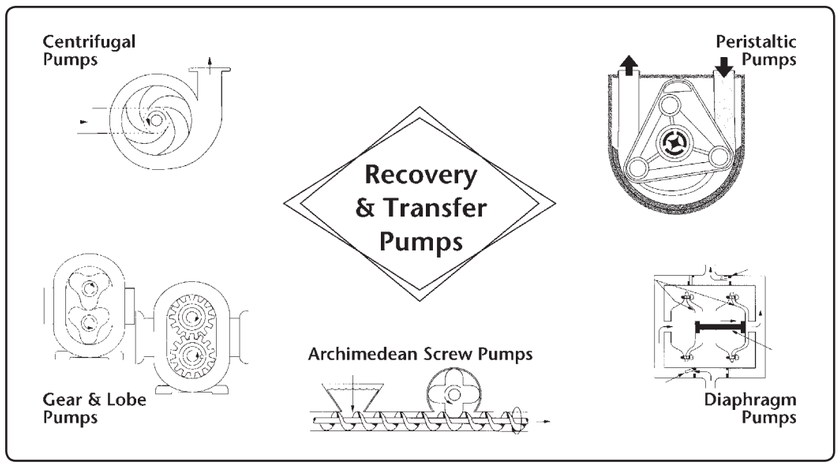
SUPPORT

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Heater	All	Heat	1	1 for setup	1 hr	0.5 hr
Fuel Truck	All	Fuel	1	Once per shift	1 hr	0.5 hr
Light Plant	All	Illumination	1	1 for setup	1 hr	0.5 hr

CAPACITIES FOR PLANNING

- Rate of thaw is variable and is dependent on exhaust temperature from indirect fired heater or radiant heat from ground matt and ambient air temp.





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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
	Vacuum Truck	All	Recovery	1	2	1 hr	0.5 hr
	Manta Ray Skimmer Head	GPB, KRU, ACS, MPU, Alpine	Direct suction	1	—	0.5 hr	0
or	Archimedes Screw Pump	ACS	Recovery	1	2	1 hr	1 hr
or	Peristaltic Pump (2-inch)	ACS, Alpine, KRU	Recovery	1	2	1 hr	
or	Trash Pump (3-inch)	All	Recovery	1	2	1 hr	
or	Diaphragm Pump (3-inch)	All	Recovery	1	2	1 hr	
or	TransVac	ACS, WOA	Recovery	1	2	2 hr	
	Portable 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

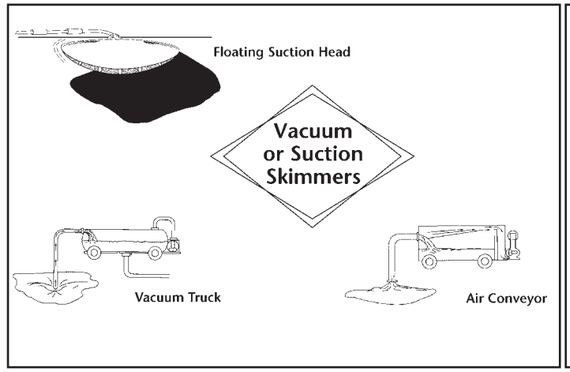
EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Fuel Truck	All	Fuel heavy equipment	1	Once per shift	1 hr	0.5 hr
Mechanic Support	All	Support equipment	1	1	1 hr	0.5 hr
Light Plant	All	Illumination	≥1	2 for initial setup, and 1 to check and fuel occasionally	1 hr	0.5 hr
Semi and Trailer	GPB, KRU, Alpine, ACS	Haul backhoe	1	1	1 hr	0

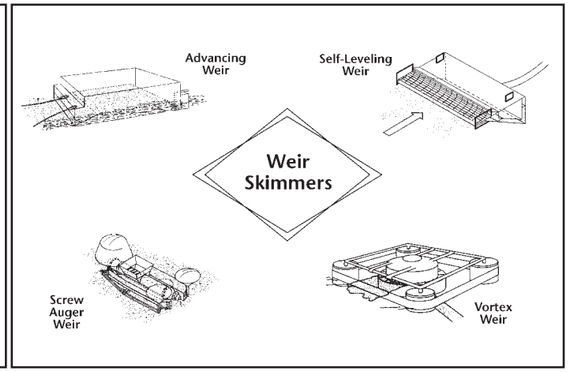
CAPACITIES FOR PLANNING

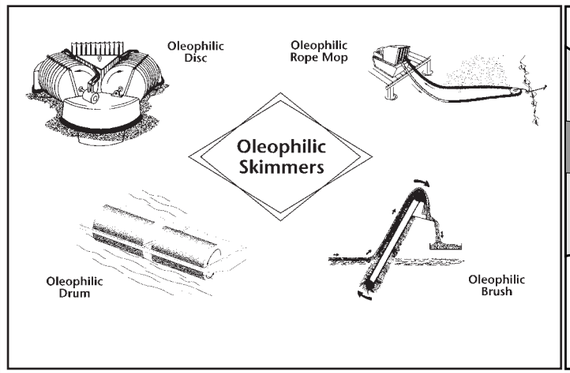
- Vacuum truck recovery rate: 200 bbl/hr, 150 bbl/hr winter (reduced to 34 bbl/hr if a Manta Ray skimmer is used with the vacuum truck). Remains at 200 bbl/hr year-round for pooled diesel.

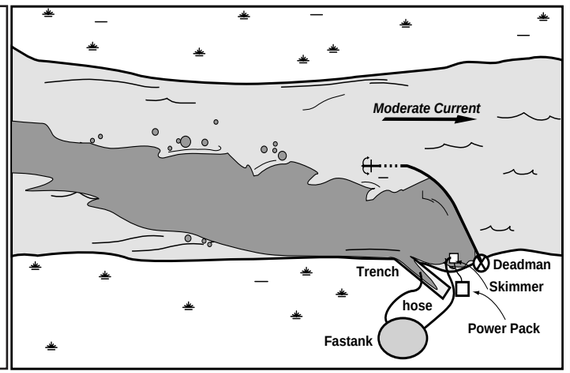
DEPLOYMENT CONSIDERATIONS AND LIMITATIONS

- 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.









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.)

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: *“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

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

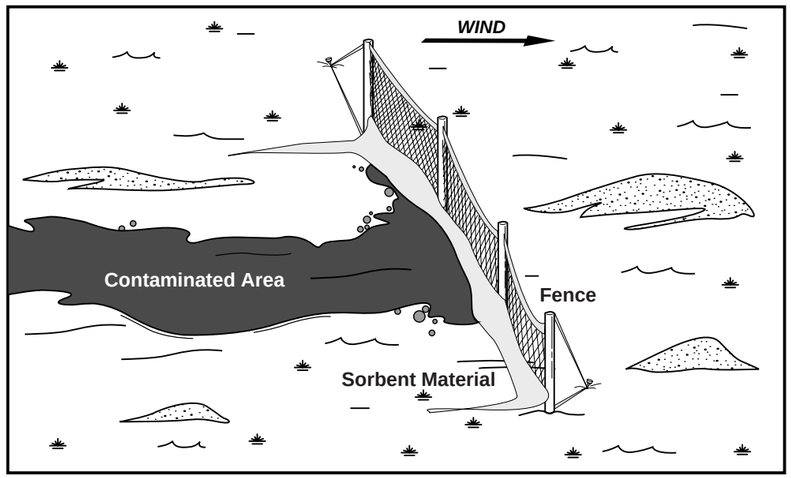
SUPPORT

- Portable tanks, bladders, Rolligon with tank, mini-barge possible.

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. Do not use a centrifugal pump with a weir skimmer.

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 Pad (18 x 18 inch)	All
Sorbent Sweep (18 x 18 inch)	All
Sorbent Pad (36 x 36 inch)	All
Sorbent Roll (36 inch x 150 ft)	All
Pom Pom	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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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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Rake	All	Recovery	≥1	1 per	1 hr	0
Pitchfork w/Screen	All	Recovery	≥1	1 per	1 hr	0
Shovel	All	Recovery	≥1	1 per	1 hr	0
Oily Waste Bag	All	Disposal	>1 Box	—	1 hr	0
Fencing Material	All	Containment	Variable	2	1 hr	2 hr

CAPACITIES FOR PLANNING

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

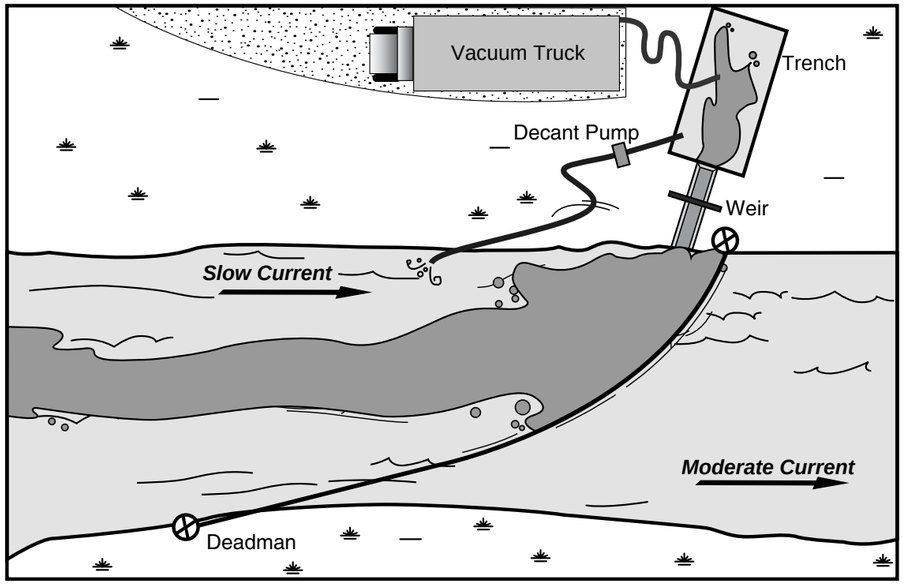
COMMON SORBENT PACKAGING CHARACTERISTICS (For Fibrous Polypropylene Products)

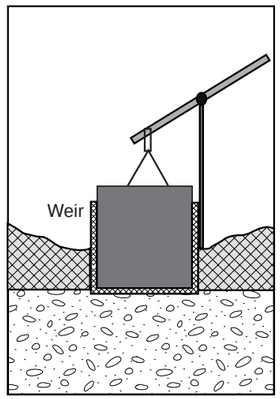
Sorbent Type	Dimensions	Units/Bale	Approximate Weight (Pounds/Bale)
(A) Rolls	3/8" x 36" x 150'	1 Roll	38
(B) Sweeps	3/8" x 19" x 100'	1 Sweep	15
(C) Sheets	3/16" x 18" x 18"	200 Sheets	18
(D) Sheets	3/8" x 18" x 18"	100 Sheets	18
(E) Sheets	3/8" x 36" x 36"	50 Sheets	38
(F) Particulate	—	1 Bag	25
(G) 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.





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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Backhoe	GPB, KRU, Peak, AIC, Alpine	Trenching	1	1	2 hr	3 hr
Vacuum Truck (300-bbl)	All	Recovery	1	1	1 hr	
Slide Gate Weir System	KRU	Recovery	1	2	1 hr	
Trash Pump (4-inch)	ACS, GPB, Alpine	Decanting	1	1	1 hr	
Suction Hose (4-inch)	ACS, WOA, Alpine	Liquid transfer	≥20 ft	2 for setup	2 hr	
Discharge Hose (4-inch)	ACS, WOA, KRU, Alpine	Liquid transfer	≥50 ft	—	1 hr	
		TOTAL STAFF FOR SETUP		**7**		
		TOTAL STAFF TO SUSTAIN OPERATIONS		**5**		

SUPPORT

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Avgas Trailer	ACS, GPB, KRU, Badami, Alpine	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 Support	All	Support equipment	1	1	1 hr	0.5 hr
Lube Truck	All except Badami	Provide fluids to heavy equipment	1	Once per shift	1 hr	0.5 hr

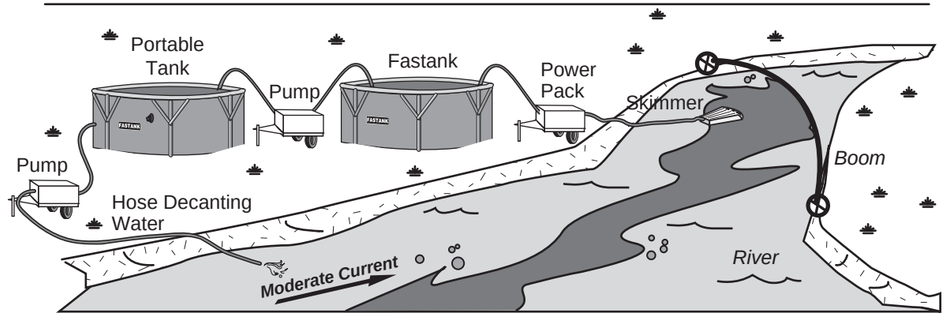
CAPACITIES FOR PLANNING

- 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.)
- 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.

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

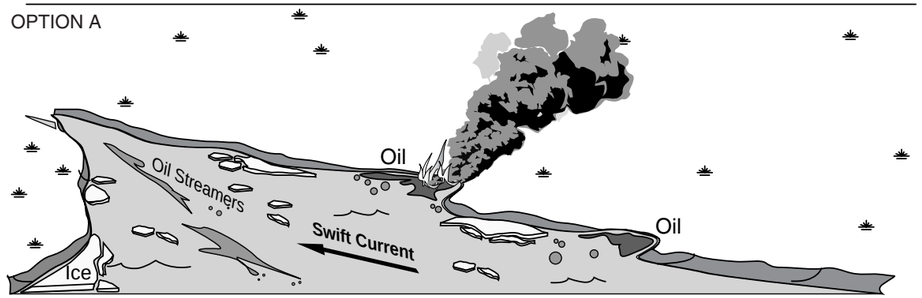
- Equipment and personnel required to set up and maintain boom are listed in the applicable containment tactic.

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Small Stationary Skimmer System	ACS, GPB, KRU, Endicott, Alpine	Recovery	1	1	1 hr	0.5 hr
Pump (3-inch)	All (ACS, MPU, Alpine have diesel)	Transfer	1	1	1 hr	
Suction Hose (3-inch)	All	Transfer	≥20 ft	—	1 hr	
Discharge Hose (3-inch)	All	Transfer	≥50 ft	2 for setup	1 hr	
Pump (2-inch)	All	Decanting	1	1	1 hr	
Portable Tank	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**		

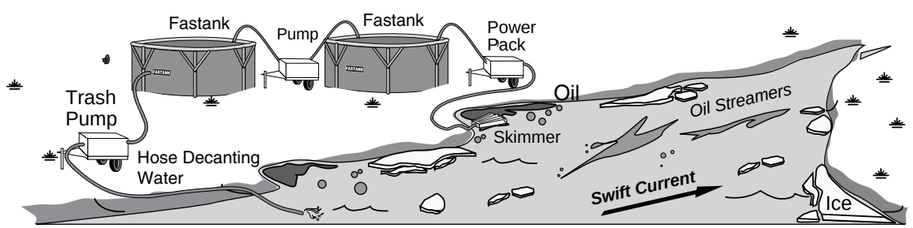
DEPLOYMENT CONSIDERATIONS AND LIMITATIONS

- 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.

OPTION A

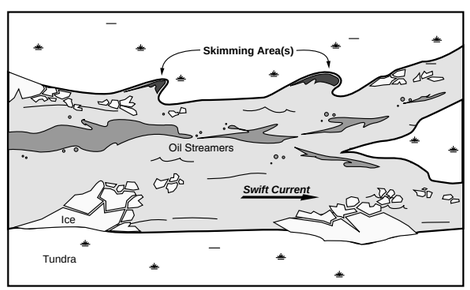


OPTION B



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	# STAFF PER 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 Igniter	ACS	Ignition	≥6	1	1 hr	
Gelled Fuel	ACS	Firestarter Material	>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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Small Stationary Skimmer System	All	Recovery	1	1	1 hr	3 hr
Diaphragm Pump (3-inch)	All (ACS, MPU, Alpine 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	
Portable Tank	All	Temporary Storage	2	2 for setup	1 hr	

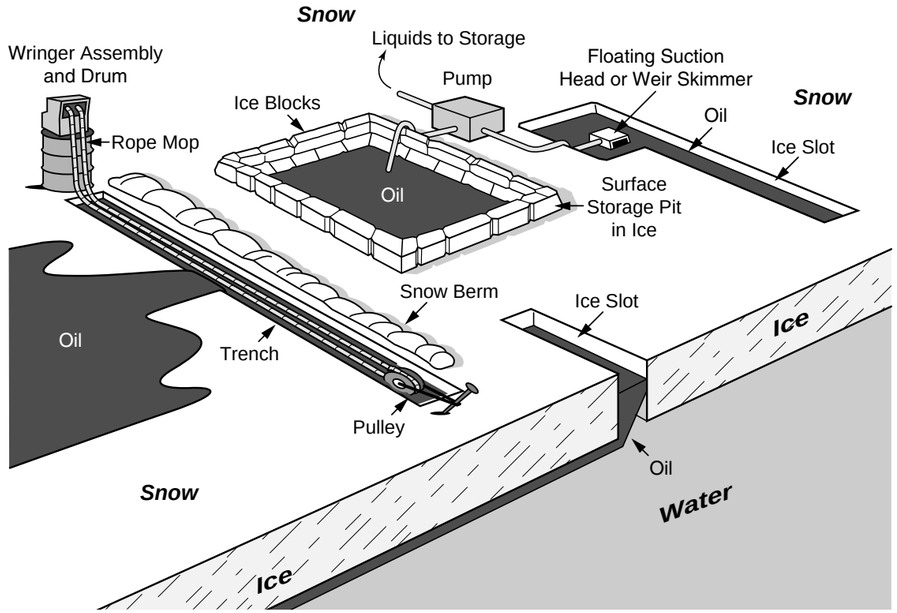
TOTAL STAFF FOR SETUP 5

TOTAL STAFF TO SUSTAIN OPERATIONS 3

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.

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



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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Rube Witch w/Chain Saw	All	Trenching	3	6	1 hr	0.5 hr
Ice Auger	All;	Recovery hole	1		1 hr	0.5 hr
Rope Mop (4-inch)	All	Recovery	1		1 hr	1 hr
or Small Stationary Skimmer System	All	Recovery	1	4	1 hr	1 hr
Portable Shelter (10x12)	All	Shelter	1		1 hr	1 hr
Pump (3-inch)	All	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 and ACS	Berming	2	2	1 hr	0.5 hr
		TOTAL STAFF FOR SETUP AND TRENCHING		**12**		
		TOTAL STAFF TO SUSTAIN OPERATIONS		**3**		

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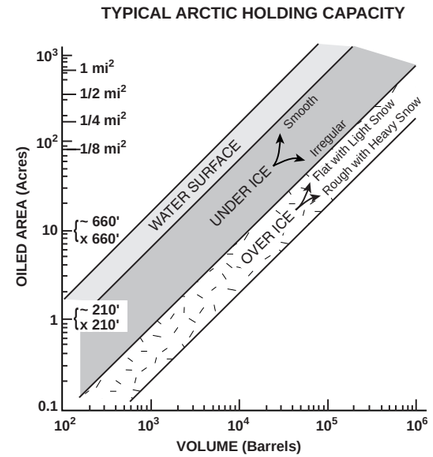
NOTE: *"Base Location" is storage location (may change seasonally); "Mobe Time" is time to get it out of storage, prepare it for operation, and make it ready to travel (concurrent for all equipment); "Deploy Time" is time to make it operational for its intended use at the spill site. These times do not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

SUPPORT

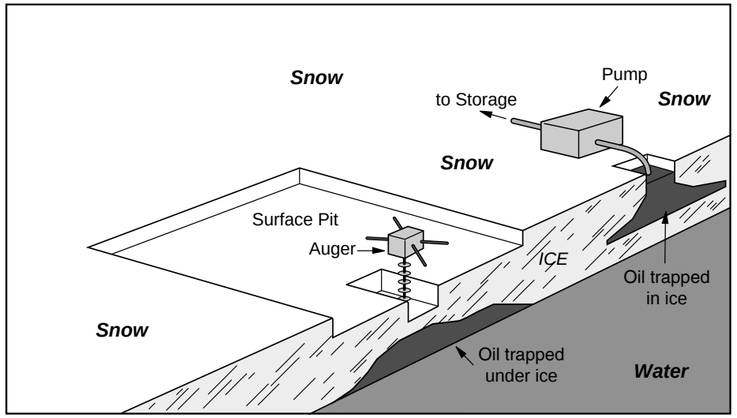
EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Mechanic Support	All	Support Equipment	1	1	1 hr	0.5 hr
Light Plant	All	Illumination	≥1	2 for initial setup, and 1 to check and fuel occasionally	1 hr	0.5 hr
Heater	All	Heat	>1	1 initial setup	1 hr	0.5 hr

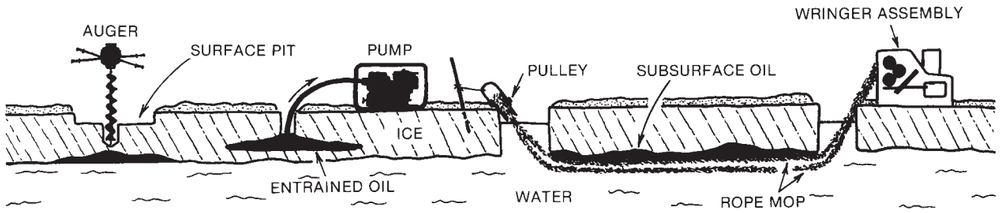
CAPACITIES FOR PLANNING



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.





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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Rube Witch w/Chain Saw	All	Sump construction	3	6	1 hr	0.5 hr
Portable Shelter (10x12)	All	Shelter	1	4	1 hr	1 hr
Ice Auger	GPB, KRU, ACS, Endicott, Alpine	Recovery hole	1		1 hr	0.5 hr
Rope Mop (4-inch)	All	Recovery	1		1 hr	1 hr
Pump (3-inch)	All	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

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).*

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).*

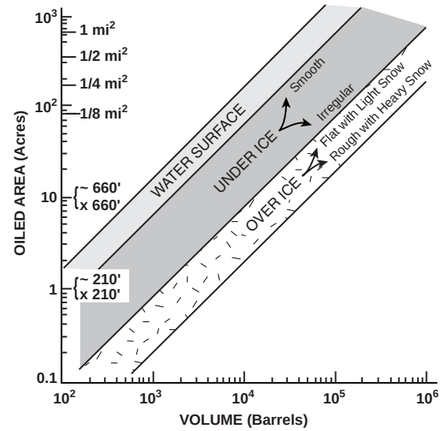
SUPPORT

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Heater	All	Heat	1	1 initial setup	1 hr	0.5 hr
Mechanic Support	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

CAPACITIES FOR PLANNING

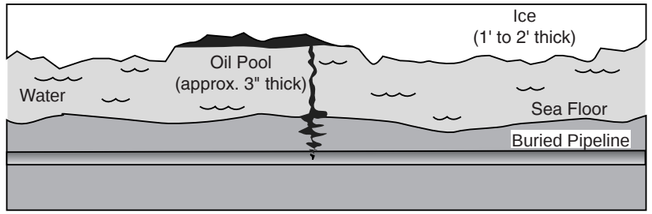
- Depending on the thickness of a trapped oil pool, a single sump or auger hole may drain a very small lateral area. Repeated holes may have to be drilled at a close spacing to recover most of the oil. This technique is most effective for thicker oil pockets on the order of 4 to 6 inches or more. Thin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

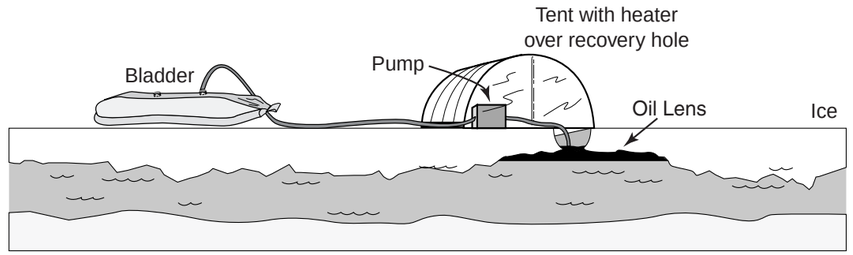
TYPICAL ARCTIC HOLDING CAPACITY

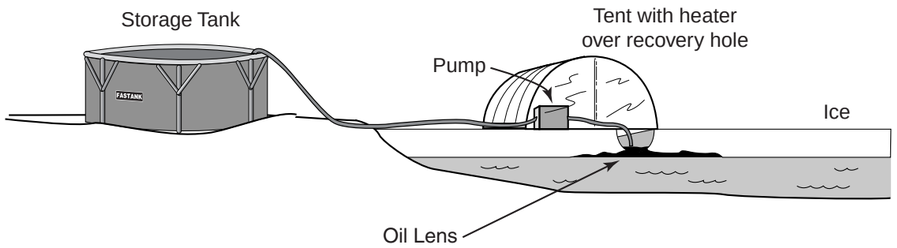


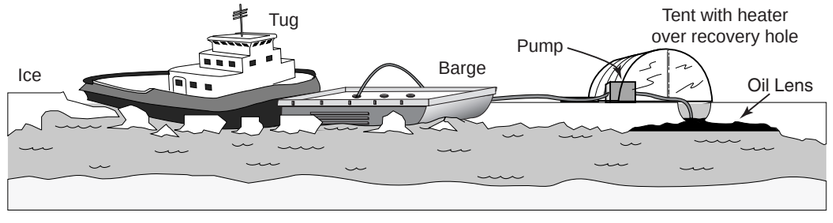
DEPLOYMENT CONSIDERATIONS AND LIMITATIONS

- 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.









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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EQUIPMENT AND PERSONNEL

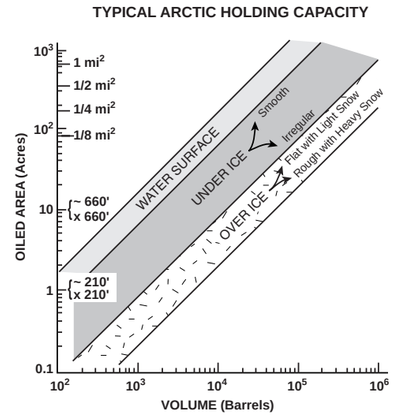
	EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
	Ice Auger	ACS, GPB, KRU, Endicott, Alpine	Recovery	1	2	1 hr	0.5 hr
	Portable Shelter (10x12)	All	Shelter	1	3 for setup	1 hr	1 hr
	Pump (3-inch)	All	Recovery	1	1	1 hr	0.5 hr
	Suction Hose (3-inch)	All	Recovery	2≥20 ft	2 for 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
or	Portable Tank	All	Storage	1	2 (initial)	1 hr	0.5 hr
or	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

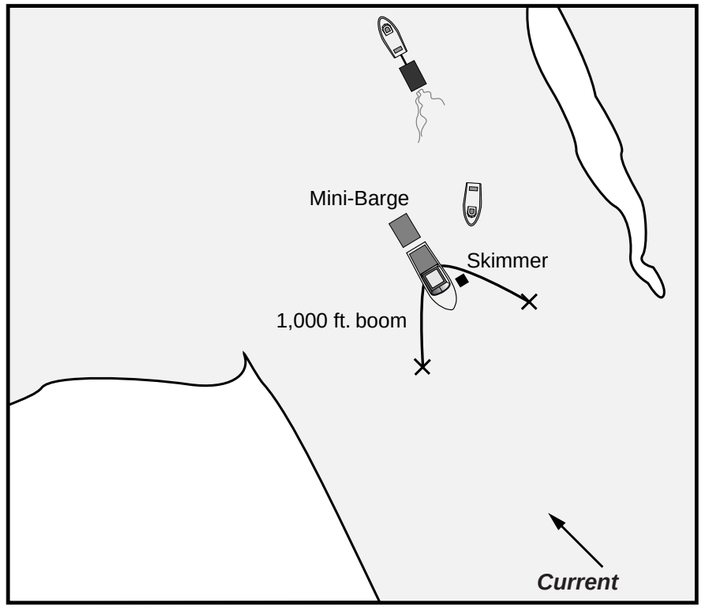
EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Heater	All	Heat	1	1 initial setup	1 hr	0.5 hr
Light Plant	All	Illumination	≥1	2 for initial setup, and 1 to check and fuel occasionally	1 hr	0.5 hr

CAPACITIES FOR PLANNING



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., Coliwasa tube). Emulsion samples will be collected and analyzed for oil content.



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 will be tied in at the apex. 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	# STAFF PER 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	Intermediate 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

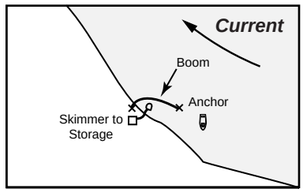
- An aircraft will track the oil and help coordinate the on-water task forces. A work boat with propeller tows the mini-barge into place and leaves once the barge is anchored.

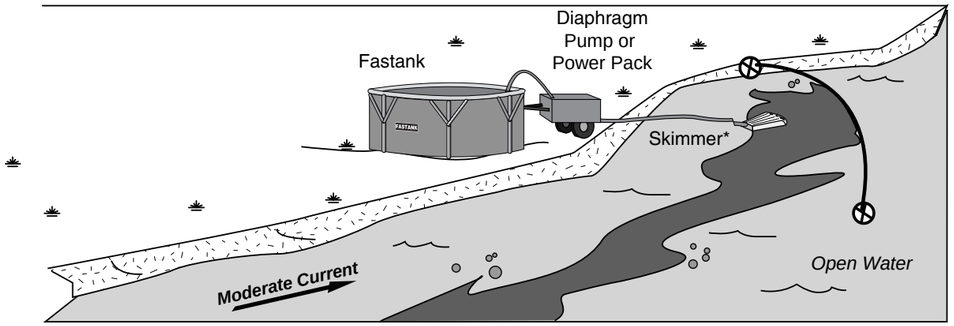
CAPACITIES FOR PLANNING

- Boom throughput efficiency is 100% in open sea water and 90% in rivers.

DEPLOYMENT CONSIDERATIONS AND LIMITATIONS

- Approval to decant is needed from the Federal or State On-Scene Coordinator, as appropriate. 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.
- In shallow water operations, a mini-barge may be grounded and used as a work platform.





*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 Federal or State On-Scene Coordinator, as appropriate.

Additional portable tanks and pumps can be added as needed depending on oil encounter rates.

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

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Small Stationary Skimmer System	All	Recovery	1	4 for setup 2 to maintain	1 hr	3 hr
Pump (3-inch)	All	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	
Portable Tank	All	Storage	1		1 hr	
or Tank Bladder (500 gal)	ACS, WOA, Alpine	Storage	1	—	1 hr	1hr

SUPPORT

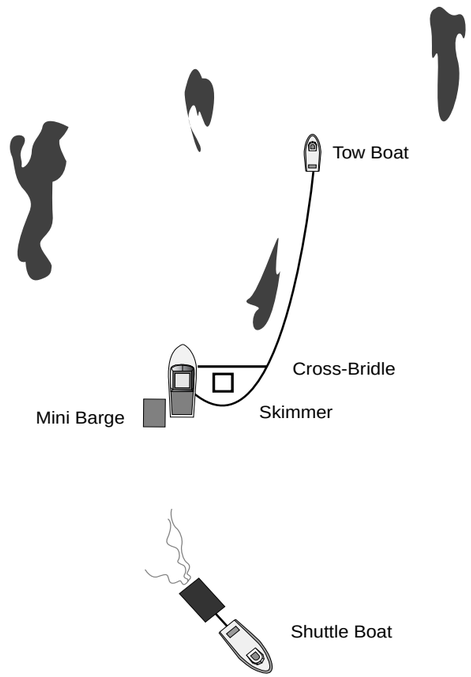
EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Avgas Trailer	ACS, GPB, KRU, Badami, Alpine	Airboat fuel	1	1 (initial)	1 hr	0.5 hr
Fuel Truck	All	Fuel heavy equipment	1	Once per shift	1 hr	0.5 hr

CAPACITIES FOR PLANNING

- 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 portable tanks with associated hoses.

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 wide-track 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.



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 near-shore 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.

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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	# STAFF PER 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	Intermediate storage	2	—	1 hr	
			TOTAL STAFF	**7**		

DECANTING

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER 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).

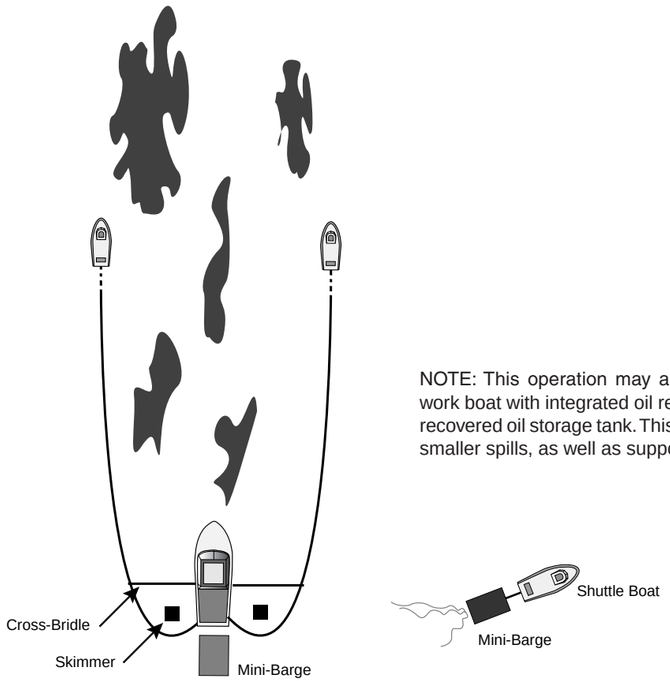
CAPACITIES FOR PLANNING

- 1 hr to load mini-barge; 1.5 hr to unload.
- 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.

DEPLOYMENT CONSIDERATIONS AND LIMITATIONS

- Approval to decant is needed from the Federal or State On-Scene Coordinator, as appropriate. 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.



NOTE: This operation may also be conducted using a work boat with integrated oil recovery system and built-in recovered oil storage tank. This option is ideal for handling smaller spills, as well as supporiing larger responses.

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. The skimmer pumps recovered liquids into a towed storage platform (mini-barge or floating storage bladder). Free water is decanted during the loading step. When the storage platform is full, a work boat replaces it and tows it to an intermediate storage platform for off-loading. Skimming continues uninterrupted.

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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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
	Work Boat	All	Tow boom, up to 500 ft	2	4	1 hr	2 hr
	Boom	All	On-water recovery	1,000 ft	—	1 hr	
	Work Boat* w/ 2 integrated Skimmers	Shell	Tow boom and mini-barge or floating storage bladder; skim, decant and store or pump oil	1	2	0.5 hr	0.5 hr
or	Work Boat	All	Run skimmer and pump; tow mini-barge while loading; tow boom	1	4	1 hr	2 hr
	Skimmer	All	On-water recovery	2		1 hr	
	Work Boat	All	Shuttle storage platforms	1	2	1 hr	
	249-bbl Mini-Barge (237 bbl available storage)	West Dock, Oliktok	Intermediate storage	2	—	1 hr	
or	Floating Storage Bladder**	Shell	Intermediate storage	2	—	0.5 hr	0.5 hr

* *50 bbl onboard recovered oil tank and off-loading PDP*
** *Onboard 3-inch diaphram diesel decanting pump*

TOTAL STAFF 11-13

DECANTING

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER 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

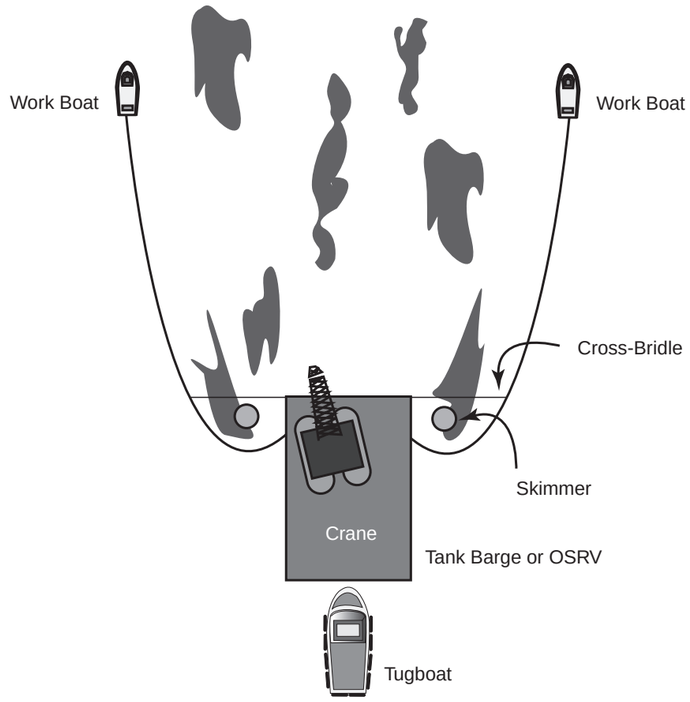
- A trained aerial observer in a fixed-wing aircraft or helicopter tracks the oil location and movement from above and coordinates the on-water task force recovery effort.

CAPACITIES FOR PLANNING

- 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.
- 1 hr to load mini-barge; 1.5 hr to unload.

DEPLOYMENT CONSIDERATIONS AND LIMITATIONS

- The oil recovery rate and number of mini-barges required (fill to 95% capacity) vary with the oil encounter rate.
- Approval to decant is needed from the Federal or State On-Scene Coordinator, as appropriate. 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) prior to offloading. Emulsion samples will be collected and analyzed for oil content.



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 tank barge or OSRV. 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.

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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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
	Work Boat (ACS Bay Class or equivalent**)	West Dock	Tow boom	2	6	1 hr	3 hr
	Boom	West Dock, Oliktok	On-water collection	Variable	4	1 hr	
	Transrec 250 Skimmer* (w/ power pack)	ACS	On-water recovery	1	—	2 hr	
or	Walosep W4 Skimmer* (w/ power pack)	ACS	On-water recovery	1	—	2 hr	
or	Crucial 13/30 Skimmer	ACS	On-water recovery	2	—	1 hr	
or	LORI LFS Skimmer*	ACS	On-water recovery	2	—	1 hr	
or	Lamor LSC-5 Skimmer*	Shell	On-water recovery	2	—	—	1 hr
	Tug	West Dock	Towing	1	4	2 hr	3 hr
	Tank Barge	West Dock	Storage	1	6	4 hr***	
or	OSRV	Shell	Storage	1	12	1 hr	1 hr
	Mobile Crane	GPB, KRU, Peak	Skimmer deployment	1	1	2 hr	3 hr
	Archimedes Screw Pump	ACS, KRU	Decanting	1	—	1 hr	
	Discharge Hose (4-inch w/ 6-inch to 4-inch reducer)	ACS, WOA, KRU	Decanting	≥50 ft	—	1 hr	
or	PDP, with diesel/hydraulic power-pack (annular injection flanges)	Shell	Decanting/Offload	8	—	1 hr	1 hr

TOTAL STAFF 21-27

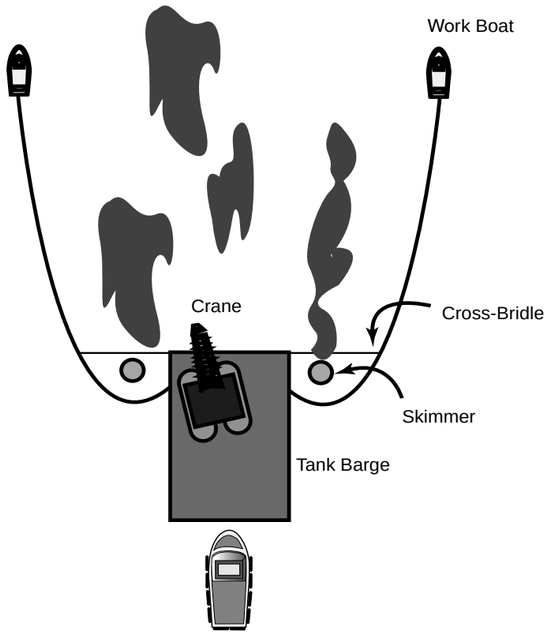
** Two LORI LFS or Lamor LSC-5 skimmers are interchangeable with the Transrec 250 and Walosep W-4 skimmers, depending on ice conditions.*
*** 200 hp minimum*
**** This mobilization time applies after tank barge arrives on North Slope.*

SUPPORT

- A trained aerial observer in a fixed-wing aircraft or helicopter tracks the oil location and movement from above and coordinates the on-water task force recovery effort.

DEPLOYMENT CONSIDERATIONS AND LIMITATIONS

- The oil recovery rate and number of mini-barges required (fill to 95% capacity) vary with the oil encounter rate.
- Approval to decant is needed from the Federal or State On-Scene Coordinator, as appropriate. 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) prior to offloading. Emulsion samples will be collected and analyzed for oil content.



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.

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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
	Work Boat (ACS Bay Class or equivalent*)	West Dock	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	On-water collection	Variable	4 for setup	1 hr	
	Mobile Crane	GPB, KRU, Peak	Skimmer deployment	1	1	2 hr	
	Desmi 250 (Ocean)	ACS	On-water recovery	1	—	1 hr	
	Desmi 250 (Harbor)	ACS	On-water recovery	1	—	1 hr	3 hr
	LORI LFS Skimmer**	ACS	On-water recovery	2	—	1 hr	
and/or	Crucial 13/30 Skimmer	ACS	On-water recovery	2	—	1 hr	
and/or	Foxtail Rope Mop V.A.B 2-9	ACS	On-water recovery	1	—	2 hr	
and/or	Foxtail Rope Mop V.A.B. 4-9	ACS	On-water recovery	1	—	2 hr	
and/or	Transrec 250 Skimmer** (w/ power pack)	ACS	On-water recovery	1	—	2 hr	
and/or	Walosep W4 Skimmer** (w/ power pack)	ACS	On-water recovery	1	—	2 hr	

TOTAL STAFF 25

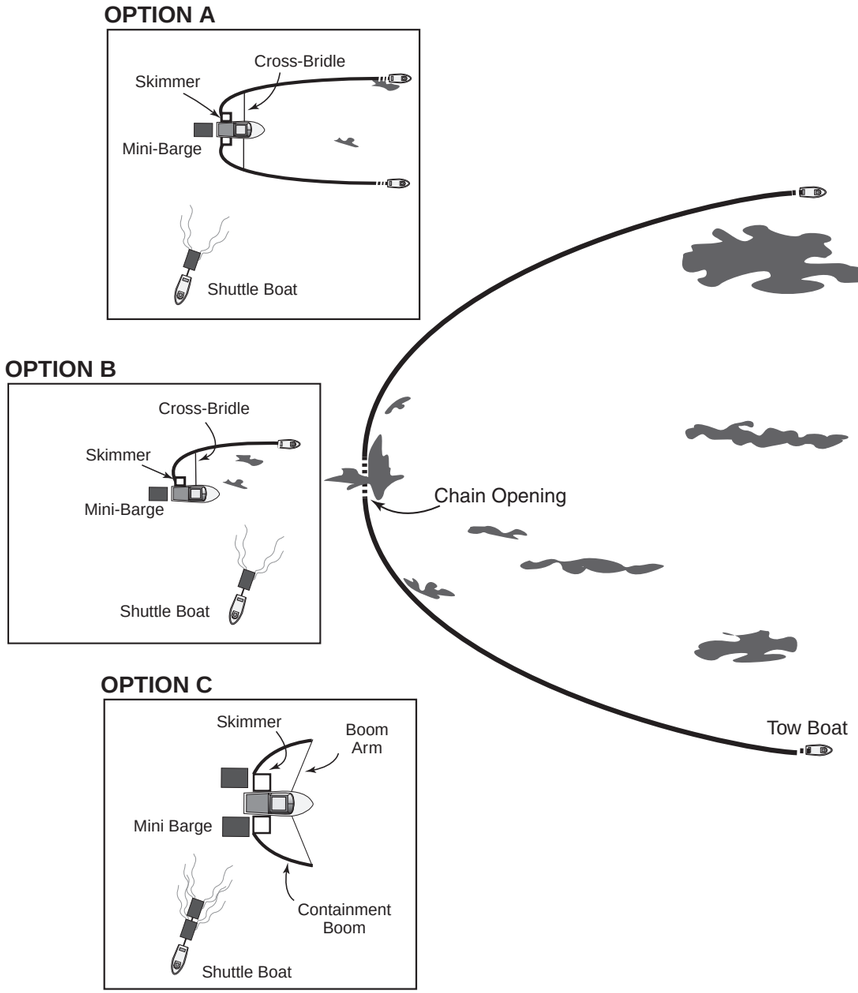
* *200 hp minimum*
** *Two LORI LFS skimmers are interchangeable with the Transrec 250 and Walosep W-4 skimmers, depending on ice conditions.*
*** *This mobilization time applies after barge arrives on North Slope.*

SUPPORT

- A trained aerial observer in a fixed-wing aircraft or helicopter tracks the oil location and movement from above and coordinates the on-water task force recovery effort.

DEPLOYMENT CONSIDERATIONS AND LIMITATIONS

- Ice management may be used to decrease ice concentrations encountered by the containment system.
- Approval to decant is needed from the Federal or State On-Scene Coordinator, as appropriate. 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.



The length of boom and boom swath width are determined by the towing capacity of the boats and the water depth. For a swath width of 650 feet, two work boats each pull 1,000 feet of ocean boom. (Shorter lengths of boom may be necessary to avoid boom planing or entrainment based on sea conditions).

Oil funnels through the boom's chained opening in the apex, with concentrated oil moving directly into a collection boom consisting of one or two 250-foot sections, each towed by a work boat (Options A and B). A recovery vessel (work boat, OSRB or OSRV) with skimming capability is tied into the apex of the collection boom. The recovery vessel's engines power a hydraulic system to drive the skimmer and the pumps. For Option C, the 250-foot sections of boom and towboats are replaced by two 42-foot sections of boom held in place off the recovery vessel by means of boom arms.

Oil and sea water are pumped into a mini-barge or floating storage bladder. To replace when full, a shuttle boat hooks up an empty replacement to the skimmer vessel and tows away the full one.

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).

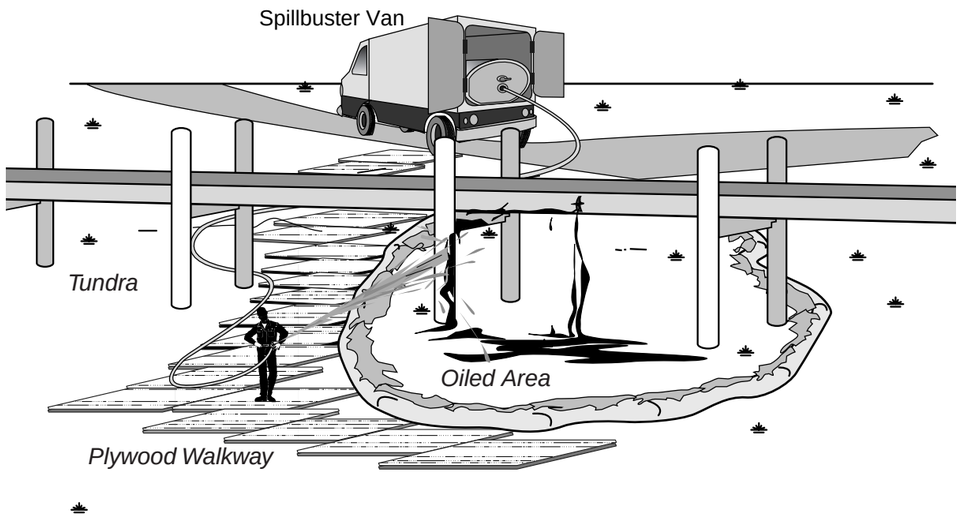
	EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
	Work Boat	West Dock, Oliktok, Northstar	Tow boom for open apex	2	6	1 hr	Opt. A: 4 hr Opt. B: 4 hr Opt. C: 4.5 hr
	Work Boat	All	Tow boom, up to 250 ft	Opt. A: 2 Opt. B: 1 Opt. C: 0	Opt. A: 6 Opt. B: 3 Opt. C: 0	1 hr	
	Boom	All	On-water recovery	Variable	—	1 hr	
	LORI LSC Skimmer	West Dock	On-water recovery	Opt. A: 2 Opt. B: 1 Opt. C: 2	—	1 hr	
or	Lamor LSC-5 Skimmer	Shell	On-water recovery	Opt. A: 2 Opt. B: 1 Opt. C: 2	—	—	
or	Crucial 13/30 Skimmer	West Dock	On-water recovery	Opt. A: 2 Opt. B: 1 Opt. C: 2	—	1 hr	
or	LORS-2C	Shell	On-water recovery	Opt. A: 2 Opt. B: 1 Opt. C: 2	—	—	
	Work Boat	West Dock	Run skimmer and pump; tow mini-barge while loading	1	4	Opt. A: 1 hr Opt. B: 1hr Opt. C: 1.5 hr	
or	Tug and OSRB w/crane	Shell	Run skimmer and pump; store recovered oil; deploy equipment	1 each	Tug: 5 OSRB: 6 Crane: 1	Opt. A: 1 hr Opt. B: 1hr Opt. C: 1.5 hr	
or	OSRV	Shell	Run skimmer and pump; store recovered oil; deploy equipment	1	12	Opt. A: 1 hr Opt. B: 1hr Opt. C: 1.5 hr	
	249-bbl Mini-Barge (237-bbl available storage)	West Dock, Oliktok	Intermediate storage	Opt. A: 2 Opt. B: 2 Opt. C: 4	—	2 hr	
or	Floating Storage Bladder	Shell	Intermediate storage	2	—	0.5 hr	
				TOTAL STAFF	**OPT. A: 16-24 OPT. B: 13-21 OPT. C: 10-18**		

SUPPORT

- A trained aerial observer in a fixed-wing aircraft or helicopter tracks the oil location and movement from above and coordinates the on-water task force recovery effort.

DEPLOYMENT CONSIDERATIONS AND LIMITATIONS

- The oil recovery rate and number of mini-barges required (fill to 95% capacity) vary with the oil encounter rate.
- Approval to decant is needed from the Federal or State On-Scene Coordinator, as appropriate. 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) prior to offloading. Emulsion samples will be collected and analyzed for oil content.



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	# STAFF PER 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	1	8	2 hr	4 hr
Deck 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	# STAFF PER 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

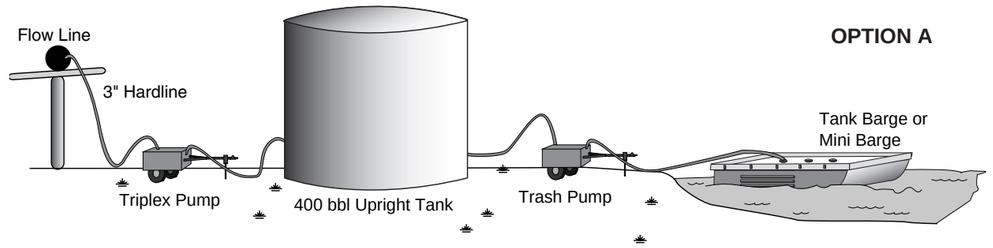
- Vacuum trucks, skimmers, and sorbents are used for collection. Pumps transfer the oil to mini-barges or bladders towed by work boats. Containment booming is used when recovering near or over water and the oil is washed into the boomed area (see Tactic C-4 for containment options). A water truck is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

CAPACITIES FOR PLANNING

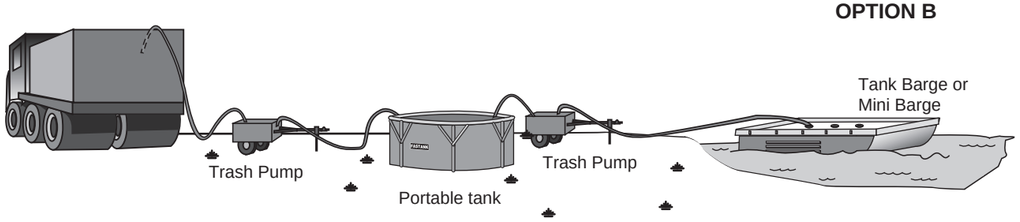
- The water tank on the Spillbuster van has a capacity of 200 gal.

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, ConocoPhillips' 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.



OPTION A



OPTION B

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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
	Upright Tank (400-bbl)	KRU, Alpine	Store recovered fluids	1	1 intial	2 hr	2 hr
	Trash Pump (4-inch)	ACS, GPB, Alpine	Liquid transfer	1	1	1 hr	
or	Archimedes screw pump	West Dock	Liquid transfer	1	—	1 hr	3 hr
	Triplex (6-inch)	GPB, KRU; Alpine has 2-inch	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

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).*

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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
	Rolligon	Peak	Transport tank	1	1	6 hr	2 hr
	Diesel Power Pack	ACS, GPB, KRU, Endicott	Power recovery equipment	1	1	1 hr	1 hr
	Portable Tank	All	Intermediate storage	1	2 for setup	1 hr	0.5 hr
	Vacuum Truck	All	Transfer liquid	1	1	1 hr	
	Trailer Tank (10,000 gal)	Peak	Transfer liquid	1	—	6 hr	
	Archimedes Screw Pump	West Dock	Transfer liquid	1	—	1 hr	3 hr
or	Trash Pump (4-inch)	ACS, GPB, Alpine	Transfer liquid	2	2	1 hr	1 hr
	Suction Hose (4-inch)	ACS, WOA, Alpine	Transfer liquid	≥20 ft	2 for setup	2 hr	
	Discharge Hose (4-inch)	ACS, WOA, KRU, Alpine	Transfer liquid	>50 ft	—	1 hr	

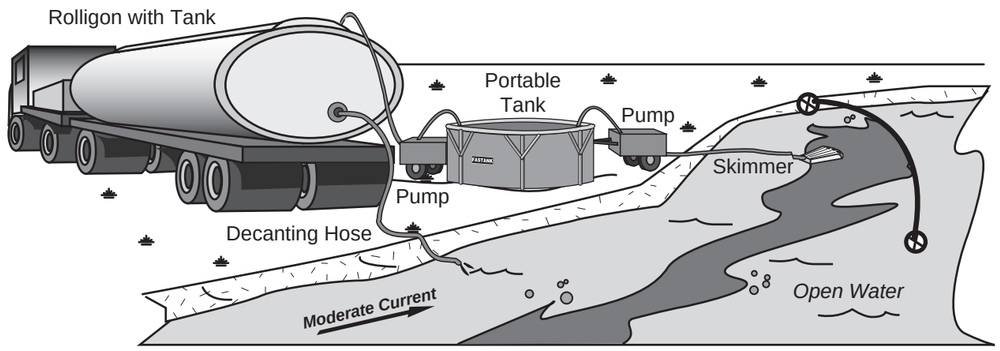
TOTAL STAFF 7

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

- 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 Federal or State On-Scene Co-ordinator, as appropriate, 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.



A Rolligon pulls the empty 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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Rolligon	Peak	Transport tank	1	1	6 hr	2 hr
Trash Pump (4-inch)	ACS, GPB, Alpine	Liquid transfer	1	1	1 hr	
Suction Hose (4-inch)	ACS, WOA, Alpine	Liquid transfer	≥20 ft	2 for setup	2 hr	
Discharge Hose (4-inch)	ACS, WOA, KRU, Alpine	Liquid transfer	≥50 ft	—	1 hr	
Diaphragm Pump (3-inch)	All	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.)	Peak	Intermediate storage	1	—	6 hr	
			TOTAL STAFF	**3**		

SUPPORT

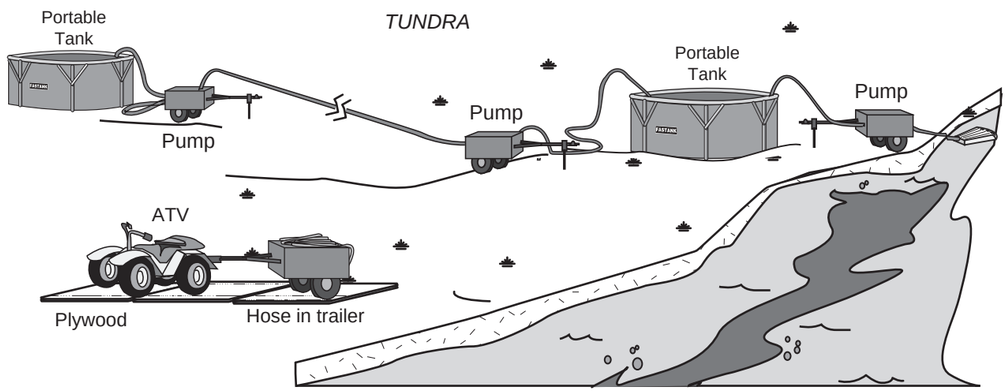
- Temporary storage tanks at a recovery site are the liquid source for the trailer tank. Vacuum trucks wait on gravel pads or nearby roads to empty the trailer tank.

CAPACITIES FOR PLANNING

- 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 Federal or State On-Scene Coordinator, as appropriate.
- 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.

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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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
ATV	All except Badami	Transport equipment	2	2	1 hr	4 hr
Trash Pump (3- or 4-inch)	ACS, GPB, Alpine	Liquid transfer	≥2	4	1 hr	
Suction Hose (3- or 4-inch)	ACS, WOA, Alpine	Liquid transfer	>20 ft	—	2 hr	
Discharge Hose (3- or 4-inch)	ACS, WOA, KRU, Alpine	Liquid transfer	>500 ft	6	1 hr	
TOTAL STAFF FOR SETUP				**12**		
TOTAL STAFF TO SUSTAIN OPERATIONS				**6**		

SUPPORT

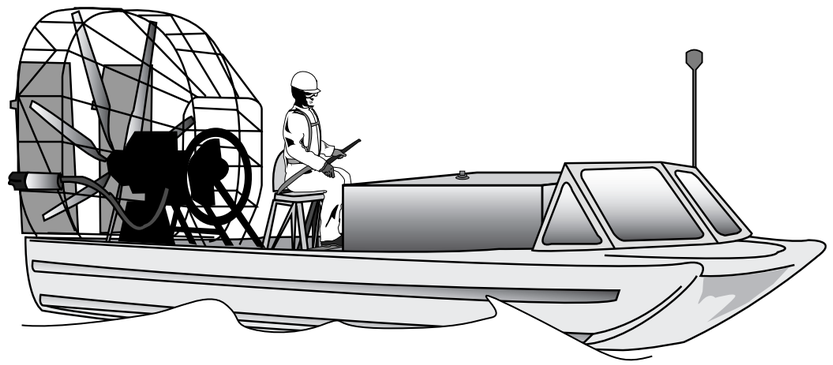
- A pipeline, tank, vacuum truck, or other suitable storage receives the transported liquids from the hose and pump in series. Plywood sheets are laid across the tundra to ease travel and minimize impact to the tundra.

CAPACITIES FOR PLANNING

- 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 300-gallon DOT tank is mounted on a 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: 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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Freighter Airboat	ACS, KRU, Alpine	Transport tank	1	4	1 hr	1 hr
Trash Pump (2-inch)	MPU, ACS, KRU, Alpine	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, Alpine	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.

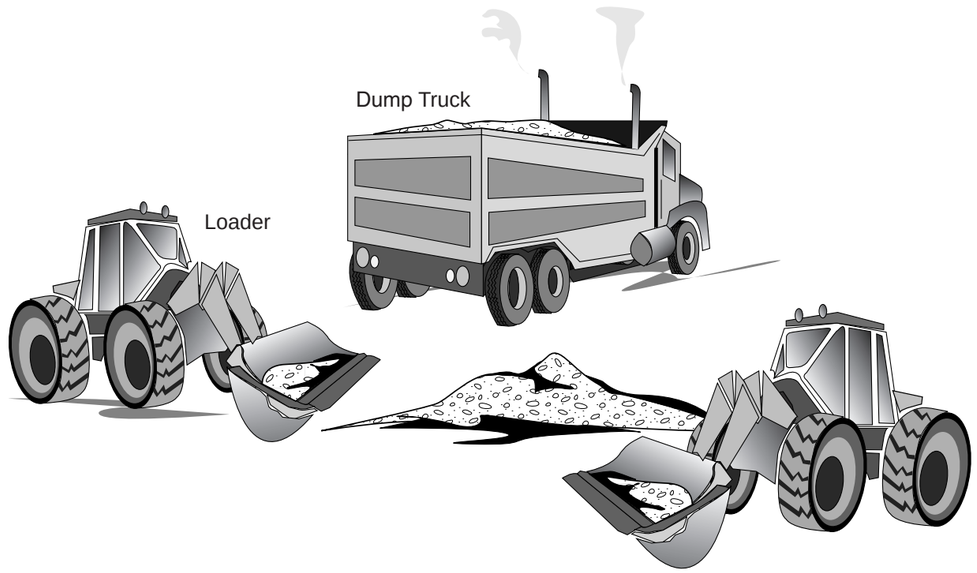
CAPACITIES FOR PLANNING

- 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.)
- Maximum load of freighter airboat = 4,000 lb.

DEPLOYMENT CONSIDERATIONS AND LIMITATIONS

- Approval from the Federal or State On-Scene Coordinator, as appropriate, 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.

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



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.

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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
	Front-End Loader	All	Recover oiled gravel	1	1	1 hr	0.5 hr
or	Bobcat	KRU, EOA, ACS, Alpine	Recover oiled gravel	1	1	1 hr	0.5 hr
	Grader, Backhoe or Dozer	All GPB, KRU, Peak, AIC, Alpine All	Loosen gravel	1	1	1 hr	0.5 hr
	Dump Truck	GPB, KRU, Alpine	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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Semi and Trailer	GPB, KRU, Alpine	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 except Badami	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.
- 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):

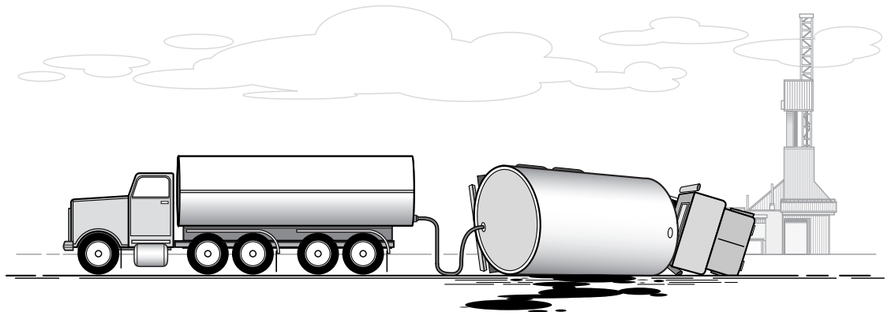
$$\textit{Dump Recovery} = \frac{T_c}{L_t + T_t + U_t} = \frac{20 \text{ cubic yd}}{0.25 \text{ hr} + \left(\frac{2 \text{ mi} * 2}{35 \text{ mph}}\right) + 0.08 \text{ hr}} = 45 \text{ cubic yd/hr or } 5.6 \text{ bbl/hr}$$

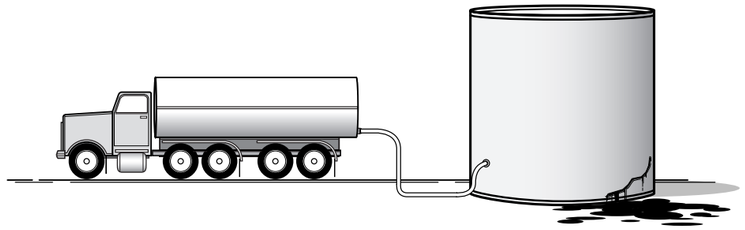
Example: T_c = *Truck Capacity*
L_t = *Load Time (15 min or 0.25 hr)*
U_t = *Unload Time (5 min or 0.08 hr)*
T_t = *Travel Time* $\left(\frac{\text{miles to disposal} * 2 \text{ trips}}{35 \text{ mph}}\right)$

- 1 yd^3 of gravel contains approximately 1/8 (0.125) bbl of oil.

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.





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	# STAFF PER 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	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

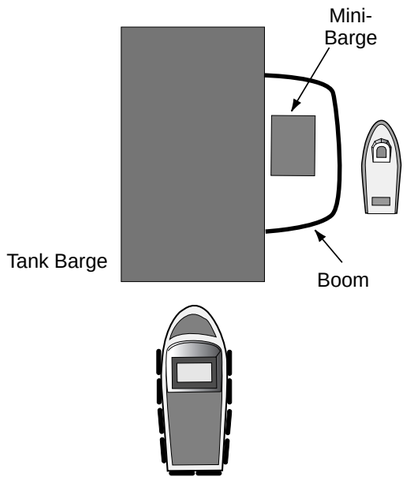
- The typical suction rate for liquids by a vacuum truck is 200 bbl/hr in the summer and 150 bbl/hr in the winter. The typical suction rate for pooled diesel remains at 200 bbl/hr year round.

DEPLOYMENT CONSIDERATIONS AND LIMITATIONS

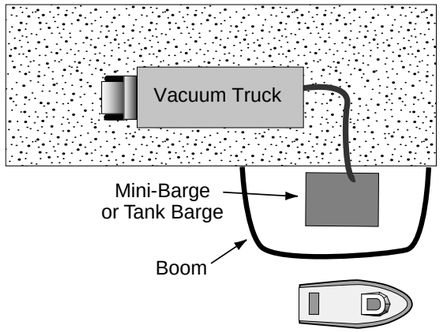
- Inert gases may be required for displacing flammable or explosive air mixtures.
- A Safety Officer should be on site conducting continuous air monitoring.
- Plug-and-patch kits are available from owner company HAZMAT teams.
- Non-sparking tools may be required for working on equipment.
- The amount 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.

LIGHTERING AT SEA



OFFLOADING AT SHORE



Work boats tow recovered oil-laden mini-barges or floating storage bladders to a waiting OSR platform (tank barge, OSRV, or tanker vessel). Towing speed is 5 knots. The mini-barge or floating storage bladder is tied off using appropriate fendering. Before offloading mini-barges, a bonding cable is connected for protection against accidental ignition. A tankerman assists with the entire off-loading operation, and a Declaration of Inspection form will be completed prior to commencing transfer.

To offload, a 3- to 4-inch trash or Archimedes screw pump is used depending on the oil viscosity. Personnel monitor tie-up lines during offloading to minimize surge. When pumping is complete, hatches are put back in place, hoses and pumps are retrieved and secured, and bonding cable removed (where necessary). At that time, the mini-barge or floating storage bladder is ready to return to service.

NOTE: Similar operations are utilized to off-load OSRBs or OSRVs to a tanker vessel.

Barges may also be offloaded directly to a vacuum truck onshore.

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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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
	OSRV	Shell	Fluid storage	1	6	0.5 hr	0.5 hr
or	Tug	West Dock	Tow barge	1	4	2 hr	2 hr
	Tank Barge	West Dock	Fluid storage	1	3	4 hr**	
	Boom	All	Surround off-loading vessel	Variable	2	1 hr	
	Work Boat*	All	Tow mini-barge or floating storage bladder	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 (3- to 4-inch)	ACS, GPB, Alpine	Lightering	2	2	1 hr	
or	Archimedes Screw Pump	ACS, KRU	Lightering	1	2	1 hr	
or	Vacuum Truck (300-bbl)	All	Offloading	1	1	1 hr	

**Work boat staff are counted in recovery.*
***This mobilization time applies after barge arrives on North Slope.*

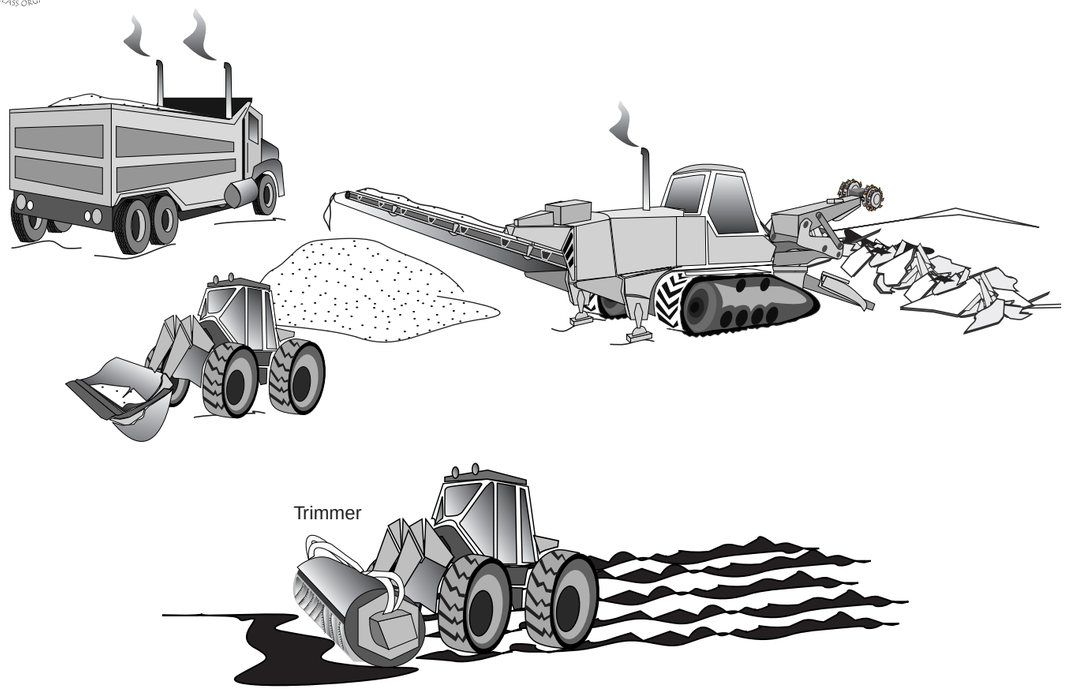
TOTAL STAFF 10-13

SUPPORT

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Fuel Truck	All	Provide diesel fuel for boats and pumps	1	Once per shift	1 hr	0.5 hr

DEPLOYMENT CONSIDERATIONS AND LIMITATIONS

- The mini-barges have davits, but the Archimedes screw pump can be deployed by hand.
- If recovered oil is weathered to the point the 4-inch trash pump will not work, the Archimedes screw 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 is estimated based on gauging by appropriate means (e.g., ullage tape). Emulsion samples are collected and analyzed for oil content.



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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Ice Miner	GPB, KRU	Grinding oiled ice rubble	1 (3 are available on the Slope)	1	1 hr	0.5 hr
Roto Trimmer	KRU, GPB	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 Truck	GPB, KRU, Peak, AIC, Alpine	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).*

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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Semi and Trailer	GPB, KRU, Alpine	Transport ice miner	1	1 driver	1 hr	0
Heater	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 Support	All	Support heavy equipment	1	1	1 hr	0.5 hr
Lube Truck	All except Badami	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

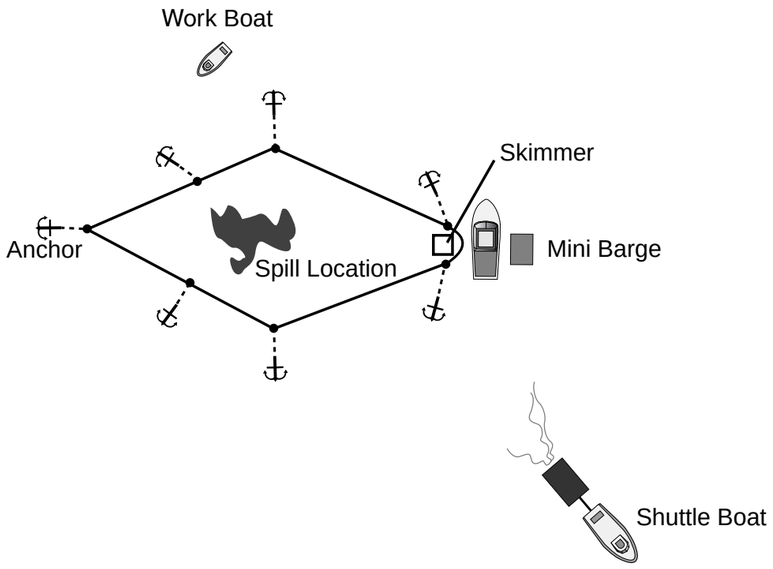
- Capacity of ice miner: 1,400 cubic yd per hour for sea ice, 1,420 cubic yd per hour for freshwater ice.
- A front-end loader with an 8-cubic-yd snow bucket can fill a dump truck in 10 minutes and move 500 cubic yd per hour. The dump trucks available on the Slope typically have 10-, 20-, or 25-cubic-yd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

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

Example: 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 $\left(\frac{\text{miles to disposal} * 2}{35 \text{ mph}}\right)$

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.



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.

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).*

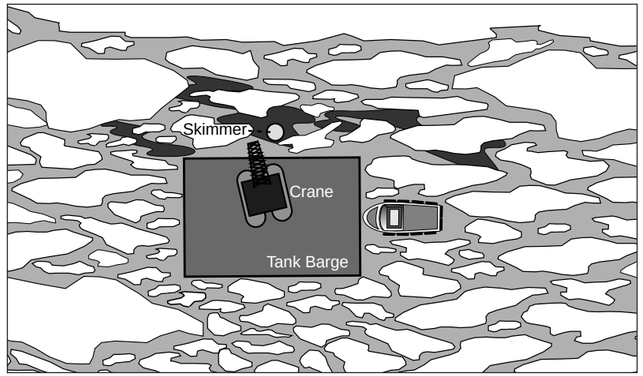
EQUIPMENT AND PERSONNEL

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER 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	Intermediate storage	2	—	1 hr	2 hr
			TOTAL STAFF	**10**		

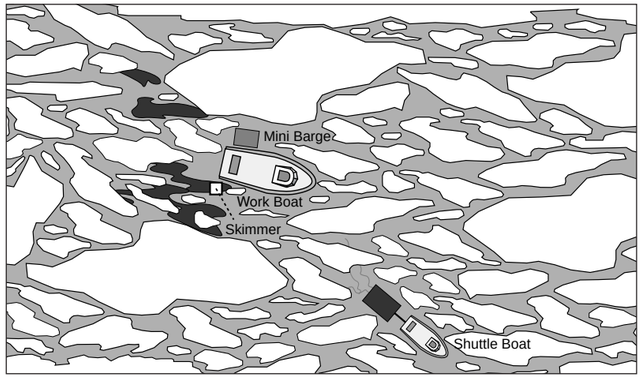
DEPLOYMENT CONSIDERATIONS AND LIMITATIONS

- On the North Slope, this tactic is limited to shallow, slow-moving water.
- 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 Federal or State On-Scene Coordinator, as appropriate. 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.

OPTION A



OPTION B



A tug-pushed tank barge, OSRB, OSRV or workboat utilizing various skimmers navigates the spill area collecting oil in pockets of broken sea ice. Onboard cranes place the skimmers into the deepest pools of oil. During collection/recovery, vessels maintain no forward speed and are not using boom.

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).

OPTION A

	EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
	OSRV	Shell	Skimmer and pump platform; storage	1	12	1 hr	1 hr
or	OSRB	Shell	Skimmer and pump platform; storage	1	6	1 hr	1 hr
and	Tug	Shell	Tow OSRB	1	5	1 hr	1 hr
or	Tank Barge	West Dock	Skimmer and pump platform; storage	1	14	4 hr*	3 hr
and	Tug	West Dock	Tow tank barge	1	4	2 hr	
	Skimmer (various)	ACS, Shell	On-water recovery	1	—	1 hr	
	Mobile Crane	GPB, KRU, Peak	Skimmer deployment	1	1	1 hr	
	Discharge Hose (4-inch w/ 6-inch to 4-inch reducer)	ACS, WOA, KRU	Decanting	≥50 ft	—	1 hr	
	Archimedes Screw Pump	ACS, KRU, North Star	Decanting	1	—	1 hr	
or	PDP (w/ powerpack)	Shell	Decanting; Off-loading	8	—	—	1 hr

This mobilization time applies after barge arrives on North Slope.* **TOTAL STAFF 12-19

OPTION B

	EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
	Work Boat* w/integrated Skimmer	Shell	Tow storage platform or store internally; skimmer and pump platform	1	2	0.5 hr	0.5 hr
or	Work Boat	West Dock	Tow storage platform, skimmer and pump platform	1	4	1 hr	4 hr
	Skimmer (various)	West Dock, Shell	On-water recovery	1	—	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	
	Work Boat	West Dock	Shuttle storage platforms	1	3	1 hr	
	249-bbl Mini-Barge (237-bbl available storage)	West Dock, KRU	Intermediate storage	2	—	1 hr	
or	Floating Storage Bladder**	Shell	Intermediate storage	2	—	0.5 hr	0.5 hr

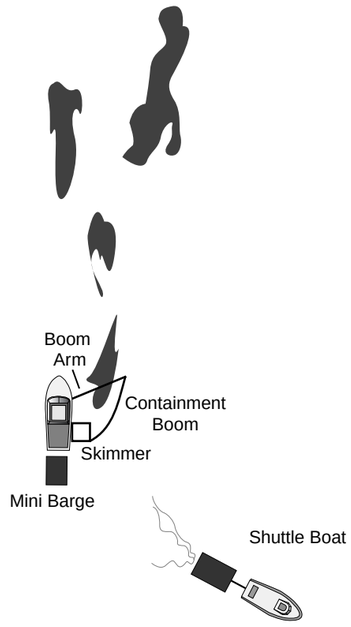
** 50 bbl onboard recovered oil tank and off-loading PDP* **TOTAL STAFF 5-7**
*** Onboard 3-inch diaphram diesel decanting pump*

SUPPORT

- A trained aerial observer in a fixed-wing aircraft or helicopter tracks the oil location and movement from above and coordinates the on-water task force recovery effort.

DEPLOYMENT CONSIDERATIONS AND LIMITATIONS

- Approval to decant is needed from the Federal or State On-Scene Coordinator, as appropriate. 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.



A skimmer vessel (tug-pushed tank barge, OSRB, OSRV or workboat) deploys a skimmer off one side in a boom-arm configuration. The skimmer vessel can advance at a maximum speed of 3 knots, giving an increased encounter rate and maneuverability in recovery operations.

Skimmed liquids are pumped into towed mini-barges or floating storage bladders. 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 and floating storage bladders laden with recovered oil are towed to an intermediate storage platform for off-loading.

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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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
or	OSRV	Shell	Skimmer and pump platform; storage	1	12	1 hr	1 hr
and	OSRB	Shell	Skimmer and pump platform; storage	1	6	1 hr	1 hr
or	Tug	Shell	Tow OSRB	1	5	1 hr	1 hr
	Work Boat	West Dock	Deploy boom, tow mini-barge, operate skimmer and pump	1	3	1 hr	2 hr
	Skimmer	West Dock	On-water recovery	1		1 hr	
	Boom	All	On-water collection	21 ft		1 hr	
	Work Boat	West Dock	Shuttle storage platforms	1	2	1 hr	
or	249-bbl Mini-Barge (237-bbl available storage)	West Dock, Oliktok	Intermediate storage	2	—	1 hr	
	Floating Storage Bladder*	Shell	Intermediate storage	2	—	0.5 hr	0.5 hr

* *Onboard 3-inch diaphram diesel decanting pump*

TOTAL STAFF 5-14

DECANTING

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER 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

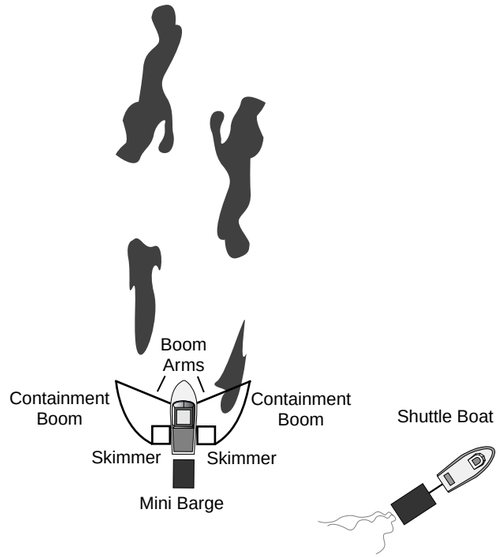
- A trained aerial observer in a fixed-wing aircraft or helicopter tracks the oil location and movement from above and coordinates the on-water task force recovery effort.

CAPACITIES FOR PLANNING

- 1 hr to load mini-barge; 1.5 hr to unload.

DEPLOYMENT CONSIDERATIONS AND LIMITATIONS

- The oil recovery rate and number of mini-barges required (fill to 95% capacity) vary with the oil encounter rate.
- Approval to decant is needed from the Federal or State On-Scene Coordinator, as appropriate. 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) prior to offloading. Emulsion samples will be collected and analyzed for oil content.



Deployable arms off both sides of the skimming vessel are configured with containment boom and skimmer. The skimmer vessel can advance at a maximum speed of 3 knots, giving an increased encounter rate and maneuverability in recovery operations.

Skimmed liquids are pumped into towed mini-barges or floating storage bladders. 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 and floating storage bladders laden with recovered oil are towed to an intermediate storage platform for off-loading.

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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
	Work Boat* w/integrated Skimmer	Shell	Tow boom and mini-barge or floating storage bladder; skim, decant and store or pump oil	1	2	0.5 hr	0.5 hr
or	Work Boat	West Dock	Run skimmer and pump; tow mini-barge while loading; tow boom	1	4	1 hr	2 hr
	LORI LSC Skimmer	West Dock	On-water recovery	2		1 hr	
or	Crucial 13/30 Skimmer	West Dock	On-water recovery	2		1 hr	
	Boom	All	On-water recovery	42 ft	—	1 hr	
	Work Boat	West Dock	Shuttle storage platforms	1	2	1 hr	
	249-bbl Mini-Barge (237 bbl available storage)	West Dock, Oliktok	Intermediate storage	2	—	1 hr	
or	Floating Storage Bladder**	Shell	Intermediate storage	2	—	0.5 hr	0.5 hr

* *50 bbl onboard recovered oil tank and off-loading PDP* **TOTAL STAFF 4-6**
** *Onboard 3-inch diaphram diesel decanting pump*

DECANTING

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER 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

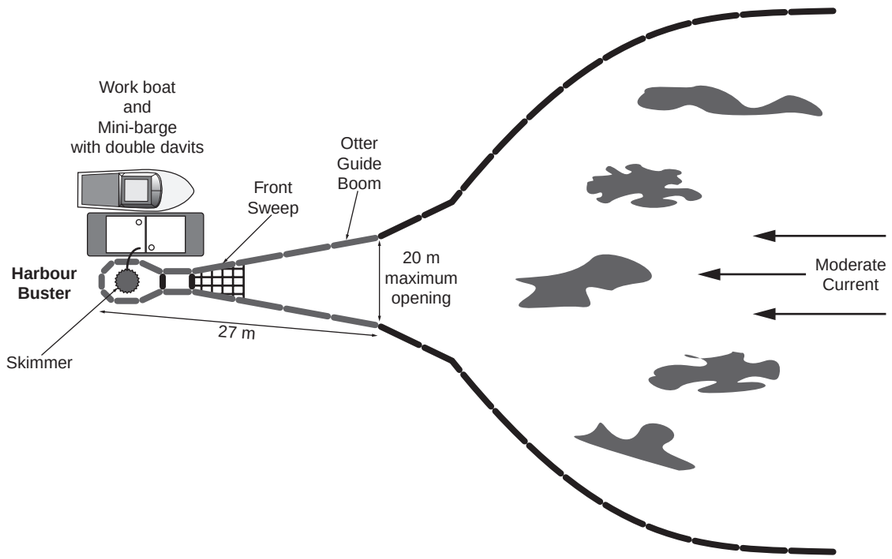
- A trained aerial observer in a fixed-wing aircraft or helicopter tracks the oil location and movement from above and coordinates the on-water task force recovery effort.

CAPACITIES FOR PLANNING

- 1 hr to load mini-barge; 1.5 hr to unload.

DEPLOYMENT CONSIDERATIONS AND LIMITATIONS

- The oil recovery rate and number of mini-barges required (fill to 95% capacity) vary with the oil encounter rate.
- Approval to decant is needed from the Federal or State On-Scene Coordinator, as appropriate. 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) prior to offloading. Emulsion samples will be collected and analyzed for oil content.



Option A – When used under a bridge, the boom is anchored to each shore. An anchor and long tow line connects the boom to shore.

Option B – For open water operations, boom is towed with work boats or used with anchor systems to create a funnel that will deflect oil into the Harbour Buster collection area.

For either option listed above, a skimmer or direct suction unit is placed in the Harbour Buster collection point. Power packs on the mini-barge power the skimmer (if used). Recovered liquids are pumped into mini-barge or shoreside storage, as appropriate.

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EQUIPMENT AND PERSONNEL

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Work Boat	West Dock	Tow mini-barge and operate skimmer and pump	1	4	1 hr.	2 hr.
Skimmer	All	On-water recovery	1		1 hr.	
Suction Hose (3-inch)	All	Skimmer recovery	≥20 ft.			
249-bbl Mini-Barge (237-bbl available storage)	West Dock, Oliktok	Intermediate storage; skimmer power pack platform	1		1 hr.	
Harbour Buster	Endicott	On-water containment	1		1 hr.	
Boom	All	On-water containment	variable	4	1 hr.	
Work Boat	West Dock	Tow boom	2		1 hr.	
or Anchor System	All	Anchor boom	2	4 for setup	1 hr.	

TOTAL STAFF FOR SETUP 8

TOTAL STAFF TO SUSTAIN OPERATIONS 4 (8 FOR OPTION B)

SUPPORT

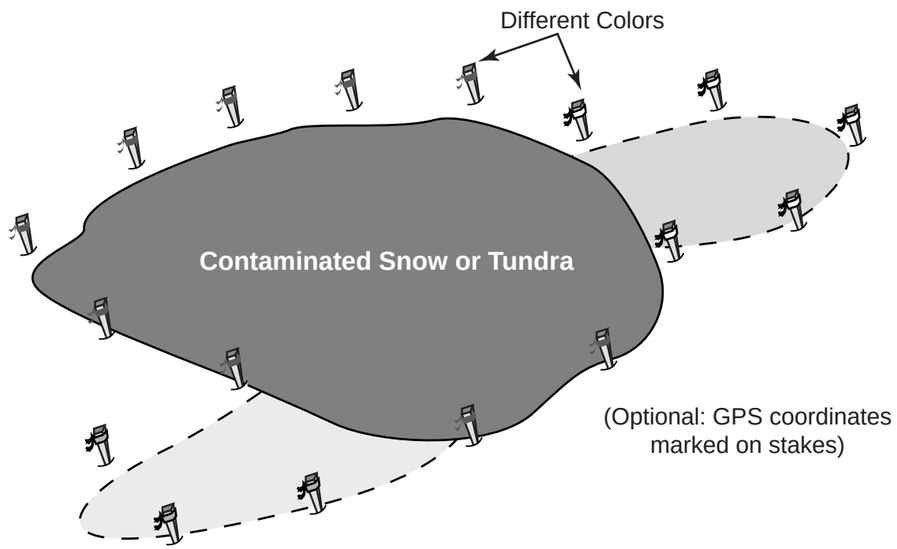
EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Fuel Truck	All	Provide diesel fuel for boats and pumps	1	Once per shift	1 hr	0.5 hr

RECOVERY CAPACITIES FOR PLANNING

- Mulitiple skimmers may be used with the Harbour Buster containment system. Type is limited by size of apex and mini-barge davit capacity.

DEPLOYMENT CONSIDERATIONS AND LIMITATIONS

- Using a chaffing or protective mat during Harbour Buster deployment greatly reduces the risk of damage to the equipment's otter boom guide.
- Boom height should be considered when selecting the proper boom to avoid splashover in fast current.
- Under Option A, ensure the Harbour Buster is folded and secured before towing it into position. Tow with two lines; the first a long tow line and the second a pass-off line so the Harbour Buster remains secured to the vessel thus taking the strain off responders.
- Both pelican hooks and carabineers may be used to secure the Harbour Buster to a bridge or shore, but pelican hooks are superior since they are safer to cut loose while under pressure during demobilization operations.
- Long towlines facilitate easier tie-off when connecting the Harbour Buster boom system to shore. Consider a carabineer-type hookup to the shore.
- Tending vessels should carry an inflation pump onboard for re-inflating the Harbour Buster guide boom as needed.



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, ATV, pickup truck with Mattracks, or similar personal motorized vehicle. The crews are part of the SRT.

For a small spill, one crew is sufficient.

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

- Each staking crew has 2 SRT staff.

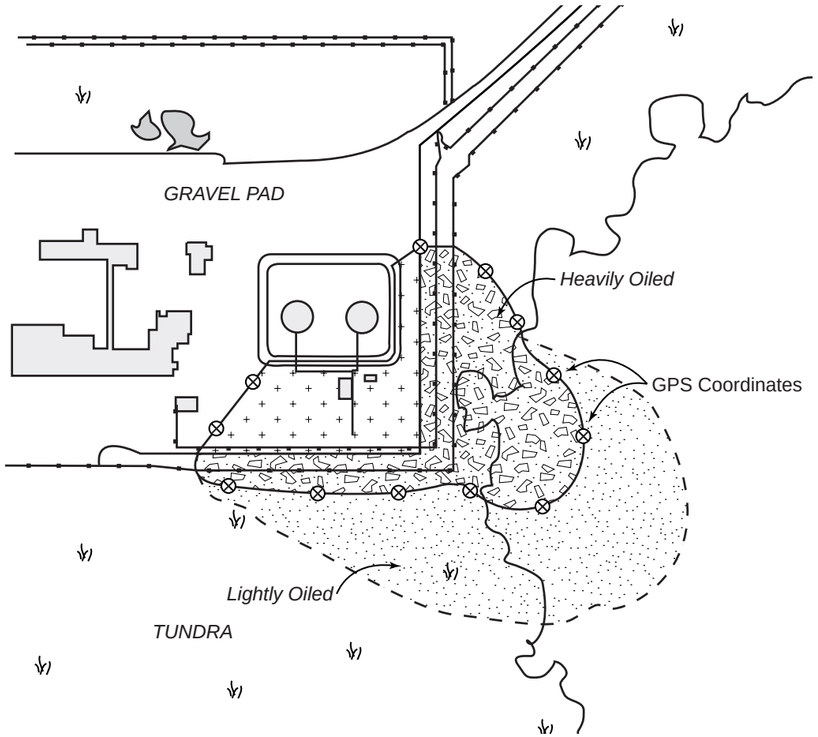
EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Wooden Lath Stakes	All	Delineation	One for every 100 ft of spill perimeter	2	1 hr	0.5 hr
Light Plant	All	Illumination	≥1	2 for initial setup, and 1 to check and fuel occasionally.	1 hr	0.5 hr
GPS Unit	All	Mapping	1 per crew	—	0.5 hr	0.5 hr
				TOTAL STAFF	**4**	

SUPPORT

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
ATV	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, Alpine	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.



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.
- A forward-looking infrared (FLIR) system-equipped aircraft flies over the spill-affected area, recording the fly-over with its FLIR. The infrared (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.
- Ground-penetrating radar may also be used to detect oil in and under ice.

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EQUIPMENT AND PERSONNEL

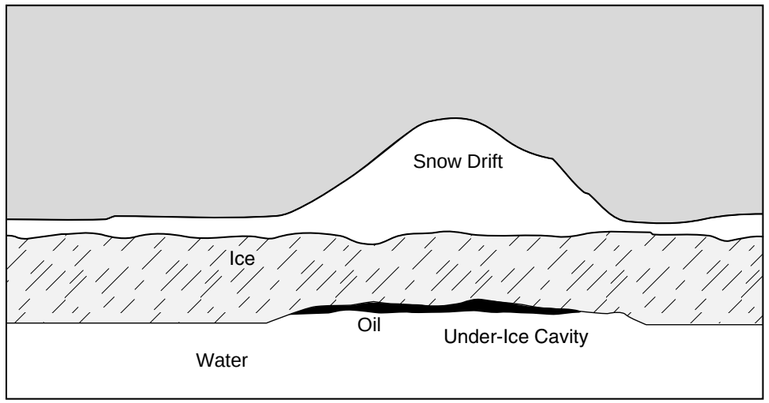
EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Aircraft with FLIR	KRU	Surveillance	1	3	1 hr	1 hr
Hand-Held FLIR	KRU	Mapping	1/crew	Part of delineation staff	0.5 hr	0.5 hr
MapInfo® Software	All, except Badami	Mapping	1	Part of delineation staff	—	—
GPS Unit	All	Mapping	1/crew	Part of delineation staff	0.5 hr	0.5 hr

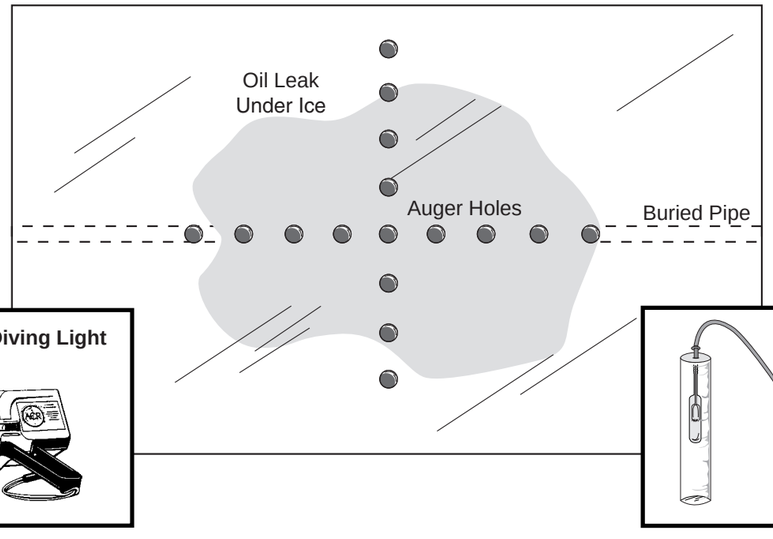
SUPPORT

- 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.





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.

Ground-penetrating radar may also be used to detect oil in and under ice.

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EQUIPMENT AND PERSONNEL

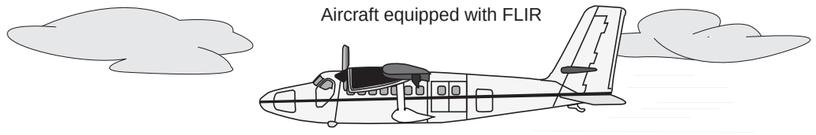
EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Ice Auger	All	Detection	2	4	1 hr	0.5 hr
Underwater Light	All, except Badami	Detection	2	1	1 hr	0.5 hr
Front-end Loader w/Bucket	All	Snow Removal	1	1	1 hr	0.5 hr
ATVs w/Plow	ACS, GPB, END, KRU, Alpine	Snow Removal	2	2	1 hr	0.5 hr
Snow Machine	All	Personnel Transportation	4	4	1 hr	0.5 hr
			TOTAL STAFF	**6**		

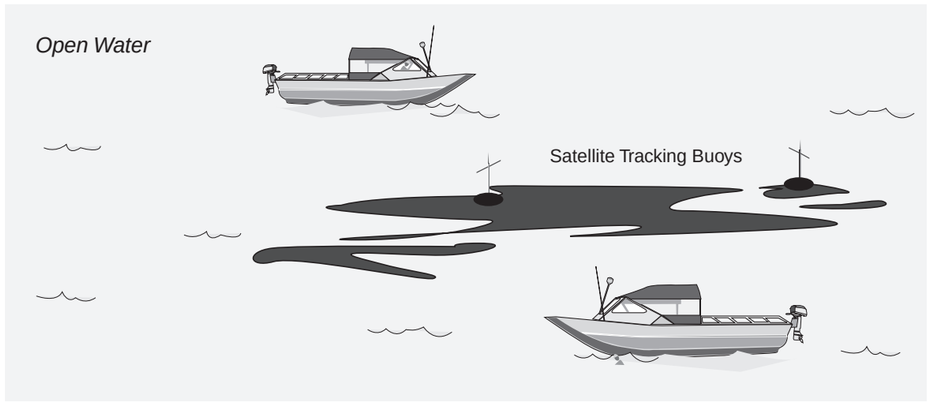
SUPPORT

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER 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 except Badami	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 rubber-tracked, wide-track 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.

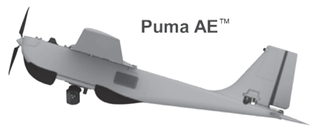




Several options are available for tracking discharges in open water:

Oil slicks may be tracked by visual observation from a forward-looking infrared (FLIR) system-equipped aircraft. The aircraft provides radio reports and FLIR video images. 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. FLIR systems work both day and night.

On the water, satellite tracking buoys can be deployed directly into the slick from response vessels. The buoys transmit collected position information and other pertinent data to overhead satellites for retransmission to authorized oil spill response personnel end users.



An increasingly viable aerial alternative is the use of Unmanned Aircraft Systems (UAS), commonly known as drones. For contingency use, ACS has contracted with a UAS operator whose systems can carry payloads including electro-optical and infrared sensors, LiDAR, and high-resolution cameras. The UAS is operated remotely by a ground controller located at or near the spill site, providing response personnel with real-time direct view of the area.

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EQUIPMENT AND PERSONNEL

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

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Aircraft with FLIR	KRU	Aerial tracking and response coordination	1	3	1 hr	1 hr
Unmanned Aircraft System	Simi Valley, CA	Aerial tracking and response coordination	1	1	48 hrs	1 hr
Satellite Tracking Buoys	ACS	Track the oil slick	24	—	2 hr	1 hr
Work Boat	All	Deploy tracking buoys	1	2	2 hr	0

SUPPORT

- A response vessel deploys the satellite tracking 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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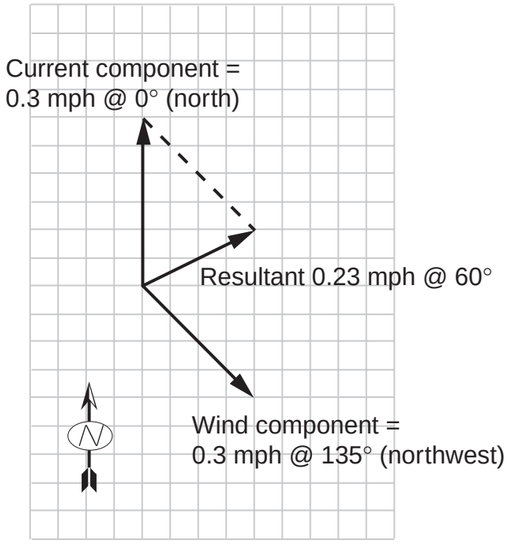
EQUIPMENT AND PERSONNEL

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER 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.

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 MODELING

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

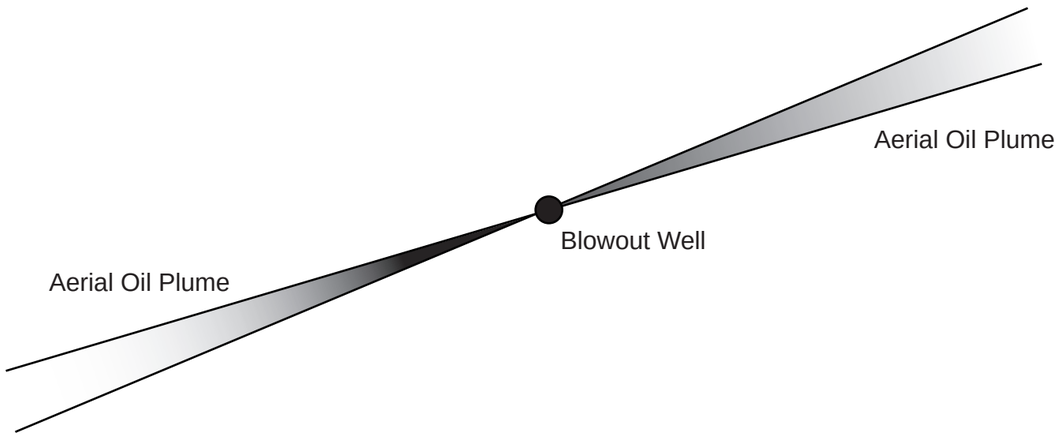
Waldman, G. A., R. A. Johnson, and P. C. Smith. 1973. The spreading and transport of oil slicks on the ocean in the presence of wind, waves, and current. AVCO Systems Division. USCG Report CG-D-17-73.

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 determining how oil will be deposited from a surface well blowout, for use in developing response scenarios in facility-specific contingency plans.

An unobstructed surface well blowout can 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. The gas flow rate controls the plume height and subsequent fallout distribution.

Downwind oil distributions predictions are modeled for the following conditions:

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

The methods used to complete the modeling are described in *Oil Deposition Modeling for Surface Oil Well Blowouts* (Belore, McHale & Chapple, 1998 Arctic and Marine Oilspill Technical Program, Environment Canada).

Wind speed has no net effect on the deposition pattern. A high wind reduces the plume rise height by bending the 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 Figures 1A or 1B is used to select curves in Figures 2 to 11. Figures 2 to 11 have been developed using an oil drop size distribution with a 750 m 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 of 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 to 11. Therefore, Figures 2 to 11 are not valid for the flow conditions that fall in the shaded areas below the “limit lines” plotted for each of the pipe diameters in Figure 1B.

Figures 2 to 11 show the downwind length and width of the aerial plume where a percentage of the total oil flow has fallen to the surface for different outlet pipe diameters. The highest gas flow curve shown in each of these figures represents the flow rate where sonic velocity is achieved (the maximum possible exit velocity). Use the largest gas flow curve in the figure if higher gas flow rates are predicted for releases from pipes of these diameters. Higher flow rates (at STP) than those shown in the figures are possible due to pressure/density factors at the pipe exit.

Ten percent of the oil is assumed to be in the form of drops so small (50 m 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 11:

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 6.184 inch inner diameter pipe. To determine the amount of oil that falls within 200 meters from the source, complete the following steps:

From Figure 1b, determine the gas flow to be about 8.5 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 is 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 and determine the fallout width at 72% of oil on "ground" (about 40 meters) for 8.75 mmscf/d. 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

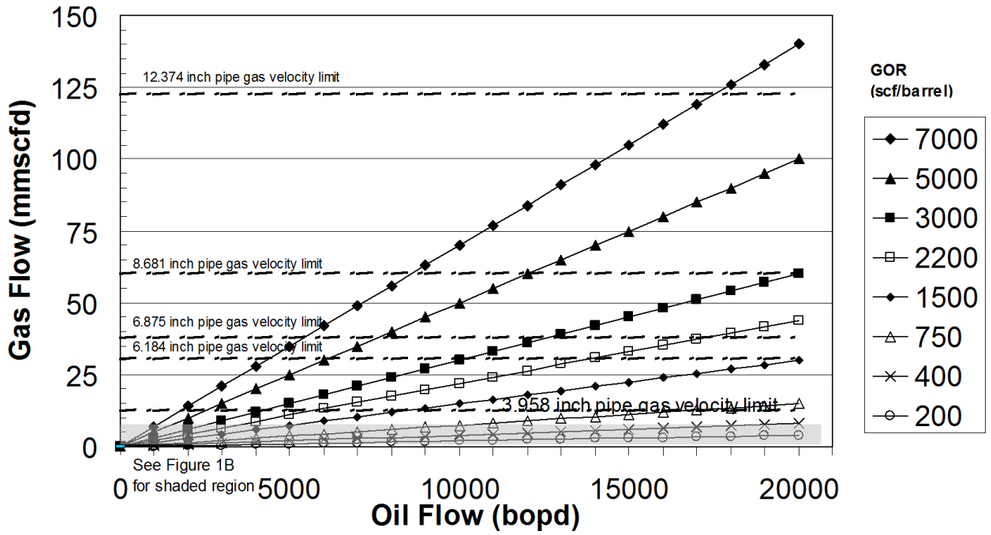


FIGURE 1B
GAS FLOW - OIL FLOW - GOR (low flows)

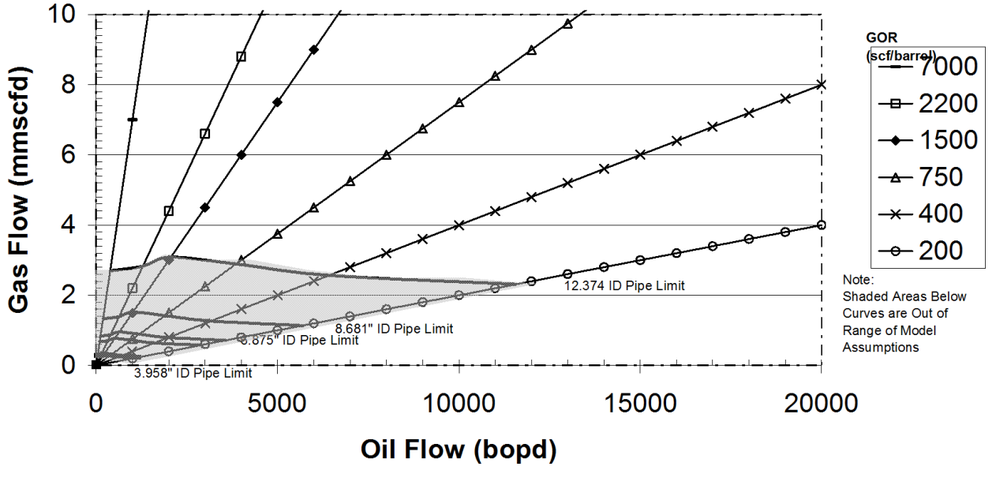


FIGURE 2
OIL FALLOUT PERCENT VS. DISTANCE FROM SOURCE (3.958-INCH ID PIPE)

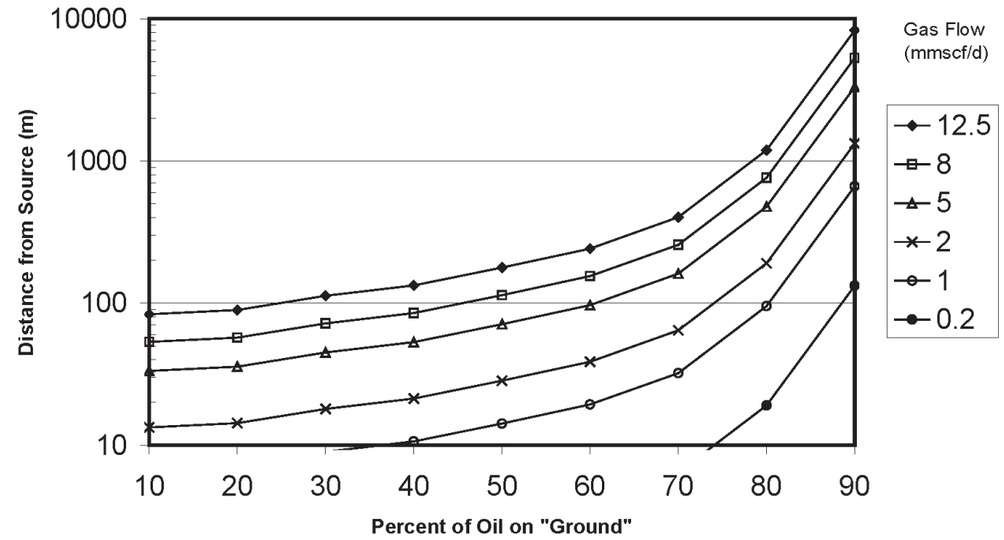


FIGURE 3
FALLOUT WIDTH VS. PERCENT ON THE GROUND (3.958-INCH ID PIPE)

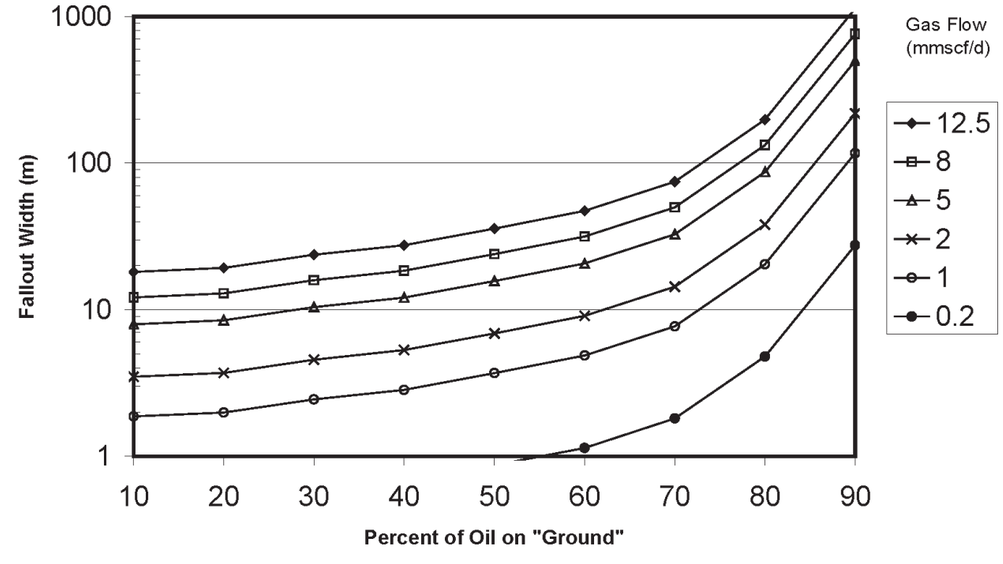


FIGURE 4
OIL FALLOUT PERCENT VS DISTANCE FROM SOURCE (6.184-INCH ID PIPE)

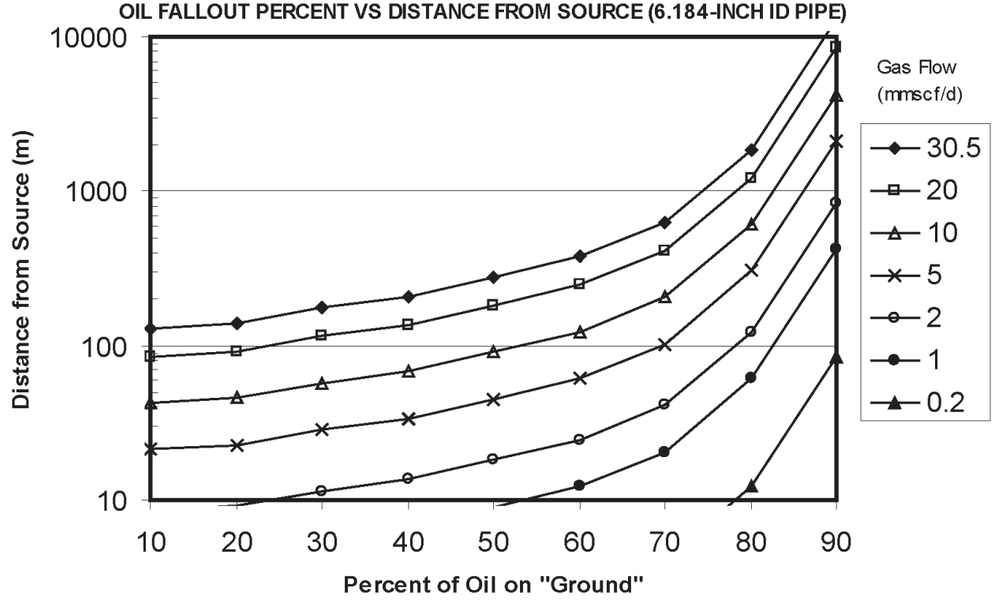


FIGURE 5
FALLOUT WIDTH VS. PERCENT ON THE GROUND (6.184-INCH ID PIPE)

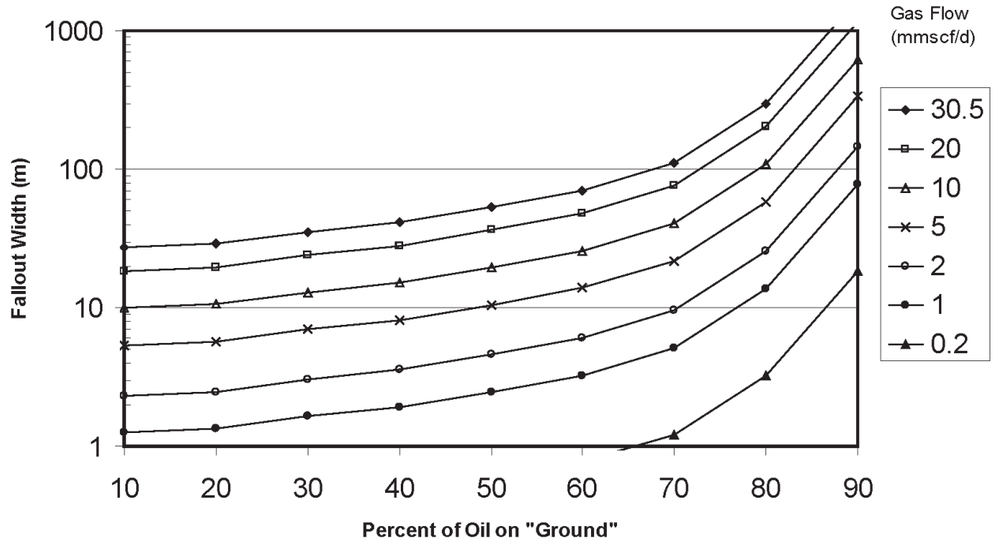


FIGURE 6
OIL FALLOUT PERCENT VS DISTANCE FROM SOURCE (6.875-IN ID PIPE)

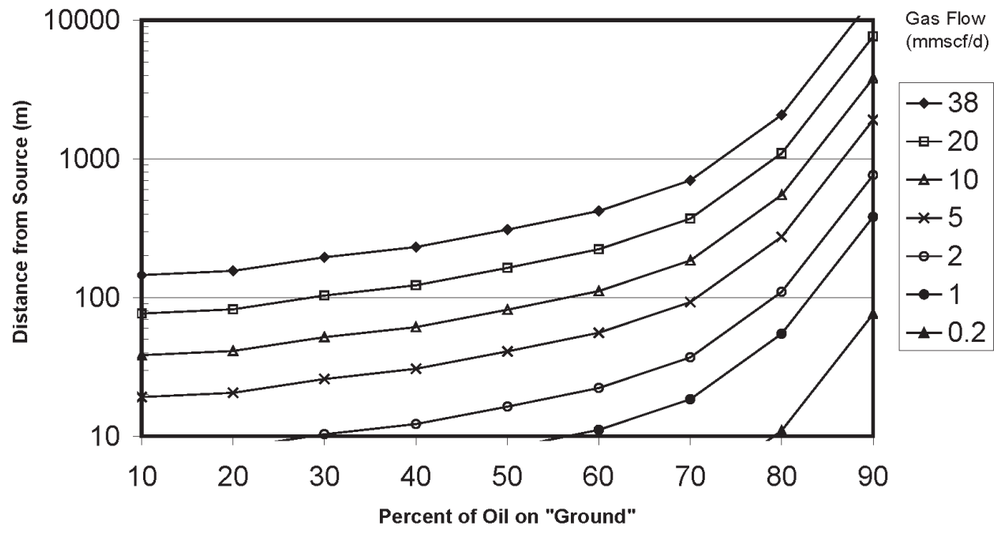


FIGURE 7
FALLOUT WIDTH VS. PERCENT ON THE GROUND (6.875-INCH ID PIPE)

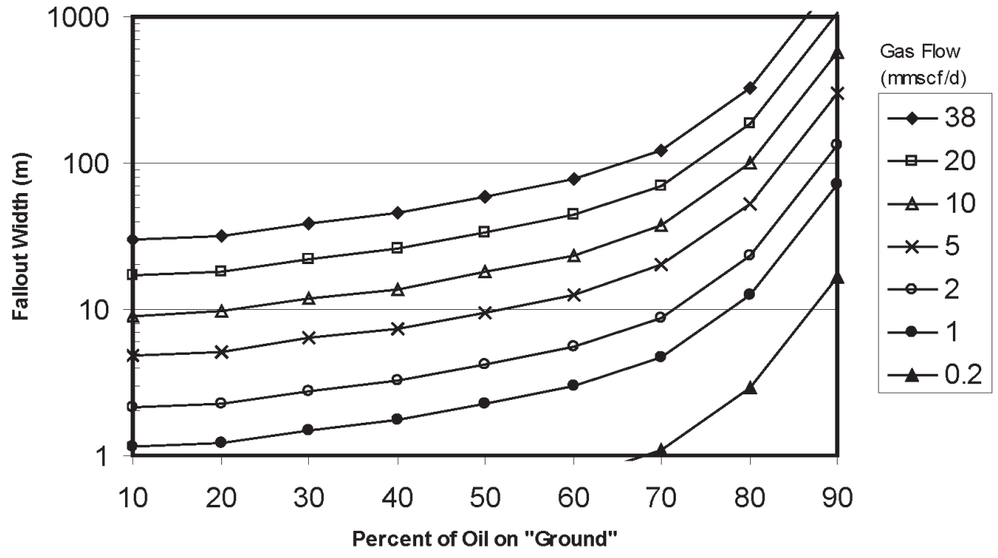


FIGURE 8
OIL FALLOUT PERCENT VS DISTANCE FROM SOURCE (8.681-IN ID PIPE)

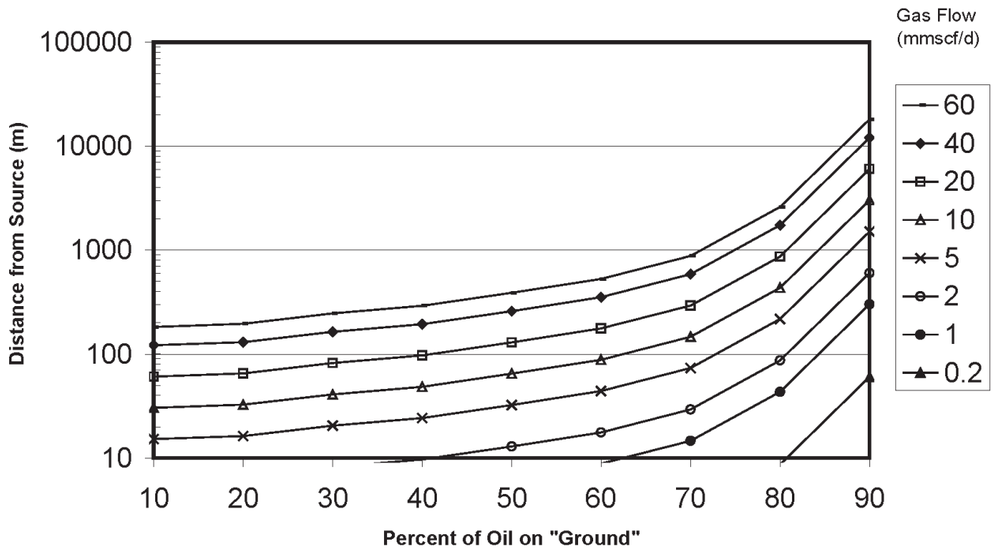
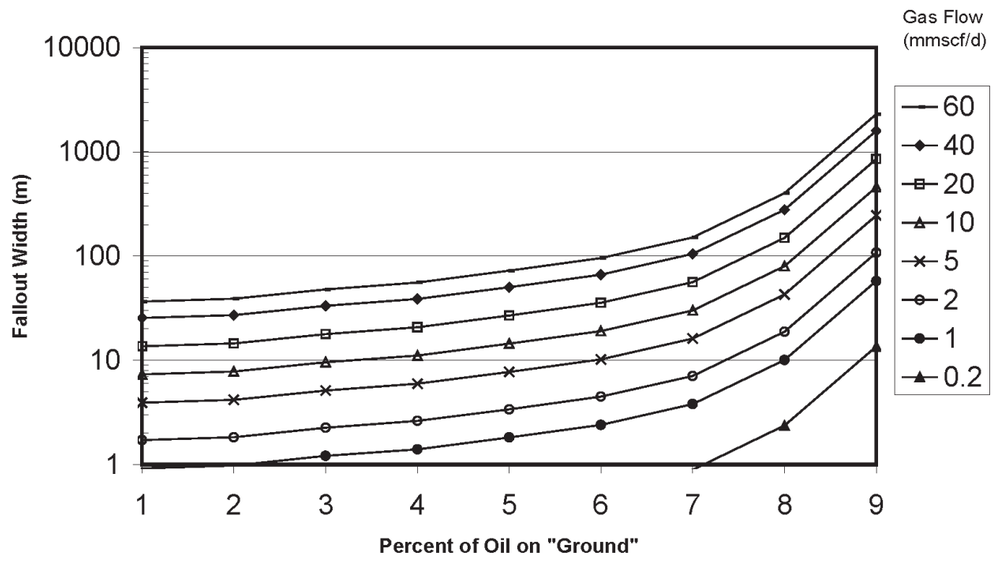


FIGURE 9
FALLOUT WIDTH VS. PERCENT ON THE GROUND (8.681-INCH ID PIPE)



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

FIGURE 10
OIL FALLOUT PERCENT VS DISTANCE FROM SOURCE (12.374-IN ID PIPE)

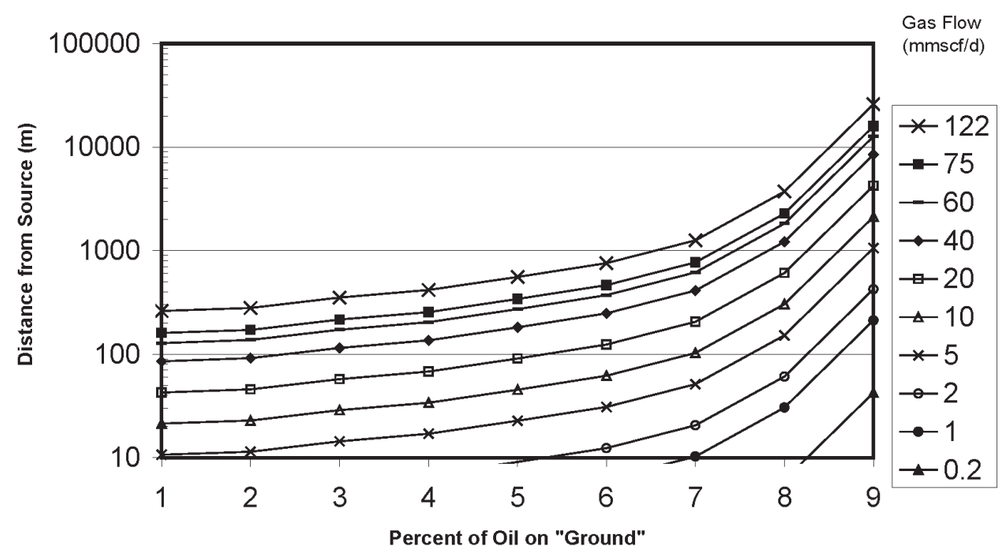
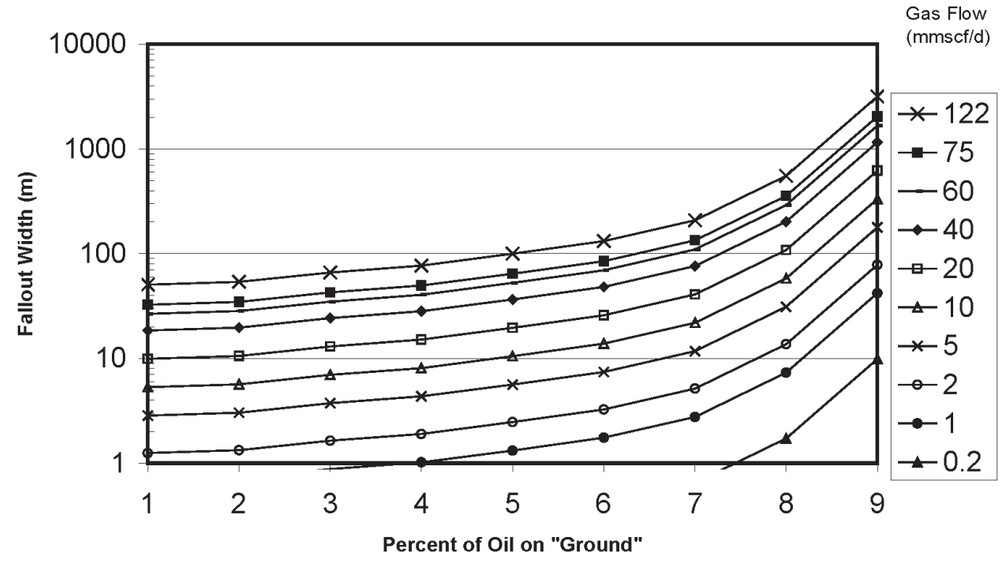


FIGURE 11
FALLOUT WIDTH VS. PERCENT ON THE GROUND (12.374-INCH ID PIPE)



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:

	Silt	Sand	Gravel
Crude Oil	12% - 20%	4% - 13%	0% - 5%
Diesel	7% - 12%	2% - 8%	0%- 2%
Gasoline	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:

  $V\ (bbl) = (4.14 \times 10^{5}) \times A\ (mi^2) \times t\ (in.)$

  $V\ (bbl) = 647 \times A\ (acres) \times t\ (in)$

  $V\ (bbl) = (1.48 \times 10^{-2}) \times A\ (ft^2) \times t\ (in.)$

  $V\ (gal) = 42 \times V\ (bbl)$

  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 x 10^{-1} inch with 50% to 70% water).

- Equations for estimates:

  $V\ (bbl) = 4.14 \times 10^{5}\ A\ (mi^2) \times t\ (inches)$

  $V\ (bbl) = 647\ A\ (acres) \times t\ (inches)$

  $V\ (bbl) = 1.48 \times 10^{-2}\ A\ (ft^2) \times t\ (inches)$

  $V\ (gal) = 0.624\ A\ (ft^2) \times t\ (inches)$

  V = Volume of oil spill

  A = Area of slick at thickness t

  t = Thickness of oil slick

ENCOUNTER RATE CALCULATIONS

- Calculations used to estimate the amount of oil moving past in a stream, entering a collection boom, or in a windrow/patch of oil.

  $EnR\ (gpm) = 37 \times W\ (ft) \times V\ (ft/sec) \times t\ (in)$

  $EnR\ (bbl/hr) = 53.33 \times W\ (ft) \times V\ (ft/sec) \times t\ (in)$

  $EnR\ (bbl/day) = (1.28 \times 10^{3}) \times W\ (ft) \times V\ (ft/sec) \times t\ (in)$

  W = Width of oil swath

  V = Velocity in feet per second (1 knot = 1.68 ft/sec)

  t = Thickness of oil slick

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:

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

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

  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.

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Information in this tactic is taken from the *In-Situ Burning Guidleines for Alaska*, Revision 1, August 2008, prepared by the Alaska Department of Environmental Conservation, the U.S. Coast Guard, and the U.S. Environmental Protection Agency, Region 10.

Before in-situ burning can be used a spill control measure, regulatory approval must be obtained. First complete the application and burn plan in Tactic B-1A and submit it to the Unified Command. Approval is required for the burn to proceed.

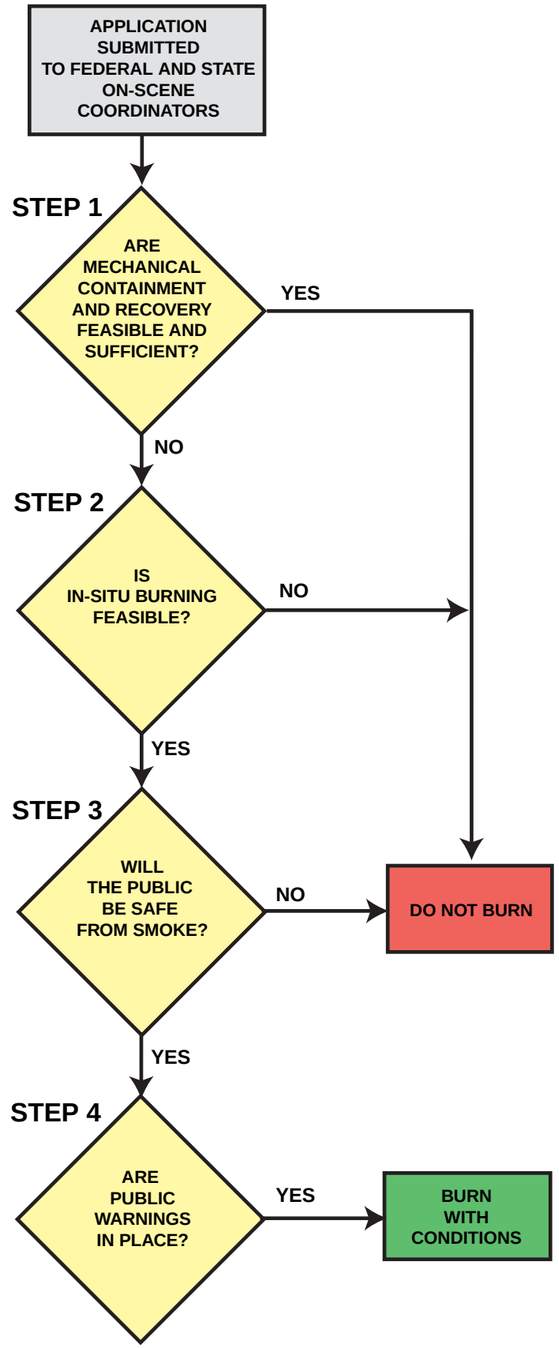
Refer to pages 3 and 4 of this tactic for information on safe distances from downwind human populations.

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.



DEPLOYMENT CONSIDERATIONS AND LIMITATIONS

The following information is summarized from the *In-Situ Burning Guidelines for Alaska*, Revision 1, August 2008.

Table 1 below lists the general safe distances separating an in-situ burn and downwind, populated areas in flat terrain. Figure 1 below shows a bird's-eye of the zones for in-situ burns on populated flat land and on water within 3 miles of shore.

Table 1
Safe Distances Between In-Situ Burns and Downwind Human Populations in Flat Terrain

Location of Fire	Green Zone	Yellow Zone	Red Zone
Flat terrain on land	>3 miles	1 to 3 miles	<1 mile
Water <3 miles from shore			
Water >3 miles from shore	>1 mile	not applicable	<1 mile

On water more than 3 miles from shore, the green zone safe distance is 1 mile from the public.

On land or on water less than 3 miles from shore, the green zone safe distance is 3 miles from the public. Burning at a green zone safe distance from the public is acceptable following Level 1 public notification.

The yellow zone distance extends from 1 to 3 miles downwind of an in-situ burn, and within 45 degrees of the smoke plume, when the burn is on land or on water within 3 miles of shore. The quadrant shape of the zone protects people from smoke subjected to minor wind shifts.

The on-scene coordinators may authorize burning following Level 2 and Level 3 public notifications, warning, and sheltering in place or evacuation.

The red zone distance is within 1 mile of any in-situ burn and within 45 degrees of the smoke plume. The on-scene coordinators may authorize burning in the red zone following public notifications, warnings, and sheltering in place or evacuation, and if the on-scene coordinators' best professional judgment supports the expectation of $PM_{2.5}$ less than 65 micrograms per cubic meter 1-hour average in populated areas.

The red zone radius takes into account that the risk of smoke exposure becomes greater close to the fire. In addition, the ALOFT model does not predict the behavior of smoke close to the fire before it lofts. The red zone downwind boundary also lies downwind of the expected in-situ burn operations site safety area. For example, a 1,000-foot radius around an in-situ burn of oil in a fire boom may be designated as the worker site safety zone by the site safety officer.

The Table 1 rules apply only in the following situations:

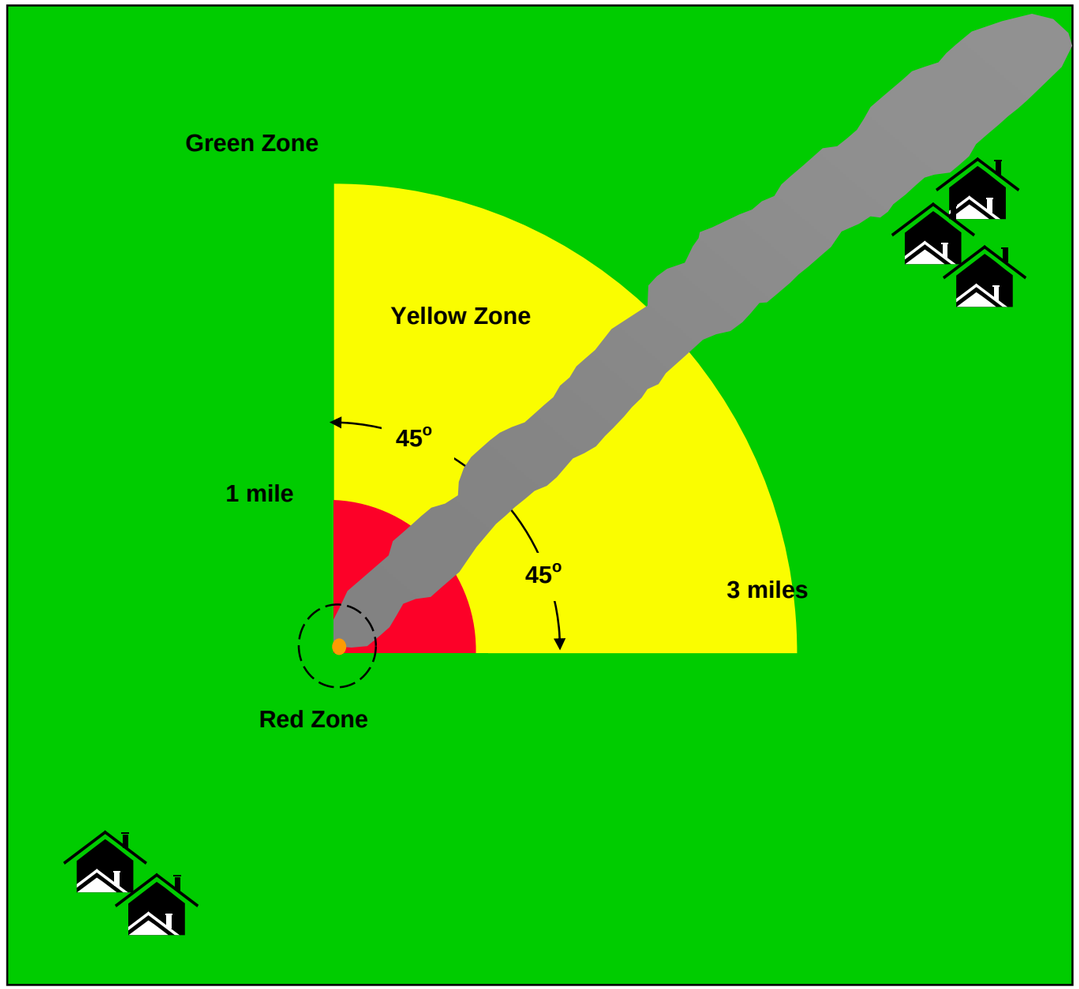
- In the vicinity of human populations
- For a burn of any size from a single source
- For simultaneous burns less than 100 yards apart

The Table 1 rules do not apply in the following situations:

- In unpopulated areas
- In-situ burns less than 3 miles upwind of terrain that rises more than 10 percent of the mixing layer height
- For simultaneous burns more than 100 yards apart

NOTE: This figure is taken directly from the *In-Situ Burning Guidelines for Alaska*, Revision 1, August 2008.

Figure 1: Zones for In Situ Burns on Populated Flat Land, and on Water Within 3 Miles of Shore



The dashed circle shows an example of a 1,000-ft radius site safety zone for workers, determined under a separate site safety plan.

NOTE: This form is taken directly from the *In-Situ Burning Guidelines for Alaska*, Revision 1, August 2008.

Appendix 1: Application and Burn Plan

In Situ Burning Guidelines for Alaska

Incident Name: _____	Date Prepared	Operational Period	
		Date	Time
Incident Location: _____			
Incident Date: _____	Time Prepared — Start:		
Incident Time: _____	End:		

Title of Applicant: _____ Address: _____

Affiliation: _____ Phone: _____ Fax: _____

PART 1

Potential Burn Location_____
Site Description_____
Latitude _____
Longitude _____

Type of Incident (check one):
_____ Grounding
_____ Transfer Operations
_____ Explosion
_____ Collision
_____ Blowout
_____ Other_____

Product Released (check one):
_____ North Slope Crude
_____ Cook Inlet Crude
_____ Residual/Bunker Oil
_____ Diesel #2
_____ JP4
_____ Other_____

Estimated Volume of Released Product:
_____ gallons, or
_____ BBL

Estimated Volume of Product That May Potentially be Released:
_____ gallons, or
_____ BBL

Release Status (check one):
_____ Continuous
_____ Intermittent
_____ One time only, now stopped

If Continuous or Intermittent, estimated Rate of Release:
_____ gallons, or
_____ BBL

Estimated Surface Area Covered (square miles)
At Time of Application _____

If inland, identify/describe:.
- Vegetative cover at burn site (e.g., wetlands, grasslands, shrublands, forest, tundra, non-vegetated)
- Fire danger rating at and near the burn site (see Appendix 6) Whether burn is on permafrost
- Any ignitable vegetation near the burn
- Any structures/buildings near the burn

Why is mechanical recovery alone **inadequate** for spill response?

Consider the spill size, forecasted weather and trajectories, amount of available equipment, time to deploy, and time to recover. _____
_____

Will you use mechanical recovery in conjunction with in situ burning? _____ yes no

Have you evaluated dispersants? yes no

Will you use dispersants in conjunction with in situ burning? yes no

Why is in situ burning preferred? _____
_____
_____

Appendix 1: APPLICATION AND BURN PLAN
In Situ Burning Guidelines for Alaska

PART 2

Did source burn? yes no
Is source still burning? yes no

Is product easily emulsified? yes no

Is product already emulsified? (check one)
_____ No
_____ Light emulsion (0-20%)
_____ Moderate emulsion (21-50%)
_____ Heavy emulsion (>50%)
_____ Unknown

Estimated Percent Oil Naturally Dispersed and Evaporated Within First 24 Hours: _____

Check boxes and enter wind values in the following table:

	Current Conditions	12-hour Forecast	24-hour Forecast
Clear			
Partly cloudy			
Overcast			
Rain			
Snow			
Fog			
Wind Speed (kt)			
Wind Direction (from)			

Percentage Ice Coverage (check one):
_____ No ice present
_____ <10%
_____ 11-30%
_____ 31-50%
_____ 51-100%

Tidal state at _____ o'clock (check one):
_____ Slack tide
_____ Incoming (flood)
_____ Outgoing (ebb)

✓ **Attach a graph** with tidal information for three tidal cycles.

Dominant current (not drift):
Speed (knots)_____
Direction (to)_____

Current Speed (knots) Relative to the Containment Boom _____

Note: Current speed relative to the fire boom should be .75 knots or less to minimize entrainment.

Sea State (check one):
_____ Calm
_____ Choppy
_____ Swell

Waves (estimate height in feet) _____

Does your site safety plan cover this in situ burn plan? yes no

Will response workers be briefed on the site safety plan before burning? yes no

Are the responders trained and equipped with safety gear? yes no

✓ **Attach an ICS 204 form, or similar document**. On it, list the following equipment you will use:

Vessels
Aircraft for ignition and aerial observation
Lengths of fire boom
Residue containment and removal equipment
Fire fighting equipment
Ignition systems
Burn promoters
Communications systems
Air/plume monitoring equipment.

_____

Appendix 1: APPLICATION AND BURN PLAN
In Situ Burning Guidelines for Alaska

Proposed Burn Date and Time _____

Describe how you intend to carry out the burn.

_____
_____

Check one:

_____ Ignition is away from source after containment and movement of the oil to safe location (i.e., controlled burn).

_____ Ignition of uncontained slick(s) is at a safe distance from the source.

_____ Ignition is at or near source without controls.

How will you ignite the oil? _____

_____

Enter the volume of oil you expect to burn:

Fire No.	Oil Volume (BBL__ or Gal__)	Fire Duration (Hrs__ or Min__)
1		
2		
3		
4		
5		
Attach a list for more fires.		
Total Vol.:		

How many simultaneous burns are planned?

_____

What distance will separate simultaneous burns?

_____

Are you planning sequential or repeat (not simultaneous) burns?
yes no

Estimated area of oil in uncontrolled burn
(square feet)_____

Describe your ability and procedures to extinguish the burn if necessary or directed to do so.

_____

Part 3

✓ **Attach a chart with a distance scale**. Show estimated spill trajectory and landfalls, with time. Show the location and distance of your proposed burns relative to the following features:

1. Source:

Location _____

Distance from Burn (miles)_____

2. Ignitable slicks:

Location _____

Distance from Burn (miles)_____

3. Nearest Land (burns on water) or Non-Flat Terrain (burns on land):

Location _____

Distance from burn (miles) _____

Nearby Populated Areas (i.e., one or more non-spill-related people present):

Location _____

Distance from Burn (miles)_____

Location _____

Distance from Burn (miles)_____

Location _____

Distance from Burn (miles)_____

For Inland Burns consider

- Ignitable vegetation
- Structures/buildings
- Areas with Fire Danger Rating of extreme, very high, or high
- Nearest airport
- Alaska Class I Area (see Appendix 4)

4. Attach a drawing showing your mechanical recovery and in situ burning equipment configurations.

6. For burns potentially impacting populated areas, provide an air monitoring plan in accordance with the SMART protocols.

7. Identify whether any Class 1 Areas (Appendix 4) will be impacted.

Appendix 1: APPLICATION AND BURN PLAN
In Situ Burning Guidelines for Alaska

Part 4

How do you plan to collect burned oil residue?

_____
_____

How do you plan to store and dispose of burned oil residue?

_____
_____

For inland burns, how do you plan to address post- burn erosion if applicable?

Describe plan for eliminating risk (if any) of accidental (secondary) fires (e.g., structures/buildings and/or vegetation).

_____

_____

Will the burn affect visibility at downwind airports within 20 miles?

_____

Signatures

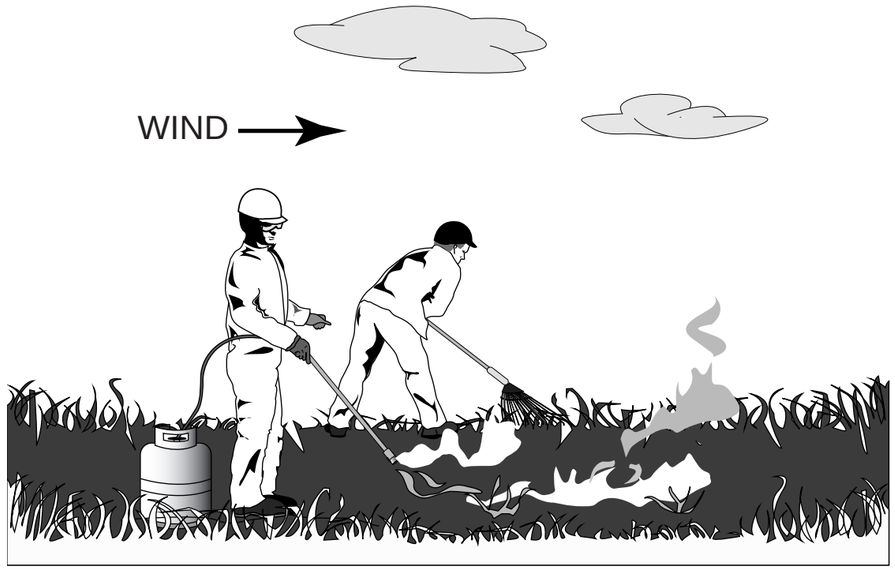
_____
Signature of Applicant

_____
Printed name of Applicant

_____
Date and Time Submitted to Federal and State On-Scene Coordinators

_____

Prepared by: _____ ICS Position: _____ Phone: _____



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	# STAFF PER 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.

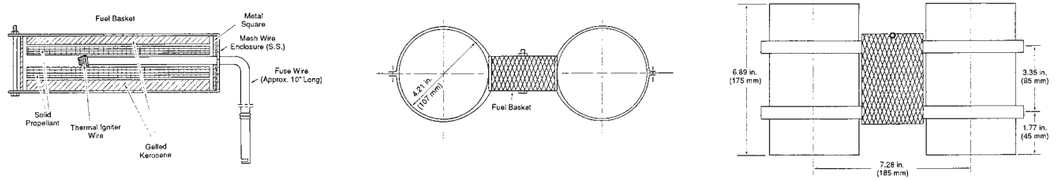
CAPACITIES

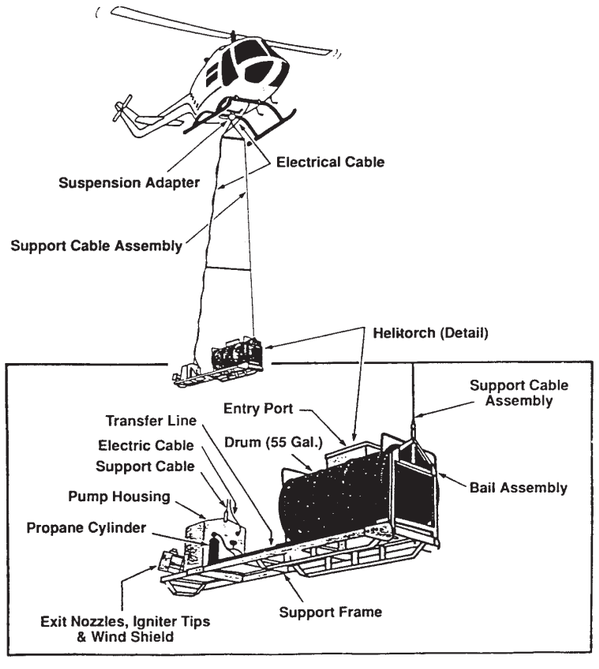
- One weed burner can cover approximately 50 sq. ft in an hour, depending on terrain and degree of oiling.

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 ice melt pools.

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

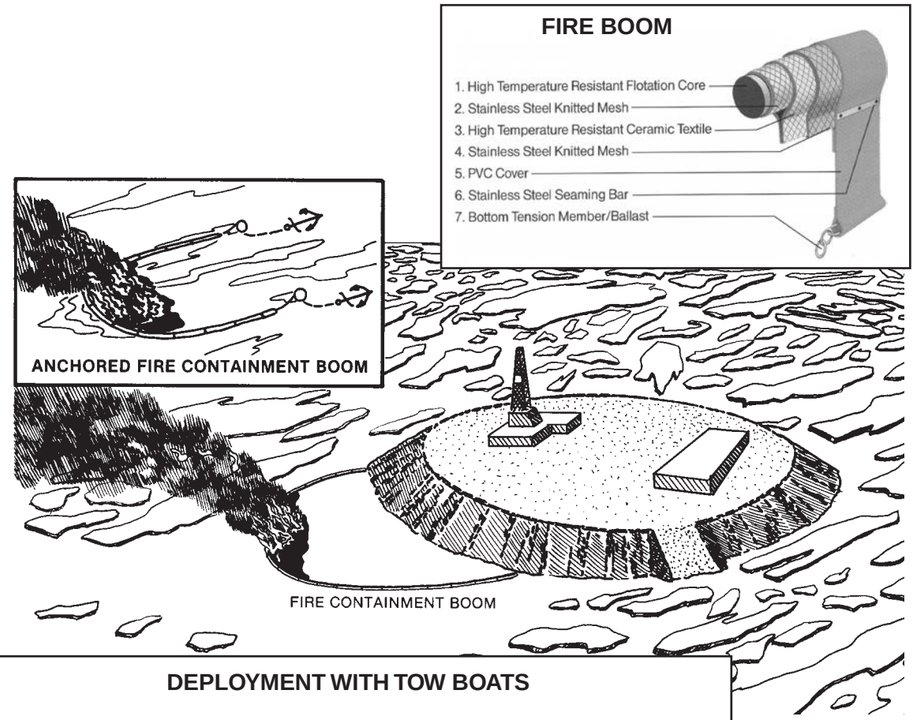
EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Heli-torch (55-gal)	ACS/KRU	Ignition	2	3	1 hr	2 hr
Helicopter with FAR Part 137 Approved Pilot	Alyeska	Sling-load Heli-torch	1		2 hr	
Hand-held Igniters	ACS, Northstar, Alpine	Ignition	≥6	2	1 hr	
Gelled Fuel	ACS	Firestarter Material	≥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.



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.

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	# STAFF PER 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)	All	Tow boom	500 to 800 ft per towboat	—	—	
Hand-held Igniters	ACS, Northstar, Alpine	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	# STAFF PER 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)

DEPLOYMENT CONSIDERATIONS AND LIMITATIONS (CONT'D)

- 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
- Chemical herders may be used, if approved by the Unified Command, to thicken oil and enhance in-situ burning.
- 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).

(Continued on next page)

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

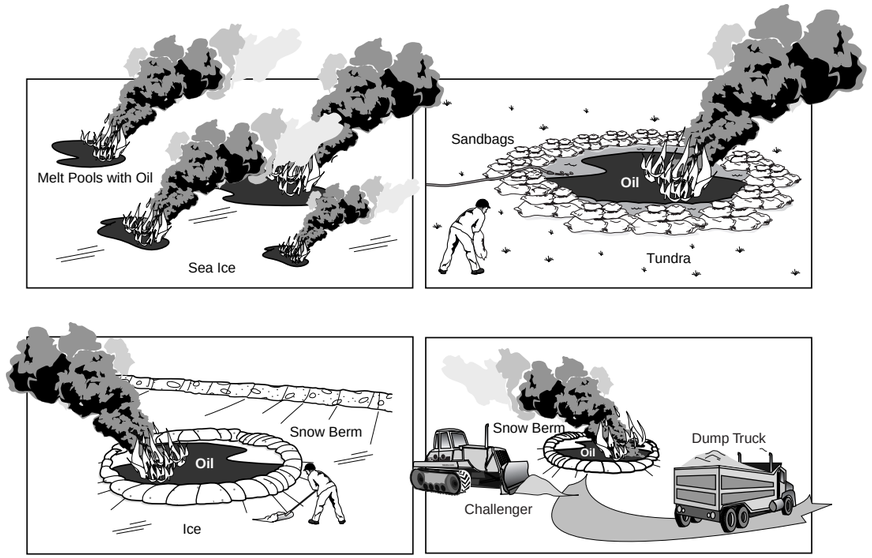
DEPLOYMENT CONSIDERATIONS AND LIMITATIONS (CONT'D)

- 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.
- Below are boom towing limitations for airboats during overflood conditions in the nearshore Beaufort Sea (based on 2005 ACS seasonal recovery testing):

ICE CONDITIONS	FIRE BOOM (20 lb/linear ft)	FIRE BOOM (7 lb/linear ft)	FIRE BOOM (6 lb/linear ft)	DELTA BOOM
Groundfast or Shorefast Ice (with overflood)	100 ft	300 ft	350 ft	750 ft
Broken Ice: Large, Dense, First-Year, Afloat	100 ft	300 ft	350 ft	750 ft
Broken Ice: Smaller, Less Dense, Rotted	200 ft	600 ft	700 ft	1,000 ft

- In extreme shallow water conditions, sheet metal may be used in lieu of boom in the apex. Use 36 pieces of metal and 37 stakes per 100 ft.

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



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.

EQUIPMENT AND PERSONNEL

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Heli-torch (55-gal)	ACS/KRU	Ignition	2	3	1 hr	
Helicopter with FAR Part 137 Approved Pilot	Alyeska	Sling-load Heli-torch	1		2 hr	
Gelled Fuel	ACS	Firestarter Material	≥5 lb.	—	1 hr	
Batch Mixer (300 gal)	ACS/KRU	Mix gel	1	2	1 hr	2 hr
Sand Bags	ACS, GPB, KRU, Alpine	Containment	≥100	>6 for setup* 2 to maintain	2 hr	1 hr
Propane Weed Burner	All	Ignition	2	2	1 hr	
or Hand-held Igniters	ACS, Northstar, Alpine	Ignition	≥6	1	1 hr	

Number of personnel depends on number of sandbags needed.* **TOTAL STAFF ≥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).*

SUPPORT

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Front-End 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	—
ATV	All	Transfer	3	3	1 hr	0.5 hr
Rolligon	Peak	Transportation to site	1	1	6 hr	2 hrs
Sno-Cat	KRU, APSC	Transportation to site	1	1	1 hr	0.5 hr
Sno-Cat with Blade	KRU, APSC	Move snow	1	1	1 hr	0.5 hr
Amphibious Personnel Carrier (e.g., Haaglund)	AIC	Transportation to site	1	1	2 hr	0.5 hr

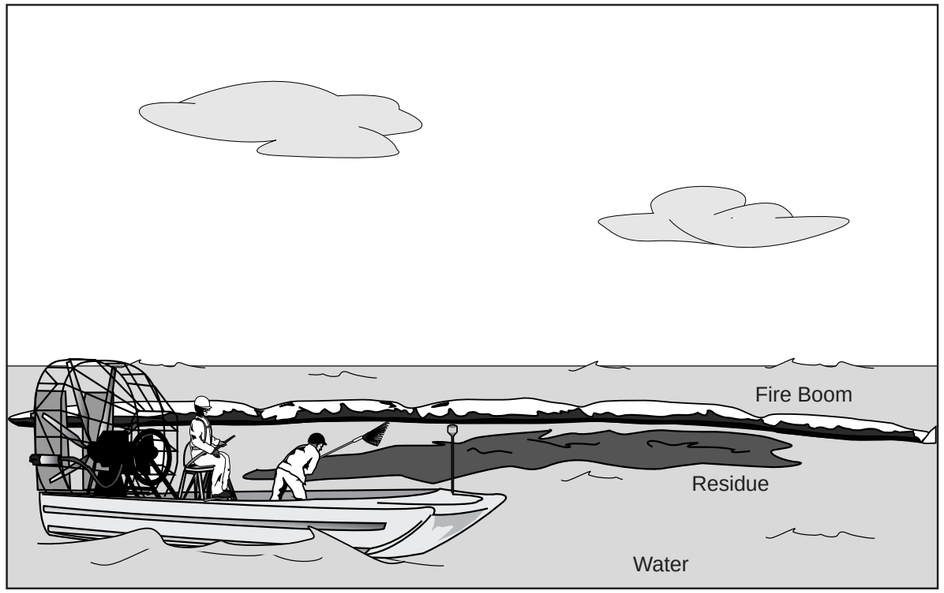
**Marsh buggies may be used in rotting ice conditions.*

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.
- A backhoe on a tracked, amphibious marsh buggy is capable of gathering snow at the rate of 9 cubic yards per minute and of transiting natural sea ice at 1.2 miles per hour.
- A Tucker Sno-Cat with blade is capable of moving snow into berms at the rate of 2 acres per day, assuming 10 hours of operation in each of two, 12-hour shifts per day at 70 sq. ft. per minute.

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.



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.

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	# STAFF PER 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**		

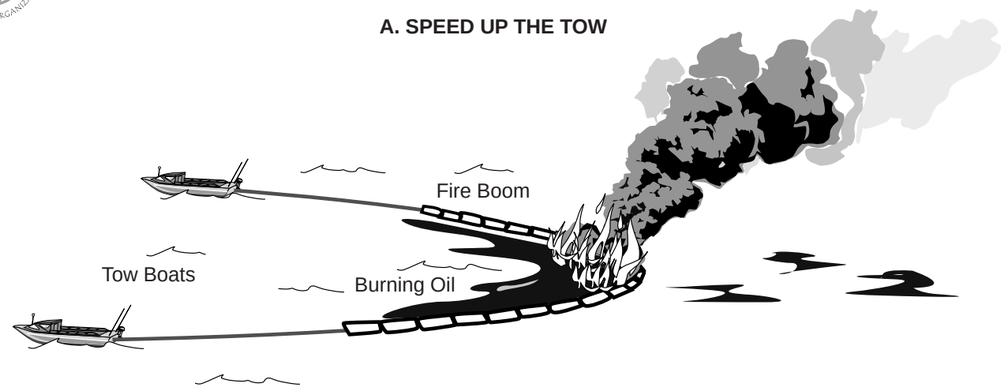
CAPACITIES

- 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

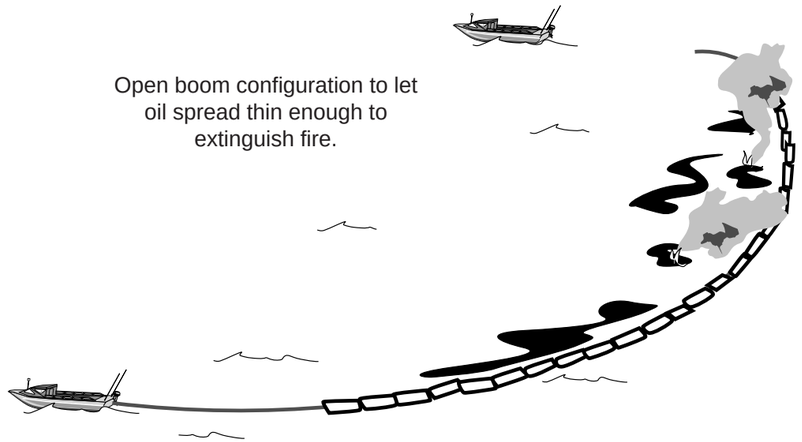
- Proper safety procedures must be followed, and the necessary personal protective equipment (PPE) must be used.
- Beware of flashback! After the fire appears to be extinguished, unexpected re-ignition can occur. Wait until the residue cools before approaching.
- Shortly after it cools, the burn residue 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

Open boom configuration to let oil spread thin enough to extinguish fire.



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 tenfold 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.

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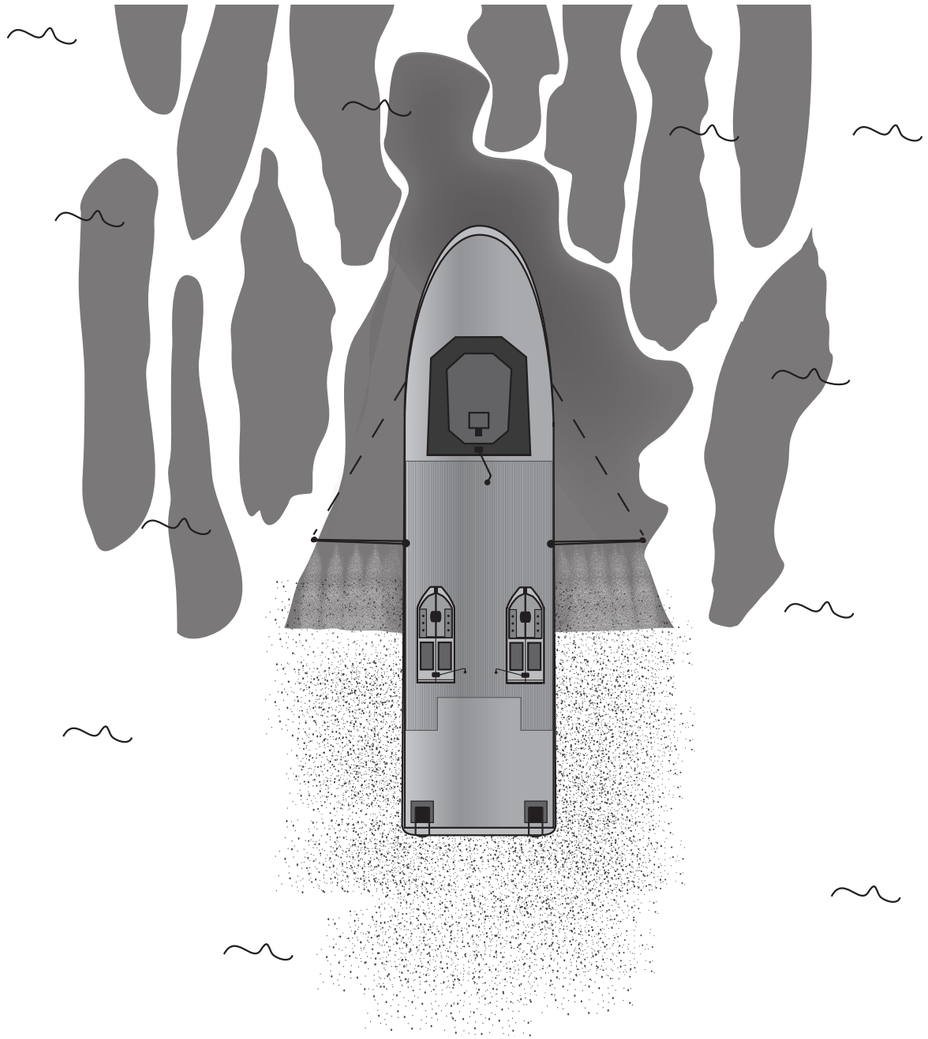
NOTE: Permission to use dispersants MUST be requested in advance, and approval received, in accordance with Alaska Regional Response Team (ARRT) Unified Plan, Annex F.



Chemical dispersants, once authorized for use, may be applied from spray arms off one or both sides of a vessel. Large vessels offer unique advantages over aerial systems involving the potential for large payloads of dispersant, continuous spraying for long periods, higher dosages (avoiding the need for multiple passes), and relatively simple, on-site application systems. Working with spotter aircraft, the vessel can be guided to the heaviest concentrations of oil where it can apply dispersants over swaths of typically 60 to 100 feet, depending upon the beam of the spray vessel and the length of the spray arms. With application speeds of approximately 3 to 8 knots, dispersants can be sprayed undiluted (neat) or diluted. Neat application, yielding higher efficiencies, is usually preferred.

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).*

Spray systems are designed and positioned on the vessel to give slightly overlapping spray patterns at the surface, yielding droplet-sizes that are typically 250 to 750 microns (1/4 to 3/4 mm), and making initial contact directly with the oil, thereby avoiding any wasteful treatment of oil that has been mixed into the water column by the vessel's bow wave and wake. With dosages of typically 5 to 15 gallons of dispersant per acre, pump rates are controlled to operate within that range based on the vessel's spray swath and speed. NOAA's Open Water Oil Identification Job Aid (characterizing oil slicks at various thicknesses) and its Dispersant Mission Planner 2 are helpful in determining appropriate slicks for chemical treatment and system operating parameters for both vessel and aerial spray systems.

EQUIPMENT AND PERSONNEL

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
OSRV	Shell	Dispersant Application	12	6	0.5 hr	0.5 hr
Dispersant Spray Arm	Shell	Dispersant Application	2	1	0.5 hr	0.5 hr
CorExit 9500	Shell	Dispersant	≥100 bbls			
			TOTAL STAFF	**7**		

SUPPORT

- An aircraft, either fixed-wing or helicopter with a trained observer, is important in guiding spray vessels to the heaviest oil concentrations as well as the leading edges of slicks that could threaten sensitive resources.
- In the event of a fixed point-source spill (e.g., a blowout or sub-sea pipeline rupture), the need for aerial support may be reduced by spraying directly downstream of the source.
- Operations will normally involve strong support from the USCG and/or trained contractors to monitor and document the results of dispersant use following Special Monitoring of Applied Response Technologies (SMART) protocols.

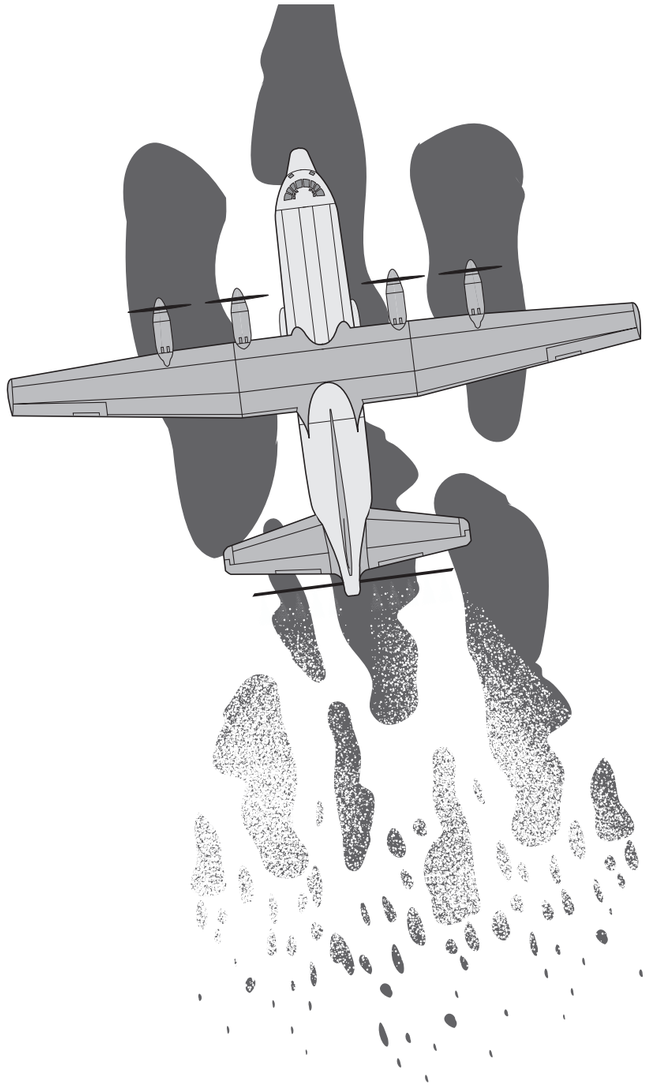
CAPACITIES

- With good visibility (especially with a fixed, continuous spill source), the equipment has the potential to operate 24 hours per day.
- For each 1,000 gallons of dispersant carried onboard, the vessel could treat as much as 20,000 gallons of oil (based on a dispersant-to-oil ratio of 1:20).
- Typical areal coverage rates for vessels with swaths of 60 to 100 feet, spraying at 5 knots, run between 0.7 and 1.2 acres/min. (i.e., ~0.06 to 0.11 mi^2/hr).
- Reference NOAA's Dispersant Mission Planner to determine incident-specific operating and application parameters.

DEPLOYMENT CONSIDERATIONS AND LIMITATIONS

- Spray arms provide relatively low areal coverage rates.
- It can be difficult to observe oil on the water surface from the vessel's wheelhouse.

NOTE: Permission to use dispersants MUST be requested in advance, and approval received, in accordance with Alaska Regional Response Team (ARRT) Unified Plan, Annex F.



The aerial application of dispersants can be conducted as a primary response option when wind/sea conditions preclude the safe and effective use of booms for containment and recovery or burning operations. Dispersants may also be used strategically to treat oil that has escaped recovery and/or burning operations.

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Once authorized for use, dispersants may be applied from a large fixed-wing aircraft, with the important advantage being speed of application with a relatively wide swath. MSRC's dedicated C-130 Hercules has a built-in tank and spray system with a dispersant carrying capacity of 3,250 gallons. Dependent upon the aircraft type and dispersant spray system storage capacity, a C-130 Hercules may be flown with up to 5,000 gallons per sortie and can operate effectively with a 100 ft altitude and application speeds of typically 145 to 150 knots. Since higher speeds and altitudes can be used for transit to the spill site and observation of the spill, the aircraft provides an opportunity to select the optimum direction and pattern for delivery of the dispersant. The large payload of this system, combined with its long-range capabilities and high areal coverage rates, typically many tens of acres/minute, make the Hercules one of the most effective options for treating large areas and volumes of oil far from shore (100 miles or more).

EQUIPMENT AND PERSONNEL

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
C-130 Hercules aircraft	Anchorage	Dispersant Application	1	2	24 hrs	0.5 hr
CorExit 9500	Anchorage	Dispersant	25,000 gals	4	4 hrs	1 hr
			TOTAL STAFF	**6**		

SUPPORT

- Whenever possible, a second spotter aircraft (fixed-wing or helicopter) would be used to help align the Hercules with each pass over the oil, giving "start" and "stop" instructions for spraying as the aircraft enters and leaves the desired spray zone. The spotter aircraft can provide important information to the pilot of the spray plane regarding wind effects on targeting of the dispersant, proper overlap with previous spray paths, effectiveness of dispersion, and any other adjustments that may be needed for the flight path.
- Flight crews manning aerial dispersant C-130 and spotter planes should be trained to work in tandem.
- The spotter aircraft can also be of help to those conducting the Special Monitoring of Applied Response Technologies (SMART) protocols by directing those boats to the regions where dispersants had been applied.
- Additional support is required back at the staging location for refueling of the aircraft and for the rapid loading of dispersant between sorties.
- Reloading dispersant pack requires two staff in PPE.

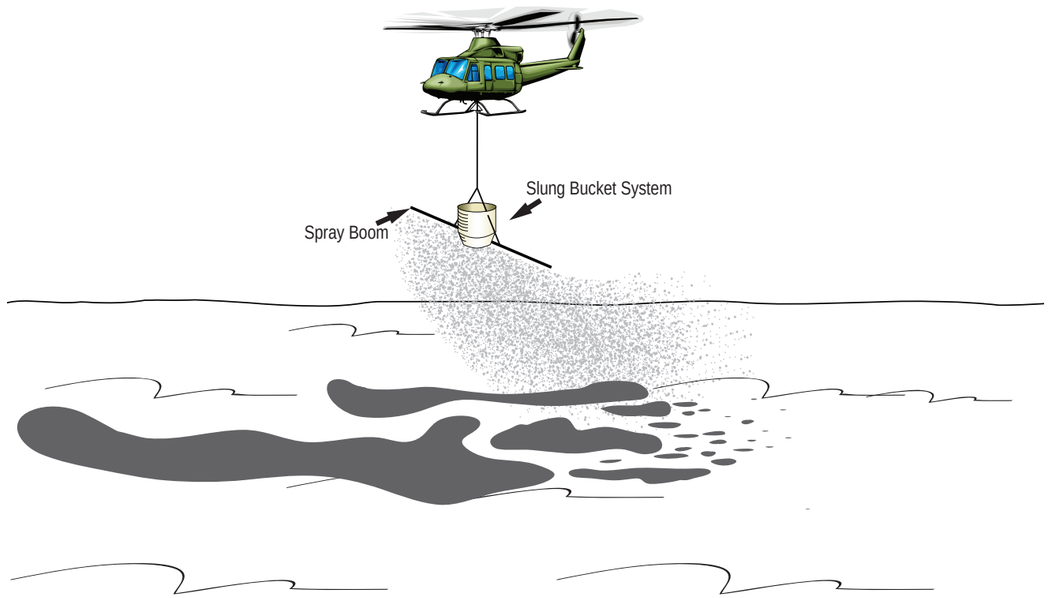
CAPACITIES

- The MSRC dispersant application platform consists of a built-in tank with removable spray arms that are positioned just forward of the tail. The booms, 15 ft on each side, deliver a swath width of 150 ft at altitudes of 50 to 100 ft.
- The Hercules' MSRC Dispersant system can deliver up to 4 payloads, depending upon the actual transit distance from staging to spill location, over a 12 to 18-hour period resulting in treatment of up to 10,000 bbl of oil (using a dispersant-to-oil ratio of 1:20).
- With good visibility there is the potential for dispersant application 24 hours per day during periods of extended daylight in the summer months.
- See NOAA's Dispersant Mission Planner to determine incident-specific operating and application parameters.

DEPLOYMENT CONSIDERATIONS AND LIMITATIONS

- Distance of sortie from staging location to application site.
- High wind and rough sea conditions may degrade application effedtiveness.
- Oil type, thickness, emulsification, and weather are other factors determining effectiveness.
- SMART protocols require a test application to evaluate effectiveness.

NOTE: Permission to use dispersants MUST be requested in advance, and approval received, in accordance with Alaska Regional Response Team (ARRT) Unified Plan, Annex F.



Dispersant application from a "bucket" slung beneath a helicopter provides the capability for "surgical" spraying over oil that has escaped containment during recovery or burning operations. Helicopters can also access relatively large areas (typically 10 acres/min or more), maneuver well to hit the highest concentrations of oil, and make quick altitude adjustments locating oil from 500 feet or more, and then dropping to a 50-ft altitude or less for spraying.

Helicopter spray buckets will vary in size from approximately 150 to 300 gallons of dispersant. For example, a 240-gallon bucket can spray with a swath width of 75 to 100 feet at speeds of typically 50 to 85 knots. Depending upon the payload/range capabilities of the helicopter, such spray systems are somewhat restricted to waters that are typically less than 20 n mi from shore or offshore staging.

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EQUIPMENT AND PERSONNEL

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Helicopter	Shell	Dispersant Application	1	2	1 hr	1 hr
Spray Bucket (mobilized with aircraft)	Shell	Dispersant Application	1	2	1 hr	1 hr
CorExit 9500	Shell	Dispersant	1			
			TOTAL STAFF	4		

SUPPORT

- A spotter aircraft (fixed-wing or helicopter), if available, can greatly enhance the operation by locating slicks, guiding the spray helicopter to those regions, and documenting the effectiveness of dispersion.

CAPACITIES

- With good visibility there is the potential for dispersant application 24 hours a day during periods of extended daylight in the summer months.
- Depending upon the distance from shore and the availability of backup dispersant supplies and ground support, a helicopter spray system could deliver well over a dozen sorties in a single day. If 200 gallons of dispersant are sprayed during each of 12 sorties, the system could treat nearly 1,200 bbls of oil (assuming a dispersant-to-oil ratio of 1:20).
- Each staging location may store at least 2,000 gallons of dispersant for each helo-bucket system to be serviced for each day of operation.
- Reference NOAA's Dispersant Mission Planner to determine incident-specific operating and application parameters.
- AES spray bucket has a capacity of 200 gallons.

DEPLOYMENT CONSIDERATIONS AND LIMITATIONS

- Due to the limited range of most small helicopters and the added risks of flying over water, helicopter spraying operations should be conducted from staging locations relatively close to the spill.
- Remote locations, far offshore, would need to be supported by vessels or a platform with heli-pad, refueling facilities and dispersant for reloading the bucket between sorties.

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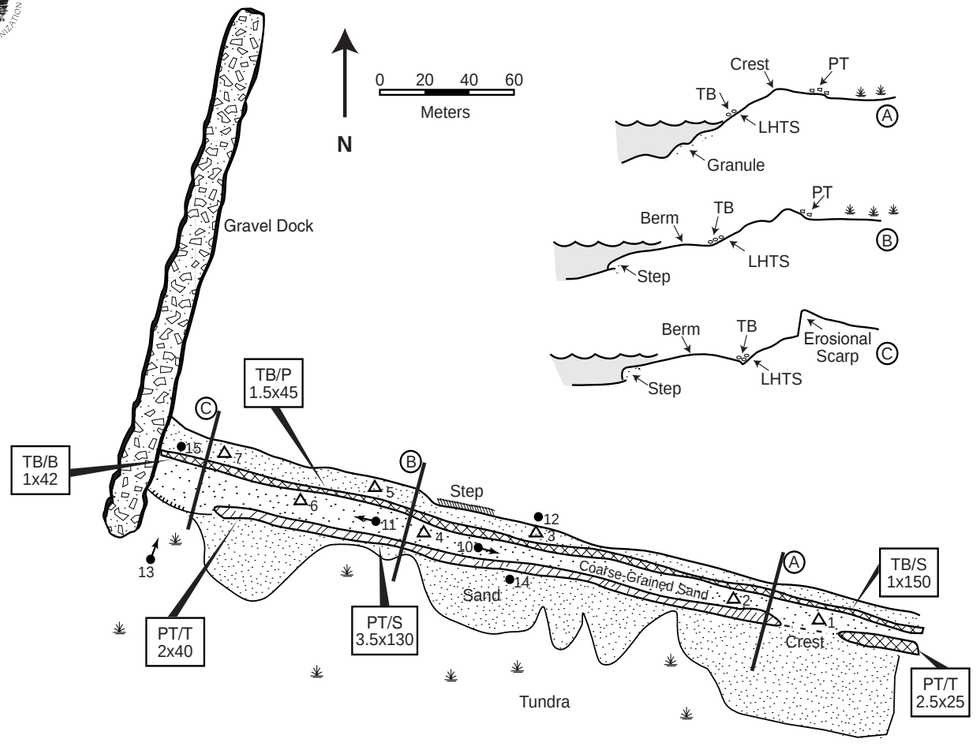
SAMPLE SHORELINE ASSESSMENT SKETCH MAP



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).

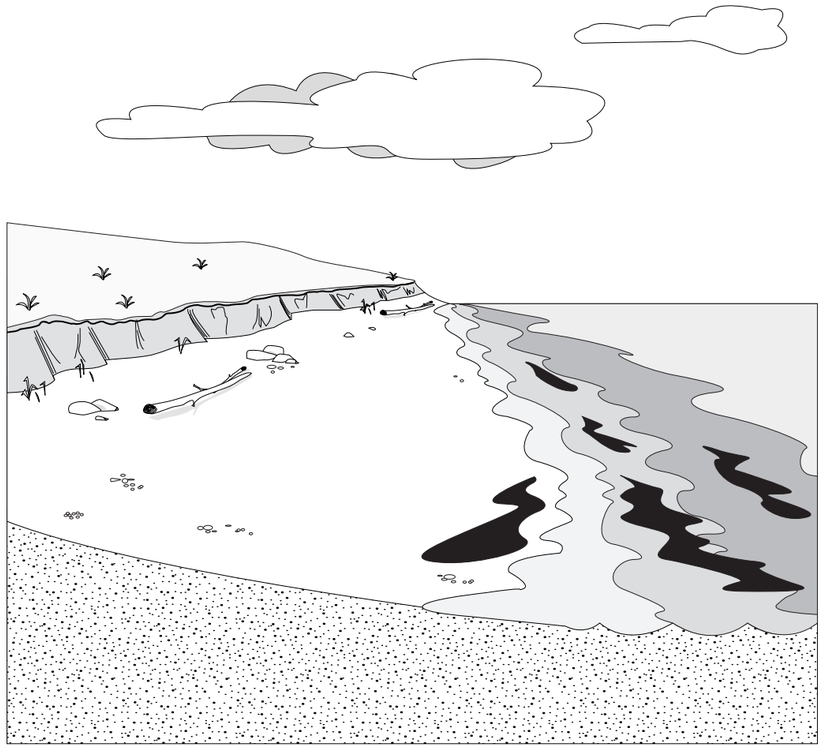
SCAT SURVEY TEAM AND RESPONSIBILITIES

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	• Logistical direction and management of the survey team • Review of existing data, maps and photos • Reviewing and verifying existing shoreline segmentation and adapting it as necessary • Photographic/video documentation • Collection and documentation of any sediment/oil samples that may be required • Consultation with the spill response operations representative and other team members concerning appropriate response options and constraints for a given site • Post-survey mapping, documentation, and categorization of the severity of oiling based on on-site observations
Ecologist	• Cross-checking information from existing sensitivity atlases and databases with actual conditions • Describing the abundance and location of different coastal ecosystems in the segment • Tabulating information on the general character and health of indicator species along the shoreline • Providing information on nearshore, shallow areas and wildlife observations • Recommending ecological constraints on operations or cleanup activities • Providing photo documentation and a sketch map of the surveyed area
Archaeologist	• Evaluate the foreshore areas to identify likely site locations • Update known site by recording additional information on site location, size, depth, presence of surface features and conditions • Document newly discovered sites • Complete forms as required (Cultural Resource Evaluation Form and Human Use Summary Form) • Apply constrains as necessary on operations or cleanup activities • Provide photo documentation and draw a sketch map

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 recovery 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.).

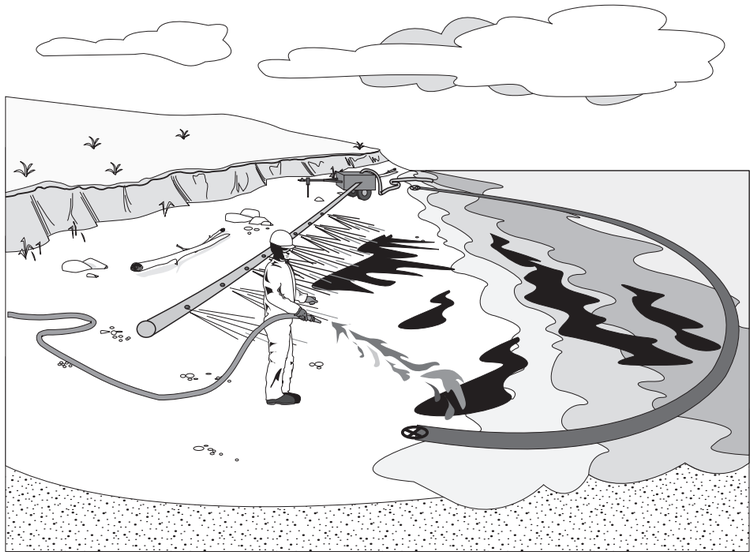
Other factors include an analysis of the:

- 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.

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.



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.

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.

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EQUIPMENT AND PERSONNEL

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Trash Pump (2-inch)	All	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, KRU	Deluge	>100 ft	2 for setup	1 hr	
Water Heating Plant*	EOA	Heat water	—	—	—	
Water Truck*	All	Transport heated water	1	1	2 hr	

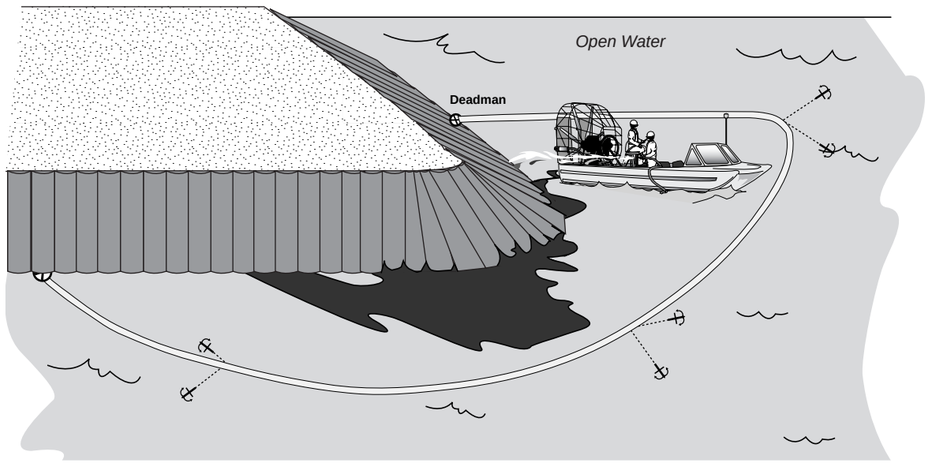
TOTAL STAFF 2 (3 if water truck is used)

**Warm/hot-water flushing would be used only where road access is available to truck heated water to the site.*

- See tactics on booming and skimming for additional equipment and personnel needs for recovery of free oil generated by these tactics.
- Ambient sea water for flooding and flushing operations may also be supplied via pumps located aboard off-shore response vessels.

DEPLOYMENT CONSIDERATIONS AND LIMITATIONS

- Unified Command approval is required for any shoreline cleanup tactic. Additional permits may be required for beach or upland access, and to anchor boom to the beach (e.g., ADF&G, ADNR, SHPO, etc.).
- 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.



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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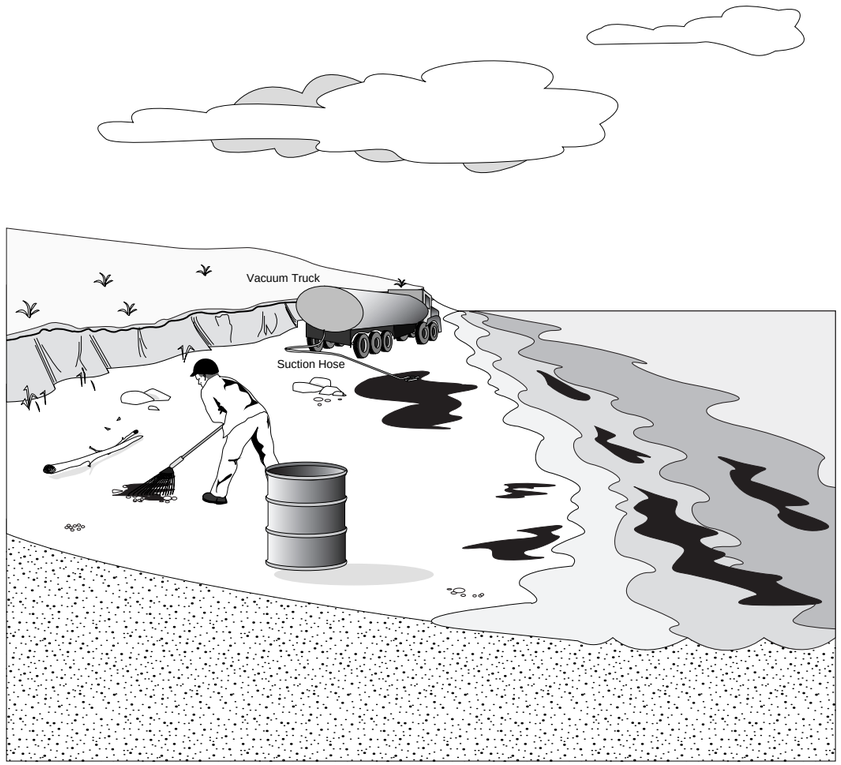
EQUIPMENT AND PERSONNEL

- 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	# STAFF PER 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	
or	Spillbuster Van	EOA, KRU	Steam cleaning	1	2	1 hr	2 hr
or	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.



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

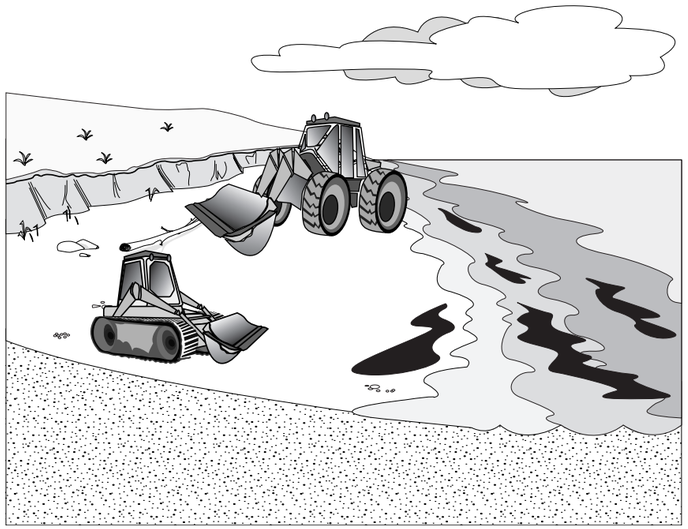
EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Rakes	All	Recovery	≥1	1	1 hr	0.5 hr
Pitch Forks w/Screen	All	Recovery	≥1	1	1 hr	1 hr
Shovels	All	Recovery	≥1	1	0.5 hr	0.5 hr
Sorbents	All	Recovery	≥1 Pkg.	1	1 hr	1 hr
Vacuum Truck	All	Recovery	1	2	1 hr	0.5 hr
Oily Waste Bags	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 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.



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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
	Bobcat	ACS, KRU, EOA, Alpine	Recovery	1	1	1 hr	0.5 hr
or	Front-End Loaders	All	Recovery	1	1	1 hr	0.5 hr
or	Backhoe	All, Peak, AIC	Recovery	1	1	2 hr	0.5 hr
	Wide-Track Dozer	All	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
or	Dump Trucks	All	Disposal	2	2	1 hr	0
				TOTAL STAFF	**≥3**		

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SUPPORT

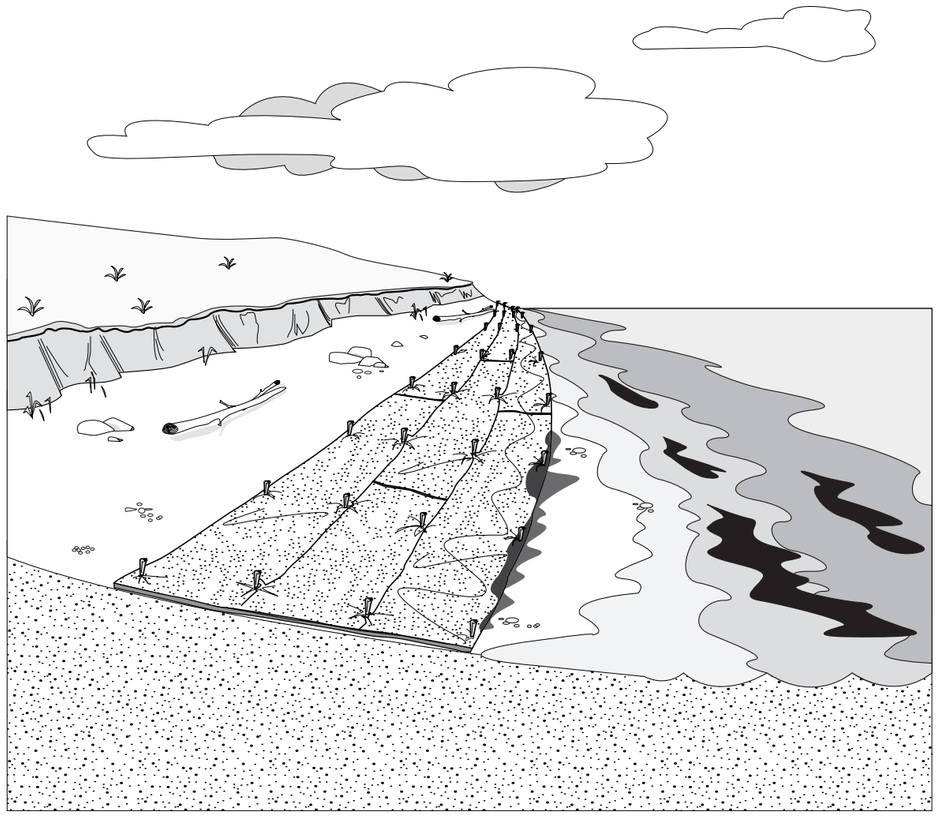
EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Fuel Truck	All	Fuel heavy equipment	1	Once per shift	1 hr	0.5 hr
Lube Truck	All except Badami	Provide fluids to heavy equipment	1	Once per shift	1 hr	0.5 hr
Mechanic Support	All	Support equipment	1	1	1 hr	0.5 hr
Semi and Trailer	GPB, KRU, Alpine	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.)

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.



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.

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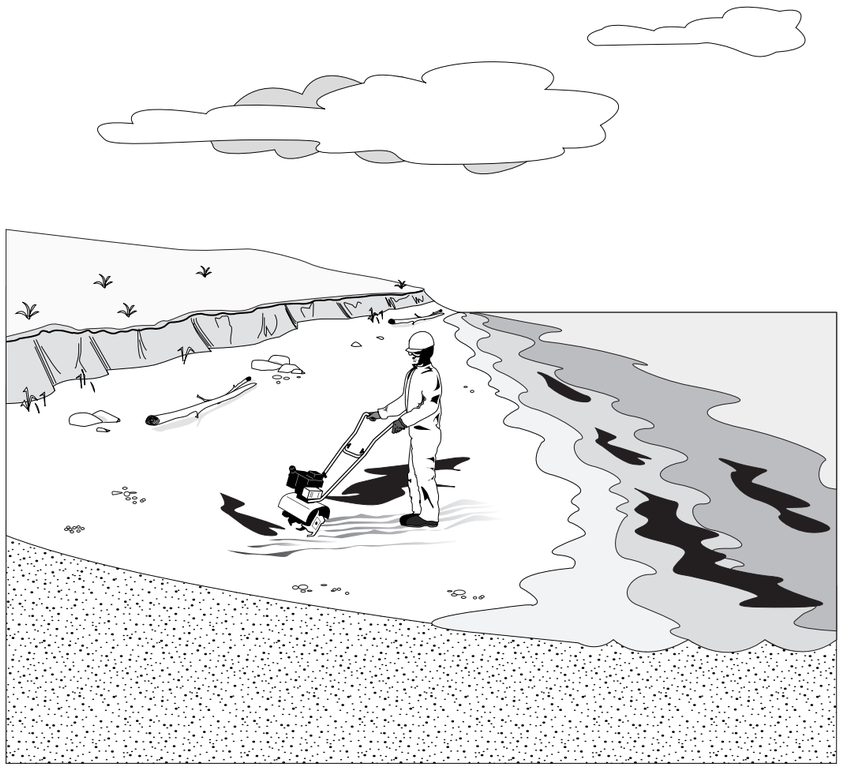
EQUIPMENT AND PERSONNEL

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER 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

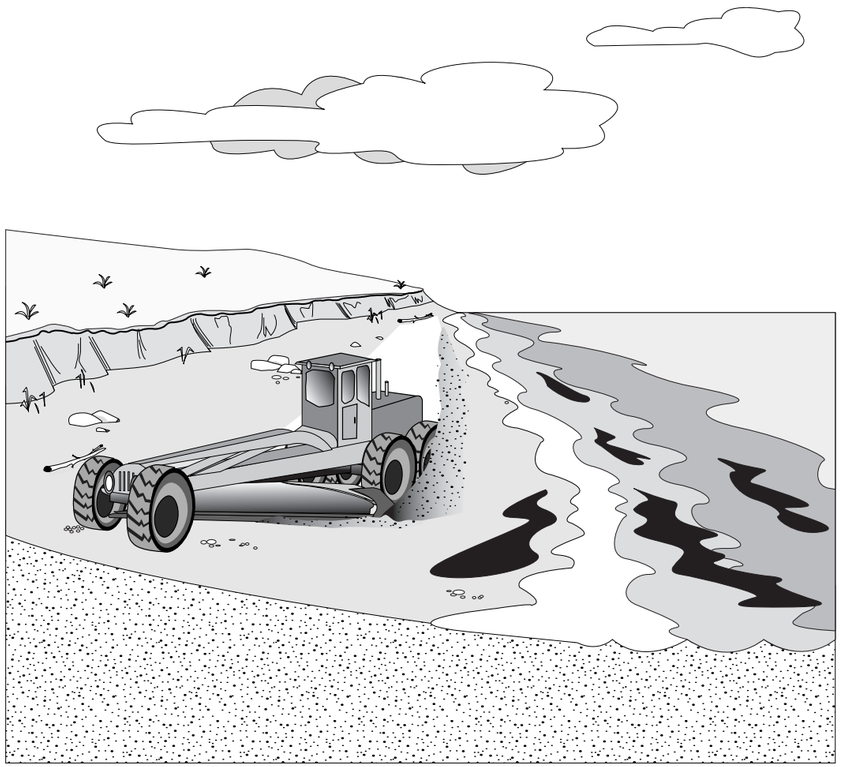
	EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
	Aerator	KRU	Aeration	1	1	2 hr	1 hr
or	Roto-tiller	EOA	Aeration	1	1	2 hr	1 hr
or	Front-End Loader	All	Aeration	1	1	1 hr	0.5 hr
or	Grader w/Scarifying Teeth	All	Aeration	1	1	2 hr	0.5 hr
or	Dozer w/Ripper Teeth	GPB, KRU, Peak	Aeration	1	1	1 hr	0.5 hr
or	Tractor w/Tilling Attachment	Peak	Aeration	1	1	1 hr	0.5 hr
or	Skid-Steer w/Trimmer	All	Aeration	1	1	1 hr	0.5 hr
			TOTAL STAFF		**≥2**		

SUPPORT

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Semi and Trailer	GPB, KRU, Alpine	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 except Badami	Provide fluids to heavy equipment	1	Once per shift	1 hr	0.5 hr
Mechanic Support	All	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.



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

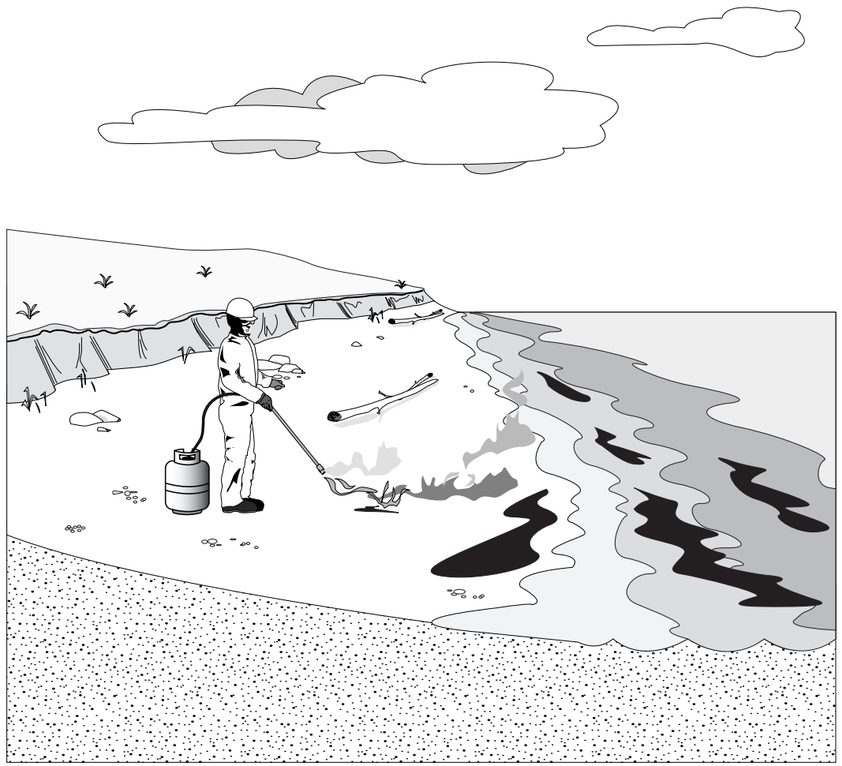
	EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
	Front-End Loader	All	Sediment reworking	1	1	1 hr	0.5 hr
or	Grader	All	Sediment reworking	1	1	2 hr	0.5 hr
or	Wide-Track Dozer	All	Sediment reworking	1	1	1 hr	0.5 hr
or	Tractor w/Tilling Attachment	Peak	Aeration	1	1	1 hr	0.5 hr
			TOTAL STAFF		**≥2**		

SUPPORT

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Semi and Trailer	GPB, KRU, Alpine	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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Propane Weed Burner	All	In-situ burning	1	1	1 hr	0.5 hr
or 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).

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 is it 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
Physical Cleaning — Washing										
2) Flooding	L	L	M	L	L	L	L	L	L	L
3) Low-Presure 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
Physical Cleaning — Removal/Disposal										
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
Physical Cleaning — *In Situ*										
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	-
Treatment — Chemical/Biological										
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/scraper	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.

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 ConocoPhillips for hazing and incidental take of polar bears. BP Exploration and/or ConocoPhillips maintain these permits on behalf of ACS.

ACS has the following permits from ADF&G:

- Permit FG05-III-0012: Hazing, capture, stabilization, transport, and rehabilitation of birds.
- Permit FG05-III-0013: Hazing 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[1]	Haze[2]	Collect and Hold[3]	Haze[4]	Collect and Hold	Haze
Migratory Birds	NO	YES	YES[3]	NO[1]	NO	NO
Sea Otters, Walruses, and Polar Bears	NO[1]	NO[1]	YES	YES	NO	NO
Whales, Porpoises, Seals, and Sea Lions	NO	NO	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.

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

APPENDIX 24, CONT.

II. WILDLIFE DATA	
SPECIES/SPECIES GROUPS	ESTIMATED NUMBERS OF WILDLIFE AND LOCATION RELATIVE TO SPILL RELEASE
e.g., Waterfowl	e.g., 100 eiders 1 mile from leading edge of spill

APPENDIX 24, CONT.

III. PRIMARY RESPONSE ACTIONS

Describe any response actions underway or previously taken: (1) to protect wildlife and/or wildlife habitat, and (2) that may affect proposed hazing activities.

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:

Permit holder:

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 LISTED IN APPENDIX 26

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:_____

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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

APPENDIX 25, CONT.

II. WILDLIFE DATA	
SPECIES/SPECIES GROUPS	**ESTIMATED NUMBERS OF WILDLIFE AND LOCATION RELATIVE TO SPILL RELEASE**
e.g., Waterfowl	e.g., 100 eiders 1 mile from leading edge of spill

NOTE: All values given on these pages are for planning purposes only. ACS Tech. Manual Vol. 1, 03/12

APPENDIX 25, CONT.

III. PRIMARY RESPONSE ACTIONS

Describe any response actions underway or previously taken: (1) to protect wildlife and/or wildlife habitat, and (2) that may affect proposed capture, transport, stabilization, or wildlife treatment activities.

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:

Permit holder:

APPENDIX 25, CONT.

V. TERTIARY RESPONSE ACTIONS: CAPTURE, TRANSPORTATION, STABILIZATION AND TREATMENT
A. Describe capture, transportation, stabilization, and treatment plan for each species or species group identified in Section II, including objectives, procedures, equipment, number of persons, and location(s):

APPENDIX 25, CONT.

V. TERTIARY RESPONSE ACTIONS: CAPTURE, TRANSPORTATION, STABILIZATION AND TREATMENT, CONT.
B. Information on Stabilization Facility Address: Specific location (if not discernible from address): Telephone number: Fax number:
C. Information on Treatment Facility Address: Specific location (if not discernible from address): Telephone number: Fax number:
D. Information on Person in Charge Name: Affiliation: Address: Qualifications: Telephone number: Fax number: Permit holder(s):

APPENDIX 25, CONT.

VI. 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-VI NEED TO BE SUBMITTED TO THE FEDERAL ON-SCENE COORDINATOR AND APPROPRIATE WILDLIFE RESOURCE AGENCY REPRESENTATIVES LISTED IN APPENDIX 26

APPENDIX 25, CONT.

VII. 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.

VIII. 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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APPENDIX 26

CONTACT INFORMATION FOR WILDLIFE RESOURCE AGENCIES:
MIGRATORY BIRDS, MARINE MAMMALS, AND TERRESTRIAL MAMMALS

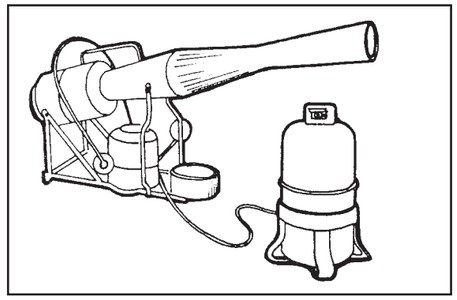
SPECIES	AGENCIES/CONTACTS	
Migratory Birds Sea Otters Pacific Walruses Polar Bears Caribou Muskoxen Moose Sitka Black-Tailed Deer Bison Mountain Goats Dall Sheep Brown and Black Bears Wolves Red Foxes Arctic Foxes Mink River Otters Muskrats Beavers Wolverine Marten Miscellaneous Small Mammals	**Fish and Wildlife Service** *Primary contact* Catherine Berg Fax: 271-2786 Wk: 271-1630 Hm: 694-7379 Cell: 244-1529 catherine_berg@fws.gov *Alternate contact* Philip Johnson Fax: 786-3350 Wk: 786-3483 Hm: 345-0300 Cell: 242-6893 philip_johnson@fws.gov	**Alaska Department of Fish and Game** *Primary contact* Mark Fink Fax: 267-2464 Wk: 267-2338 Hm: 337-7933 markf@fishgame.state.ak.us *Alternate contact* Jack Winters Fax: 456-3091 Wk: 459-7285 Hm: 479-2320 jwinters@fishgame.state.ak.us

APPENDIX 26, CONT.

SPECIES	AGENCIES/CONTACTS	
Northern Fur Seals Northern (Steller) Sea Lions Ringed Seals Harbor Seals Spotted Seals Bearded Seals Ribbon Seals Cetaceans	**National Marine Fisheries Service** *Primary contact* Brad Smith Fax: 271-3030 Wk: 271-5006 Hm: 248-4211 brad.smith@noaa.gov *Alternate contact* Matt Eagleton Fax: 271-3030 Wk: 271-6354 Hm: 338-2822 matthew.eagleton@noaa.gov	**Alaska Department of Fish and Game** *Primary contact* Mark Fink Fax: 267-2464 Wk: 267-2338 Hm: 337-7933 markf@fishgame.state.ak.us *Alternate contact* Jack Winters Fax: 456-3091 Wk: 459-7285 Hm: 479-2320 jwinters@fishgame.state.ak.us

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.

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.

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.

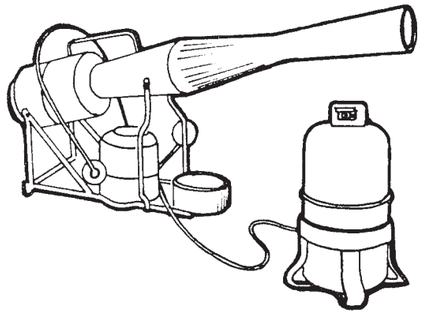
To protect mammals from oil:

- 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.

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.

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.

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	• Bird density reduction ranges from 50% to 100% depending on species and amount of human attendance • Works for 2 to 3 days • May not be effective in rough, open sea	Propane exploder cannons and pyrotechnics are available from ACS inventory.
Visual and Auditory Methods	Herding or Hazing with Aircraft	• Used for flying waterfowl or waterfowl on the ground that fly in response to disturbances • Aircraft may cause diving birds to dive into contaminated area • Helicopters can be used to herd flightless birds (e.g., young or molting birds)	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	• Slow and labor-intensive • May be effective with flightless waterfowl • Ineffective for diving birds	Small boats available for summer use.
	BRECO Bird Scare Buoys	Floating scare devices	Available from ACS inventory.
Other Methods	Capture and Relocation	• For small populations of birds of critical sensitivity • Labor-intensive and not practical in most cases	Will be used only if visual and auditory methods fail, and only with specific authorization by agency personnel for a specific spill.

BRECO Bird Scare Buoy

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

SUPPORT EQUIPMENT

BASE LOCATION	FUNCTION	QTY
Deadhorse	**Large bear holding cage (USFWS)**	**1**
Deadhorse	**Bear culvert trap**	**2**
Deadhorse	**Small transport cage**	**1**
Deadhorse	**Pinniped holding enclosure**	**2**
Deadhorse	**Bear and pinniped stabilization kit**	**1**

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. Gavaged **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: _____

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

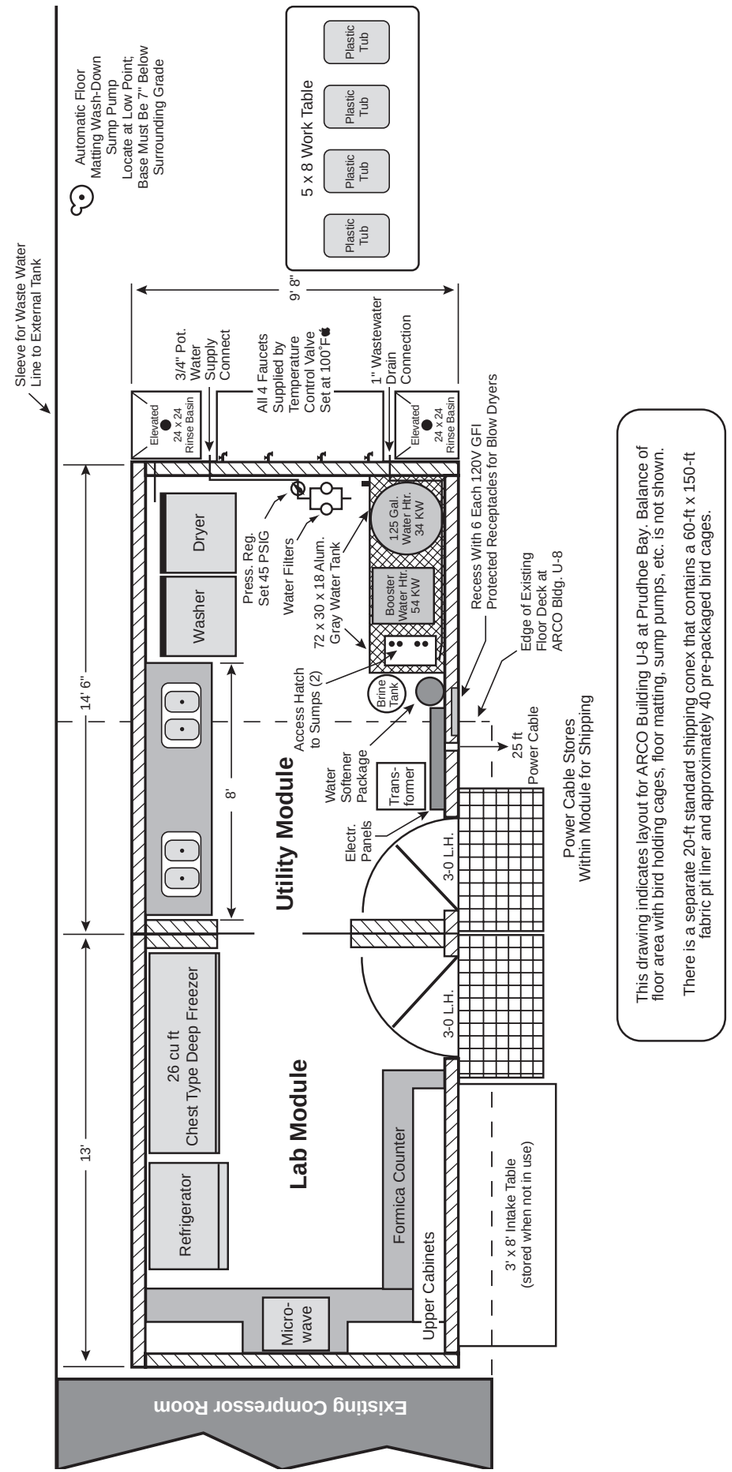
The following list of salvage procedures will be included in an incident-specific plan for retrieving dead oiled wildlife. The plan will be reviewed and approved by the appropriate wildlife resource agency(ies), and implemented by the responsible party.

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.

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.

Date:	**Control Number:**	
Oil Spill Incident:		
Location Animal Found (Specific): **Latitude/Longitude:**		
Species Found:		
Is Specimen Obviously Oiled? (circle one):	**Yes**	**No**
Was Specimen Scavenged? (circle one):	**Yes**	**No**
Collected by: **Printed Name:** _____ **Signature:** _____ **Date:** _____ **Telephone Number:** _____ **Affiliation:** _____		
Relinquished to: **Printed Name:** _____ **Signature:** _____ **Date:** _____ **Telephone Number:** _____ **Affiliation:** _____		
Remarks:		



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

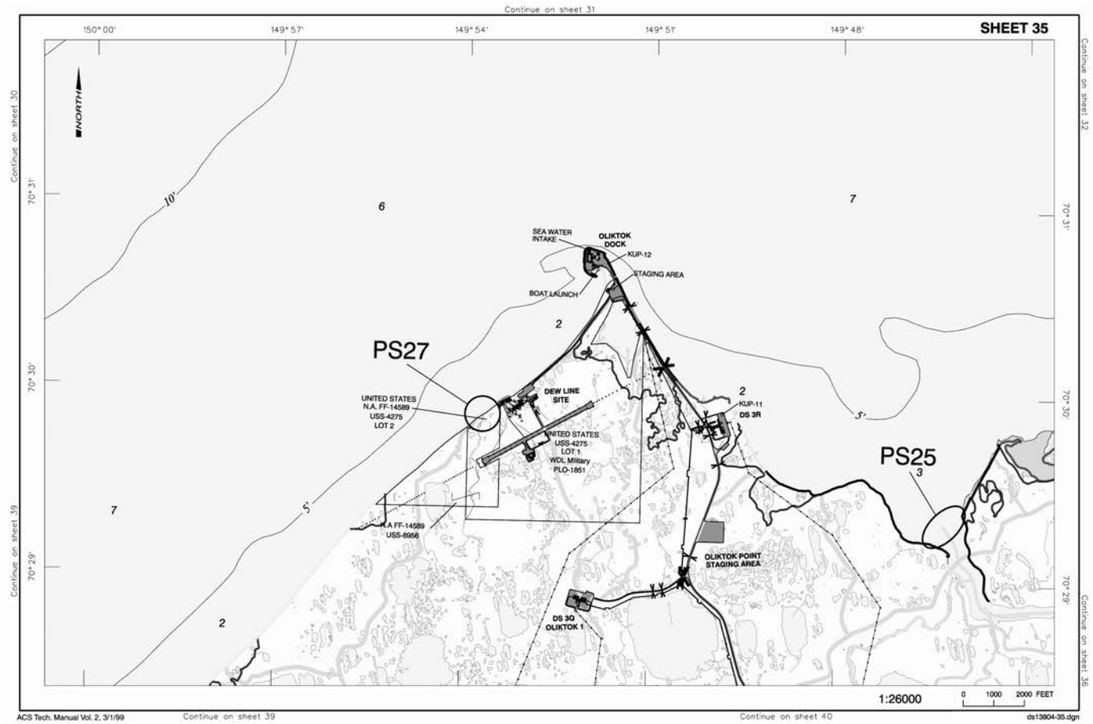
	WIDTH	LENGTH	HEIGHT	WEIGHT
Lab Module	9 ft 8 in.	13 ft	8 ft 7 in.	2,500 lbs
Utility Module	9 ft 8 in.	15 ft	8 ft 7 in.	3,800 lbs
Accessories Conex	8 ft	20 ft	8 ft	5,100 lbs

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.

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

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*.

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

*NOTE: 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.

- 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)
- 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

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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

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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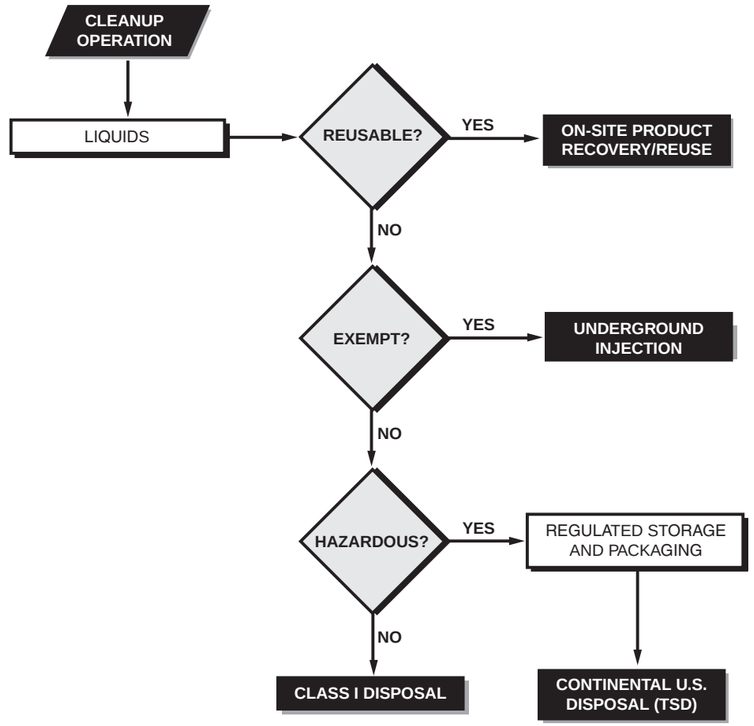


Liquids from cleanup operations include liquid oil; mixtures of oil, water, snow, ice, and/or gravel; used engine oils and hydraulic fluids; contaminated fuels; bilge/ballast waters; stormwater runoff from waste storage areas; and washwaters from decontamination operations.

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/CPAI 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 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:

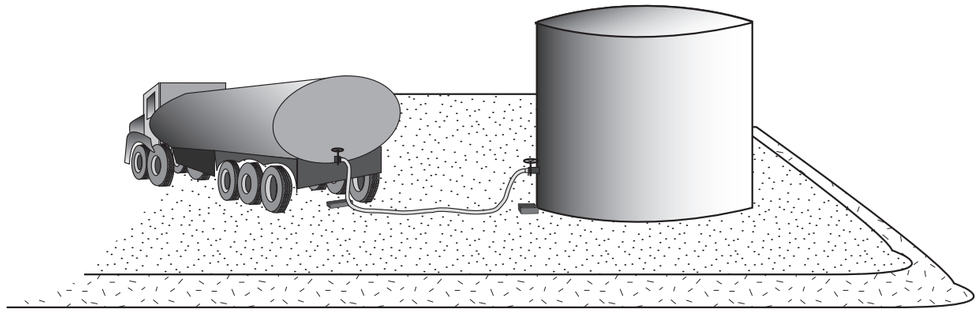
- **Crude oil** - returned to the production stream
- **Refined hydrocarbons (fuels, lubrication oil)** - returned to the production stream (note that policies on refined hydrocarbon recycling are not the same in all operating areas)
- **Water, seawater, other approved fluids** - injected underground for enhanced oil recovery (EOR)
- **Crude, diesel, methanol** - reserved for well work or other field operations.

FACILITIES FOR HYDROCARBON RECOVERY AND ENHANCED OIL RECOVERY[1]

LOCATION	FACILITY	OFFLOADING LOCATION (TRUCKS)
Kuparuk River Unit	CPF-1 hydrocarbon recycle facility	CPF-1
Kuparuk River Unit	CPF-1 water recycle facility	CPF-1
Greater Prudhoe Bay Area	FS 1, GC 2	Slop oil tank, Dirty water tank
Milne Point Unit	Production facility	ORT (Oil Reserve Tank)
Endicott	Production facility	Snowmelt tank
Badami	Badami Class I Well B1-01 (if recycling is not possible)	Badami Class I injection skid
	Production facility	Badami CPU
Alpine	Production facility	A1 sump
Northstar	Production facility	Designated sumps, Well cleanup tank
Alyeska PS-1	PS-1	PS-1 injection skids

[1]*Contact the facility/asset environmental staff for detailed information, or refer to the Alaska Waste Disposal and Reuse Guide.*

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.



WASTE FLUIDS

Wastes are subdivided into three major categories:

- RCRA-exempt (includes exemptions for oil and gas)
- 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[1]

LOCATION	FACILITY	OFFLOADING LOCATION (TRUCK)
Kuparuk River Unit	None – Use Pad 3 (Prudhoe) or evaluate for EOR	CPF 1 (EOR) or Pad 3
Greater Prudhoe Bay Area	Pad 3	Pad 3 injection skid
	G&I (Grind & Inject) Facility (DS-4)	DS-4 injection skid
Milne Point Unit	MPU Class I Well B-50	B-50 wellhead
Endicott	None – Evaluate for EOR or Pad 3 (Prudhoe)	Snowmelt tank (EOR) or Pad 3
Badami	Badami Class I Well B1-01 (Pad 3 as backup)	Badami G&I plant
Alpine	Alpine Class I Well WD-2 (Pad 3 as backup)	L2 injection hookup
Northstar	Northstar Class I Well NS-10, NS-32	Northstar G&I plant or designated sumps
Alyeska PS-1	None – Use Pad 3 (EOA) or evaluate for recycling at PS-1	

[1]Contact the facility/asset environmental staff for detailed information, or refer to the Alaska Waste Disposal and Reuse Guide.

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

CLASS II DISPOSAL FACILITIES (LIQUIDS)[1]

LOCATION	FACILITY	OFFLOADING LOCATION (TRUCK)
Kuparuk River Unit	CPF-1 oily waste disposal facility	CPF-1 oily waste injection skid
	Pad 3 (EOA)	
Greater Prudhoe Bay Area	G&I (Grind & Inject) Facility (DS-4)	DS-4 injection skid
	Flow Station 1	Injection skid
	Pad 3	Pad 3 injection skid
	GC 2	Dirty water tank
Milne Point Unit	MPU Class I Well B-50	B-50 wellhead
Endicott	Well P-18/2-02	2-02 injection skid
Badami	Badami Class 1 Well	Badami G&I plant
	Pad 3 (Prudhoe)	
Alpine	Alpine Well CD1-19A	Temporary hookup, as needed
Northstar	Northstar Class I Well NS-10, NS-32	Northstar G&I plant or designated sumps

[1]Contact the facility/asset environmental staff for detailed information, or refer to the Alaska Waste Disposal and Reuse Guide.

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	# STAFF PER SHIFTT	MOBE TIME	DEPLOY TIME
Divert Tank or Facility Slop Oil 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, 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	MOBILE / PAGER
Alpine	Environmental Coordinator	670-4423 / 4200	670-4930, x719
Kuparuk River Unit	Environmental Coordinator	659-7212 / 7242	659-7000, x669
Badami	Environmental Specialist	659-1331	
Endicott	Environmental Specialist	659-6541	659-6799, x313
Northstar	Environmental Specialist	670-3508	659-5100, x1487
Milne Point Unit	Environmental Advisor	670-3382	448-3471, x257
Greater Prudhoe Bay Area	Environmental Advisor (Central)	659-5893	
Greater Prudhoe Bay Area	Environmental Advisor (East)	659-5999	659-5100, x1746
Endicott, Northstar	Environmental Advisor (North)	659-6810	
Greater Prudhoe Bay Area	Environmental Advisor (West)	659-4789	659-4236, x966
Greater Prudhoe Bay Area	Waste Coordinators	659-4810	
Greater Prudhoe Bay Area	Waste Technicians	659-4705	
Alyeska PS-1	Field Environmental Coordinator	659-1085 / 787-4185	

CAPACITIES FOR PLANNING

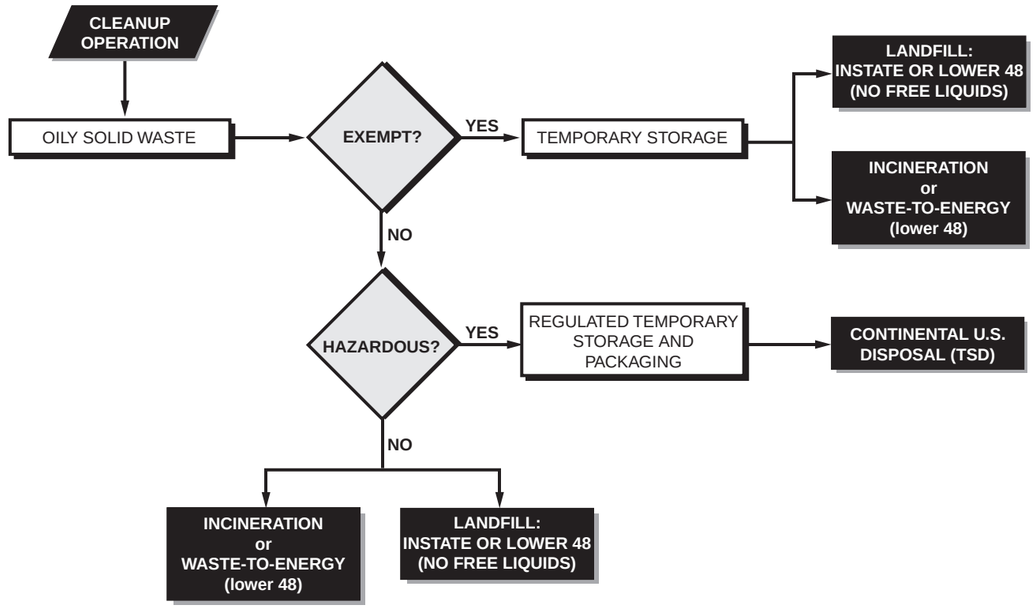
- Liquid processing capacity of recycling and disposal facilities is facility- and incident-specific, and the asset environmental staff should be contacted in the event of an incident.
- Vacuum trucks travel at 35 mph; their storage capacity is 300 bbl.

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, Area Injection Orders)
  - 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.
  - Ensure all necessary permits and approvals are in place for storage, transportation and disposal, and that any/all stipulations are understood by response personnel.
  - Do not dispose or recycle without accurate volume tracking (manifests) and regulatory agency approval.
  - 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.



CLASSIFICATION OF OILY SOLID WASTES

Oily solid wastes include oiled clothing and personal protective equipment, used sorbent material, discarded response equipment, and construction materials. 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.

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 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 reported to ADNR and NSB, and repaired.

Oily solids that cannot be managed (landfilled) on the North Slope are shipped to other approved landfill disposal facilities in Alaska or the continental United States. Continental U.S. disposal options include landfill, waste-to-energy or incineration.

Oily wastes are not to be burned by response personnel without appropriate agency approvals or permits. Open burning may be approved by ADEC and other agencies on a case-by-case basis by permit.

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 in the lower 48.

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	# STAFF PER 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 CONTACTS FOR WASTE MANAGEMENT

LOCATION	CONTACT	PHONE	MOBILE / PAGER
Alpine	Environmental Coordinator	670-4423 / 4200	670-4930, x719
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Greater Prudhoe Bay Area	Waste Technicians	659-4705	
Alyeska PS-1	Field Environmental Coordinator	659-1085 / 787-4185	

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.

CAPACITIES FOR PLANNING

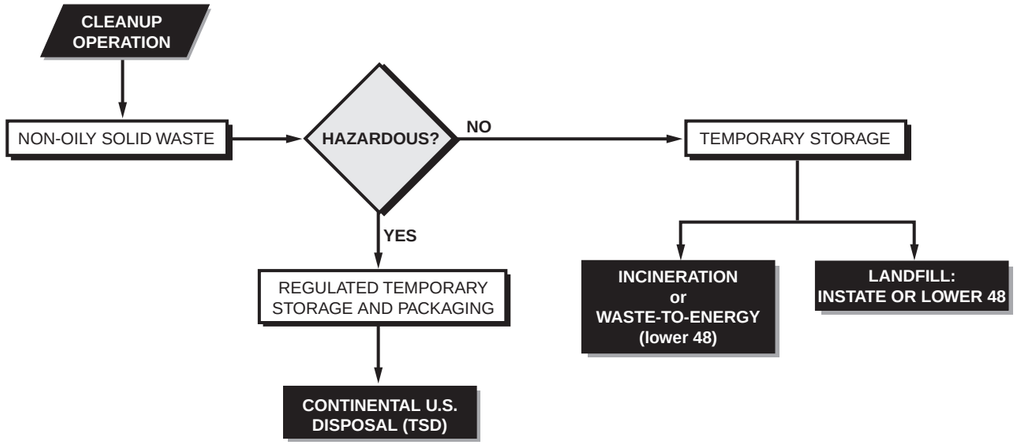
The average end dump on the North Slope can hold 20 cu. yd and travels at 35 mph.

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 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.



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.
- **Non-oily trash and food 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. 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. Disposal will be to permitted landfill in the North Slope, elsewhere in (no free liquids), or the lower 48.
- **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.

Wastes can be transferred to disposal facilities by truck or, as needed, Rolligons. Offshore operations require marine vessel support. The nearest solid waste disposal facility is the NSB Oxbow Landfill. However, due to the limited capacity of this facility and potential long-term liability issues, other disposal options will be considered on a case-by-case basis. These options may include municipal landfills elsewhere in Alaska, or approved disposal facilities (landfill, incinerator, waste-to-energy) 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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EQUIPMENT AND PERSONNEL

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER 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	GPB, MPU, KRU, Endicott, Deadhorse	Non-liquid hazardous material disposal	1	—	0.5 hr	0.5 hr
Dump Truck	GPB, 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 CONTACTS FOR WASTE MANAGEMENT

LOCATION	CONTACT	PHONE	MOBILE / PAGER
Alpine	Environmental Coordinator	670-4423 / 4200	670-4930, x719
Kuparuk River Unit	Environmental Coordinator	659-7212 / 7242	659-7000, x669
Badami	Environmental Specialist	659-1331	
Endicott	Environmental Specialist	659-6541	659-6799, x313
Northstar	Environmental Specialist	670-3508	659-5100, x1487
Milne Point Unit	Environmental Advisor	670-3382	448-3471, x257
Greater Prudhoe Bay Area	Environmental Advisor (Central)	659-5893	
Greater Prudhoe Bay Area	Environmental Advisor (East)	659-5999	659-5100, x1746
Endicott, Northstar	Environmental Advisor (North)	659-6810	
Greater Prudhoe Bay Area	Environmental Advisor (West)	659-4789	659-4236, x966
Greater Prudhoe Bay Area	Waste Coordinators	659-4810	
Greater Prudhoe Bay Area	Waste Technicians	659-4705	
Alyeska PS-1	Field Environmental Coordinator	659-1085 / 787-4185	

CAPACITIES FOR PLANNING

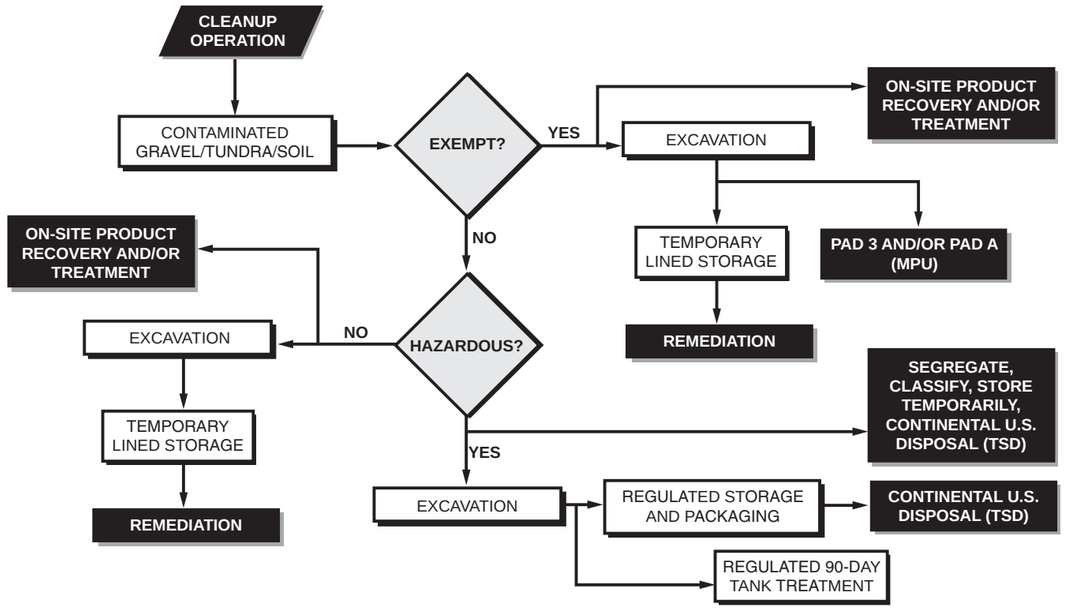
The average end dump on the North Slope holds 20 cubic yards and travels at 35 mph.

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 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.



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.

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).*

CONTAMINATED GRAVEL STORAGE AREAS

LOCATION	FACILITY	GRAVEL STORAGE CAPACITY (CU. YDS)
Kuparuk River Unit	DS 1-H	12,230
	CPF-1 (Class 2), lined pit	3,800
Greater Prudhoe Bay Area	Pad 3, West Pit	1,500 (lightly contaminated gravel)
	CC2-A, lined pit	2,280 yd^3 max.
	W Pad, lined pit	1,230 yd^3 max.
	Santa Fe Pad (bins)	3 each; total storage = 15
Milne Point Unit	D-Pad	Variable; temporary pits built as needed; contact MPU Environmental Technician
Endicott	MPI storage pits	356
	Storage bins (2 bins)	18 each; total storage = 36
Badami	Badami ball mill temporary storage pit	1,282
	Storage bins (6 bins)	18.5 each; total storage = 111. More storage can be constructed if needed.
Alpine	Lined storage area	2 each; total storage = 400
Northstar	Spot cleaning bins	6 each; total storage = 12
Alyeska PS-1	Temporary stockpiles	100,000

EQUIPMENT AND PERSONNEL

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER 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	GPB, KRU, Peak	Gravel removal	1	1	1 hr	0.5 hr
Dump Truck	GPB, 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 CONTACTS FOR WASTE MANAGEMENT

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Alpine	Environmental Coordinator	670-4423 / 4200	670-4930, x719
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Alyeska PS-1	Field Environmental Coordinator	659-1085 / 787-4185	

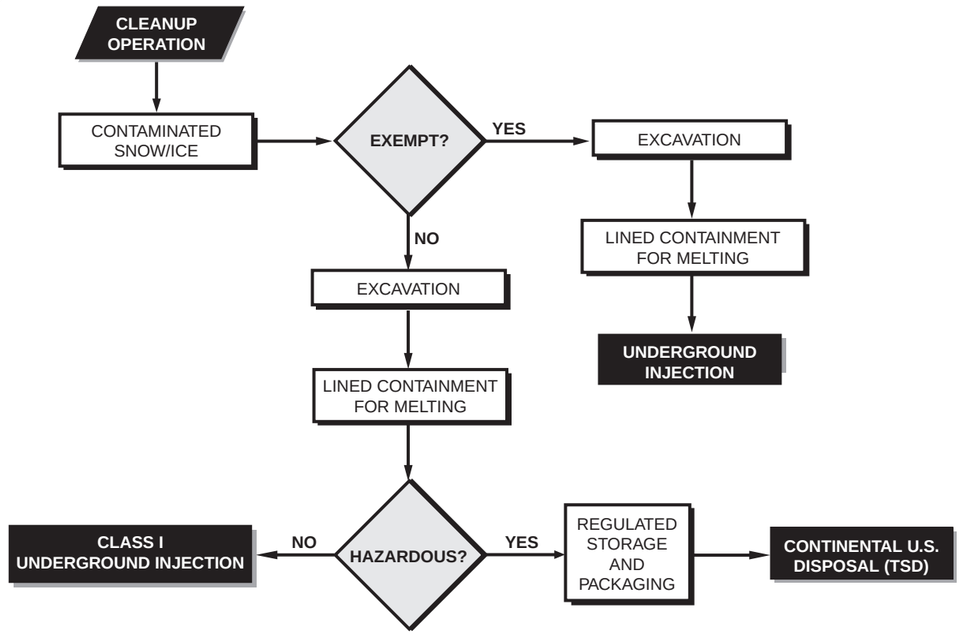
Contaminated gravel is moved at the response site by shovels, Bobcats, loaders and dozers. Front-end loaders and end dumps transport gravel to designated storage or treatment areas. Contaminated gravel at remote sites may be staged in lined areas until freeze-up, when tundra travel is permitted, then 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.

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 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.



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).

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	Approx. 30 acres
Put 23 Mine Site Staging Area	South Put River boat launch	8.1 miles	Approx. 200 acres
OSP Staging Area	North of FS 1	9.9 miles	Approx. 25 acres
DS-4, G&I Pits / Material Transfer Site (MTS) #1	G&I	14 miles	4,000 yd^3 (MTS #1)
Alpine	CD-1 and CD-2	—	Approx. 2 acres

SUPPORT

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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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Snow Melter	EOA	Snow melting	1	3	2 hr	2 hr

CAPACITIES FOR PLANNING

	TYPICAL LIQUID PROCESSING CAPACITY
Snow Melter	• 30 cu. yd/hr of lightly oiled snow and 30 bbl/hr of resulting liquids • 30 cu. yd/hr of heavily oiled snow and 70 bbl/hr of resulting oil

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TECHNICAL CONSIDERATIONS

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ENVIRONMENTAL CONSIDERATIONS

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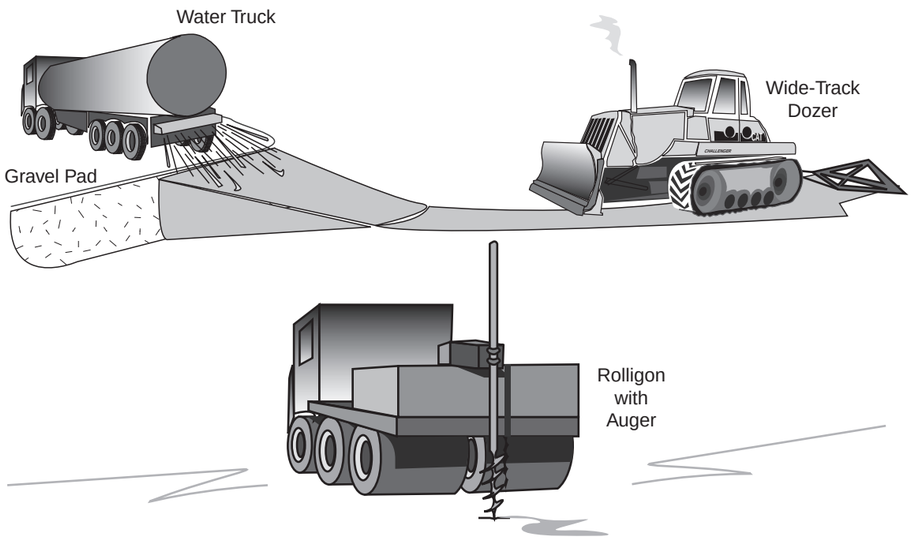

An ice road is built by spraying water from a water truck onto the surface of a lake, the tundra, or the sea. The water is allowed to freeze in place, while layers are continually added. Thickness of the ice road depends on equipment that will be traveling over it and on the terrain. The water truck 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 wide-track dozer pulling a drag, or a grader smoothing out the surface. All of these combine lifts of snow with the water.
- Flooding can also be accomplished with small portable pumps or pick-up mounted pumps.
- Rolligons may be used on sea ice for flooding purposes.

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EQUIPMENT AND PERSONNEL

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Water Truck	All	Ice road construction	≥2	≥2	2 hr	0.5 hr
Wide-Track Dozer with Drag	All	Ice road construction	1 (3 are available on the Slope)	1	1 hr	0.5 hr
or						
Rolligon with Auger	Peak, AIC	Ice road construction	6	6	6 hr	2 hr
Rotary Trimmer	KRU, GPB	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 Truck	KRU, GPB, Peak, AIC, Alpine	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**		

SUPPORT

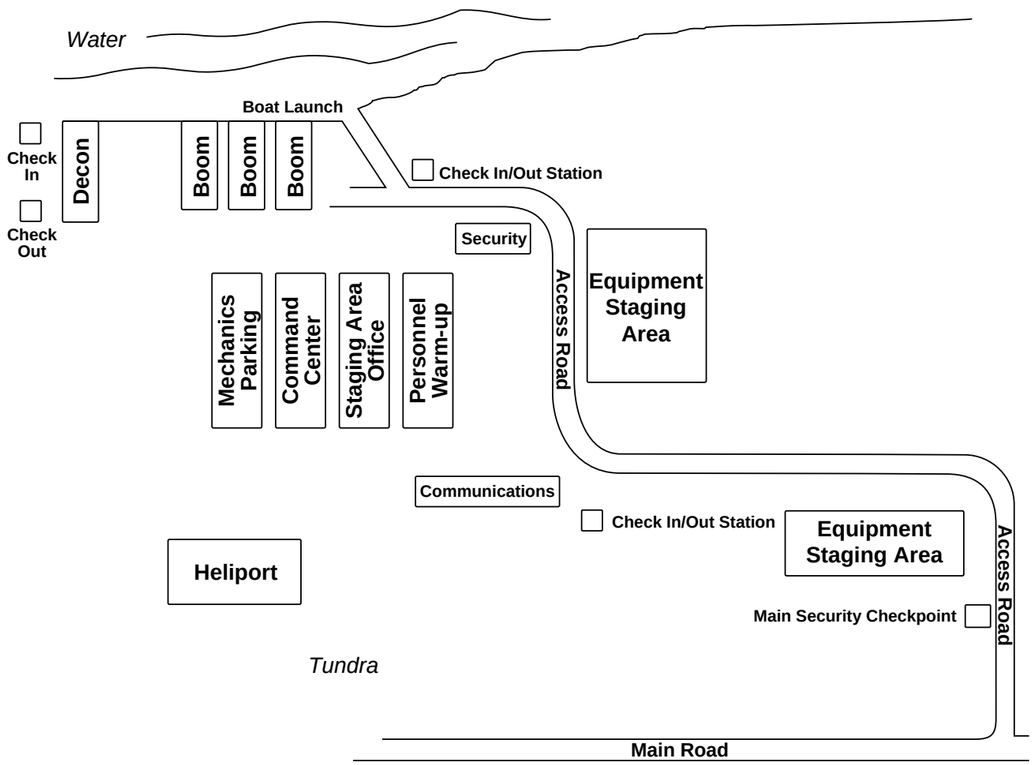
EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Semi and Trailer	GPB, KRU, Alpine	Transport Wide-Track Dozer	1	1 driver	1 hr	0
Hose	All	Spraying water	1	1	1 hr	0
Pump	All	Transferring water	≥1	1	1 hr	1 hr
Light Plant	All	Illumination	≥1	2 for initial setup, and 1 to check 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.

DEPLOYMENT CONSIDERATIONS AND LIMITATIONS

- When working with equipment around or near flowlines, add a spotter to each front-end loader and wide-track dozer.
- 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.



Example of a staging area

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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Staging Area Manager's Office	GPB, KRU	Office duties	1	4 for setup	1 hr	0.5 hr
SRT Command Center	ACS, GPB, KRU	Field command post	1	—	1 hr	0.5 hr
Generator	All	Power	2	—	1 hr	0.5 hr
Loader	All	Misc. support	2	2	1 hr	0.5 hr
Skid-Steer Loader	All	Staging area organization	1	1	1 hr	0.5 hr
Semi and Trailer	All	Transfer of equipment and supplies	1	1 driver	1 hr	0.5 hr
Pickup Truck	All	Expediting & misc. support	6	6	0.5 hr	0.5 hr
Envirovac	ACS, GPB	Restroom facility	1	—	1 hr	1 hr
Communications Center	ACS	Communications	1	2 for setup	1 hr	1 hr
Portable Shelter	All	Staging area shelter/working area	2	—	1 hr	1 hr
Port-a-Potty*	ACS, GPB, KRU	Restroom facility	2	—	1 hr	0.5 hr
Breakroom	ACS, GPB, KRU	Staff needs	1	—	1 hr	1 hr
Wet or Dry Decon Unit	ACS, GPB, KRU	Decontamination	1	See Tactic S-6	1 hr	1 hr
Mechanic Support	All	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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Heliport	GPB, KRU,	Helicopter support	1	2 for setup	1 hr	1 hr
Light Plant	All	Illumination	≥1	2 for inital 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
Portable Heater	All	Heat	>1	1 for intial setup	1 hr	0.5 hr
Freighter Air Boat	ACS	Equipment and personnel transport	2	8	1 hr	0

- Additional personnel may be required: Beach Master, Heliport Manager, and Check In / Check Out Coordinator.
- Mobimat material may be used on mud flats to create a work platform.

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 ConocoPhillips, BPXA, their contractors and/or others for use of the gravel pad space.
- For remote areas more than 1 mile off the road/pad system, rolligons may be utilized for transport and as work platforms.
- 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.

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

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 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	Point Hope	Point Lay	Pt. Thomson	Seattle	Umiat	Valdez	Wainwright
Anchorage		4.3	4.8	4.3	4.5	4.3	1.9	0.5	4.3	4.4	4.6	4.6	4.4	9.7	3.8	0.8	4.7
Badami	4.3		1.6	0.6	0.0	0.2	2.4	5.0	0.4	0.6	3.4	2.6	0.1	14.0	0.9	4.2	2.1
Barrow	4.8	1.6		2.1	1.6	1.3	3.5	5.1	1.3	1.1	2.1	1.2	1.7	14.5	1.1	5.3	0.6
Barter Island	4.3	0.6	2.1		0.6	0.8	2.7	5.6	1.0	1.2	3.9	3.1	0.3	14.0	1.4	4.3	2.6
Bullen Point	4.5	0.0	1.6	0.6		0.2	2.4	5.0	0.4	0.7	3.4	2.6	0.1	14.2	0.9	4.6	2.1
Deadhorse/Prudhoe Bay	4.3	0.2	1.3	0.8	0.2		2.7	4.8	0.2	0.4	3.1	2.3	0.3	14.0	0.7	4.3	1.8
Fairbanks	1.9	2.4	3.5	2.7	2.4	2.7		2.4	2.8	2.8	3.8	3.5	2.4	9.9	2.2	1.6	3.4
Kenai	0.5	5.0	5.1	5.6	5.0	4.8	2.4		5.0	5.2	4.7	4.8	5.0	9.6	4.1	1.2	4.9
Kuparuk	4.3	0.4	1.3	1.0	0.4	0.2	2.8	5.0		0.2	3.0	2.2	0.5	14.1	0.6	4.5	1.6
Nuiqsut/Alpine	4.4	0.6	1.1	1.2	0.7	0.4	2.8	5.2	0.2		2.8	1.9	0.6	14.4	0.5	4.5	1.4
Point Hope	4.6	3.4	2.1	3.9	3.4	3.1	3.8	4.7	3.0	2.8		0.9	3.5	14.0	2.5	5.2	1.5
Point Lay	4.6	2.6	1.2	3.1	2.6	2.3	3.5	4.8	2.2	1.9	0.9		2.7	13.7	1.8	5.1	0.6
Pt. Thomson	4.4	0.1	1.7	0.3	0.1	0.3	2.4	5.0	0.5	0.6	3.5	2.7		14.0	1.0	4.2	2.2
Seattle	9.7	14.0	14.5	14.0	14.2	14.0	9.9	9.6	14.1	14.4	14.0	13.7	14.0		12.1	8.9	13.5
Umiat	3.8	0.9	1.1	1.4	0.9	0.7	2.2	4.1	0.6	0.5	2.5	1.8	1.0	12.1		4.0	1.4
Valdez	0.8	4.2	5.3	4.3	4.6	4.3	1.6	1.2	4.5	4.5	5.2	5.1	4.2	8.9	4.0		5.1
Wainwright	4.7	2.1	0.6	2.6	2.1	1.8	3.4	4.9	1.6	1.4	1.5	0.6	2.2	13.5	1.4	5.1	

Transit time may be greater during winter whiteouts, break-up, foggy conditions, or other adverse weather.

Dimensions of Major North Slope Airstrips:

- Alpine 5,000 ft x 100 ft
- Badami 5,100 ft x 85 ft
- Barrow 6,500 ft x 150 ft
- Barter Island 4,800 ft x 100 ft
- Bullen Point 3,500 ft x 70 ft
- CD-3 (Alpine) 3,000 ft x 75 ft
- Deadhorse 6,500 ft x 150 ft
- Kuparuk 6,000 ft x 130 ft
- Nuiqsut 4,343 ft x 90 ft
- Point Hope 4,000 ft x 75 ft
- Point Lay 3,519 ft x 80 ft
- Point Thomson 5,000 ft x 150 ft
- Umiat 5,400 ft x 75 ft
- Wainwright 4,494 ft x 90 ft

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

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	Point Hope	Point Lay	Pt. Thomson	Seattle	Umiat	Valdez	Wainwright
Anchorage		2.2	2.4	2.1	2.3	2.1	0.9	0.3	2.2	2.2	2.3	2.3	2.2	4.8	1.9	0.4	2.4
Badami	2.2		0.8	0.3	0.0	0.1	1.2	2.5	0.2	0.3	1.7	1.3	0.1	7.0	0.5	2.1	1.0
Barrow	2.4	0.8		1.1	0.8	0.7	1.7	2.5	0.7	0.5	1.1	0.6	0.8	7.2	0.6	2.7	0.3
Barter Island	2.1	0.3	1.1		0.3	0.4	1.3	2.8	0.5	0.6	2.0	1.6	0.2	7.0	0.7	2.1	1.3
Bullen Point	2.3	0.0	0.8	0.3		0.1	1.2	2.5	0.2	0.3	1.7	1.3	0.1	7.1	0.5	2.3	1.0
Deadhorse/Prudhoe Bay	2.1	0.1	0.7	0.4	0.1		1.3	2.4	0.1	0.2	1.6	1.2	0.2	7.0	0.4	2.2	0.9
Fairbanks	0.9	1.2	1.7	1.3	1.2	1.3		1.2	1.4	1.4	1.9	1.8	1.2	4.9	1.1	0.8	1.7
Kenai	0.3	2.5	2.5	2.8	2.5	2.4	1.2		2.5	2.6	2.4	2.4	2.5	4.8	2.0	0.6	2.5
Kuparuk	2.2	0.2	0.7	0.5	0.2	0.1	1.4	2.5		0.1	1.5	1.1	0.3	7.0	0.3	2.3	0.8
Nuiqsut/Alpine	2.2	0.3	0.5	0.6	0.3	0.2	1.4	2.6	0.1		1.4	1.0	0.4	7.2	0.2	2.3	0.7
Point Hope	2.3	1.7	1.1	2.0	1.7	1.6	1.9	2.4	1.5	1.4		0.5	1.8	7.0	1.3	2.6	0.8
Point Lay	2.3	1.3	0.6	1.6	1.3	1.2	1.8	2.4	1.1	1.0	0.5		1.4	6.9	0.9	2.5	0.3
Pt. Thomson	2.2	0.1	0.8	0.2	0.1	0.2	1.2	2.5	0.3	0.4	1.8	1.4		7.0	0.5	2.1	1.1
Seattle	4.8	7.0	7.2	7.0	7.1	7.0	4.9	4.8	7.0	7.2	7.0	6.9	7.0		6.1	4.4	6.7
Umiat	1.9	0.5	0.6	0.7	0.5	0.4	1.1	2.0	0.3	0.2	1.3	0.9	0.5	6.1		2.0	0.7
Valdez	0.4	2.1	2.7	2.1	2.3	2.2	0.8	0.6	2.3	2.3	2.6	2.5	2.1	4.4	2.0		2.5
Wainwright	2.4	1.0	0.3	1.3	1.0	0.9	1.7	2.5	0.8	0.7	0.8	0.3	1.1	6.7	0.7	2.5	

Transit time may be greater during winter whiteouts, break-up, foggy conditions, or other adverse weather.

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

TABLE 3
TRAVEL TIME FOR HELICOPTERS
AT PLANNING SPEED OF 100 MPH (HOURS)

	Anchorage	Badami	Barrow	Barter Island	Bullen Point	Deadhorse	Endicott Main 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	Oooguruk Production Island	Point Hope	Point Lay	Pt. Thomson (Pad)	Pump Station #4	Umiat	Wainwright	West Dock
Anchorage		6.6	7.2	6.4	6.8	6.4	6.5	2.8	0.8	6.5	6.5	6.6	6.6	6.6	6.6	6.8	6.5	7.0	6.7	6.9	5.0	5.7	7.1	6.5
Badami	6.6		2.4	0.9	0.1	0.3	0.2	3.6	7.5	0.6	0.5	0.1	0.6	0.4	1.0	0.6	0.8	5.1	3.4	0.3	1.4	1.4	3.1	0.3
Barrow	7.2	2.4		3.2	0.9	2.0	2.1	5.2	7.6	2.0	2.1	2.2	1.8	2.0	1.6	1.7	1.6	3.2	1.8	2.7	2.5	1.7	0.9	2.0
Barter Island	6.4	0.9	3.2		0.9	1.2	1.1	4.0	8.4	1.5	1.4	1.0	1.4	1.3	1.9	1.5	1.6	5.9	4.7	0.6	1.9	2.2	3.9	1.2
Bullen Point	6.8	0.1	0.9	0.9		0.4	0.3	3.7	7.6	0.7	0.5	0.2	0.6	0.4	1.0	0.7	0.8	5.1	3.9	0.2	1.5	1.4	3.1	0.4
Deadhorse	6.4	0.3	2.0	1.2	0.4		0.1	4.0	7.2	0.3	0.2	0.2	0.2	0.2	0.7	0.4	0.5	4.7	3.5	0.6	1.4	1.1	2.7	0.1
Endicott Main Production Island	6.5	0.2	2.1	1.1	0.3	0.1		4.1	7.3	0.4	0.2	0.1	0.3	0.2	0.7	0.4	0.5	4.8	3.6	0.4	1.5	1.2	2.8	0.1
Fairbanks	2.8	3.6	5.2	4.0	3.7	4.0	4.1		3.6	4.3	4.2	4.2	4.3	4.2	4.3	4.4	4.0	5.7	5.3	3.9	2.6	3.4	5.1	4.1
Kenai	0.8	7.5	7.6	8.4	7.6	7.2	7.3	3.6		7.5	7.4	7.4	7.6	7.4	7.9	7.5	6.9	7.1	7.2	7.8	5.8	6.1	7.4	7.3
Kuparuk Central Production Facilities #1	6.5	0.6	2.0	1.5	0.7	0.3	0.4	4.3	7.5		0.2	0.5	0.1	0.2	0.4	0.1	0.2	4.4	3.2	0.9	1.5	0.9	2.4	0.3
Kuparuk River Staging Area West	6.5	0.5	2.1	1.4	0.5	0.2	0.2	4.2	7.4	0.2		0.4	0.1	0.1	0.5	0.2	0.3	4.6	3.4	0.8	1.4	1.0	2.6	0.1
Liberty Production Island	6.6	0.1	2.2	1.0	0.2	0.2	0.1	4.2	7.4	0.5	0.4		0.4	0.3	0.8	0.5	0.6	4.9	3.7	0.3	1.6	1.2	2.9	0.2
Milne Point Central Faclities Pad	6.6	0.6	1.8	1.4	0.6	0.2	0.3	4.3	7.6	0.1	0.1	0.4		0.2	0.4	0.1	0.2	4.5	3.2	0.9	1.5	1.0	2.4	0.2
Northstar Production Island	6.6	0.4	2.0	1.3	0.4	0.2	0.2	4.2	7.4	0.2	0.1	0.3	0.2		0.5	0.3	0.4	4.6	3.4	0.7	1.6	1.1	2.6	0.1
Nuiqsut/Alpine	6.6	1.0	1.6	1.9	1.0	0.7	0.7	4.3	7.9	0.4	0.5	0.8	0.4	0.5		0.3	0.3	4.1	2.9	1.3	1.6	0.4	2.1	0.6
Oliktok Point	6.8	0.6	1.7	1.5	0.7	0.4	0.4	4.4	7.5	0.1	0.2	0.5	0.1	0.3	0.3		0.1	4.4	3.2	0.9	1.6	1.0	2.4	0.3
Oooguruk Production Island	6.5	0.8	1.6	1.6	0.8	0.5	0.5	4.0	6.9	0.2	0.3	0.6	0.2	0.4	0.3	0.1		4.3	3.1	0.8	1.5	0.9	2.9	0.4
Point Hope	7.0	5.1	3.2	5.9	5.1	4.7	4.8	5.7	7.1	4.4	4.6	4.9	4.5	4.6	4.1	4.4	4.3		1.4	5.3	4.4	3.8	2.3	4.7
Point Lay	6.7	3.4	1.8	4.7	3.9	3.5	3.6	5.3	7.2	3.2	3.4	3.7	3.2	3.4	2.9	3.2	3.1	1.4		4.1	3.5	2.7	0.9	3.4
Pt. Thomson (Pad)	6.9	0.3	2.7	0.6	0.2	0.6	0.4	3.9	7.8	0.9	0.8	0.3	0.9	0.7	1.3	0.9	0.8	5.3	4.1		1.7	1.5	3.3	0.6
Pump Station #4	5.0	1.4	2.5	1.9	1.5	1.4	1.5	2.6	5.8	1.5	1.4	1.6	1.5	1.6	1.6	1.6	1.5	4.4	3.5	1.7		1.0	3.0	1.5
Umiat	5.7	1.4	1.7	2.2	1.4	1.1	1.2	3.4	6.1	0.9	1.0	1.2	1.0	1.1	0.4	1.0	0.9	3.8	2.7	1.5	1.0		2.1	1.1
Wainwright	7.1	3.1	0.9	3.9	3.1	2.7	2.8	5.1	7.4	2.4	2.6	2.9	2.4	2.6	2.1	2.4	2.9	2.3	0.9	3.3	3.0	2.1		2.7
West Dock	6.5	0.3	2.0	1.2	0.4	0.1	0.1	4.1	7.3	0.3	0.1	0.2	0.2	0.1	0.6	0.3	0.4	4.7	3.4	0.6	1.5	1.1	2.7	

Transit time may be greater during winter whiteouts, break-up, foggy conditions, or other adverse weather.

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

TABLE 4
TRAVEL TIME FOR VESSELS AT PLANNING SPEED OF 5 KNOTS (HOURS)

	CAN/US Border North	Point Thomson	Badami	Kadleroshilik River Delta	Endicott SDI	Endcott Main Production Island	BP Sagavanirktok River Launch	East Dock	Deadhorse River Access	Putuligayuk River Launch West	West Dock Launch 2	West Dock (STP)	Northstar Production Island	Kuparuk River Delta	Kuparuk River Launch	Central Creek Mouth	ENI (Spy Isl North)	Oliktok Point	Oooguruk Production Island	Colville River Delta	Cape Simpson	Barrow	Wainwright	Point Lay	Point Hope
CAN/US Border North		23.8	28.1	31.0	32.7	33.4	35.0	35.1	36.3	35.7	35.7	36.3	37.5	37.8	39.2	40.4	42.1	42.2	43.9	44.1	53.4	74.6	90.7	108.0	134.1
Point Thomson	23.8		4.3	7.2	7.7	8.4	11.3	11.3	12.5	10.7	10.7	11.3	12.5	12.8	14.2	15.4	17.1	17.2	18.8	19.1	28.3	49.5	65.6	82.9	109.0
Badami	28.1	4.3		2.9	4.7	5.3	7.0	7.1	8.3	6.5	7.6	7.8	9.0	10.5	11.9	13.1	13.6	13.7	15.3	15.6	24.8	46.0	62.0	79.4	105.5
Kadleroshilik River Delta	31.0	7.2	2.9		1.7	2.4	4.0	2.4	5.3	3.5	4.7	4.9	6.1	7.8	8.9	7.2	6.5	6.9	8.7	8.9	20.3	41.5	57.6	74.9	101.0
Endicott SDI	32.7	7.7	4.7	1.7		0.7	2.3	2.4	3.6	3.0	3.0	3.1	4.4	4.6	5.4	6.5	8.2	8.9	10.4	10.7	18.6	39.8	55.9	73.2	99.3
Endcott Main Production Island	33.4	8.4	5.3	2.4	0.7		1.7	1.7	2.9	2.3	2.3	2.5	3.7	4.1	5.4	6.5	8.2	8.1	9.7	10.3	17.9	39.1	55.2	72.5	98.6
BP Sagavanirktok River Launch	35.0	11.3	7.0	4.0	2.3	1.7		2.6	3.8	3.3	2.9	3.0	4.1	4.4	5.8	6.9	8.9	8.7	9.0	9.6	18.6	39.7	55.8	73.1	99.3
East Dock	35.1	11.3	7.1	5.3	2.4	2.9	2.6		3.8	4.5	4.1	1.1	1.2	2.6	4.3	5.8	7.3	7.2	8.9	9.5	19.0	40.2	56.3	73.6	99.7
Deadhorse River Access	36.3	12.5	8.3	5.3	3.6	2.9	3.8	3.8		4.5	4.1	3.0	1.7	2.9	4.4	5.8	7.6	8.7	10.3	10.9	19.8	41.0	57.1	74.4	100.5
Putuligayuk River Launch West	35.7	10.7	6.5	3.5	3.0	2.3	2.9	3.3	4.5		1.1	1.7	3.0	3.2	4.6	5.9	7.4	7.9	9.3	9.9	17.4	38.5	54.6	71.9	98.1
West Dock Launch 2	35.7	10.7	7.6	4.7	3.0	2.3	2.9	4.1	4.1	1.1		0.6	1.8	2.1	3.5	4.7	6.4	6.5	8.2	8.8	16.2	37.4	53.5	70.8	97.0
West Dock (STP)	36.3	11.3	7.8	4.9	3.1	2.5	3.7	3.7	4.2	1.7	0.6		1.8	2.1	3.5	4.7	6.4	6.5	8.2	8.8	15.6	37.4	53.5	70.8	96.4
Northstar Production Island	37.5	12.5	9.0	6.1	4.4	3.7	4.1	2.6	4.2	2.9	1.8	1.8		1.5	2.7	3.8	5.4	5.5	7.1	7.7	14.5	36.8	52.9	70.2	95.3
Kuparuk River Delta	37.8	12.8	10.5	6.3	4.6	3.9	4.5	2.9	4.5	3.2	2.1	1.5	1.5		1.2	2.5	4.0	4.1	5.6	6.2	13.2	35.3	51.4	68.7	94.9
Kuparuk River Launch	39.2	14.2	11.9	7.8	6.1	5.4	6.0	4.4	5.9	4.6	3.5	2.9	2.5	1.4		1.3	2.8	2.9	4.4	5.0	12.0	34.1	50.2	67.5	93.7
Central Creek Mouth	40.4	15.4	13.1	8.9	7.2	6.5	6.9	5.8	7.1	5.8	4.7	4.3	3.3	2.6	1.3		1.5	1.6	3.1	3.7	10.7	32.8	48.9	66.2	92.4
ENI (Spy Isl North)	42.1	17.1	13.6	10.7	8.9	8.2	8.7	7.3	8.7	7.5	6.4	5.8	4.8	4.4	5.8	2.0		0.6	1.8	2.4	9.8	31.0	47.1	64.4	90.6
Oliktok Point	42.2	17.2	13.7	10.7	8.8	8.1	9.7	7.2	8.7	7.6	6.5	5.9	4.8	4.3	5.8	2.0	0.6		1.6	2.2	10.2	31.4	47.4	64.8	90.9
Oooguruk Production Island	43.9	18.8	15.3	12.1	10.4	9.7	9.0	8.9	10.3	9.3	9.9	8.5	6.4	5.9	7.4	3.6	1.6	1.6		0.8	8.5	29.6	45.7	63.0	89.2
Colville River Delta	44.1	19.1	15.6	12.7	10.9	10.3	9.6	9.5	10.9	9.9	8.8	8.1	6.9	6.5	7.9	4.2	2.2	2.4	0.8		9.1	30.3	48.8	66.1	92.2
Cape Simpson	53.4	28.3	24.8	20.3	18.6	17.9	18.6	19.0	19.8	16.2	15.6	15.6	14.5	13.2	13.1	9.8	10.2	10.2	8.5	9.1		21.2	37.3	54.6	80.7
Barrow	74.6	49.5	46.0	41.5	39.8	39.1	39.7	40.2	41.0	38.5	37.4	36.8	35.7	36.7	38.1	39.2	39.7	40.4	41.0	40.2	30.3		16.1	33.4	59.5
Wainwright	90.7	65.6	62.0	57.6	55.9	55.2	55.8	56.3	57.1	54.6	53.5	53.5	52.7	52.7	54.2	50.4	47.4	47.4	45.7	48.8	66.1	54.6		17.3	43.4
Point Lay	108.0	82.9	79.4	74.9	73.2	72.5	73.1	73.6	74.4	71.9	70.8	70.8	69.1	70.0	71.5	67.7	64.4	64.8	63.0	66.1	54.6	33.4	17.3		26.1
Point Hope	134.1	109.0	105.5	101.0	99.3	98.6	99.3	99.7	100.5	98.1	97.0	96.4	95.3	96.2	97.6	93.8	90.6	90.9	89.2	92.2	80.7	59.5	43.4	26.1	

Transit time may be greater during winter whiteouts, break-up, foggy conditions, or other adverse weather.

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

TABLE 5
TRAVEL TIME FOR VEHICLES
AT PLANNING SPEED OF 35 MPH (HOURS)

	Alpine[1]	Anchorage	Badami[1]	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	Nikiski	Northstar Production Island[1]	Oliktok Pt.	Oooguruk Production Island[1]	PBOC	Point Thomson (Pad)[1]	Pump Station #1	Valdez	West Dock
Alpine[1]		25.8	2.8	2.2	1.6	1.9	2.5	15.6	2.1	1.0	0.8	1.4	1.4	30.1	2.0	1.3	1.4	1.9	3.2	1.7	26.0	1.8
Anchorage	25.8		25.0	24.4	24.2	23.9	24.5	10.2	24.2	24.8	25.0	24.4	25.0	4.3	24.6	25.3	25.4	24.0	25.5	24.1	8.7	24.4
Badami[1]	2.8	25.0		0.6	1.2	1.0	0.8	14.7	1.0	1.9	2.0	1.4	2.0	29.2	1.4	2.3	2.4	0.9	0.5	1.1	25.1	1.2
Badami Pipeline tie-in at Endicott Causeway	2.2	24.4	0.6		0.6	0.4	0.2	14.1	0.4	1.3	1.4	0.8	1.4	28.6	0.8	1.7	1.8	0.3	1.1	0.5	24.5	0.6
BPX Base Operations Camp	1.6	24.2	1.2	0.6		0.3	0.9	14.0	0.5	0.6	0.8	0.2	0.8	28.5	0.5	1.1	1.2	0.3	1.7	0.1	24.4	0.3
Deadhorse	1.9	23.9	1.0	0.4	0.3		0.6	13.7	0.3	0.9	1.1	0.5	1.0	28.2	0.6	1.3	1.4	0.1	1.5	0.1	24.1	0.4
Endicott Main Production Island	2.5	24.5	0.8	0.2	0.9	0.6		14.3	0.7	1.5	1.7	1.1	1.6	28.8	1.2	1.9	2.0	0.5	1.3	0.7	24.7	1.0
Fairbanks	15.6	10.2	14.7	14.1	14.0	13.7	14.3		14.0	14.6	14.8	14.2	14.7	14.5	14.3	15.1	15.2	13.8	15.2	13.9	10.4	14.1
Heald Pt.	2.1	24.2	1.0	0.4	0.5	0.3	0.7	14.0		1.2	1.3	0.7	1.3	28.5	0.7	1.6	1.7	0.2	1.5	0.4	24.4	0.5
Kuparuk Central Production Facilities #1	1.0	24.8	1.9	1.3	0.6	0.9	1.5	14.6	1.2		0.2	0.4	0.4	29.1	1.0	0.5	0.6	1.0	2.4	0.7	25.0	0.8
Kuparuk Central Production Facilities #2	0.8	25.0	2.0	1.4	0.8	1.1	1.7	14.8	1.3	0.2		0.6	0.6	29.3	1.2	0.5	0.6	1.1	2.5	0.9	25.2	1.0
Kuparuk River Staging Area	1.4	24.4	1.4	0.8	0.2	0.5	1.1	14.2	0.7	0.4	0.6		0.6	28.7	0.6	0.9	1.0	0.5	1.9	0.3	24.6	0.4
Milne Point Central Production Facility	1.4	25.0	2.0	1.4	0.8	1.0	1.6	14.7	1.3	0.4	0.6	0.6		29.3	1.1	0.9	1.0	1.1	2.5	0.9	25.1	0.9
Nikiski	30.1	4.3	29.2	28.6	28.5	28.2	28.8	14.5	28.5	29.1	29.3	28.7	29.3		28.9	29.6	29.7	28.3	29.7	28.4	13.0	28.7
Northstar Production Island[1]	2.0	24.6	1.4	0.8	0.5	0.6	1.2	14.3	0.7	1.0	1.2	0.6	1.1	28.9		1.5	1.6	0.5	1.9	0.5	24.7	0.2
Oliktok Pt.	1.3	25.3	2.3	1.7	1.1	1.3	1.9	15.1	1.6	0.5	0.5	0.9	0.9	29.6	1.5		0.5	1.4	2.8	1.2	25.5	1.3
Oooguruk Production Island[1]	1.4	25.4	2.4	1.8	1.2	1.4	2.0	15.2	1.7	0.6	0.6	1.0	1.0	29.7	1.6	0.5		1.5	2.9	1.3	25.6	1.4
PBOC	1.9	24.0	0.9	0.3	0.3	0.1	0.5	13.8	0.2	1.0	1.1	0.5	1.1	28.3	0.5	1.4	1.5		1.4	0.2	24.2	0.3
Point Thomson (Pad)[1]	3.2	25.5	0.5	1.1	1.7	1.5	1.3	15.2	1.5	2.4	2.5	1.9	2.5	29.7	1.9	2.8	2.9	1.4		1.6	25.6	1.7
Pump Station #1	1.7	24.1	1.1	0.5	0.1	0.1	0.7	13.9	0.4	0.7	0.9	0.3	0.9	28.4	0.5	1.2	1.3	0.2	1.6		24.3	0.3
Valdez	26.0	8.7	25.1	24.5	24.4	24.1	24.7	10.4	24.4	25.0	25.2	24.6	25.1	13.0	24.7	25.5	25.6	24.2	25.6	24.3		24.5
West Dock	1.8	24.4	1.2	0.6	0.3	0.4	1.0	14.1	0.5	0.8	1.0	0.4	0.9	28.7	0.2	1.3	1.4	0.3	1.7	0.3	24.5	

Transit time may be greater during winter whiteouts, break-up, foggy conditions, or other adverse weather.
[1]Accessible by vehicle only in winter months via ice road. Expect travel times listed to vary due to ice road conditions and speed limits.

Dalton Highway legal weight limits:

- 2 axle 38,000 lb
- 3 axle 42,000 lb
- 4 axle 50,000 lb

Endicott Causeway legal weight limit: 80 tons gross, 40 tons per axle

West Dock Causeway legal weight limit: 130 tons gross

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IDENTIFICATION OF AIRCRAFT, VESSELS, AND OTHER MEANS TO TRANSPORT EQUIPMENT AND PERSONNEL

This is a suggested list of resources. Inventory and availability vary.

AIRCRAFT

TYPE	QUAN-TITY	OWNERSHIP	PAYLOAD W/O PASSENGERS (LBS)	RANGE (MILES)	PASSEN-GERS	SPEED (MPH)	RUNWAY NEEDS	STATION LOCATION	OBLIGATION
S-64 E/F Aircrane	18	Erikson Air-Crane Inc.	Sling 18,000 to 21,000	6 with sling load	0	115-125	None	Central Point, OR	ACS MSA
Bell 206B	2	Air Logistics	Sling 350	245	4	115	None	Various AK locations	ACS MSA
Bell 206L	6	Air Logistics	Sling 500	280	6	120	None	Various AK locations; one at PS4 (long-term contract to Alyeska)	ACS MSA and Mutual Aid Agreement
Bell 407	2	Air Logistics	Sling 1500	308	6	155	None	Various AK locations	ACS MSA
BO105CBS BOELKOW	2	Air Logistics	Sling 1000	260	5	125	None	Various AK locations	ACS MSA
Bell 212	1	Air Logistics	Sling 2000	390	13	115	None	Various AK locations	ACS MSA
Twin Otter	1	Conoco-Phillips	3000 on short VFR flights	560	15	155	2000 ft paved or gravel with heavy load	North Slope	Mutual Aid Agreement
Casa 212	1	Yute Air	5000 on short VFR flights	1000	18	175	3000 ft paved or gravel with heavy load	North Slope	Mutual Aid Agreement and CPAI contract
L-382 Hercules (C-130)	2	Lynden Air Cargo	48,000	3000	N/A	400	5000 ft paved or gravel with heavy load	Anchorage	Alyeska contract (4-hr standby)
B-737	3	BP/CPAI Shared Services	12,000 in cargo area (limited space available)	2400	111	440	6000 ft paved; two aircraft fitted for gravel	Anchorage to conduct regular crew changes to/from the North Slope	Mutual Aid Agreement
DC6	5	Northern Air Cargo	28,000	2700	0	220	4000 ft paved or gravel	Various AK locations	ACS MSA
B-727	2	Northern Air Cargo	41,000	1800	0	450	5000 ft paved or gravel	Various AK locations	ACS MSA
ATR-42	1	Northern Air Cargo	12,000	1800	0	270	3500 ft paved or gravel	Various AK locations	ACS MSA
Bell 214ST	1	Evergreen	Sling 8000	400	17	150	None	Various AK locations	ACS MSA
Sikorsky S61R	1	Evergreen	Sling 6000	250	0	110	None	Various AK locations	ACS MSA
Bell 212 with pop-out floats	4	Evergreen	Sling 2500	250	9	105	None	Various AK locations	ACS MSA
Bell 205A1	1	Evergreen	Sling 3500	250	9	105	None	Various AK locations	ACS MSA
AS350B3 "ASTAR" with pop-out floats	2	Evergreen	2000	400	5	130	None	Various AK locations	ACS MSA
AS350B2 with pop-out floats	3	Evergreen	2000	350	5	120	None	Various AK locations	ACS MSA
Bell 206L3 "Long Ranger"	2	Evergreen	1075	210	6	100	None	Various AK locations	ACS MSA
B206B3 "Jet Ranger"	2	Evergreen	650	210	4	100	None	Various AK locations	ACS MSA
Beech King Air 200C	2	Evergreen	N/A	950	9	250	3000 ft paved or gravel	Various AK locations	ACS MSA

MSA = Master Services Agreement; CPAI = ConocoPhillips Alaska, Inc.
Evergreen = Evergreen Helicopters of Alaska; Air Logistics = Air Logistics of Alaska
Additional aircraft are available through contracts maintained by ACS with major Alaskan air carriers.

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

VESSELS

TYPE	NO.	(L x W x Depth, ft)	LIQUID CAP. (bbl)	DECK CAP.	LIGHT DRAFT	LOADED DRAFT	OWNER	AVAILABILITY	OBLIGATION
200 Series Barge (✠A1 classification)	2	200x60x12	5,500	2,750 s/t	1' 8"	12' 5"	Crowley	Stationed at Prudhoe Bay	ACS Master Services Agreement
River Class Tug (1,100 hp)	2	—	—	—	—	3'	Crowley	Stationed at Prudhoe Bay	ACS Master Services Agreement

In addition, ACS and the North Slope operators own approximately 94 vessels in a variety of sizes and types that can be used for transport of personnel and equipment (see Tactic L-6).

ROAD TRANSPORTATION

TYPE	QUANTITY	OWNERSHIP	AVAILABILITY	OBLIGATION
Bus	Minimum of 20	BP, ConocoPhillips, Alyeska, Peak	Used on a daily basis throughout the North Slope oil fields	Owned by BP, ConocoPhillips, Alyeska or available through ACS Master Services Agreement
Lowboy	Minimum of 20	BP, ConocoPhillips, Alyeska, VECO, H.C. Price, Peak	Used on a daily basis throughout the North Slope oil fields	Owned by BP, ConocoPhillips, Alyeska or available through ACS Master Services Agreement
Hi-Deck Trailer	Minimum of 20	BP, ConocoPhillips, Alyeska, VECO, H.C. Price, Peak	Used on a daily basis throughout the North Slope oil fields	Owned by BP, ConocoPhillips, Alyeska or available through ACS Master Services Agreement
Tractor	Minimum of 20	BP, ConocoPhillips, Alyeska, VECO, H.C. Price, Peak	Used on a daily basis throughout the North Slope oil fields	Owned by BP, ConocoPhillips, 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
Griffon 2000PD Mk III	1	Crowley	5-ton payload	1 hr

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 ConocoPhillips, 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. 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, ConocoPhillips 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. Iridium satellite telephones with data capabilities are installed on certain ACS vessels, and portable satellite phones are available at ACS in Deadhorse.

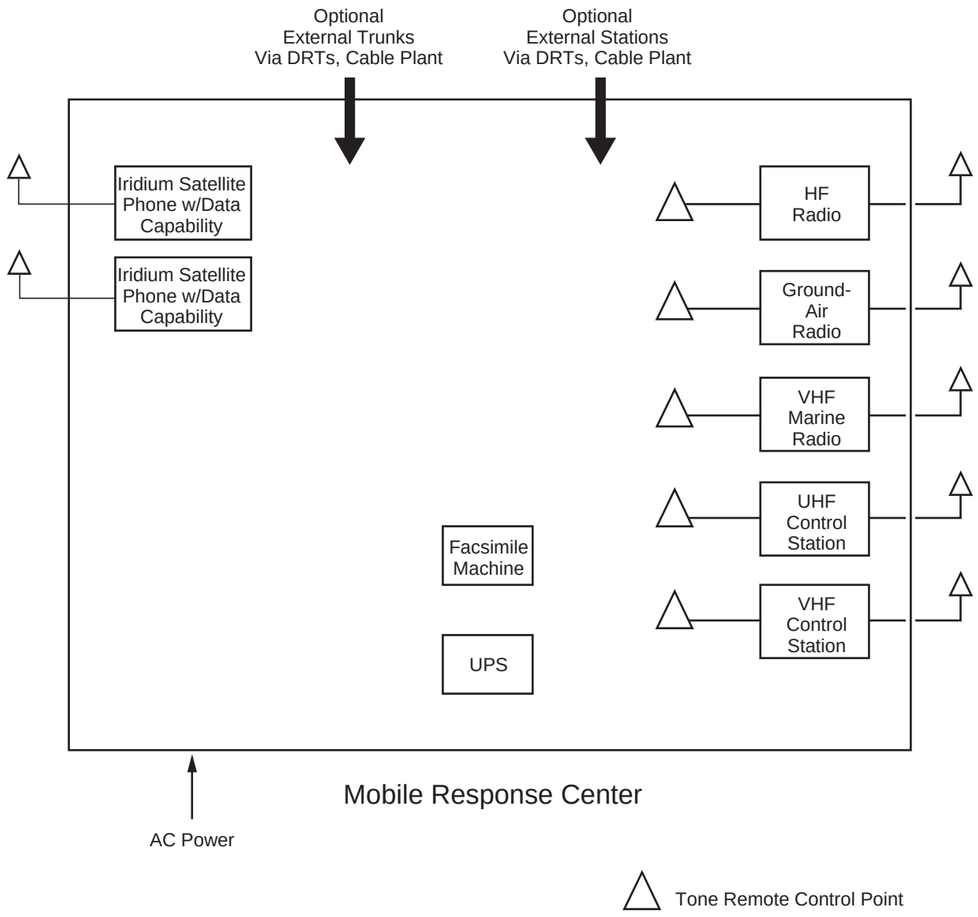
Mobile Response Center (MRC)

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 Iridium satellite telephones with data capability, two dial-radiotelephone phone lines, and a variety of HF, VHF, and UHF two-way radios and repeaters.

DEPLOYMENT CONSIDERATIONS AND LIMITATIONS

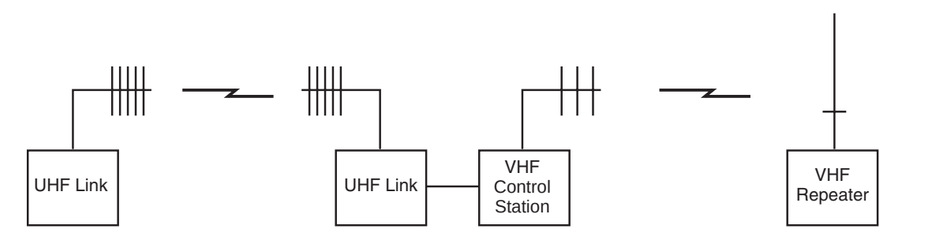
- The existing permanently installed Slope-wide systems should be all that is needed to respond to smaller spills. When a spill of a magnitude requiring the activation of the IMT occurs, the Communications Unit Leader will determine the most effective portable systems to be deployed and will develop 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.

ACS MOBILE RESPONSE CENTER BLOCK DIAGRAM



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

ACS BLOCK DIAGRAM SHOWING EXTENDED AREA COVERAGE USING UHF LINKS AND TRANSLATORS



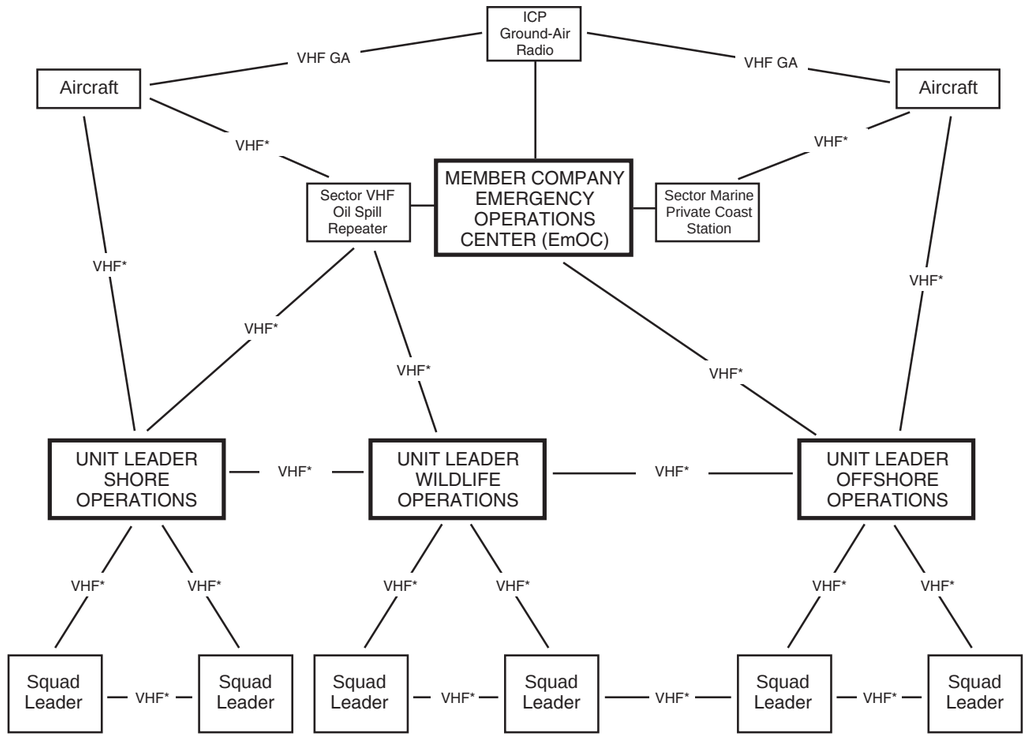
This station can be located at ACS, in a member company ICP, in the Mobile Response Center, or at any other fixed or mobile facility.

The translator can be located at intermediate commercial sites, on mountaintop sites, or on offshore vessels.

The repeater can be located near a spill site onshore or offshore.

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

ACS BLOCK DIAGRAM OF EMERGENCY OPERATIONS CENTER (EmOC)
COMMUNICATIONS CHANNELS
FOR SPILLS IN DEADHORSE PRODUCTION CORRIDOR

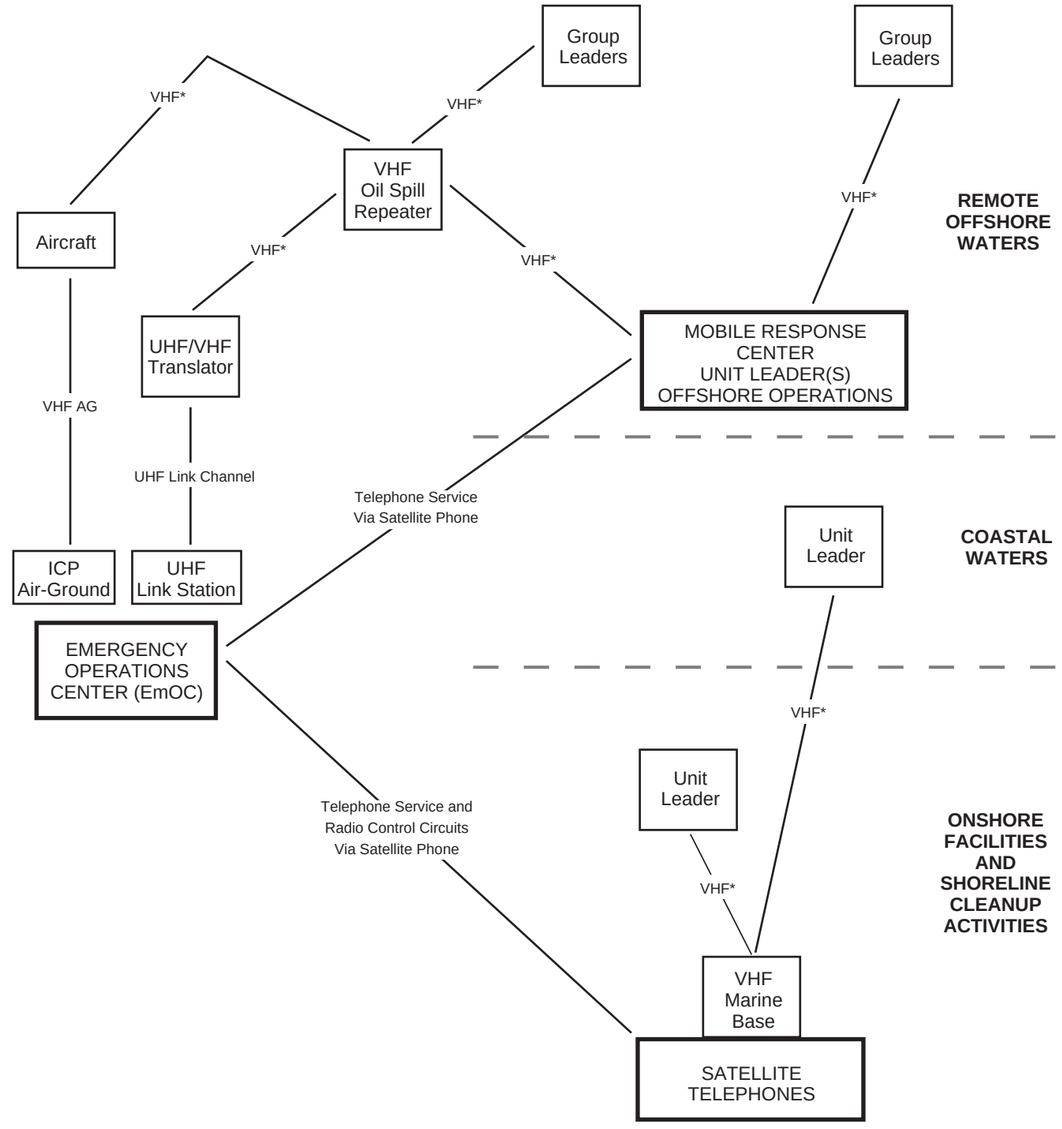


Onshore and River Cleanup Activities
Any number of Unit Leaders
Five Squads/Unit Leader

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).

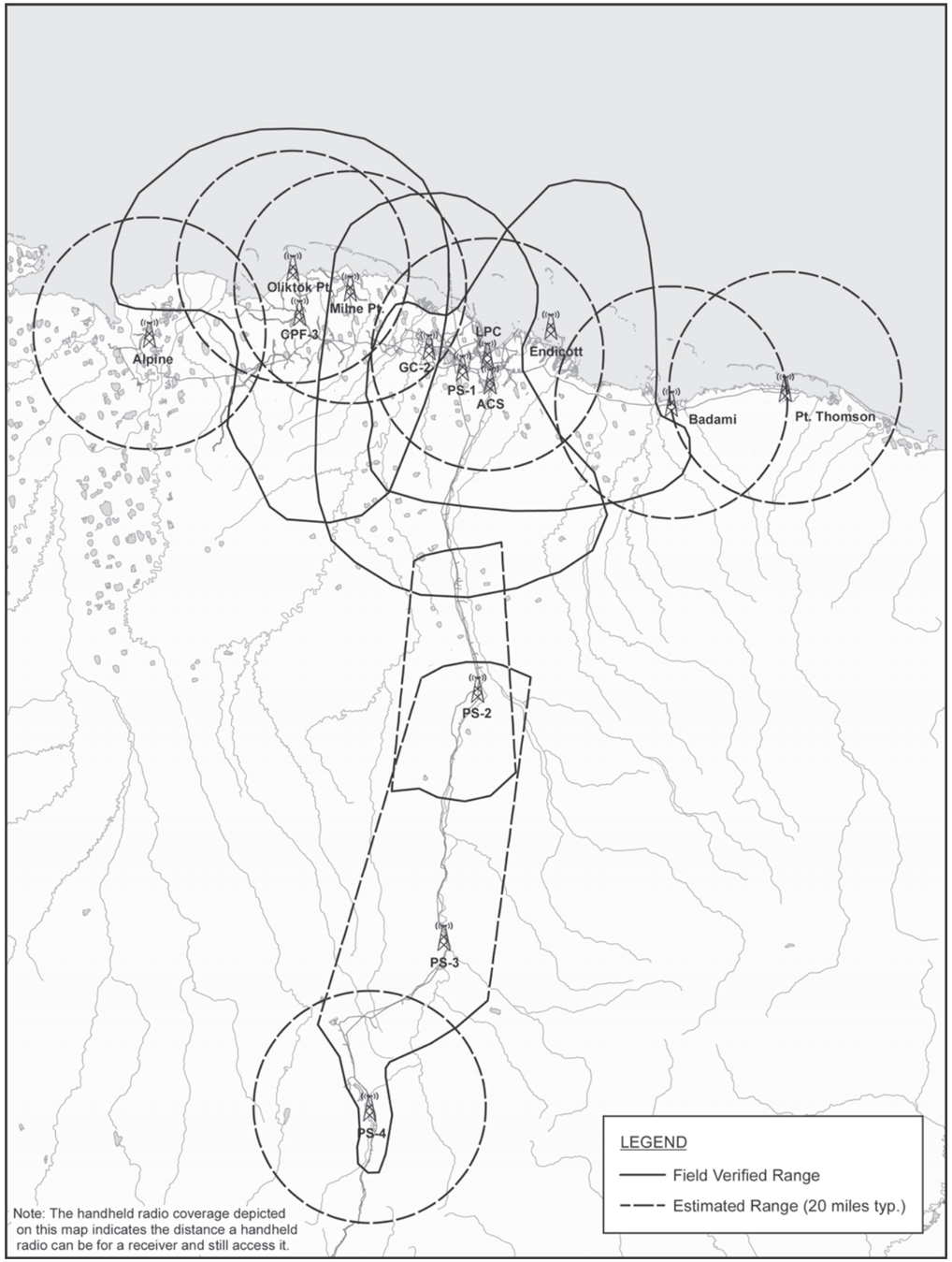
ACS BLOCK DIAGRAM OF EMERGENCY OPERATIONS CENTER (EmOC)
COMMUNICATIONS CHANNELS
FOR REMOTE OFFSHORE EXPLORATION SPILLS



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.

NORTH SLOPE HAND-HELD RADIO COVERAGE



NORTH SLOPE RADIO CHANNEL ASSIGNMENTS

CHANNEL DESIGNATOR	LOCATION / AREA	USE	TRANSMIT (MHZ)	RECEIVE (MHZ)
Tactical Channels Statewide				
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
ACS Fixed VHF Repeater/Talk Around Channels North Slope				
OS-33	ConocoPhillips/Alpine	Oil Spill Repeater	159.585	161.235
OS-34	Talk Around (33)	Tactical	159.585	159.585
OS-35	ConocoPhillips/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	ConocoPhillips/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	Savant/Badami	Oil Spill Repeater	154.585	15.980
OS-44	Talk Around (43)	Tactical	150.983	150.980
OS-45	Point Thomson/Oliktok Point	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
Portable VHF Repeater/Talk Around Channels Statewide				
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
ACS Logistics VHF Repeater/Talk Around Channels North Slope				
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	ConocoPhillips/Kuparuk (CPF3)	Logistics Repeater (Kuparuk)	161.160	159.750
OS-68	Talk Around (67)	Tactical	159.750	159.750
Emergency Chanel Statewide				
OS-69	North Slope Emergency	Tactical	152.420	152.420
Marine Channels Statewide				
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	ConocoPhillips/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

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, 18 AAC 75.445 (g) Response Equipment, and 30 CFR 254.24.

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 titled CORE. 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 CORE. A comprehensive inventory of response-dedicated equipment is listed in ACS's Master Equipment List (MEL), which is generated by CORE.

ACS updates CORE daily. CORE is updated as equipment is moved from one location to another, purchases are made, equipment is surplused 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 State of Alaska 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 each planholder's RPS (Federal terminology = Worst Case Discharge (WCD)). The additional equipment is listed in Tables 10 and 10A. 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.

TABLE 1 -- BOOM SUMMARY

TYPE	NOTE	QUANTITY (ft)
Open Water (36" or greater)	Ro-Boom and Nordan boom require blower units that are prepackaged with the boom	23,003
Light Ocean (27"-35")	—	15,950
Harbor (20"-26")	—	24,308
Protected Water (10"-16")	—	47,575
Fast Water (14")	—	128,750
Shore Seal	Requires air blower and pumps that are prepackaged with the boom	19,250
Fire (20")	—	5,950
Fire (30")*	—	13,250
Fire (42")	—	700
NOFI Boom Bag (24"-34")	—	5,428

** 30" boom quantity also includes 27-33" boom*

TABLE 2 -- VESSEL SUMMARY

TYPE	LENGTH (ft)	WORKING DRAFT (ft)	CAPABILITIES	QUANTITY
Skiff	12-18	0.5-1.5	Transport	22
Airboat	19-30	0.5	Transport, boom deployment	28
Workboat (A)	18-22	0.5-2	Transport, boom deployment	14
Workboat (B)	24-26	1-3	Transport, boom towing	9
Workboat (C)	25-29	1-3	Transport, boom towing	10
Workboat (D)	32-42	2.5-3	Transport, boom towing, skimmer deployment, minibarge towing	9
Workboat (E)	45-55	2-3.5	Transport, skimmer deployment	2

TABLE 3 -- PUMP SUMMARY

DESCRIPTION	SIZE	QUANTITY	NAMEPLATE PUMPING CAPACITY (gpm)
Diaphragm, Air	3"-4"	17	260
Diaphragm, Diesel	2"	3	86
Diaphragm, Diesel	3"	32	100-250, depending upon manufacturer
Diaphragm, Gas	3"	12	80
Submersible, Hydraulic	3"	8	110-132
Submersible, Hydraulic	6"	17	628
Submersible, Air	3"	7	100
Trash, Diesel	2"	18	220
Trash, Diesel	3"	43	330-400, depending upon manufacturer
Trash, Diesel	4"	20	370-750, depending upon manufacturer
Trash, Gas	2"-3"	1	92-340
Peristaltic	2"	9	115
Positive Displacement Lobe	6"	5	827

TABLE 4 -- HOSE SUMMARY

HOSE SIZE	QUANTITY (ft) OF DISCHARGE HOSE	QUANTITY (ft) OF SUCTION HOSE
2”	2,200	2,512
3”	9,035	6,012
4”	2,425	1,470
5”	2,500	0
6”	2,118	0

TABLE 5A -- SKIMMER SUMMARY

TYPE	MANUFACTURER NAME AND MODEL	QTY.	NAMEPLATE CAPACITY (bph)	DERATED CAPACITY[1] (bph)	PKG
Brush, Rock Cleaner		2	75	15	A
Brush Skimmer	Advancing Minimax 10	1	2	0.4	A
Brush Skimmer	Advancing Minimax 20	8	168	34	A
Brush Skimmer	Advancing Minimax 30	1	252	50	A
Conversion for Desmi 250	LBH Quattro	1	298	60	A
Disc Skimmer	Crucial 13/24	4	121	24	A
Disc Skimmer	Crucial 13/30	6	157	31	A
Disc Skimmer	MI-11/24	7	29	6	A
Disc Skimmer	Morris MI-30	6	143	10[2]	A
Disc Skimmer	Vikoma 12K MKII	9	75	15	A
Disc Skimmer	Vikoma 30K	10	189	10[2]	A
Disc Skimmer	T-54	3	340	68	A
Drum/Brush Combination	24MD	14	100	20	A
Drum/Brush Combination	RBS10/1D	3	138	28	A
Drum Skimmer	Crucial	5	121	24	B
Drum Skimmer	Mini	2	2	0.4	A
Drum Skimmer	TDS-118	5	33	7	A
Drum Skimmer	TDS-136	7	100	20	A
Floating Pontoon	Lori LFS-3	1	271	217[2]	A[3]
Heli Skimmer	Sea-Vac 660	1	937	187	A
Manta Ray	Rigid	37	34	7	B
Manta Ray	Flexible	11	34	7	B
	Mini Vac II	3	252	50	A
Rope Mop	Foxden 2-9	1	114	23	A
Rope Mop	Foxtail V.A.B. 4-9	1	249	75[2]	A
Rope Mop	MW-41	10	14	3	A
Rope Mop	MW-62	2	29	6	A
Rope Mop	Z14-E	16	14	3	A
Rope Mop	Mark 2-3E	3	14	3	A
Side Collector	Lori LSC-3	7	271	217[2]	A[3]
Slurp Skimmer		10	63	13	B
Weir Skimmer	Desmi 250 Harbor	3	440	88	A
Weir Skimmer	Desmi 250 Ocean	1	628	126	A
Weir Skimmer	Fasflow Weir	1	486	97	A
Weir Skimmer	Mini Fasflow	4	143	29	A
Weir Skimmer	Transrec 250	1	1,570	314	A
Weir Skimmer	Walosep W-1	1	250	50	A
Weir Skimmer	Walosep W-4	1	566	113	A

Package A skimmers include the skimmer head, power pack, hoses (hydraulic, discharge, suction), fittings, and spare parts.
Package B skimmers can be operated by a variety of pumps.
[1] As per ADEC, derated capacity = 20% of skimmer nameplate capacity.
[2] Non-standard derated capacity approved by ADEC, 3/2/1999.
[3] Lori skimmers can be run with vessel hydraulics or with an independent system.

TABLE 5B -- OPERATIONAL CHARACTERISTICS AND LIMITATIONS OF SKIMMERS

Skimmer Type	Operational Characteristics	Limitations
Weir	• Use in calm water and a thick layer of oil where the edge of the weir is at the water/oil interface. • Small floating weir skimmers most stable in calm water or a gentle swell. • 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. • Small floating weirs are easily transported. Maintenance for most is limited to debris removal during operation and post-cleanup cleaning.	• 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. • Are likely to be clogged by highly viscous oils. • Conventional floating weir skimmers may become obstructed by debris. • Floating weir skimmers affected by waves. • Recovery rates limited only by pumping rate in a thick layer of oil. • For most small weir skimmers, pumping rate is decreased to increase oil/water collection ratio. • Transportability of larger devices mounted to boats may be limited by size and characteristics of boat.
Rope mops	• Versatility allows effective use in a variety of wave conditions. • Generally have high recovery efficiency. • Generally most effective in light- to medium-viscosity oils. • Can recover heavy oils, but not non-flowing products. • Can operate in very shallow water, amid debris or mixed ice. • 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.	• Viscous oil tends to gum up the rope mop and slow down oil wringers. • Smaller diameter mops work well on viscous oil. • Effective on small amounts of oil, but slow for large quantities. • Generally work better in warmer temperatures (60° F and above). • Setups may be more difficult to construct and require more operator attention than some other mechanisms. • Oil may drip on shore as rope is drawn from water. • Rope wears quickly when used in rough areas. • Rope may twist in rough currents.
Disc	• Larger disc skimmers equipped with vanes to protect collection mechanism from debris. • Vanes also permit collection in light ice conditions. • Smaller disc skimmers can be used as floating skimmers for spills inland or at industrial sites. • Can recover slicks as thin as 1 mm while maintaining efficiency up to 97%. • Recovery rate depends on slick thickness and disc-rotation rate. • Generally most effective with medium-viscosity oils. • Maintenance needs are generally low and involve periodic cleaning and/or replacement of scrapers.	• Often expensive, complicated, vulnerable to obstruction by debris, and more likely to break down than other recovery devices. • Do not work well on viscous oil or oil laden with debris. • Large skimmers may be difficult to transport. • Heavy oils adhere readily and may cause clogging. • Light oils do not adhere to the discs well, but can be recovered.
Drum	• Perform in a broad range of oil viscosities. • Are likely to handle debris better than disc skimmers. • Recovery rates generally high, especially for larger drum skimmers.	• Small drum skimmers are not effective in rough seas. • Recovery efficiency may decrease in slicks less than a few millimeters thick.
Brush	• Recovery rates likely to be very high. • For drum brush skimmers, tolerance to debris and broken ice is good. • 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. • Standard chain brush size allows effective recovery of products ranging from #2 fuel oil to weathered crude and #6 fuel oil. • Chain brush systems are not readily affected by debris.	• Transport of large drum brushes may be cumbersome.

SOURCE: SL Ross. 2013. *World Catalog of Oil Spill Response Products*, tenth edition.

TABLE 6 -- STORAGE

TYPE	VOLUME (gal)	QUANTITY	TOTAL CAPACITY (gal)
650 Barge	27,300	1	27,300
Floating open-top tank	2,100	1	2,100
Mini-barge*	5,376	2	10,752
MIni-barge*	10,458	12	125,496
Tank bladder	250	2	500
Tank bladder	500	3	1,500
Tank bladder	2,500	8	20,000
Tank bladder	5,000	5	25,000
Tank bladder (liftable)	500	7	3,500
Tank bladder (liftable)	1,320	8	10,560
Tank bladder (liftable)	2,640	6	15,840
Tank (fast)	400	1	400
Tank (fast)	500	8	4,000
Tank (fast)	1,500	2	3,000
Tank (fast)	2,000	4	8,000
Tank (fast)	2,400	48	115,200
Tank (fast in satchel)	2,500	50	125,000
Tank (folding)	360	1	360
Tank (folding)	400	2	800
Tank (folding)	600	38	22,800
Tank (folding)	1,000	5	5,000
Tank (folding)	1,500	32	48,000
Tank (folding)	3,000	26	78,000
Tank (open-top)	3,000	1	3,000
Tank (upright)	16,800	1	16,800

**The maximum draft of the mini-barges is 4 ft.*

TABLE 7 -- BURNING EQUIPMENT

TYPE	QUANTITY
Heli-Torch (55 gal)	6
Heli-Torch Liquid	600 gals
Air Deployable Igniter	1417
Heli-Torch Batch Gel Mixer	2

TABLE 8 -- LOGISTICS EQUIPMENT

TYPE	QUANTITY
4x4 all-terrain vehicle	18
6-wheel all-terrain vehicle	3
Kubota ATV with Tracks	9
Snow machine	39
Skid Steer Loader	5
Dozer (350 Case)	2
Front-End Loader w/Attachments	5
Chainsaw	47
Ice Auger	38

TABLE 9 -- TRACKING & SURVEILLANCE EQUIPMENT

TYPE	QUANTITY
METOCEAN I-Sphere satellite tracking buoy	24

Tactic L-5 describes the communication equipment inventory.

Tactic L-4 describes equipment available to transport equipment and personnel.

TABLE 10 -- EQUIPMENT INVENTORY BY CONTRACTOR

(current as of June 2014; subject to change; based on availability)

EQUIPMENT TYPE	QUANTITY OR CAPACITY	OWNERSHIP
Vac Truck	156 available on the Slope; Variable capacity, maximum of 300 bbl.	AFC, ASRC, AIC, APSC, BP, CH2M Hill, CONAM, COP, PEAK
Super Sucker 15 yd	46 each	ASRC, AIC, CH2M Hill, COP, CRUZ, PEAK
Rolligons	2 @ 50 Ton	PEAK
	11 @ 35 Ton	PEAK
	17 @ 25 Ton	PEAK
	2 @ 15 Ton	BRICE, PEAK
	Baby rolligon w/water auger pump (14)	AIC, PEAK
Truck Tractor	191 each	ASRC, AIC, CH2M Hill, COP
Loader	317 each	AFC, ASRC, AIC, AER, APSC, BP, BRICE, CH2M Hill, CONAM, COP, DELTA, CRUZ, MEGTEC, NC, PEAK
Trimmer	35 each	AFC, ASRC, AIC, AER, BP, CH2M Hill, CRUZ, NC, PEAK
Backhoe, Rubber Tired	7 each	AER, APSC, PEAK
Grader	47 each	AFC, ASRC, AIC, AER, BP, CH2M Hill, CONAM, COP, CRUZ, NC, PEAK
Trencher	6 each	AIC, CONAM, PEAK
Vessel and Barge	—	—
Tracked Amphibian (e.g., Marsh Buggy) with Backhoe	2 each	AIC
Tracked Amphibian Personnel Carrier (e.g., Haaglund)	11 each	AIC
Tucker Sno-Cat	85 each	AFC, ASRC, AIC, AER, APSC, BP, COP, DELTA, CRUZ, PEAK
Dozer	94 each	AFC, ASRC, AIC, AER, APSC, BP, CONAM, COP, MAGTEC, NC, PEAK
Snow Melter	4 each	AFC, ASRC, MAGTEC
Snow Blower	63 each	ASRC, AIC, BP, BRICE, CONAM, COP, DELTA, CRUZ, NC, PEAK
Excavator	48 each	ASRC, AIC, AER, BP, BRICE, CH2M Hill, CONAM, COP, CRUZ, NC, PEAK
Skid Steer Loader	28 each	ASRC, AER, BRICE, CH2M Hill, COP, DELTA, NC, PEAK

NOTE: See Tactic L-9 for a list of contact names and phone numbers for the referenced contractors.

TABLE 10A -- DUMP TRUCKS INVENTORY BY CONTRACTOR

(current as of June 2014; subject to change; based on availability)

TRUCK TYPE	QUANTITY AND CAPACITY	OWNERSHIP
Dump Truck 10 yd	10 each	AFC, AER, BP, PEAK
Maxi-haul 25 yd	95 each	AFC, ASRC, AIC, BRICE, CH2M Hill, COP, PEAK
Belly Dump	8 each	ASRC, CH2M Hill, COP
Articulating Dump Truck 25 yd	36 each	ASRC, AIC, COP, CRUZ, NC, PEAK
Euclide B-70	51 each	AFC, AIC

TABLE 10B -- TANK INVENTORY BY CONTRACTOR

(current as of June 2014; subject to change; based on availability)

TANK TYPE	QUANTITY AND CAPACITY	OWNERSHIP
Tanks > 500 bbls	24 each	TANKCO
Tanks 300-499 bbls	36 each	TANKCO
Tanks 200-299 bbls	11 each	TANKCO

TABLE 10C -- SUPPORT EQUIPMENT INVENTORY BY CONTRACTOR

(current as of June 2014; subject to change; based on availability)

TYPE	QUANTITY AND CAPACITY	OWNERSHIP
Envirovac	74 each	AIC, BP, BRICE, CH2M Hill, CONAM, COP, CRUZ, MAGTEC, PEAK
Fuel Truck	48 each	ASRC, AIC, AER, BP, CH2M Hill, CONAM, COP, CRUZ, PEAK
Service Truck	57 each	ASRC, AIC, AER, BP, BRICE, CH2M Hill, CONAM, COP, DELTA, CRUZ, MAGTEC, PEAK
Bus ≤ 30 passengers	48 each	ASRC, AIC, BP, CH2M Hill, COP, DELTA, MAGTEC, PEAK
Bus > 30 passengers	51 each	AFC, ASRC, AER, BP, CH2M Hill, CONAM, COP, CRUZ, MAGTEC

NOTE: See Tactic L-9 for a list of contact names and phone numbers for the referenced contractors.

This tactic describes Shell Oil Company-owned and contracted oil discharge containment, control, cleanup, storage, and transfer equipment. It is intended to fulfill Shell's C-Plan requirements for offshore drilling in the Arctic. Some items listed are stored in the village of Wainwright; the remainder are located aboard vessels deployed to the Chukchi Sea during actual offshore drilling operations (typically summer months).

TABLE 1 -- BOOMS

QTY	UNIT OF MEASURE	TYPE	DESCRIPTION
40	Section	Ocean	Oil Boom; 164 ft sections (50m) x 48 inches; 20 inch free board + 28 inch skirt.
10	Section	Coastal	Oil Boom; 1000 ft (305 m) sections; 12 inch x18 inch; inflatable.
20	Section	Coastal	Oil Boom; 164 ft sections; 14 x 17 inches
80	Section	Intertidal	Oil Boom; 50 ft (15 m) sections.
200	Section	Harbor	Oil Boom; 50 ft sections; 8 x 12 inches
121	Section	Shoreseal	Oil Boom; 32 ft sections
200	Section	Conventional	Oil Boom; 50 ft (15 m) sections x up to 20 inches.
2	System	Hydro-Fire	Boom system; 5 x 100 ft (30 m), two water pumps, suction strainers with manifolds, boom reel, hydraulic power pack.

TABLE 2 -- POWERPACKS AND BOOM REELS

QTY	UNIT OF MEASURE	TYPE	DESCRIPTION
8	Each	Hydraulic	Reels with Control Stands (48 inches x 164 ft boom).
4	Each	Elastec	Boom Reel
4	Each	Diesel/Hydraulic	Power Packs with Air Blowers.
1	Each	Integrated	Power Pack, 300 kW Hydraulic Power Unit.
2	Each	Containerized	150 kW Hydraulic Power Unit.
2	Each	Portable	80 kW Hydraulic Power Unit.
6	Each	Diesel/Portable	Power Pack, 7.4 kW Hydraulic Power Unit.
1	Each	Diesel	Power Pack, 14 kW Hydraulic Power Unit.

TABLE 3 -- RESPONSE VESSELS

QTY	UNIT OF MEASURE	TYPE	DESCRIPTION
1	Each	OSRV	300 ft vessel under charter to Shell.
1	Each	OSRB	205 ft tank barge under charter to Shell.
1	Each	Tanker	Arctic tanker under charter to Shell.
6	Each	Work Boat	34 ft, 300-gallon fuel, 500# Davit, 8 kW generator.
1	Each	Integrated Skimmer Vessel	47 ft, 800 gallons fuel, 9 kW generator, two brush pack skimmers (164 bbl/hr).
4	Each	Landing Craft	26-32 ft nearshore and shoreline support vessel.
2	Each	Support Boat	24 ft open-hull skiff.

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

TABLE 4 -- SKIMMERS

QTY	UNIT OF MEASURE	TYPE	DESCRIPTION
4	Each	Lamor	Lamor side collector system, 1,289 bbl/hr, jib arm and sweep boom.
2	Each	Crucial	Vertical rope mop, 8 rope system, 503 bbl/hr.
6	Each	Multi-functional	Brush/Disc, 96 bbl/hr.
2	Each	Weir	Transrec 150 Skimmer, 2516 bbl/hr

TABLE 5 -- PUMPS

QTY	UNIT OF MEASURE	TYPE	DESCRIPTION
28	Each	Positive Displacement	≥ 723 bbl/hr, annular injection ring.
3	Each	Positive Displacement	≥ 315 bbl/hr, annular injection ring.
6	Each	Positive Displacement	≥ 94 bbl/hr transfer pump.
5	Each	Gasoline	2-inch trash pump.

TABLE 6 -- ADDITIONAL STORAGE

QTY	UNIT OF MEASURE	TYPE	DESCRIPTION
3	Each	Bladder	100 bbl towable storage.
4	Each	Mini-barge	249 bbl, two tanks.
1	Each	Tank	ISO Tank, 6000-gallon capacity.

TABLE 7 -- DISPERSANT

QTY	UNIT OF MEASURE	TYPE	DESCRIPTION
25,000	Gallon	9500	Dispersant, 350-gallon stainless steel totes.
1	Each	Application System	Heli-Spray bucket.
1	Each	Application System	Vessel-mounted spray arm system.

TABLE 9 -- MISCELLANEOUS

QTY	UNIT OF MEASURE	TYPE	DESCRIPTION
1	Each	Diesel	Containerized water heater.
1	Each	Gasoline	Model PD3-2300 Pressure Washer.
1	Each	Gasoline	Model EB6500X 6.5kW Generator
2	Each	Gasoline	Model EU2000i 2kW Generator

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 Nov 1 - May 15		BREAKUP May 15 - June 30		SUMMER AND FALL June 30 - Sept 30		FREEZE-UP, MEDIAN PERIOD Oct 1 - 31	
Daily Mean Temperature <-35°F[1]	4%	Avg. 3.3 occurrences; avg. 2.6 days duration	–	–	–	–	–	–
Daily Mean Winds 15kt[1] (Typically with 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.[1]	3%	6 occurrences; avg. <1 day; up to 2 days[5]	0%	NOAA's summary charts for Deadhorse report zero occurrences in 1995, 1996, and 1997.	4%	Avg. 4 occurrences; avg. 1 day duration[1,5] 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.[3] July offshore records show 22% of time visibility <.5 nm[3].	–	–
Daily Mean Wind Chill <-35°F[1]	37%	Avg. 11 ccurrences; avg. 7 days duration	<1%	None in last 5 years	–	–	–	–
Flight Cancellations[6]	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[2]; when encountered by containment boom, limits recovery – Tactics R-16 to R-20	10%	Depends on location[2]; 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- 40%	Sag. River: July 7 for 9 days; Kuparuk River: July 7 for 19 days; Colville River: July 1 for 13 days[7]	–	–	–	–

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

TABLE 1A (CONT'D)

OPERATING LIMIT	WINTER Nov 1 - May 15		BREAKUP May 15 - June 30		SUMMER AND FALL June 30 - Sept 30		FREEZE-UP, MEDIAN PERIOD Oct 1 - 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[7]	–	–	–	–
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[7]	–	–	–	–
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[1,4]	–	–
Atmospheric Icing	20%	Up to 5 days per mo. no flying;Avg. 3 additional days partial flight restrictions[5]	–	–	20%	Up to 5 days per mo. no flying; Avg. 3 additional days partial flight restrictions[5]	20%	Up to 5 days per mo. no flying;Avg. 3 additional days partial flight restrictions[5]
Spine Road to Kuparuk and Milne Pt. Facilities Washed Out or Closed	–	–	33%	Avg. Kuparuk River Floods: May 31 through June 13[7]	–	–	–	–
Darkness[3]	50%	–	0%	–	27%	–	40%	–
Sea Ice Load Bearing Capacity:	40%	–	100%	–	–	–	100%	–
Heavy Equipment	20%	–	0%	–	–	–	100%	–
Light Equipment								

[1] Based on Deadhorse records for 1995, 1996 and 1997 from NOAA Global Summary of the Day Web Page, www.ncdc.noaa.gov/cgi-bin/gsod_xmgr

[2] 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.

[3] 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.

[4] Personal conversation with Peter Gadd August 20, 1998 and 1

[5] Personal conversation with Robert Glover, Era Helicopters, Deadhorse, Alaska

[6] Personal communication, Prudhoe Bay Airport, 1997

[7] 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 Nov 1 - May 15	BREAKUP May 15 - June 30	SUMMER & FALL June 30 - Sept 30	FREEZE-UP MEDIAN DATES October 1-31
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.

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

- National Weather Service Alaska Region Headquarters online forecast for North Slope: http://www.arh.noaa.gov/zonefcst.php?zone=203
- National Weather Service Alaska Region Headquarters recorded forecast: (800) 472-0391
- FAA Weather Data Service for Deadhorse (SCC): ID = SCC / Type = WX ASOS / Frequency = 118.4 MHz / Phone = (907) 659-2591
- ConocoPhillips Channel 5, 5:30 a.m. to 5:30 p.m.
- Prudhoe Bay WOA - BPXA Channel 5
- Kuparuk Operation NSK Security (Phone 7997)

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 four 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. Table 5 lists vehicle travel speeds to minimize dynamic effects associated with resonant waves on the sea ice.

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.

Late-season ice can support a variety of vehicles without an ice road. Figure 2 shows the relative durations that equipment can work on the sea ice before breakup.

Freshwater ice supports heavier loads than sea ice. See Figure 3.

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.

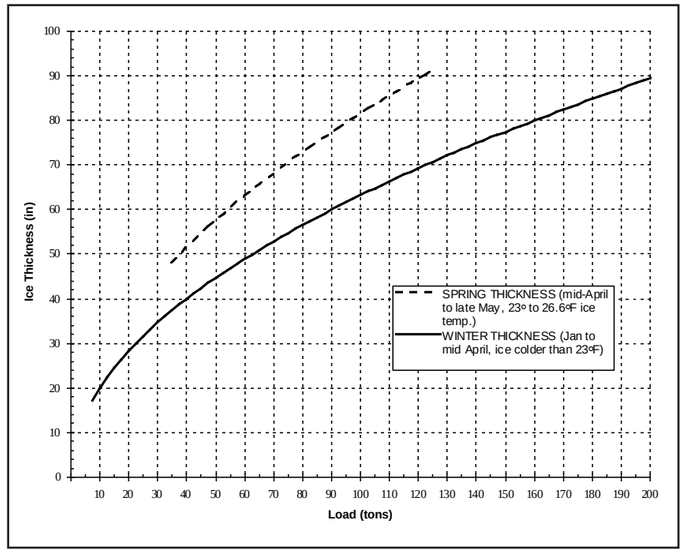
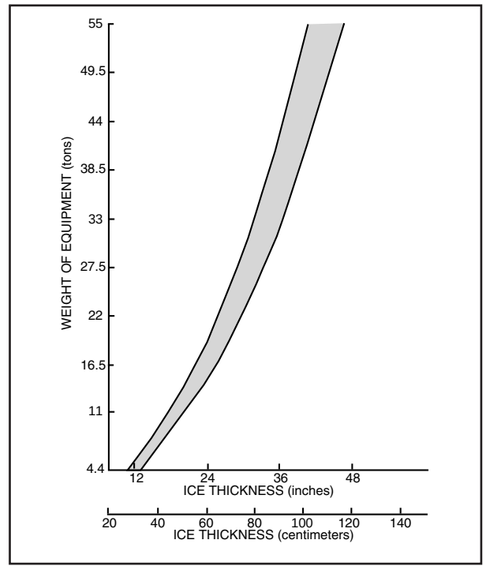


FIGURE 2
MINIMUM THICKNESS TO SUPPORT LOADS ON FRESHWATER ICE



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
Peak 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	156,000	65,000
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 R-100	9,500	N/A
Snowmachine w/Sled	545	200
966 Loader	47,000	10,000
Vac Truck	75,000	40,000
Max Haul	74,000	32,000
Tandem Trailer	52,000	22,000
Wide-Track Dozer	35,000	N/A

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)

Minimum Ice Thickness	Load (pounds)				Short-Term Load Separation[4]
	Parked on 9x9 Area[1]		With Resonant Wave		
Feet	4 hours to 4 days	4 days to 4 months	Single load area[2]	Multiple load area[3]	Feet
1.5	Not reported	10,000[5]	10,000	Not reported	42
2	Not reported	15,000	18,000	25,000	54
2.5	27,000	17,000	25,000	30,000	64
3	43,000	27,000	40,000	50,000	72
4	88,000	56,000	70,000	80,000	90
5	156,000	92,000	Not reported	125,000	106
6	Not reported	131,000	Not reported	170,000	122
7	Not reported	178,000	Not reported	240,000	140

Adapted from Sandwell. 2001.

[1] Sandwell, 2001, Tables 7-1 and 7-2.

[2] Sandwell, 2001, Figure 3-2

[3] Sandwell, 2001, Figure 3-3

[4] Sandwell, 2001, Table 3-8

[5] Alaska Clean Seas. 1999. Tactic L-7, Table 4.

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.

TABLE 5
VEHICLE SPEED ASSOCIATED WITH DYNAMIC EFFECTS ON SEA ICE

	Water Depth	
	10 Feet	40 Feet
Max. Speed (mph) for Dynamic Effect	12	24
Speed (mph) to Avoid Dynamic Effect	8	17

Adapted from Sandwell, 2001, Figure 3-1.

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. 1999. Alaska Clean Seas Technical Manual, Volume 1, Tactics Descriptions.

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*.

Coastal Frontiers Corporation. 2001. Spring Break-Up Equipment Access Test Program, June 2001. For BP Exploration (Alaska) Inc. 21 pages.

Gold, L.W. 1971. Use of Ice Covers for Transportation. Canadian Geotechnical Journal. No. 8:170-181.

Sandwell Engineering Inc. 2001. Ice Access Guidelines for Spill Responders. For Alaska Clean Seas, Prudhoe Bay, AK.

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' on-scene equipment and personnel, as determined by the field manager of the field in which the spill occurs.
II	A moderate oil spill, the response to which requires equipment or trained personnel located in other operating areas of the North Slope, or equipment or trained personnel of a Village Response Team, to supplement the Operator's and ACS' 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 or trained personnel to be brought to the North Slope to supplement the equipment and personnel located on the North Slope, 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.

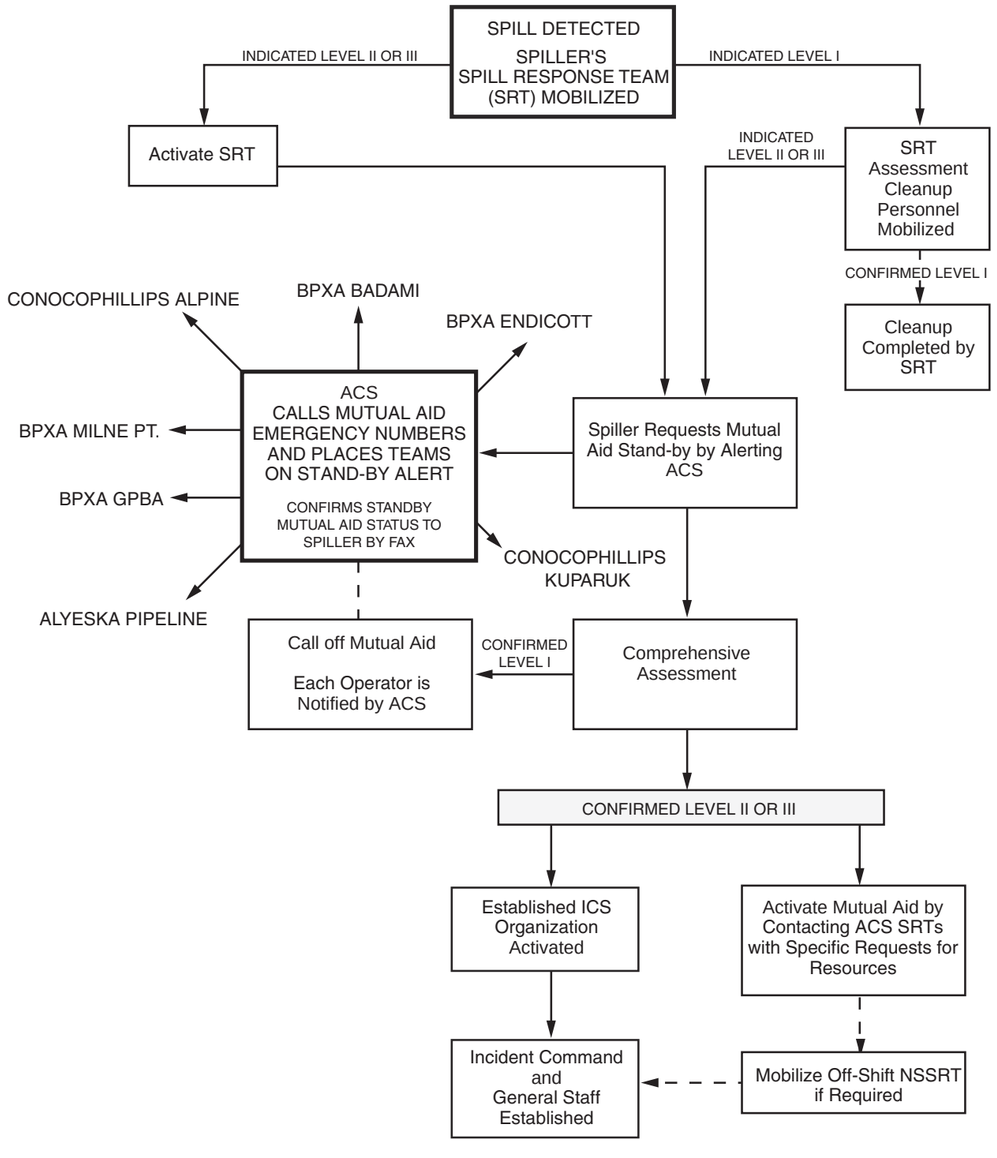
4. In the event of a Level III callout, Providing Entity shall notify and mobilize off-shift NSSRT personnel at Receiving Entity's request.

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 has implemented a number of contractual agreements, including 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 contractual agreements is:
   Materials/Purchasing Specialist
   Alaska Clean Seas
   Deadhorse, AK

ACS CONTRACTUAL AGREEMENTS APPLICABLE FOR USE IN A SPILL RESPONSE

(current as of September 2014)

SERVICE CATEGORY	CONTRACTOR	PHONE	FAX
Admin Contract Labor	Swift Technical Services, LLC	(907) 306-7261	
Casual Labor & Equipment/Spill Response	CH2M Hill	(907) 277-5309	(907) 264-8130
Casual Labor & Equipment/Spill Response	CCI, Inc.	(907) 258-5755	(907) 258-5766
Casual Labor & Equipment/Spill Response	Peak Oilfield Services	(907) 561-3200	(907) 562-5860
Casual Labor & Equipment/Spill Response	PENCO (Pacific Environmental Inc.)	(907) 562-5420	(907) 562-5426
Casual Labor & Equipment	G.B.R. Equipment Inc.	(907) 563-6500	(907) 563-0710
Communications Services	Alaska Communications Systems	(907) 563-8000	-
Communications Services	North Slope Telecom, Inc.	(907) 562-4693	(907) 562-0818
Environmental Engineering	S.L. Ross and Associates, Ltd.	(613) 232-1564	(613) 232-6660
IT Management and Technical Services	TekMate IT Outsource	(907) 561-6283	(877) 354-1449
Labor (ACRT only)	Progressive Environmental Svcs. (SWS Env.)	(850) 234-8428	(850) 234-2451
Large Animal	Alaska Zoo	(907) 346-2133	(907) 346-2673
Legal Services	Delaney, Wiles, Attys. at Law (Steve Ellis)	(907) 257-0713	(907) 277-1331
Marine Wildlife Capture and Rehabilitation	Alaska Sealife Center	(907) 224-6317	(907) 224-6320
Mapping/GIS Support Services	Quantum Spatial	(907) 272-4495	(907) 274-3265
Mapping/GIS Support Services	F. Robert Bell & Associates	(907) 274-5257	(907) 272-7531
Marine Support Services	Crowley Alaska Inc.	(907) 278-4978	(907) 257-2828
Survival/Safety Training Services	LTR Systems, Inc.	(907) 563-4463	(907) 563-9185
Technical Support for ACS Tech Manual	ERM, Inc.	(907) 258-4880	(907) 258-4033
Wildlife Response Services	International Bird Rescue	(907) 230-2492	(907) 277-4956
Unmanned Aircraft	AeroVironment	(805) 581-2198	-
Veterinary Services	The Pet Stop, LLC	(907) 522-1006	(907) 522-1848
Village Response Team Manpower Svcs.	UIC Arctic Response Services	(907) 865-4948	(907) 334-8283

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CONTRACTOR CONTACT NUMBERS

ABBREVIATION	CONTRACTOR NAME	PHONE	FAX
AFC	Alaska Frontier Constructors	(907) 659-3090	(907) 659-2237
ASRC	ASRC Energy Services	(907) 659-3812	(907) 659-2254
AIC	Alaska Interstate Construction	(907) 670-2501	(907) 659-2477
AER	Airport Equipment Rental	(907) 659-2000	(907) 659-2104
APSC	Alyeska Pipeline Service Company	(907) 450-4101	(907) 450-4175
BP	British Petroleum Alaska	(907) 659-5049	(907) 659-2103
BRICE	Brice Incorporated	(907) 659-2330	(907) 659-2329
-	CH2M Hill	(907) 659-3341	(907) 659-6003
CONAM	Conam Construction Company	(907) 659-3157	(907) 659-9278
COP	ConocoPhillips	(907) 659-7949	(907) 659-5749
CRUZ	Cruz Construction Inc	(907) 659-2866	(907) 659-2867
DELTA	Delta Leasing	(907) 659-9056	(907) 659-9057
MAGTEC	MagTech Alaska LLC	(907) 394-9771	(907) 659-9055
NC	NC Machinery Company	(907) 659-9600	(907) 659-0801
PEAK	Peak Oilfield Service Company	(907) 659-2030	(907) 659-2037
TANKCO	Tankco Alaska	(907) 659-3152	

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.

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
Alaska Chadux Corp.	Anchorage, AK	(907) 348-2365	(907) 348-2230
Alaska Clean Seas	Prudhoe Bay, AK	(907) 659-3220	(907) 659-2616
Alyeska / SERVS	Valdez, AK	(907) 834-6902	(907) 834-6973
CISPRI	Nikiski, AK	(907) 776-5129	(907) 776-2190
Clean Carribean & Americas	Ft. Lauderdale, FL	(954) 983-9880	(954) 987-3001
Clean Channel Assn.	Pasadena, TX	(713) 534-6195	(713) 534-6197
Clean Gulf Associates	New Orleans, LA	(504) 799-3035	
Clean Harbors Cooperative, LLC	Linden, NJ	(908) 862-7500	(908) 862-7560
Clean Islands Council	Honolulu, HI	(808) 845-8465	(808) 845-8457
Clean Rivers Cooperative, Inc.	Portland, OR	(503) 220-2087	(503) 295-3660
Clean Seas, LLC	Carpinteria, CA	(805) 684-3838	(805) 684-2650
Corpus Christi Area Oil Spill Control Assn.	Corpus Christi, TX	(361) 885-6188	(361) 881-5162
Delaware Bay & River Coop., Inc.	Linwood, PA	(610) 859-2830	(610) 859-2834
Eastern Canada Response Corp.	Corunna, Ontario, Canada	(613) 230-7369	(613) 230-7344
Guam Response Services, Ltd.	Agana, Guam	(671) 475-7520	(671) 649-6451
MSRC	Richmond, CA	(510) 478-0702	(510) 478-0725
Oil Spill Response Limited	Southampton, UK	+44 23 8033 1551	
Savannah Spill Response Corp.	Savannah, GA	(912) 429-3350	
SEAPRO	Ketchikan, AK	(907) 225-7002	(907) 247-1117
Western Canada Marine Response Corp.	Burnaby, BC, Canada	(604) 294-6001, x204	(604) 294-6003

* 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.

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.

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			

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.

At the present time, all communications equipment used is currently being updated to meet 2013 FCC requirements.

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 days 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 15-20 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.

NOTE: All communications equipment used is currently being updated to meet 2013 FCC requirements.

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).	Harmony 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 Harmony 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.

NOTE: All communications equipment used is currently being updated to meet 2013 FCC requirements.

BEST AVAILABLE TECHNOLOGY ANALYSIS
SATELLITE EARTH STATION

BAT EVALUATION CRITERIA	CURRENT METHOD: SATELLITE TELEPHONES	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, satellite phones 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.

NOTE: All communications equipment used is currently being updated to meet 2013 FCC requirements.

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. Not 2013 compliant.	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 15-20 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.

NOTE: All communications equipment used is currently being updated to meet 2013 FCC requirements.

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 ConocoPhillips 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: • NOAA is the source of most meteorological data input into any modeling software. • NOAA understands the limitations of the data and depicts these using uncertainty bounds. •NOAA uses three computer models to calculate water current speed and direction.	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

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

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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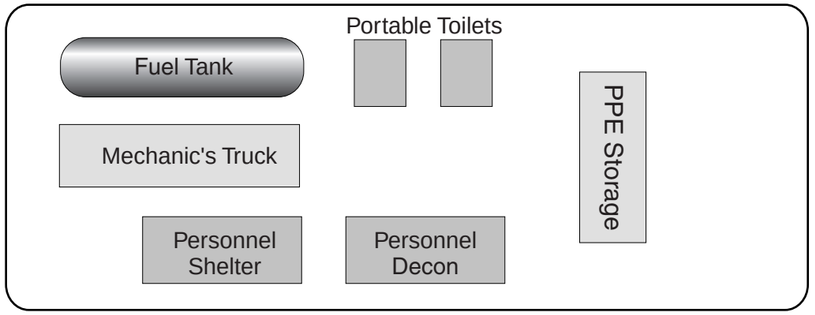
BARGE
SAMPLE LAYOUT



A barge can be used for support operations during a spill. Such operations include the following:

- Transporting response equipment
- Handling and transporting sewage from the response vessels
- Transporting potable water and food
- Handling and transporting solid waste (oily waste and garbage)
- Conducting crew changes
- Supporting refueling operations with a fuel tank
- Providing mechanical support and spare parts
- Providing safety support and transporting safety gear, including decontamination equipment

At least one vessel or workboat is required for this tactic.

A vessel could be used to meet portions of the logistical support requirements.

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	# STAFF PER SHIFT	MOBE TIME	DEPLOY TIME
Barge	West Dock	Support	1	6	6 hr	0
Fuel Tank	Colville	Fuel	1	0	0	0
Mechanic Support	All	Repair and Maintenance	1	1	2 hr	0
Portable Toilet	West Dock	Staff needs	2	0	0	0
or Envirovac	GPB	Staff needs	1	—	1 hr	1 hr
PPE and Decon Equipment	All	Support	Various	1	0	0
Work Boat	All	Personnel transport	Several	1	1 hr	1 hr

DEPLOYMENT CONSIDERATIONS AND LIMITATIONS

- This tactic may be used to support gross decontamination of vessels. See Tactic S-7.
- See Tactic S-6 for resources and techniques for personnel decontamination.

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

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

EXTERNAL AND AGENCY NOTIFICATION CHECKLIST

The following is provided as guidance to ACS member companies on notification. Each company should have its own procedure and reporting forms.

- ❑ Each operation should designate person or position responsible for agency notification
- ❑ Assure that all required agency notifications have been made.
- ❑ Complete and send via fax a spill report.
- ❑ Make internal company notifications as required by company policy and/or company C-Plans.
- ❑ Make additional agency notifications as merited by circumstances of spill.
- ❑ As response requirements dictate, contact ACS and activate Mutual Aid.
- ❑ When appropriate, complete required written report to ADEC of spill and response.
- ❑ When appropriate, activate ACS emergency use permits (see Tactic A-3).

NOTE: At time of incident, determine whether ARRT Guideline Checklist must be completed.

WRITTEN REPORTING REQUIREMENTS

18 AAC 75.300 requires notification of the Alaska Department of Environmental Conservation of any spill on State lands or waterways. After notification of the discharge has been made to the department, the department will, at its discretion, require interim reports until cleanup has been completed (18 AAC 75.307). A written final report must be submitted within 15 days of the end of cleanup operations, or if no cleanup occurs, within 15 days of the discharge (18 AAC 75.307). Interim and final written reporting requirements are specified in 18 AAC 75.307 and must contain the following information:

- Date and time of discharge or release.
- Location of discharge or release.
- Name of facility or vessel.
- Name, mailing address, and telephone number of person or persons causing or responsible for the discharge and the owner and the operator of the facility or vessel.
- Type and amount of each hazardous substance discharged or released.
- Factors that caused or contributed to the discharge or release.
- Description of any environmental effects of the discharge or release, or the containment and cleanup, to the extent those effects can be identified.
- Description of the containment or cleanup action(s) taken.
- Estimated amount of hazardous substance cleaned up and hazardous waste generated.
- Date and method of disposal or treatment of the hazardous substance, contaminated equipment, contaminated materials, contaminated soil, and contaminated water.
- Description of actions being taken to prevent another discharge or release.
- Other information the department requires to fully assess the cause and impact of the discharge or release, including any sampling reports and a description and estimate of any remaining contamination.

SAMPLE SPILL ASSESSMENT REPORT

USE LETTER CODE FOR RADIO TRANSMISSION		**DATE OF SPILL/REPORT** **TIME OF SPILL/REPORT**
A SPILL LOCATION	LOCATION LAT/LONG GRID	
B SOURCE OF SPILL IS	MODULES, TANK, VESSEL, PIPELINE, ETC.	
C SUBSTANCE TYPE AND VOLUME	TYPE VOLUME	
D APPARENT CAUSE OF SPILL	ACCIDENT, CORROSION, BLOWOUT, UNKNOWN SOURCE SECURED? YES/NO	
E SPILL STATUS & RATE OF RELEASE	TERMINATED CONTINUING	
F CONTAMINATED AREA	NATURE AND EXTENT OF CONTAMINATED AREA	
G DIRECTION OF SPILL MOVEMENT	CARDINAL DIRECTION OR GEOGRAPHIC DESCRIPTION THREAT TO WATERWAYS? YES/NO	
H INJURIES	EXTENT	
I SPILL CONTROL	IS THE SPILL CONTAINED? IF YES, HOW? YES **NO**	
J ENVIRONMENTAL CONDITIONS	WIND SPEED WIND DIRECTION SEA STATE _____ AIR TEMP VISIBILITY	GENERAL CONDITIONS OF OPERATIONS (Visibility, weather, ice, currents)
K REMARKS	ROADS, OTHER ACCESS EQUIPMENT REQUIRED ACTION UNDERTAKEN	

REPORTED BY:

NAME **POSITION** **DATE**

AGENCY REPORTING REQUIREMENTS FOR OIL SPILLS

AGENCY	SPILL SIZE	VERBAL REPORT	PHONE NUMBERS	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 hrs)		Not required -- form is completed during phone notification process.
U.S. Environmental Protection Agency (EPA)	Any size to navigable waters of the U.S. (includes tundra) or to land that may threaten navigable waters	Immediately	907.257.1342 (M-F, 8-5) 206.553.1263 (24 hrs) 907.271.3424 (fax)	Matt Carr 24 hrs -- Seattle	For facility requiring SPCC plan if spill is 1,000 gallons or more or if it is second spill greater than 42 gallons in 12 months.
U.S. Coast Guard (USCG)	Any size in or threatening navigable waters	Immediately	907.271.6700 (24 hrs) 907.271.6751 (fax)	Marine Safety Office	Not required, but requested.
U.S. Department of Transportation (DOT)	Any size from a regulated pipeline	Immediately	800.424.8802 (24 hrs)		Required within 30 days on DOT Form 7000-I.
U.S. Department of Interior (DOI), U.S. Fish & Wildlife Service (USFWS)	Any size that poses a threat to fish and wildlife	Immediately	907.271.2797		
U.S. Department of Interior (DOI), Bureau of Ocean Energy Management, Regulation Enforcement (BOEMRE)	All spills into marine waters	Immediately	907.334.5300 (M-F, 8-5) 907.250.0546 (24 hrs) 907.334.5302 (fax)	Jeff Walker	Copies of any reports submitted to ADEC, as soon as possible.
Alaska Department of Environmental Conservation (ADEC) Northern Alaska Response Team	WATER: any spill	Immediately	907.451.2121 (M-F, 8-5) 907.451.2362 (fax) 800.478.9300 (after hours)	ADEC Spill Line or Alaska State Troopers	A followup within 15 days of end of cleanup for spills > 10 gallons.
	LAND: 1-10 gallons	None			A monthly written record of each discharge or release, including cumulative releases.
	LAND: >55 gallons	Immediately			Fax on same day spill occurs.
	LAND: >10 but <55 gallons	48 hrs			Fax on same day spill occurs.
Alaska Department of Natural Resources (ADNR)	WATER: any spill	Immediately	907.451.2678 907.451.2751 (fax)	Spill Report Number	A follow-up report within 15 days of end of cleanup for spills greater than 10 gallons.
	LAND: 1-10 gallons	None			A monthly written record of each discharge or release, including cumulative releases.
	LAND: >55 gallons	Immediately			Fax on same day spill occurs.
	LAND: >10 but <55 gallons	48 hrs			Fax on same day spill occurs.
Alaska Oil & Gas Conservation Commission (AOGCC)	All spills from wells or involving crude loss	Immediately	907.279.1433 (24 hrs) 907.276.7542 (fax)		Within 5 days of loss.
North Slope Borough (NSB) Local On-Scene Coordinator	>55 gallons	Immediately	907.852.0440 (Barrow) 907.852.5991 (fax)	Permitting and Zoning Ralph Davis, Office of Safety and Environmental Affairs (OSEA)	Courtesy copies of any reports submitted.
	10-55 gallons	None			Within 15 days of end of cleanup.
	1-10 gallons	None			Compile in monthly report.
	<1 gallon	None			None

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

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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

TYPE PERMIT	PERMIT #	ISSUING AGENCY	PURPOSE
Land Use	LAS 22375	Alaska Dept. of Natural Resources	Oil Spill Emergency Use Permit
Title 16 Fish Habitat Permit	FG94-III-0218	Alaska Dept. of Natural Resources	Oil Spill Emergency Use Permit
Bird Hazing	FG05-III-0012	Alaska Dept. of Fish & Game	Oil Spill Emergency Use Permit
Mammal Hazing and Mammal Stabilization, Transport & Disposal	FG05-III-0013	Alaska Dept. of Fish & Game	Oil Spill Emergency Use Permit
Capture, Salvage and Rehabilitation of Migratory Birds & Raptors	MB772518-0	U.S. Fish & Wildlife Service	Oil Spill Emergency Use Permit
Information Use Agreement	3140-4 AHRS	Alaska Dept. of Natural Resources	Access to Alaska Heritage Resources Survey information
Oil Spill Removal Organization Classification	89	U.S. Coast Guard National Strike Force Coordination Center	OSRO Classification
Oil Spill Primary Response Action Contractor Registration	09-01-08-350	Alaska Dept. of Environmental Conservation	RAC Registration
NPDES Mobil Spill Response	AKG-33-0000 Discharge #007	Environmental Protection Agency	Authorization to Discharge Pollutants
ACOE Nationwide Oil Spill Cleanup	Permit Number 20	Department of the Army	Authorization of placement of materials in navigable waters for oil spill cleanup activities.
Marine Mammal Hazing	932-1489-05	National Marine Fisheries	Authorization for hazing (take) of live marine mammals and endangered species in peril (in vicinity of an oil spill)
Permit for Small Takes of Marine Mammals	None	National Marine Fisheries	E-mail on non-requirement for this permit
NPRA Land Use	None	Bureau of Land Management	E-mail on non-requirement for this permit

NON-EMERGENCY USE PERMITS

TYPE OF PERMIT	PERMIT #	ISSUING AGENCY	PURPOSE
Land Use	LAS 22374	Alaska Dept. of Natural Resources	Storage of spill response equipment and training exercises
NSB Development	NSB 99-033	North Slope Borough	Oil spill training activities
Fish Habitat Permit	FG99-III-0002	Alaska Dept. of Natural Resources	Boom pre-deployment
Fish Habitat Permit	FH07-III-0119	Alaska Dept. of Natural Resources	Pre-staged equipment winter access
Fish Habitat Permit	FG92-III-0212	Alaska Dept. of Natural Resources	Summer oil spill containment and recovery training activities
Fish Habitat Permit	FG92-III-0213	Alaska Dept. of Natural Resources	Winter oil spill containment and recovery training activities
Bird Hazing	05-060	Alaska Department of Fish & Game	Non-spill related bird hazing
Open Burn Approval for In-Situ Burn Training	AQ907OBR01	Alaska Department of Environmental Conservation	Open burning for fire training at ACS fire training site
Boom Deployment in Navigable Waters	POA-2005-833-D POA-2005-834-D POA-2005-835-D POA-2005-836-D POA-2005-837-D POA-2005-838-D POA-2005-839-D POA-2005-840-D POA-2005-841-D POA-2005-842-D POA-2005-843-D POA-2005-844-D POA-2005-1785-D	Department of the Army	Boom pre-deployment in navigable waterways
USCG Aids to Navigation	LLNR #1435	Seventeenth Coast Guard District	Boom pre-deployment
List and Maps of Pre-Staged Equipment Sites, Pre-Deployed Boom Sites, Staging Areas, and Boat Launch Sites			
Stormwater Discharge	AKG-33-0000 (Draft)	EPA / NPDES Permits Unit	Stormwater Discharge Permit for ACS facilities
Hazardous Materials Transportation	061909 700 005RT	U.S. Department of Transportation	Hazardous Materials Certificate of Registration

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.

ACS provides spill response training for their own personnel as well as the North Slope Spill Response Team (NSSRT) and Incident Command System (ICS). 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 ICS members.

The five labor categories and criteria identified for NSSRT members are as follows.

General Laborer

The General Laborer is a responder with minimal or no field experience in spill response. Duties are associated with mobilization, deployment, and support functions for the response. Support tasks such as deployment of boom sections, assembly of anchors systems, assembly of temporary storage devices, loading and unloading equipment, and decontamination of equipment are typical tasks undertaken by this responder classification. Responders in this classification must have documentation of compliance with the following minimum training requirements:

- Current 24 Hour HAZWOPER certification
- H_2S Training
- Current North Slope Training Cooperative Academy

Over time, the NSSRT training program will bring each NSSRT member from their entry point as a General Laborer to at least the Skilled Technician level.

Skilled Technician

The Skilled Technician is a responder who has experience in spill response activities at a higher level through having received specific training, having performed related activities as part of regular employment, or having participated in spill response incidents. Tasks such as the operation of skimmers, powerpacks, and transfer pumps are typical tasks undertaken by this responder. Responders in this classification must have documentation of compliance with the following minimum training requirements:

- Must meet the minimum training requirements for General Laborer
- Completion of 16 hours of training or equivalent experience in any combination of the following categories:
  - — Response equipment deployment and use
  - — Response tactics and equipment requirements
  - — Emergency response management (ICS)
  - — Staging area management and support
  - — Boat safety, navigation, or operations
  - — Contingency plan familiarization
- Completion of 16 hours of actual spill response, response exercise, or field deployment time in any combination of the following activities:
  - — Operation of recovery equipment systems
  - — Operation of transfer and storage equipment systems
  - — Deployment and use of containment systems
  - —Decontamination procedures
  - — Wildlife hazing, capture, and stabilization
- Must have ten completed equipment proficiency checks

Team Leader

Team Leader roles may include such categories as Task Force Leader, Containment or Recovery Site Team Leader, or Staging Area Manager. A Team Leader has attended additional training in the actions, responsibilities, and task associated with managing portions of an incident. Responders in this classification must have documentation of compliance with the following minimum training requirements:

- Must meet the minimum training requirements for General Laborer
- Must meet the minimum training requirements for Skilled Technician
- Must have a current 8-hour HAZWOPER Supervisor certification
- Must have 20 completed equipment proficiency checks

Vessel Operator — Nearshore

Responders qualified as Vessel Operator — Nearshore are tasked with safe operation of vessels less than 30 feet in length. These vessels have a hull design and electronics intended primarily for operation in nearshore environments or occasionally, in conjunction with larger vessels, in an offshore response. Typical duties include towing and placement of containment booms, setting and tending anchors, and movement of equipment to remote sites. Responders in this classification must have documentation of compliance with the following minimum requirements:

- Must meet the minimum training requirements for General Laborer
- Must meet the criteria for any one of the following:
  - — Completion of the ACS Captain and Crew, or Boat Safety and Handling training programs
  - — Completion of 40 hours of equivalent training or experience on vessels, including navigation, charting, vessel electronics, and docking and maneuvering procedures
  - — Current USCG Operator Uninspected Passenger Vessel, or higher, license
- Completion of nearshore vessel proficiency check

Vessel Operator — Offshore

Responders qualified as Vessel Operator — Offshore are tasked with the safe operation of vessels larger than 30 feet in length. These vessels have a hull design and electronics capable of sustaining operations in an offshore environment. Typical duties include towing of containment booms, working in conjunction with barge containment operations, towing mini-barges, operating skimmers to recover oil, providing ice management support, and providing logistical support to offshore operations. Responders in this classification must have documentation of compliance with the following minimum requirements:

- Must meet the minimum training requirements for General Laborer
- Must meet the criteria for any one of the following:
  - — Completion of the ACS Captain and Crew Training Program
  - — Completion of 40 hours of equivalent training or experience on vessels larger than 30 feet, including navigation, anchoring, vessel electronics, and docking and maneuvering procedures
  - — Current USCG 25-Ton Near Coastal, or larger, license
- Completion of offshore vessel proficiency check

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.

- Basic Oil Spill Response (Summer)
- Basic Oil Spill Response (Winter)
- Arctic Cold Weather Survival
- Arctic Ocean Survival
- Swiftwater 1st Responder
- HAZWOPER Supervisor
- Winter Oil Spill Operations
- Summer Oil Spill Operations
- Bird Collection and Stabilization
- In-Situ Burning
- SRT Wildlife Hazing Awareness
- Captain & Crew Training 1 & 2
- Airboat Operations
- Boat Safety and Handling
- Boom Deployment on Rivers
- Decontamination Procedures
- Global Positioning Systems
- ICS Basic Radio Procedures
- Skimmer Types and Applications
- Snowmachine, ARGO and ATV Operation
- Weatherport and Survival Equipment
- Bear Deterrence
- Bird Deterrence
- Fastanks and Bladders
- Nearshore Operations
- Air Monitoring
- Deckhand/Knot Tying
- Charting & Navigation
- Winter Response Tactics
- Summer Response Tactics
- Winter Equipment PC's
- Summer Equipment PC's
- C-Plan Review
- Tundra Cleanup Techniques
- Plugging and Patching
- SCAT for 1st Responders
- Archaeological Resource Awareness
- Field Mechanics of ICS
- Staging Area Management
- North Slope Spill Overview
- Bloodborne Pathogens
- Respiratory Protection
- Marine Operations Awareness
- Hazwoper Supplemental Refresher
- Culvert Plugging/Underflow Dams
- Oil Spill Olympics
- Equipment Deployment Exercises
- Immersion Suit Training
- Ice Safety Awareness
- Best Available Technology (BAT)
- Field Organization and Resource Tracking
- Approximately 160 Proficiency Checks on Various Equipment

INCIDENT COMMAND SYSTEM (ICS) TRAINING

ACS utilizes the National Incident Management System (NIMS) Incident Command System (ICS) and the Alaska Incident Management System (AIMS) for all oil spill response operations on the North Slope.

Primary references for the NIMS ICS structure are found in U.S. Coast Guard publications and on Coast Guard and FEMA websites. The primary reference for ACS regarding NIMS ICS is the Coast Guard Incident Management Handbook, COMDTPUB P3120.17A. Copies may be obtained by calling (202) 512-0000, or found online at www.gpo.gov.

The primary reference for AIMS is found at dec.alaska.gov/spar/perp/docs/AIMS_Guide-Complete(Nov02).pdf.

Copies of all the various NIMS ICS forms can also be obtained online at www.uscg.mil/forms/ics.asp ACS internally utilizes enhanced versions of the ICS-201 and ICS-209 forms, which are somewhat different from the forms online. Copies of these enhanced ICS forms can be obtained by calling the ACS training department at: (907) 659-3229.

ACS provides ICS training courses and facilitates member company exercises and drills. Below is a representative list of the various ICS courses that ACS provides:

COURSE / WORKSHOP	COURSE PROVIDER	PREREQUISITES	DURATION	TRAINING AVAILABILITY THROUGH ACS
ICS 100	Online: www.training.fema.gov	None	1-2 hours	n/a
	Alaska Clean Seas	None	1.5 hours	As requested
ICS 200	Online: www.training.fema.gov	ICS 100	1 day	n/a
	Alaska Clean Seas	ICS 100	1 day	As requested
ICS 300	Alaska Clean Seas	ICS 100, ICS 200	2 days	As requested
Resource Unit Leader	Alaska Clean Seas	ICS 100, ICS 200, ICS 300	2 days	As requested
Situation Unit Leader	Alaska Clean Seas	ICS 100, ICS 200, ICS 300	2 days	As requested
Planning Section Chief	Alaska Clean Seas	ICS 100, ICS 200, ICS 300	2 days	As requested

ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SPILL PREVENTION AND RESPONSE

OIL SPILL PRIMARY RESPONSE ACTION CONTRACTOR REGISTRATION

NAME: Alaska Clean Seas
ADDRESS: P.O. Box 340022
CITY, STATE, ZIP: Prudhoe Bay, Alaska 99234-0022

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 17, 2014**
REGISTRATION NUMBER: **09-01-14-321**
EXPIRATION DATE: **December 31, 2017**

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,
Shauna McMahon for:
Christopher J. Pace
Contractor Registration Program

OSRO CLASSIFICATION FOR OWNER/ORGANIZATION:

Alaska Clean Seas
Pouch 340022, #1 Spine Road
Prudhoe Bay, AK 99734

NOTICE: This is *NOT* an official transcript!

COTP Zone	Operating Environment	Facility MMPD	Facility WCD1	Facility WCD2	Facility WCD3	Vessel MMPD	Vessel WCD1	Vessel WCD2	Vessel WCD3
Western Alaska (Prudhoe Bay) - DISTRICT 17	River or Canal	✓	✓	✓	✓	✓	✓	✓	✓
Western Alaska (Prudhoe Bay) - DISTRICT 17	Inland	✓	✓	✓	✓	✓	✓	✓	✓
Western Alaska (Prudhoe Bay) - DISTRICT 17	Ocean	✓	✓	✓	✓	✓	✓	✓	✓
Western Alaska (Prudhoe Bay) - DISTRICT 17	Near Shore	✓	✓	✓	✓	✓	✓	✓	✓
Western Alaska (Prudhoe Bay) - DISTRICT 17	Off Shore	✓	✓	✓	✓	✓	✓	✓	✓