

Alaska Clean Seas

North Slope
Oil Spill Response



Response Organization



- ➡ Originally Established in 1979 as ABSORB
- ➡ Restructured in 1990 from equipment Co-Op into full Response Organization
- ➡ Responds like a fire brigade to emergencies with equipment and trained personnel
- ➡ Actively improving incident response and management processes across the North Slope



Other Support



- Day to Day Field Environmental and Spill Response
 - Field Environmental Audits
 - Storm Water Run-off Management
 - Oversight and Proper Manifesting of Hazardous Waste Shipments
 - Environmental Management System Development and Audits
 - Maintenance of SAA's and RAA's
 - Wildlife Hazing and Reporting



ACS Membership



Alyeska pipeline
SERVICE COMPANY

FEX L.P.

Anadarko
Petroleum Corporation



Eni **Eni Petroleum**

Brooks Range Petroleum Corporation

ExxonMobil



PIONEER
NATURAL RESOURCES

ConocoPhillips

- Alyeska Pipeline Service Company
- Anadarko Petroleum Corporation
- Brooks Range Petroleum Corporation
- BP Exploration (Alaska) Inc.
- ConocoPhillips Alaska Inc.
- Eni U.S. Operating Company Inc.
- ExxonMobil Production Company
- FEX L.P.
- Pioneer Natural Resources (USA)
- Shell Exploration & Production Company



Manpower

ACS maintains approximately 80 full-time staff.

Averaging 150 trained responders are available daily on the slope through the North Slope Spill Response Team (NSSRT).

Additionally, personnel are available from, Auxiliary Contract Response Teams (ACRT) and North Slope Village Response Teams (VRT).



Equipment

50 million dollars of equipment is maintained by ACS. The inventory includes –

- 304,004 feet of containment boom (21,000 feet of which is Fire Boom)
- 160 Skimmers (Totaling over 19,000 Bbls/Hr.)
- Eight Heli-torch aerial ignition systems
- 94 vessels
- Two 128 barrel and Twelve 249 barrel mini barges.



Training



ACS provides spill response training to its member companies, contractors, village response teams and government agencies.

Training in all aspects of spill response, including –

Arctic/Summer oriented response training

Broken and solid ice response

In-Situ Burning

Wildlife Protection

Spill Response Management (IMS)

Safety and Health Training

ACS provided 30,000 hours of training last year.



Alaska Clean Seas Technical Manuals



- Developed by the Industry/Agency North Slope Spill Response Project Team.
- Applicable to all operators on the North Slope
- Manuals developed into three volumes:
 - Tactics Descriptions
 - Map Atlas
 - Incident Management System



Research and Development



- ✦ ACS has maintained an active oil spill R&D program since the early 1980s
- ✦ Acts as facilitator for much of R &D related to spill response in arctic conditions.
- ✦ The R&D program focuses on areas such as
 - ❖ oil spill recovery techniques in, on, and under ice, during various broken ice conditions,
 - ❖ detection and tracking of oil under ice
 - ❖ in-situ burning techniques



R & D 2011 Projects



- Airborne Ground Penetrating Radar – Boise State
- Nuclear Magnetic Resonance for Detection of oil under ice - ExxonMobil
- Arctic Task Force Joint Industry Project – API
(Technology Review and research needs for oil spills in ice and cold environments)
- Oleophilic Skimmer Testing for increased recovery rate.
- Test tank for North Slope – US Army Cold Region Research and Engineering Lab (CRREL)





Questions

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Arctic Oil Spill Response

An Overview of Response Tactics for Oil Spill in Ice Environments

North Slope Spill Response Techniques



- Mechanical Recovery
 - Heavy Equipment
 - Skimmers
- In-Situ Burning
 - Heli-Torch
 - On Land
 - On Ice



Spill Site Safety Topics

- Personnel work / warm up schedule
- Equipment and Operational limitations
- Safety considerations in broken ice and ice over-flood conditions
- Ice thickness determination for personnel and equipment



Labor Cold Weather Limitations

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.

Realistic Maximum Operating Conditions

Resource	Operating Limit
Hydraulics and Cables	Temperature -35° F
Personnel	Wind Chill -70° F
Hoists and Lifts	15 kt with 20 kt gusts
Vehicles	White out, visibility restricted to a few feet, 10 to 20 ft above ground
	Over ice flow restricts passage
	Storms from the west can flood roads
Flight Cancellations	Visibility
Booms	Moving ice restricts booming
	High water flow
	Broken ice coverage >10% and <100%
Recovery with Vessels	Some open leads- recovery and trajectory uncertain
	Storm from the east can lower coastal water and strand vessels
	Over ice flow restricts
	Waves 3 feet
	Broken ice coverage >10% and <100%
Helicopter	Visibility <0.5 nm
	Atmospheric icing

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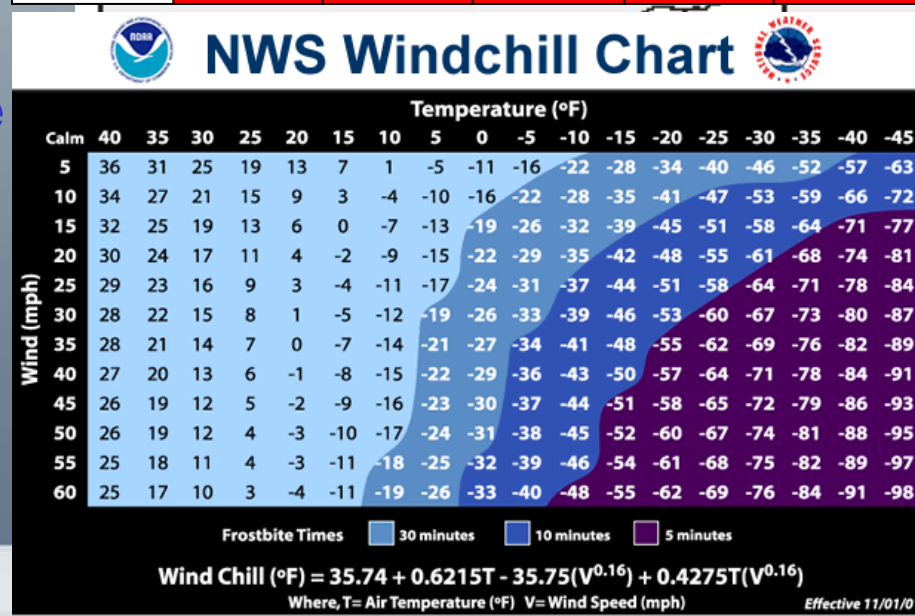
Ice Tactics

The following tactics have been identified in the ACS

Technical Manual

- C-10 Containment Using Ice Road Ring
- C-11 Containment on Ice with Trenches and Sumps
- C-12 Trenching Ice to Direct Flow to a Containment Point
- R-5 Recovery of Embedded Oil
- R-13 Cutting Ice Slots for Recovery
- R-14 Recovery of Oil under Ice
- R-29 Ice Mining
- T-3 Detection & Delineation of Under-Ice Oil
- L-7 Realistic Maximum Operating Limitations
- S-8: Safety During Operations in Overflow Conditions

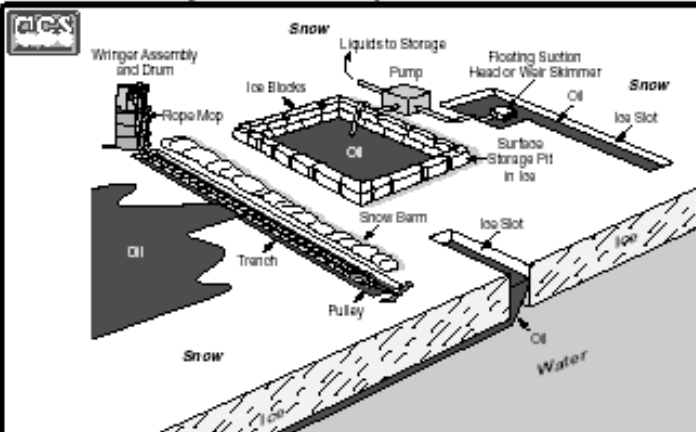
Work / Warm-up Schedule for Outside Workers based on a Four-Hour Shift*										
Air Temperature	No Noticeable Wind		5 mph Wind		10 mph Wind		15 mph Wind		20 mph Wind	
F (approx)	Max. work Period	No. of Breaks **	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks
-15 to -19	(Norm breaks) 1		(Norm breaks) 1		75 min .	2	55 mi n.	3	40 mi n.	4
-20 to -24	(Norm breaks) 1		75 mi n.	2	55 min .	3	40 mi n.	4	30 mi n.	5
-25 to -29	75 mi n.	2	55 mi n.	3	40 min .	4	30 mi n.	5	Non-emergency work should cease	
-30 to -34	55 mi n.	3	40 mi n.	4	30 min .	5				
-35 to -39	40 mi n.	4	30 mi n.	5						
-40 to -44	30 mi n.	5								
-45 & below										



Volume 1 - Tactics Descriptions



TACTIC R-13 Cutting Ice Slots for Recovery



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 maps or other types of skimmers. If the oil in the slot is thick enough, it can be removed using weir skimmers or direct suction.

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

EQUIPMENT AND PERSONNEL

EQUIPMENT	BASE LOCATION	FUNCTION	PIECES	NO. STAFF/SHIFT	MODE TIME	DEPLOY TIME
Rube Witch w/Chain Saw	AI	Trenching	3	6	1 hr	0.5 hr
Ice Auger	WGA, SGA, KRU, ACS, Endicott, Alpine	Recovery hole	1	4	1 hr	0.5 hr
Rope Map (4-inch)	AI	Recovery	1		1 hr	1 hr
Weatherport (10x12)	ACS, WGA, Alpine	Shelter	1		1 hr	1 hr
Diaphragm Pump (3-inch)	AI (ACS, MPU, Alpine have deck)	Recovery	1		1 hr	0.5 hr
Slurp Skimmer	ACS	Recovery	1		1 hr	0.5 hr
Suction Hose (3-inch)	AI	Recovery	2 ≥20 ft	2 for setup	2 hr	0.5 hr
Discharge Hose (2-inch)	AI	Recovery	2 ≥20 ft	—	1 hr	0.5 hr
Generator	AI	Rope map power	1	2 for setup	1 hr	0.5 hr
4-Wheeler w/Flare	AI, except Gadani & MPU	Berming	2	2	1 hr	0.5 hr

TOTAL STAFF FOR SETUP AND TRENCHING 12

TOTAL STAFF TO SUSTAIN OPERATIONS 3

NOTE: "Base Location" is storage location (may change seasonally); "Mode 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: All values given on these pages are for planning purposes only.

Cutting Ice Slots for Recovery TACTIC R-13

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

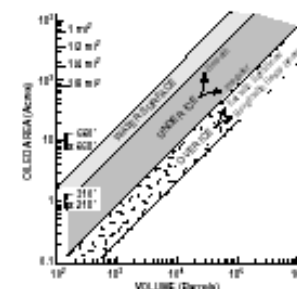
SUPPORT

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

CAPACITIES FOR PLANNING

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

TYPICAL ARCTIC HOLDING CAPACITY



DEPLOYMENT CONSIDERATIONS AND LIMITATIONS

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

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

Volume 2 - Map Atlas

SHEET 37

Sensitivity Information



PRIORITY PROTECTION SITES

SITE NO.	DESCRIPTION	SENSITIVITY	TACTIC	EST. BOOM
PS1B	Creek mouth 2 miles SE of Milne Point	Most sensitive during open water season. Keep oil from entering lagoon.	C-13 or C-14	800'
PS1BA	Salt marsh 1.75 miles SE of Milne Point	Most sensitive during open water season. Keep oil from entering salt marsh.	C-13 or C-14	800'
PS1B	Inlet to marsh 2 miles SW of Milne Point	Most sensitive during open water season. Inundated low-lying tundra shorelines.	C-13 or C-14	500'

GENERAL SENSITIVITIES

- Coastal areas support high concentrations of breeding, nesting, brood-rearing, and molting waterbirds during the summer.
- Simpson Lagoon has large flocks of molting male Oldsquaw in July and early August, especially in the lee shores of the barrier islands.
- Shoreline and offshore areas support molting and brood-rearing eiders. This is also a staging area for migrating Phalaropes (shorebirds). Birds are present in June through September.
- This is a Brant nesting, brood-rearing, and molting area. Birds are present from May through August.
- Pairs of Spectacled Eiders have been found in this area.
- Plan to deploy bird-baiting systems during the open-water season.

CULTURAL SITES

Information on the exact locations of cultural sites is confidential. This information is contained in the North Slope Archaeological Data document, copies of which are kept at the following offices: State Historical Preservation Officer (SHPO) (907-269-8721), ACS in Deadhorse (907-669-2405), North Slope Borough Lands Division (907-852-0322), North Slope Borough Lands Division (907-852-0322), BPXA Crisis Center in Anchorage (907-564-5243), and the ARCO Incident Command Center in Anchorage (907-265-1000). The following cultural site(s) are located in the area depicted on this sheet:

- XBP-010 on the coast east of Milne Point

Response Considerations

SHEET 37



AIR ACCESS*

- There is an emergency aircraft landing strip located on Oliktok Point (Sheet 35) approximately 9 miles west of Milne Point. This is a 4,000-ft gravel airstrip, which is unattended and closed to the public. Approval to use the strip must be obtained 24 hours in advance by calling 907-552-1738 or 317-552-1738. Visual inspection prior to use is recommended.
- The Kuparuk airstrip (Sheet 51) is located approximately 13 miles south-southwest of Milne Point.

AIRSTRIIP	DESCRIPTION/ LOCATION	FIXED-WING MINIMUMS	FUEL/ SERVICES	TRAFFIC CONTROL
Kuparuk Airstrip	6,000-ft. gravel runway, attended continuously	VFR: 1 mi vis. clear of clouds IFR: 0.75 mi vis.	Jet A	24-hr advance notification required 907-659-7213

VESSEL ACCESS* AND HYDROGRAPHIC CONDITIONS

- Simpson Lagoon water depths range from 3 to 7 ft.
- Aircraft wreckage is present in 4 ft of water 0.5 mile offshore north of Milne Pt. 18-1.
- Simpson Lagoon currents are generally to the west at 10 to 30 cm/sec.

COUNTERMEASURES CONSIDERATIONS

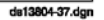
- Vegetated shorelines making up much of this area will preclude the use of heavy equipment. Sand/silt washed over on the vegetated shorelines is mixed with large peat blocks, making mechanized travel difficult.

STAGING AREAS AND PRESTAGED EQUIPMENT

- There are staging areas at MPU D Pad and at MPU L Pad.
- Boom is typically predeployed seasonally on Central Milne Creek north of MPU-2 and northeast of Milne Point Road.

PRESTAGED EQUIP. AREA	LOCATION	ITEM	QUANTITY	TYPE
MPU-2	At river east of MPU A Pad	Boom Boom Pump Skimmer Skimmer Storage	1,000' 200' 1 1 1	8' x 6' river Shore/tide 3" diaphragm Rope mop, Z14-E Disc, MI-30 2,400-gal. Fastank
MPU-3	On south side of inlet, northwest of MPU D Pad	Boom Boom Pump Skimmer Skimmer Storage	1,000' 100' 1 1 1	8' x 6' river Shore/tide 3" diaphragm Rope mop, Z14-E Weir, slurr 2,400-gal. Fastank
MPU-4	West of mouth of Central Milne Creek on south side of inlet	Boom Boom	1,000' 200'	8' x 6' river Shore/tide
MPU-5	On south side of inlet near entrance to bay	Boom Boom Pump Skimmer	1,500' 200' 1	8' x 6' river Shore/tide 3" diaphragm Disc, MI-30

*See the latest Supplement, Alaska and United States Coast Pilot for current information on air and vessel access, respectively.



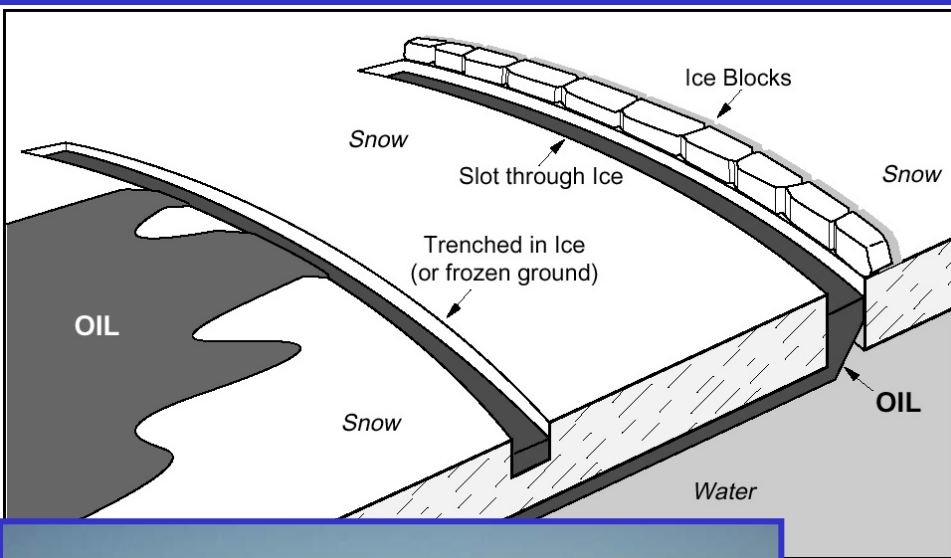
Oil Under Ice Recovery Tactics



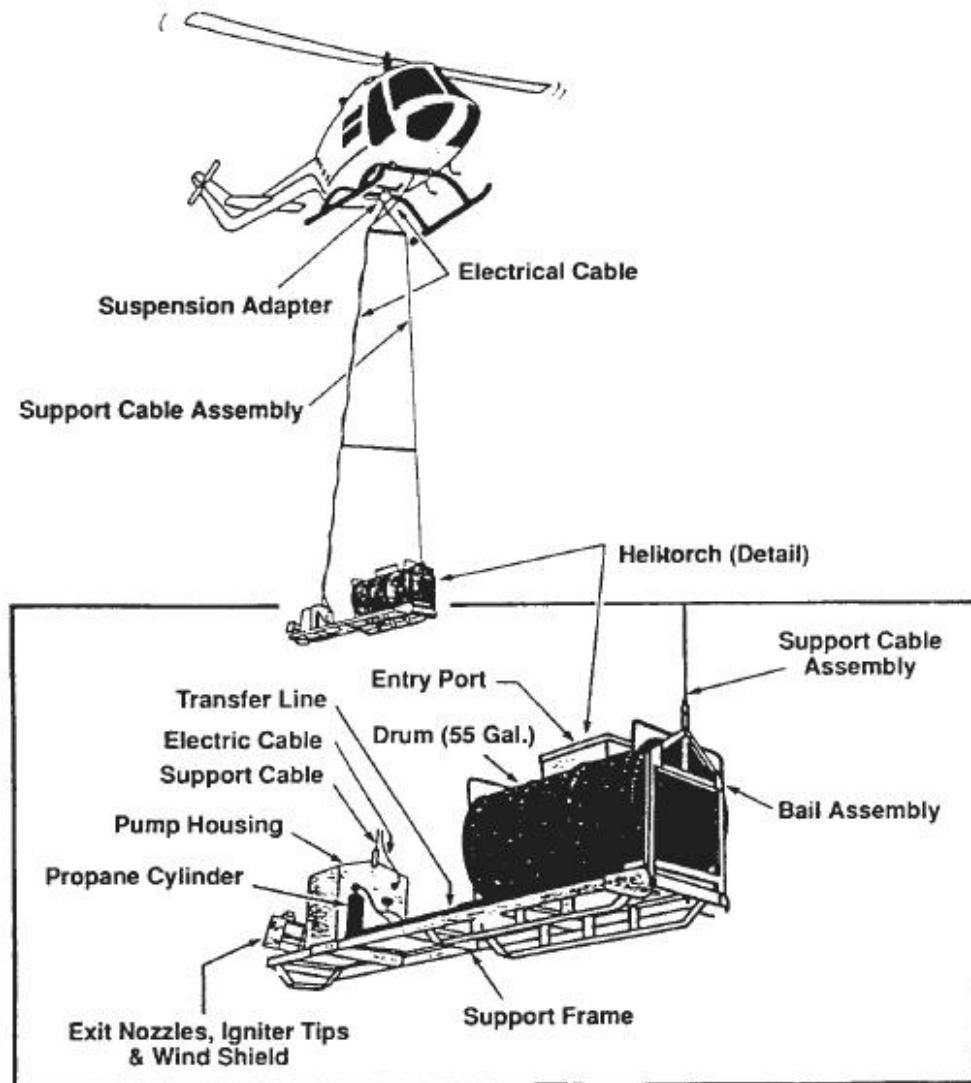




Solid Ice Containment Trenching



Broken Ice Response



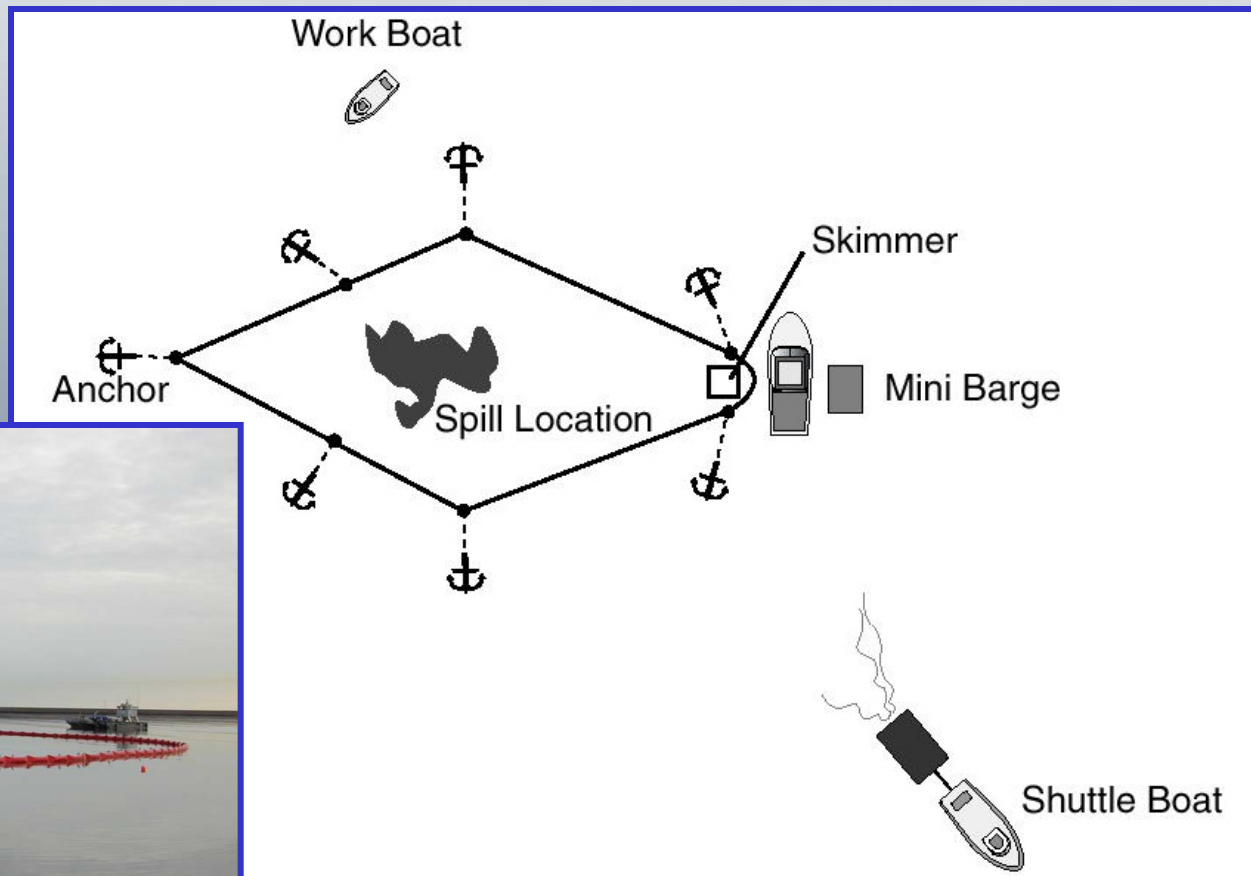
Broken Ice Response



Recovery Using Free Skimming



Recovery Using Diamond Boom for a Subsea Source



Ice Overflow



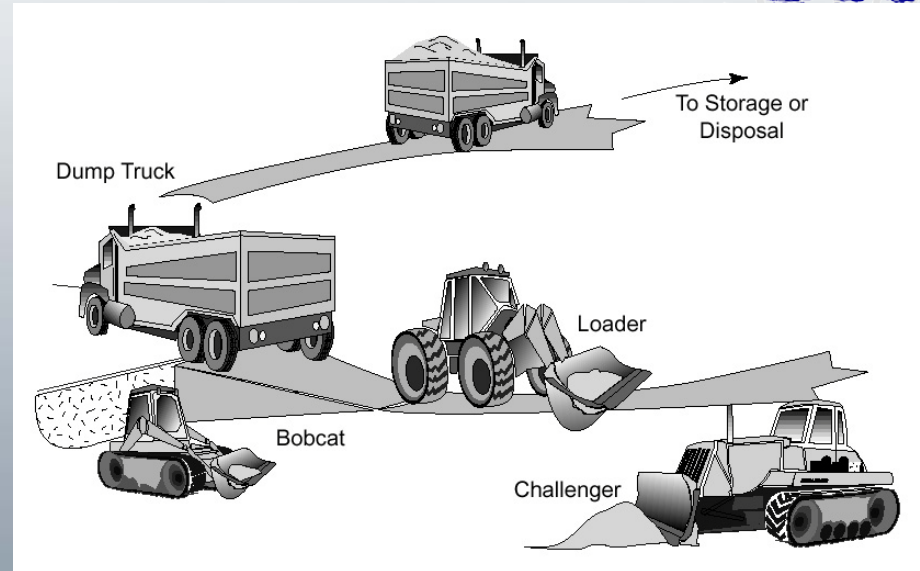
Ice Overflow



Snow Berms



Manual/Mechanical Recovery of Oiled Snow



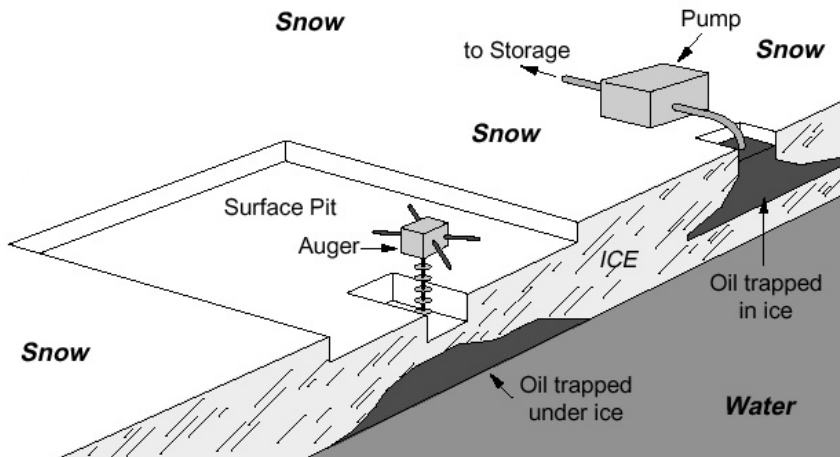
Use of Snow Blower



Warm Water Flushing of Oil



Oil Under Ice



Oil Embedded in Ice

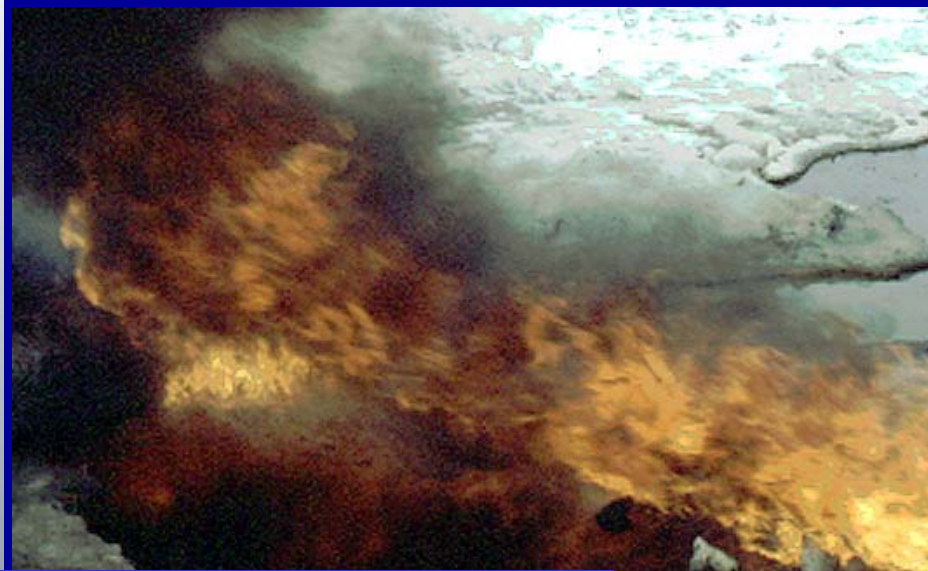


Viscous Oil Pumping





In-Situ Burning



In-Situ Burning Tests











In-Situ Burning





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