Alaska Clean Seas
Gary Stock, Training Specialist

Oil Spill Response In Fast Water And Currents
Presentation Overview

- Alaska Clean Seas Overview
- ACS Tactics Manual
- Fast Water Containment Tactics
- Fast Water Recovery Tactics
- Equipment
- Operational Limitations: Safety and Equipment
Mission

To provide personnel, material, equipment, and training response capability for use in support of its members in preparing for, responding to, and cleaning up an oil spill within the area of interest.

Under ACS By Laws –

1. All members are entitled to call upon ACS and receive assistance in the above activities.

2. Members are also entitled to refer to ACS resources in their contingency plans, and to represent to regulatory agencies and others, that these resources are available to them in the event of a spill.
Current Members

- Alyeska Pipeline
  - Conoco/Phillips Alaska, Inc.
  - BP Exploration (Alaska)
  - Exxon/Mobil Production Company
  - Anadarko, Pioneer, FEX, BRE
  - Shell Oil – Newest Member
Current Area of Operations

Providing response services to the Alaska North Slope crude oil producers and the first 167 miles of the Trans Alaska Pipeline System.
Mile Post 0 to 167 of Trans Alaska Pipeline (TAPS)
TAPS Pump Stations
Equipment

Equipment is owned by the Co-Op and maintained on the North Slope. The inventory includes –

- 287,000 feet of boom (47.3 miles), 17,450 ft of which is Fire Boom
- 160 Skimmers (Over 33,000 Bbls/Hr. of Derated Recovery Capacity)
- Eight heli-torch aerial ignition systems
- 90 vessels
- Two 128 barrel and Twelve 249 barrel mini barges.
Manpower

ACS maintains approximately 70 full-time staff.

115 responders are available through the North Slope Spill Response Team (NSSRT).

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

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

- Arctic environment: -50 F - +70 F
- Open water 3-4 months
- Tundra
- Fast water rivers
- Lakes, ponds
- Near-shore – 6” tide range
- Off-shore – primarily wind driven currents
Tactics Manual Contents

- Safety
- CONTAINMENT
- RECOVERY AND STORAGE
- Tracking and surveillance
- Burning
- Shoreline cleanup
- Wildlife and sensitive areas
- Disposal
- Logistics and Administration
Containment Tactics In Fast Water
And Currents
Criteria For Selecting Containment Sites

- Containment Sites are areas of opportunity that can enhance containment efforts. Preplanned containment sites are an essential component of our contingency plans. This section presents criteria for logical, systematic and consistent site selection.
Criteria For Selecting Containment Sites

- Channel configuration
  - Width
  - Depth
- Back Water (eddies) areas
- Side Channels
- Dry or Wet Ponds adjacent to rivers with Containment and Recovery Potential
- Back Water (eddies)
- Side Channels
- Dry or Wet Ponds adjacent to rivers
- Containment and Recovery Potential
Containment Boom
Boom Angles

- 3 knots is upper limit?
- Difficulty increases as boom angle gets steeper
- More boom required as angle gets steeper

<table>
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<th>Current (Knots)</th>
<th>Current (ft/second)</th>
<th>Boom angle relative to current, required to keep component of current &lt;1/4 Knot</th>
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## FEET OF BOOM REQUIRED

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Oil Entrainment

- Shallow skirted boom
- Velocity of water
- Length of boom
- Design of boom
- Amount of oil in boom
Fast Water Booming Tactics
C-8 Deflection Booming

Deployment Side

Upstream Anchor

Recovery Area

Boom

Current

Recovery Side

#1

#2

#3

#4

#5

#6
C-8 Deflection Booming
Diversionary (Cascade)

Upstream Anchors

Current

Recovery Area

Booms Tied to Anchors
Chevron boom configurations are used for fast water. Chevron configurations are used to break a slick for diversion to two or more collection areas. Open chevrons can be used where boat traffic must be able to pass.

CURRENT
Tag Lines Installed
Dead Man Anchor

Oil Slick Moving Towards Boom
Catenary booming is used when the current is less than \( \frac{1}{4} \) knot. Deployment and maintenance of a single long boom can be difficult and labor intensive. A trolley (cable supported diversionary boom) is a cable or line strung across a river and the boom attached to the trolley line with a pulley.

C-8 Deflection Booming
Catenary/Deflection Trolley
C-7 Deadarm Trench

- A natural or man-made deadarm trench can be used to collect and contain oil from a land based spill.
Boom Anchor?
Fast Water Anchor Plates
Boom Rudders
Boom Vanes
Boom Vanes

27 in APSC Inventory for 2005 (24”, 48” and 2 meter)
Boom Vane (2 meter, offshore)
2 Boom Vanes on Tanana River

- Boom Vane #1
- Boom Vane #2
- Aqua Guard Skimmer
Pipe Dams

Underflow and Overflow
Mega-secure Dam With Boom and Boom Vane

Water Dam

Oil Recovery Area

Klutina River + 7 knots
Mega-secure Dam with Boom

Klutina River

Quiet Water

12” Fast Water Boom

21” x 35’ Water Dam

This was fixed later
Fast Water Skimmers
Circus Wier Skimmer
Pedco Wier Skimmer
Aqua-guard Disk/Drum Skimmer
NOFI Current Busters
Harbor, Current, Ocean
Deployment Platforms
Airboats
Freighter Airboat
Offshore Vessels
Conclusions

- Most tactics not proven in real spill situations
- Equipment has operational limitations
- Entrainment with shallow skirted boom
- Safety becomes a real issue in fast cold water
- Certain equipment has proven to be effective
- Logistics can be difficult
- Pre-planning and training is essential
- Tides, currents present challenges