Incident Action Plan

Volcanic eruption/flooding. Mount Redoubt initially erupted at 10:38 PM on March 22, 2009, followed by several other eruptions. The resultant lahars (or volcanic mudflows) caused extensive flooding at the Drift River Terminal. However, no oil or hazardous substance releases have been reported at this time.

* Cdr. Joe LoSculito of the US Coast Guard (FOSC for the Terminal & Maritime)

Drift River Oil Terminal.
Picture Date: March 28, 2009
Image Creator: Russell, Steve;
Image courtesy of ADEC.

Caption: View of the northwest corner of the tertiary containment.
Incident: Drift River Terminal Flooding

Period: Period 1 (3/26/2009 16:00 - 3/27/2009 16:00)

Prepared By: Kalyan, Mala at 3/26/2009 12:55

Incident Details

Incident Name: Drift River Terminal Flooding
Incident Number: 09239908201
Incident Date/Time: 3/22/2009 22:38
Time Zone: Alaska-Hawaii Daylight Time

Organizational Structure Type: Oil Spill
Affected Asset Type: Facility
Affected Asset:
Location: Drift River Terminal, West Side Cook Inlet
Latitude: 60.6000000
Longitude: -152.1833333

Person Reporting Incident: None
Person Contact Number(s):

Incident Description: Mt. Redoubt initially erupted on March 22, 2009 at 10:38 PM, and continues to erupt with associated lahars and ashfall. The tank farm at the Drift River Terminal is composed on seven tanks, of which two are operation with each containing 74,000 barrels of crude oil. For an up-to-date assessment of the situation, please review the latest DEC Situation Report (Sitrep) posted at the following website:

http://www.dec.state.ak.us/spar/perp/drot
### Overall and Strategic Objectives

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**Ensure the safety of citizens and response personnel. Address the risk posed by actual/potential ashfall to responders.**

Develop plans for increased monitoring of lahars thru placement of additional instrumentation by AVO.

- Coordinate with AVO for notification of volcanic eruptions, lahar and flood warnings, plus any potential implications to changes in hydrological conditions.

**Prevent the release of oil, hazardous materials, and refuse/terminal debris to the environment.**

- Identify spill response resources available (CISPRI, NAVSUPSALV, CIPL, and Chevron) - status, deployment times, and location.
- Continue to determine and update information on Resources at Risk.

**Conduct a risk-based decision process prior to movement of any crude oil product to and from the facility.**

- Monitor the risk to the Drift River Terminal, tanks, pipelines, and cargo transfer facility.
- Identify oil storage capacity and inventory management of facilities.
- Coordinate and participate in Overflights. Ash plume and flight safety conditions will be monitored at all times.

**Identify regulatory requirements for facility restart of operations.**

- Monitor plans and timeframe for effecting repairs necessary for resumption of operations.

**Identify and maintain stakeholder communications and engagement.**

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**Operational Period Command Emphasis (Safety Message, Priorities, Key Decisions/Directions)**

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**Approved By**

---
Assess the threat of lahars and flooding to the DROT and associated pipelines. Specific areas of focus are as follows:

1. Lahar and flood predictions
2. Lahar and flood warning system
3. Floodplain risk assessment
4. Geologic Hazards
5. Lahar and/or flood impacts on terminal facility
6. Tertiary Containment Integrity

Special Instructions for Division / Group

Conduct overflights of the area specifically to determine the extent of lahars and flooding. Compile the reports and forecasts from other groups, including operational overflight photos, DNR-AVO data, NWS weather and river flood forecasts, Army Corps of Engineers risk assessments, and USGS hydrological information.

Tactical Objective

Conduct overflights of the area specifically to determine the extent of lahars and flooding. Compile the reports and forecasts from other groups, including operational overflight photos, DNR-AVO data, NWS weather and river flood forecasts, Army Corps of Engineers risk assessments, and USGS hydrological information.
Incident: Drift River Terminal Flooding
Period: Period 4 (3/29/2009 16:00 - 3/30/2009 16:00)

Operations Personnel

<table>
<thead>
<tr>
<th>Title</th>
<th>Name</th>
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<tbody>
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<td>Dave McMahan</td>
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<td>Richard Vanderhoek</td>
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<td></td>
<td>Shannon Miller</td>
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Assignments
Determine resources at risk, including wildlife, sensitive habitats, historical properties, and private property.

Location of Work
Anchorage
Operations Personnel

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<td>AOGCC</td>
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Assignments

> Work with Cook Inlet Pipeline, USCG, DNR, PHMSA, and AOGCC to determine oil inventory at the Drift River Terminal Facility, which includes all tanks and pipelines.

> Determine operational alternatives and corresponding tank inventory levels until threat is eliminated (including alternative storage possibilities, potential for reverse flow to up-stream storage, water-ballasting oil tanks versus using oil to stabilize tanks).

> Assess potential up-stream effects to production wells in the event that oil platforms are shut-in, including
  
  - What increased risks are there for spills from these platforms?
  
  - What are the potential effects to the oil reservoirs and recovery?
  
  - What are the risks for partial or permanent loss of production?

Location of Work

Anchorage

Special Equipment / Supplies Needed for Assignment

None at this time

Special Site-Specific Safety Considerations

All field work will require appropriate PPE.
ICS 204 - Assignment List

Incident: Drift River Terminal Flooding
Prepared By: Brown, John
Period: Period 4 (3/29/2009 16:00 - 3/30/2009 16:00)

Division/Group/Staging: Operations/ Situation Overflights

Operations Personnel

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<tr>
<td>Air Support Group</td>
<td>Neil Huddleston</td>
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</tr>
</tbody>
</table>

Assignments

Participate in facility overflights

Special Instructions for Division / Group

Use digital video and cameras to document overflight information.

Tactical Objective

Monitor and coordinate overflight information.

Location of Work

Anchorage/ Soldotna

Special Equipment / Supplies Needed for Assignment

Digital video camera and regular digital camera

Special Site-Specific Safety Considerations

Monitor reports of volcanic eruptions; no flight if there is any chance of encountering ash while flying.
Operations Personnel

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<td>Navy SUPSALV</td>
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Assignments

> Identify possible spill scenarios in light of current conditions.
> Identify spill response resources available at CISPRI, Cook Inlet Pipeline, Chevron, Navy SUPSALV.
  - Determine status
  - Deployment times, and locations
> Identify Geographic Response Strategies that can be activated to protect sensitive areas that may be impacted by a crude oil release from the terminal area.
> Identify response tactics and resources that would be used to contain and recover oil in the event of a crude oil release.
> Identify non-mechanical response tactics and resources that could be used in the event of a crude oil release.
> Identify predeployment tactics that could enhance response times and capabilities.
> Identify potential safety-related issues to personnel and response equipment in the event of ash fallout

Special Instructions for Division / Group

None

Tactical Objective

Verify which immediate response resources are available, as well as location and availability of vessels and large response equipment in Cook Inlet area.

Location of Work

Soldotna

Special Equipment / Supplies Needed for Assignment

None
Incident: Drift River Terminal Flooding

Period: Period 4  (3/29/2009 16:00 - 3/30/2009 16:00)

Operations Personnel

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<td>EPA</td>
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Assignments

Identify all actions and regulatory requirements for a restart of facility operations. Should include Cook Inlet Pipeline, PHMSA, USCG, EPA and State of Alaska requirements prior to start-up commencing.

>Develop a comprehensive safety plan.
>Continue mud and debris removal.
>Conduct integrity check. Identify any damage and repairs needed to:
  - Tertiary dike and secondary containment
  - Pipelines to loading berth
  - Crude oil transmission pipeline
  - Pumping System
  - Tanks
  - Support infrastructure, safe haven, roads, airstrip, helicopter pad, hangar, other buildings
>Identify a repair schedule, if needed.
>Ensure that all agency permits and approvals have been met.
>Coordinate schedule with facility restaffing, port operations and tanker schedules.

Location of Work

Anchorage

Special Environmental Considerations

Coordination with all State Trustee Agencies, Coast Guard, EPA, and Federal DOT

Special Site-Specific Safety Considerations

None at this time
<table>
<thead>
<tr>
<th>Name</th>
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<td>DNR-DGGS (Director)</td>
<td>Div of Geological and Geophysical Surveys</td>
<td><a href="mailto:Bob.swenson@alaska.gov">Bob.swenson@alaska.gov</a></td>
<td>451-5001</td>
</tr>
</tbody>
</table>
### Medical Aid Stations

<table>
<thead>
<tr>
<th>Name</th>
<th>Location</th>
<th>Paramedics (On-Site)</th>
<th>Phone</th>
<th>Radio</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK Air National Guard</td>
<td>Anchorage, AK</td>
<td>Yes</td>
<td>907-428-7230</td>
<td></td>
</tr>
<tr>
<td>Fairweather Inc.</td>
<td>Anchorage, AK</td>
<td>Yes</td>
<td>907-258-3446</td>
<td></td>
</tr>
</tbody>
</table>

### Transportation (Ground and/or Air Ambulances Services)

<table>
<thead>
<tr>
<th>Name</th>
<th>Location</th>
<th>Paramedics</th>
<th>Phone</th>
<th>Radio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Providence Life Flight</td>
<td>Anchorage, AK</td>
<td>No</td>
<td>907-243-5433</td>
<td></td>
</tr>
<tr>
<td>Security Aviation</td>
<td>Anchorage, AK</td>
<td>No</td>
<td>(907) 248-2677</td>
<td>N</td>
</tr>
</tbody>
</table>

### Hospitals

<table>
<thead>
<tr>
<th>Name</th>
<th>Location</th>
<th>Helipad</th>
<th>Burn Center</th>
<th>Phone</th>
<th>Radio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alaska Native Medical Center</td>
<td>Anchorage, AK</td>
<td>(907) 563-2662</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alaska Regional Hospital</td>
<td>Anchorage, AK</td>
<td>Yes</td>
<td>No</td>
<td>(907) 276-1130/175</td>
<td></td>
</tr>
<tr>
<td>Providence Alaska Medical Center</td>
<td>Anchorage, AK</td>
<td>Yes</td>
<td>Yes</td>
<td>(907) 562-2211</td>
<td></td>
</tr>
<tr>
<td>South Peninsula Hospital</td>
<td>Homer, AK</td>
<td></td>
<td></td>
<td>(907) 235-8101</td>
<td></td>
</tr>
<tr>
<td>Central Peninsula General Hospital</td>
<td>Soldotna, AK</td>
<td></td>
<td></td>
<td>(907) 262-4404 (24)</td>
<td></td>
</tr>
<tr>
<td>Peninsula Medical Center</td>
<td>Kenai, AK</td>
<td></td>
<td></td>
<td>907-262-9341</td>
<td></td>
</tr>
</tbody>
</table>

### Special Medical Emergency Procedures

In the Kenai Borough (911) can be used for contacting and mobilization of local police, Alaska State Troopers, Fire, or Ambulance.
# ICS 208 - Site Safety Plan

## Incident:
Drift River Terminal Flooding

## Period:
Period 4 (3/29/2009 16:00 - 3/30/2009 16:00)

## Prepared By:
Kalyan, Mala

## at:
3/29/2009 16:47

## Version Name:
3/28/09

## Applies To Site:
Drift River Terminal

## Products:
Volcanic Ash, Crude Oil

## SITE CHARACTERIZATION

| Water: | Cook Inlet |
| Wave Height: | 5 ft |
| Current Speed: | |
| Land: | Brushland |
| Weather: | Snowy |
| Wind Speed: | knots |

**Wave Direction:** Southwest  
**Current Direction:** Industrial  
**Use:** Industrial  
**Temp:** Mid 30s Fahrenheit  
**Wind Direction:** Northeast

### Pathways for Dispersion:
Air

### Site Hazards

- Boat safety
- Chemical hazards
- Cold Stress
- Confined Spaces
- Drum handling
- Equipment operations
- Electrical operations
- Fatigue
- Other: Volcanic Ash

### Air Monitoring

- %O2: NA  
- %LEL: NA  
- ppm Benzene: NA  
- ppm H2S: NA  
- Other (Specify): Volcanic Ash Particles

## CONTROL MEASURES

### Engineering Controls

- Source of release secured
- Site secured
- Valve(s) closed
- Facility shut down
- Energy sources locked/tagged out
- Other

### Personal Protective Equipment

- Impervious suit
- Inner gloves
- Outer gloves
- Flame resistance clothing
- Hard hats
- Respirators
- Eye protection
- Personal floatation
- Boots
- Other

### Additional Control Measures

- Decontamination stations established
- Sanitation facilities provided
- Illumination provided
- Medical surveillance provided
Incident: Drift River Terminal Flooding

Period: Period 4 (3/29/2009 16:00 - 3/30/2009 16:00)

 prepares the site for each site. The plan includes the following elements:

**WORK PLAN**

- Booming
- Skimming
- Vac trucks
- Pumping
- Excavation
- Heavy equipment
- Sorbent pads
- Patching
- Hot work
- Appropriate permits used
- Other: Assessment of Drift River Facility

**TRAINING**

- Verified site workers trained per regulations

**ORGANIZATION**

<table>
<thead>
<tr>
<th>Title</th>
<th>Name</th>
<th>Telephone/Radio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incident Commander:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deputy Incident Commander:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety Officer:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public Affairs Officer:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**EMERGENCY PLAN**

- Alarm system: Horn or Siren on Site
- Evacuation plan
- First aid location

**Notified**

<table>
<thead>
<tr>
<th>Notified</th>
<th>Name</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital</td>
<td>Central Peninsula Hospital</td>
<td>262-4404</td>
</tr>
<tr>
<td>Ambulance</td>
<td>Kenai Peninsula Emergency Services</td>
<td>911</td>
</tr>
<tr>
<td>Air ambulance</td>
<td>Kenai Peninsula Emergency Services</td>
<td>911</td>
</tr>
<tr>
<td>Fire</td>
<td>Kenai Peninsula Emergency Services</td>
<td>911</td>
</tr>
<tr>
<td>Law enforcement</td>
<td>Alaska State Troopers</td>
<td>911</td>
</tr>
<tr>
<td>Emergency response/rescue</td>
<td>USCG Sector Anchorage</td>
<td>271-6700</td>
</tr>
</tbody>
</table>

**PRE-ENTRY BRIEFING**

- Initial briefing prepared for each site

**Attachments / Appendices**

- Aircraft Travel
- Safe Work Practices for Working in Volcanic Ash
- Safe Work Practices for Boats
- Personnel Tracking System
Aircraft Travel:

The following safety guidelines are intended for SPAR personnel that are passengers in light aircraft. SPAR employees piloting aircraft must adhere to all FAA regulations and the flight safety manual used by the Alaska Department of Public Safety.

I  GENERAL

This section contains information that describes the proper attire for winter and summer flying, survival kits, forced landings, and passenger/pilot relationships.

A. Safety Rules

Most of the procedures listed below apply to SPAR employees flying in small planes or helicopters.

Dry suits must be worn on all helicopter flights over water. Mustang suits or float coats should be worn on flights over water in small fixed-wing aircraft.

Seatbelts and shoulder harnesses (if so equipped) must be worn snugly on all flights.

Passengers should not move about the aircraft without permission of the pilot.

4. Passengers should pay close attention to all pre-flight safety briefings given by the pilot(s).

5. Passengers should wear clothing appropriate to the current climatic conditions - during winter months thermal underwear and suitable cold weather outer clothing should be worn. Spare clothing should be taken.

6. Care must be taken when leaving aircraft as ground/aircraft surfaces can be slippery - when deplaning a float plane, the water depth may be deceiving.

7. Supervisors must insure the pilot is given a briefing on the mission so he/she can prepare a concise flight plan.

8. No person shall leave an aircraft until given approval by the pilot (no person should exit or board a fixed-wing aircraft until the propeller has stopped).

9. Hearing protection should be worn on all aircraft.

10. If forced to land on water, passengers should remain inside the aircraft unless it begins to sink or tip. Take emergency kits and life rafts when exiting the aircraft.

11. Know the location and use of fire extinguishers and emergency equipment and kits (including the emergency locator transmitter (ELT) and how to activate it), and the location of all exits.

12. Passengers have the right to reject a flight that they feel is unsafe. Employees should have the training and knowledge to assess aviation weather information and make an informed “go/no-go” decision. (Also see “Icing and Small Aircraft” below.)

13. Passengers who feel that they have been put in danger during a flight should contact the local FAA Flight Standards District Office (FSDO) to discuss the matter. This could save someone's life. This is particularly important if, during a flight in a single-engine commercial aircraft, the plane entered the clouds, a situation prohibited for most single-engine commercial operations.

14. Special considerations: Helicopter

a. Do not approach a helicopter until given approval by the pilot.

b. Always approach a helicopter in crouched position.

c. Don’t walk up slope when under the arc of the rotor.

d. Approach a helicopter from the front (45° angle), always in full view of the pilot.

e. REMAIN CLEAR OF THE REAR OF THE HELICOPTER. NEVER WALK NEAR OR UNDER THE TAIL BOOM OR TAIL ROTOR.

f. Do not carry any objects above head level when entering/leaving a helicopter.

g. Remove hats and secure glasses and other loose objects when entering/leaving a helicopter.
ATTACHMENT: SAFE WORK PRACTICES FOR BOATS

ATTACHMENT: SAFE WORK PRACTICES FOR BOATS

Ensure that all boats and operators comply with the appropriate state and federal regulations. In addition to the items discussed below, certain types of vessels will require such items as USCG approved fire extinguishers, backfire flame control, powered ventilation, sound signaling devices (different from emergency signals), navigation lights/signals, pollution placards, and marine sanitation devices.

1. Boat operators must familiarize themselves and passengers with safety features and equipment on their boats.
2. Boats must be operated by qualified individuals.
3. Life jackets, work vests, cold water immersion suits, or other appropriate USCG approved Personal Floatation Devices (PFDs) must be worn by personnel in boats.
   a. Use of cold water immersion suits is particularly critical under conditions of cold stress.
   b. Types of PFDs:
      Type I  Off-shore life jacket provides the most buoyancy. It is effective for all waters and intended specifically for open, rough, or remote waters where rescue may be delayed.
      Type II Near-shore buoyancy vests are intended for calm, inland water, or where there is a good chance of quick rescue.
      Type III Floatation aids are good for calm, inland water, or where there is a good chance of quick rescue. Examples: float coats, fishing vests, and ski vests.
      Type IV These are throwable devices, not intended to be worn or to replace those that are worn.
      Type V Special Use. These are intended for specific activities (according to the conditions on the labels). Some examples: deck suits, cold water immersion suits, work vests, and hybrid PFDs below.
      Type VI Hybrid Inflatables. These PFDs contain a small amount of inherent buoyancy and an inflatable chamber. Performance equals that of a Type I, II, or III PFD (as noted on the label) when inflated.
4. Boats should generally not be operated for oil recovery after sunset. If this is required or poses minimal risk, areas of operation should be carefully prescribed, and individual boat operators should maintain a communication schedule with a shore base. Each boat should be fully equipped with appropriate running lights and emergency signaling devices, and personnel onboard should be wearing emergency night signaling devices.
5. Distress signals (three or more for day and three or more for night) should be carried on board all vessels. These devices may be required by regulation. They may be stored on board or issued to individuals. If stored on board, they should be in a sealed, watertight, orange container marked "DISTRESS SIGNALS".
   a. USCG-approved pyrotechnic visual distress signals include red flares (hand-held or aerial), range smoke (hand-held or floating), and launchers (for aerial red meteors or parachute flares). Pyrotechnic devices should not be used near flammable product spills.
   b. Non-pyrotechnic distress signals are not approved individually, but must meet certain requirements. They should be in serviceable condition, readily accessible, and certified by the manufacturer as complying with USCG requirements. These devices include orange distress flags, and electric distress lights.
   c. Distress flags are day signals only. They must be at least 3x3 feet with a black square and ball on an orange background.
      i. Electric distress lights are for night use only. These devices automatically flash the international SOS code (... - - ...) so a flashlight IS NOT considered a distress signal. Under inland navigation rules, a high intensity strobe light is considered a distress signal.
      ii. It is illegal to display visual distress signals on the water, except when assistance is required.
6. Boat operators must keep their supervisors informed of their area of operations, especially when they change their work area (if plans call for a boat to move to another location during a shift, the operator should advise the supervisor of his actual time of departure).
7. Boat operators should never anchor their boats by the stern. This is typically the lowest point on the boat due to design and/or loading, and is often squared off, making it vulnerable to swamping.
8. Portable fuel tanks should be filled outside of the boat. All sources of ignition in the area of fueling (e.g., engines,
Material Safety Data Sheet
BENTONITE USA - Product No: 1763
volcanic ash
NATURAL SOURCE

<table>
<thead>
<tr>
<th>Info</th>
<th>Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td>FEMA No</td>
<td></td>
</tr>
<tr>
<td>CAS No.</td>
<td>70131-50-9</td>
</tr>
<tr>
<td>Chemical Name</td>
<td></td>
</tr>
<tr>
<td>Health</td>
<td>Hazardous</td>
</tr>
<tr>
<td>Flammability</td>
<td>Will ignite if overheated</td>
</tr>
<tr>
<td>Reactivity</td>
<td>Stable and not reactive with water</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Info</th>
<th>Fire, Explosion &amp; Reactivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flash Point</td>
<td>N/A</td>
</tr>
<tr>
<td>Extinguishing Media</td>
<td>FOG-Yes</td>
</tr>
<tr>
<td>Dot Classification</td>
<td></td>
</tr>
<tr>
<td>Stability</td>
<td>STABLE</td>
</tr>
<tr>
<td>NFPA Classification</td>
<td></td>
</tr>
<tr>
<td>Fire Fighting</td>
<td>SMOTHER TO EXCLUDE AIR. DO NOT USE WATER. CLASS B FORE PROCEDURES. FIREFIGHTERS SHOULD WEAR SELF-CONTAINED BREATHING APARATUS.</td>
</tr>
<tr>
<td>Unusual Fire Hazard</td>
<td>KEEP AWAY FROM HEAT, SPARKS, AND OPEN FLAME.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Info</th>
<th>Physical Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color &amp; Odor</td>
<td>Cream Powder</td>
</tr>
<tr>
<td>Boiling Point</td>
<td>N/A</td>
</tr>
<tr>
<td>Melting Point</td>
<td>APPROX. 1450 C</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>N/A</td>
</tr>
<tr>
<td>Vapor Density</td>
<td>N/A</td>
</tr>
<tr>
<td>Water Solubility</td>
<td>INSOLUBLE, FORMS COLLOIDAL SUSPENSION</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Info</th>
<th>Protection Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory</td>
<td>Mechanical exhaust required. In confined or poorly ventilated areas, the use of an appropriate respiratory protection may be required.</td>
</tr>
</tbody>
</table>
### Ventilation

<table>
<thead>
<tr>
<th>Skin</th>
<th>Compatible chemical-resistant gloves are recommended. Wash contaminated gloves before re-use.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eye</td>
<td>Chemical safety goggles are recommended. Wash contaminated goggles before re-use.</td>
</tr>
<tr>
<td>Other</td>
<td>Avoid inhalation and contact with skin and eyes. Good personal hygiene practices should be used. Wash after any contact, before breaks and meals, and at the end of the work period. Safety shower and eye bath recommended.</td>
</tr>
</tbody>
</table>

### Occupational Exposure Limit

<table>
<thead>
<tr>
<th>Threshold Limit</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>OSHA Permissible Limit</td>
<td>N/A</td>
</tr>
<tr>
<td>Carcinogen</td>
<td>NO</td>
</tr>
<tr>
<td>NTP Limit</td>
<td>N/A</td>
</tr>
<tr>
<td>IARC Limit</td>
<td>N/A</td>
</tr>
<tr>
<td>OSHA Limit</td>
<td>N/A</td>
</tr>
</tbody>
</table>

### Carcinogen Notes

### Health Hazards

<table>
<thead>
<tr>
<th>Material Type</th>
<th>Causes respiratory tract irritation. May cause digestive tract irritation. Irritant. Hygroscopic. The toxicological properties of this material have not been fully investigated. Causes eye and skin irritation.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Entry Routes</td>
<td>INHALATION-SKIN-EYE</td>
</tr>
</tbody>
</table>

### Emergency First Aid

<table>
<thead>
<tr>
<th>Inhalation</th>
<th>REMOVE PERSON TO VENTILATED AREA. IF SYMPTOMS PERSIST SEEK-MEDICAL ATTENTION.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eye Contact</td>
<td>REMOVE CONTACTS IMMEDIATELY. FLUSH WITH WATER FOR AT LEAST 15-MINUTES. IF IRRITATION PERSISTS, SEEK A PHYSICIAN.</td>
</tr>
<tr>
<td>Skin Contact</td>
<td>WASH AFFECTED AREA WITH COPIUS AMOUNTS OF SOAP AND WATER. CALL- A DOCTOR IF IRRITATION DEVELOPES. COMPLETELY DECONTAMINATE- CLOTHING, SHOES, AND LEATHER GOODS BEFORE RE-USE OR DISCARD.</td>
</tr>
<tr>
<td>Ingestion</td>
<td>IF SWALLOWED, RINSE MOUTH WITH WATER (ONLY IF PERSON IS CONCOUS).-OBTAIN MEDICAL ADVICE.</td>
</tr>
</tbody>
</table>

### Spill, Leakage & Disposal Procedures
<table>
<thead>
<tr>
<th>Spill Procedures</th>
<th>VACUUM OR SWEEP UP MATERIAL AND PLACE INTO A SUITABLE DISPOSAL CONTAINER. CLEAN UP SPILLS IMMEDIATELY, OBSERVING PRECAUTIONS IN THE PROTECTIVE EQUIPMENT SECTION. AVOID GENERATING DUSTY CONDITIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waste Disposal</td>
<td>--INCINERATE OR DISPOSE IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL-REGULATIONS.</td>
</tr>
<tr>
<td>Info</td>
<td>Handling &amp; Shipping Procedures</td>
</tr>
<tr>
<td>Handling &amp; Shipping Procedures</td>
<td>1. Measures should be taken to prevent materials from being splashed into the eyes or on the skin. Wear eye shields and protective clothing. Smoking should not be permitted in work areas. 2. Provide suitable air extraction ventilation in the work areas. Vapors may form explosive mixtures with air. Keep material away from sources of ignition (e.g. hot surfaces, sparks, flame and static discharges. 3. To be stored in tightly sealed and preferably full containers in cool, dry and ventilated area. Protect from heat/overheating and light sources and Keep in glass, suitable plastic, aluminum or lacquer-lined containers.</td>
</tr>
<tr>
<td>Info</td>
<td>SARA 313 Chemical Breakdown</td>
</tr>
<tr>
<td>SARA Chemical Name</td>
<td></td>
</tr>
</tbody>
</table>
MATERIAL SAFETY DATA SHEET
CHEMICAL ID: 025150  MSDS ID: 025150
PRODUCT NAME: Crude Oils, Sweet

CRUDE OILS, SWEET

Material Safety Data Sheet
October 31, 1997

PHILLIPS 66 COMPANY
A Division of Phillips Petroleum Company
Bartlesville, Oklahoma 74004

PHONE NUMBERS
Emergency: (918) 661-8118
General MSDS Information: (918) 661-8327
For Additional MSDSs: (918) 661-5952

A. PRODUCT IDENTIFICATION

Synonyms: Separator Crude; Field Crude
Chemical Name: Mixture
Chemical Family: Hydrocarbons
Chemical Formula: Mixture
CAS Reg. No.: 8002-05-9
Product No.: Not Established

Product and/or Components Entered on EPA's TSCA Inventory: YES

This product has been commercially introduced into U.S. commerce, and is listed in the Toxic Substances Control Act (TSCA) Inventory of Chemicals in Commerce; hence, it is subject to all applicable provisions and restrictions under TSCA 40 CFR, sections 721 and 723.250.

B. HAZARDOUS COMPONENTS

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>CAS Number</th>
<th>% By Wt.</th>
<th>OSHA PEL</th>
<th>ACGIH TLV</th>
</tr>
</thead>
<tbody>
<tr>
<td>n-Butane and lighter</td>
<td>NA</td>
<td>0-7.7</td>
<td>800 ppm*</td>
<td>800 ppm*</td>
</tr>
<tr>
<td>Gasoline, including</td>
<td>8006-61-9</td>
<td>10.8-80</td>
<td>300 ppm</td>
<td>300 ppm</td>
</tr>
<tr>
<td>Toluene</td>
<td>108-88-3</td>
<td>&lt; 10</td>
<td>100 ppm</td>
<td>100 ppm</td>
</tr>
<tr>
<td>Ethyl Benzene</td>
<td>100-41-4</td>
<td>&lt; 2</td>
<td>100 ppm</td>
<td>100 ppm</td>
</tr>
<tr>
<td>p-Xylene</td>
<td>106-42-3</td>
<td>&lt; 3</td>
<td>100 ppm</td>
<td>100 ppm</td>
</tr>
<tr>
<td>m-Xylene</td>
<td>108-38-3</td>
<td>&lt; 6</td>
<td>100 ppm</td>
<td>100 ppm</td>
</tr>
<tr>
<td>o-Xylene</td>
<td>95-47-6</td>
<td>&lt; 3</td>
<td>100 ppm</td>
<td>100 ppm</td>
</tr>
<tr>
<td>1,2,4-Trimethyl Benzene</td>
<td>95-63-6</td>
<td>&lt; 3</td>
<td>25 ppm</td>
<td>25 ppm</td>
</tr>
<tr>
<td>Kerosene</td>
<td>8008-20-6</td>
<td>3.9-23.6</td>
<td>NE</td>
<td>NE</td>
</tr>
<tr>
<td>Gas Oil</td>
<td>Various</td>
<td>5.8-35.6</td>
<td>NE</td>
<td>NE</td>
</tr>
<tr>
<td>Topped Crude</td>
<td>Various</td>
<td>5.6-61.8</td>
<td>NE</td>
<td>NE</td>
</tr>
<tr>
<td>Benzene</td>
<td>71-43-2</td>
<td>0-1.0</td>
<td>1 ppm**</td>
<td>10 ppm</td>
</tr>
<tr>
<td>PNA (Polynuclear Aromatics)</td>
<td>Various</td>
<td>0.3-4.1</td>
<td>0.2 mg/m3***</td>
<td>0.2 mg/m3***</td>
</tr>
<tr>
<td>Hydrogen Sulfide</td>
<td>7783-06-4</td>
<td>&lt; 0.9</td>
<td>10 ppm</td>
<td>10 ppm</td>
</tr>
</tbody>
</table>

PRINTED: 1998-04-24  PAGE: 1

1.3.A-3 March 2008
C. PERSONAL PROTECTION INFORMATION

Ventilation: Use adequate ventilation to control below recommended exposure levels. Monitoring of hydrogen sulfide air concentrations should be maintained.

Respiratory Protection: For concentrations exceeding the recommended exposure level, use NIOSH/MSHA approved air purifying respirator. In case of spill or leak resulting in unknown concentration, use NIOSH/MSHA approved supplied air respirator. If conditions immediately dangerous to life or health (IDLH) exist, use NIOSH/MSHA approved self-contained breathing apparatus (SCBA).

Eye Protection: Use safety glasses with side shields.

Skin Protection: Wear polyvinyl alcohol or Buna-N gloves. Use full-body, long sleeved garments to prevent excessive skin contact.

NOTE: Personal protection information shown in Section C is based upon general information as to normal uses and conditions. Where special or unusual uses or conditions exist, it is suggested that the expert assistance of an industrial hygienist or other qualified professional be sought.

D. HANDLING AND STORAGE PRECAUTIONS

Do not get in eyes, on skin, or on clothing. Do not swallow, may be aspirated into lungs. Do not breathe vapor or mist. May be fatal. Wear protective equipment and/or garments described in Section C if exposure conditions warrant. Wash thoroughly after handling. Immediately remove and launder contaminated clothing before reuse. Use only with adequate ventilation.

Store in well-ventilated area away from sources of ignition. Bond and ground during liquid transfer. Provide means of controlling leaks and spills. Keep containers closed.

PRINTED: 1998-04-24  PAGE: 2
MATERIAL SAFETY DATA SHEET
CHEMICAL ID: 025150  MSDS ID: 025150
PRODUCT NAME: Crude Oils, Sweet

E. REACTIVITY DATA

Stability: Stable
Conditions to Avoid: Not Applicable
Incompatibility (Materials to Avoid): Oxygen and strong oxidizing agents
Hazardous Polymerization: Will Not Occur
Conditions to Avoid: Not Applicable
Hazardous Decomposition Products: Carbon and sulfur oxides and hydrogen sulfide formed when burned.

F. HEALTH HAZARD DATA

RECOMMENDED EXPOSURE LIMITS:
See Section B.

ACUTE EFFECTS OF OVEREXPOSURE:

Eye: May cause irritation of the eyes.
Skin: Prolonged contact may result in dermal irritation.
Inhalation: May cause irritation to the nose, throat and upper respiratory tract. Headache, nausea, weakness, sedation, unconsciousness and chemical pneumonitis are possible with high vapor concentrations.
Ingestion: May cause gastrointestinal upset, nausea, vomiting and narcosis. May be aspirated into the lungs if swallowed resulting in pulmonary edema and chemical pneumonitis.

SUBCHRONIC AND CHRONIC EFFECTS OF OVEREXPOSURE:

Skin painting studies in mice have indicated a moderate carcinogenic potential for crude oil.

Benzene has been designated as a carcinogen by NTP, IARC, and OSHA. Benzene may produce blood changes which include reduced platelets, reduced red blood cells, reduced white blood cells, aplastic anemia, leukemia and erythroblenemia. Fetal death has been produced in laboratory animals. Chromosome changes were produced in humans and mutation changes occurred in cells of other organisms.

PRINTED: 1998-04-24  PAGE: 3
PNA's are designated carcinogens by IARC, NTP and OSHA. Kidney and lung tumors have been reported in animals and man with repeated PNA exposures. Stillbirths, mutagenesis and liver damage have been reported in laboratory animals exposed to PNA's.

OTHER HEALTH EFFECTS:

Sublethal concentrations of crude oil have been shown to be reversibly toxic to marine organisms.

Hydrogen sulfide may accumulate in concentrations sufficient to produce mucus membrane irritation, pulmonary edema, or even respiratory arrest. The odor of hydrogen sulfide may not be recognized after prolonged inhalation due to paralysis of the sense of smell. Effects from inhaling the fumes may lead to chronic bronchitis, respiratory irritation, increased loss of pulmonary function, and tearing of the eyes.

HEALTH HAZARD CATEGORIES:

<table>
<thead>
<tr>
<th></th>
<th>Animal</th>
<th>Human</th>
<th>Animal</th>
<th>Human</th>
</tr>
</thead>
<tbody>
<tr>
<td>Known Carcinogen</td>
<td>X</td>
<td>X</td>
<td></td>
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<tr>
<td>Suspect Carcinogen</td>
<td>X</td>
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<tr>
<td>Mutagen</td>
<td>X</td>
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<tr>
<td>Teratogen</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Allergic Sensitizer</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Highly Toxic</td>
<td></td>
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</tr>
</tbody>
</table>

FIRST AID AND EMERGENCY PROCEDURES:

Eye: Flush eyes with running water for at least fifteen minutes. If irritation develops, seek medical attention.

Skin: Wash with soap and water. If irritation develops, seek medical attention.

Inhalation: Promptly remove from exposure. If breathing becomes shallow, give oxygen. If breathing ceases, administer artificial respiration followed by oxygen. If illness or adverse symptoms develop, seek medical attention.
MATERIAL SAFETY DATA SHEET
CHEMICAL ID: 025150  MSDS ID: 025150
PRODUCT NAME: Crude Oils, Sweet

Ingestion: Do not induce vomiting. Seek immediate medical attention.
Note to Physician: Gastric lavage using a cuffed endotracheal tube may be performed at your discretion.

G. PHYSICAL DATA

Appearance: Tan to black liquid
Odor: Mild to Pungent
Boiling Point: IBP is 0F; EP is 1100F (-18 to 593C)
Vapor Pressure: Range 1 to 10 Reid Vapor Pressure
Vapor Density (Air = 1): 2.1 is typical
Solubility in Water: Slight
Specific Gravity (H2O = 1): 0.8 to 1; 0.86 is typical
Percent Volatile by Volume: <1 to 50; 15-25 is typical
Evaporation Rate (Butyl Acetate = 1): <1
Viscosity: Not Established

H. FIRE AND EXPLOSION DATA

Flash Point (Method Used): <100F to >300F (<38C to >149C)(Estimated)
Flammable Limits (% by Volume in Air): LEL - Not Established
UEL - Not Established

Fire Extinguishing Media: Dry chemical, foam or carbon dioxide (CO2)

Special Fire Fighting Procedures: Evacuate area of all unnecessary personnel. Wear appropriate safety equipment for fire conditions including NIOSH/MSHA approved self-contained breathing apparatus (SCBA). Water fog or spray may be used to cool exposed equipment and containers. Shut off source if possible.

Fire and Explosion Hazards: Carbon oxides, hydrogen sulfide, and sulfur oxides formed when burned. Highly flammable vapors which are heavier than air may accumulate in low areas and/or spread along ground away from handling site. Flash back along vapor trail is possible.

I. SPILL, LEAK AND DISPOSAL PROCEDURES

Precautions Required if Material is Released or Spilled:
Evacuate area of all unnecessary personnel. Wear protective equipment
and/or garments described in Section C if exposure conditions warrant.
Shut off source, if possible and contain spill. Protect from ignition.
Keep out of water sources and sewers. Absorb in a dry, inert material
(sand, clay, etc). Transfer to disposal drums using non-sparking
equipment.

Waste Disposal (Insure Conformity with all Applicable Disposal Regulations):
Incinerate or place in permitted waste management facility.

J. DOT TRANSPORTATION

Shipping Name: Petroleum crude oil
Hazard Class: 3
ID Number: UN 1267
Packing Group: I
Marking: Petroleum crude oil, , UN 1267
Label: Flammable liquid
Placard: Flammable/1267
Hazardous Substance/RQ: Not Applicable
Shipping Description: Petroleum crude oil, , 3, UN 1267, PG I
Packaging References: 49 CFR 173., 173.201, 173.243

K. RCRA CLASSIFICATION - UNADULTERATED PRODUCT AS A WASTE

Ignitable (D001)

Prior to disposal, consult your environmental contact to determine
if the TCLP (Toxicity Characteristic Leaching Procedure, EPA Test
Method 1311) is required. Reference 40 CFR Part 261.

L. PROTECTION REQUIRED FOR WORK ON CONTAMINATED EQUIPMENT

Contact immediate supervisor for specific instructions before
work is initiated. Wear protective equipment and/or garments
described in Section C if exposure conditions warrant.

M. HAZARD CLASSIFICATION
MATERIAL SAFETY DATA SHEET
CHEMICAL ID: 025150  MSDS ID: 025150
PRODUCT NAME: Crude Oils, Sweet

_X_ This product meets the following hazard definition(s) as defined by the Occupational Safety and Health Hazard Communication Standard (29 CFR Section 1910.1200):

_X_ Combustible Liquid
--- Compressed Gas
— Flammable Gas
_X_ Flammable Liquid
--- Flammable Solid

--- Flammable Aerosol
--- Explosive
--- Oxidizer
--- Pyrophoric
--- Health Hazard (Section F)
--- Organic Peroxide
--- Unstable
--- Water Reactive

--- Based on information presently available, this product does not meet any of the hazard definitions of 29 CFR Section 1910.1200.

N. ADDITIONAL COMMENTS

SARA 313

This product contains the following chemical or chemicals subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372. (See Section B).

Benzene
Toluene
Ethylbenzene
p-Xylene
m-Xylene
o-Xylene
1,2,4-Trimethylbenzene

NFPA 704 Hazard Codes - - - - - - - Signals

Health : 1  Least - 0  Slight - 1
Flammability: 3  Moderate - 2
Reactivity : 0  High - 3
Special Haz.: -  Extreme - 4

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1.3.A-9  March 2008
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dation for the use of any product in a manner that might in-
fringe existing patents.

Crude Oils, Sweet (US025150)

END OF MATERIAL SAFETY DATA SHEET FOR: Crude Oils, Sweet
Incident: Drift River Terminal Flooding
Period: Period 4 (3/29/2009 16:00 - 3/30/2009 16:00)
Prepared By: Ha, Young at 3/29/2009 15:13
Version Name: 3/27/2009 14:15

Area Environmental Data
Land status map is now available from ADNR. The map status map is attached and is titled Drift River. Following is more detailed description of the map's content (Provided by ADNR):

Orange spotted areas - Redoubt Bay Critical Habitat Area
Blue areas just across the river - Cook Inlet Pipeline Company (CIPC) land
Purple adjacent areas - Leased to CIPC by the state
Vertical blue striped area - Leased to CIPC by the Kenai Peninsula Borough
Red area - federal public land order issued in 1960 revoking the bombing and gunnery range of the area

ADFG provided the summary of Resources at Risk on March 26, 2009 and an updated version on March 27, 2009. The updated version is included as ICS 232.

NOAA provided Resources at Risk analysis on March 28, 2009 and is included as an attachment to ICS 232.

Priorities for Mitigating Environment and Cultural Impacts
Following is a list of Geographical Response Strategies within 10 miles of the Drift River Terminal. The link to the GRS is also included.


Wildlife Assessments and Rehabilitation
No impacts to wildlife has been observed to date.

Permits (Dispersants, Burning, and/or Other
No permits are required at this time.

Waste Management
No Waste Management Plan is required at this time.

Other Environmental Concerns

Logistical Support Needs
1. Incident Name: Drift River Facility Flooding  
2. Operational Period: from March 27, 2009, 1:00 pm, until revised  
3. Environmentally-Sensitive Areas and Wildlife Issues

<table>
<thead>
<tr>
<th>Site No.</th>
<th>Priority</th>
<th>Site Name / Physical Location</th>
<th>Site Issues</th>
</tr>
</thead>
</table>
| 1       | HIGH    | Redoubt Bay Critical Habitat Area, located north of the Drift River Facility (see attached map) | • Waterfowl concentrations in spring and fall, throughout the critical habitat area, and south to Harriet Point, inclusive of the Drift River Facility.  
• Waterfowl molting concentrations, throughout the critical habitat area, and south to Katchin Creek, inclusive of the Drift River Facility.  
• Anadromous fish in streams and lakes, including in Drift River  
• Shorebird concentrations in spring and fall, throughout the critical habitat area, and south, inclusive of the Drift River Facility.  
• Harbor seal haulout concentrations, at least 1 site within the critical habitat area.  
• Brown bear concentrations in summer and fall, throughout the critical habitat area, and south, inclusive of the Drift River Facility.  
• Black bear concentrations in spring, throughout the critical habitat area, and south, inclusive of the Drift River Facility.  
• Beluga whale feeding in nearshore waters. |
| 2       | HIGH    | Kalgin Island and Kalgin Island Critical Habitat Area, located southeast of the Drift River Facility in Cook Inlet | • Harbor seal haulout concentrations, at least two sites  
• Streams and lakes with anadromous fish  
• Waterfowl concentrations in spring and fall |
<table>
<thead>
<tr>
<th></th>
<th>HIGH</th>
<th>Area Name</th>
<th>Waterfowl Concentrations</th>
<th>Bear Concentrations</th>
<th>Shorebird Concentrations</th>
<th>Seabird Concentrations</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td></td>
<td>Trading Bay State Game Refuge, located north of Redoubt Bay Critical Habitat Area</td>
<td>- Waterfowl concentrations in spring, along the coast and up to three miles inland &lt;br&gt; - Waterfowl concentrations in fall, throughout the refuge. &lt;br&gt; - Waterfowl concentrations during molting, throughout the refuge. &lt;br&gt; - Bear concentrations in spring, throughout the refuge &lt;br&gt; - Streams and lakes with anadromous fish &lt;br&gt; - Shorebird concentrations in spring and fall, throughout the refuge. &lt;br&gt; - Beluga whales feeding in nearshore waters. &lt;br&gt; - Seabird concentrations, McArthur Flats.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>HIGH</td>
<td>Clam Gulch Critical Habitat Area, located across Cook Inlet from the Drift River Facility to the east</td>
<td>- Waterfowl concentrations in spring, in area between Clam Gulch and Kasilof. &lt;br&gt; - Waterfowl concentrations in fall, in area north and west of Kasilof. &lt;br&gt; - Waterfowl concentrations in winter, near Cape Starichkof &lt;br&gt; - Streams and lakes with anadromous fish &lt;br&gt; - Razor clam concentrations, along coast from Cape Kasilof south to Cape Starichkof. &lt;br&gt; - Seabird concentrations near mouth of Kasilof River.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>HIGH</td>
<td>Mouth of the Kenai River, located across Cook Inlet from the Drift River Facility to the east</td>
<td>- Waterfowl concentrations in spring and summer &lt;br&gt; - Beluga whale concentrations in spring, summer and fall, at the mouth of the Kenai River and in the marine environment outside of the mouth. &lt;br&gt; - Anadromous fish streams. &lt;br&gt; - Shorebird concentrations in spring at the mouth of the Kenai River. &lt;br&gt; - Seabird colonies are found at the mouth of the Kenai River.</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>
Narrative

Other most environmentally sensitive areas in Cook Inlet, further from the Drift River Facility, but still situated in the path of a potential oil spill include:

- Barren Islands
- Chinik Head to Silver Beach (Kamishak Bay)
- Susitna Flats and Susitna Flats State Game Refuge
- Anchorage Flats and Anchorage Coastal Wildlife Refuge
- Goose Bay State Game Refuge
- Palmer Hay Flats State Game Refuge
- Kachemak Bay Critical Habitat Area and Fox River Critical Habitat Area

A map showing environmentally sensitive areas for spring (April – May) can be found at: [http://www.asgdc.state.ak.us/maps/cplans/cook/PDFS/SPRING.PDF](http://www.asgdc.state.ak.us/maps/cplans/cook/PDFS/SPRING.PDF)

Individual maps of most environmentally sensitive areas for Cook Inlet can be accessed at: [http://www.asgdc.state.ak.us/maps/cplans/subareas.html#cook](http://www.asgdc.state.ak.us/maps/cplans/subareas.html#cook)

4. Archaeo-cultural and Socio-economic issues: Archaeo-cultural issues are being reported upon by ADNR. The following subsistence and personal use harvest information has been supplied by ADF&G – Subsistence Division.

<table>
<thead>
<tr>
<th>Site No.</th>
<th>Priority</th>
<th>Site Name / Physical Location</th>
<th>Site Issues</th>
</tr>
</thead>
</table>
| 1        | HIGH     | Cook Inlet                   | - Non-commercial, personal use net fisheries for salmon.  
- Subsistence set gill net salmon fisheries in Tyonek Subdistrict, around Seldovia, and in the Port Graham and Koyuktoluk subdistricts.  
- Significant marine subsistence fisheries (halibut, rockfish, cod) around Seldovia, and in the Port Graham and Koyuktoluk subdistricts.  
- Marine mammal hunting for harbor seals, sea lions, and sea otters takes place in lower Cook Inlet.  
- Subsistence bird hunting, lower Cook Inlet.  
- Very significant subsistence harvests of marine invertebrates in areas outside the nonsubsistence areas of lower Cook Inlet.  
- Significant personal use fisheries for clams. |

Prepared by: Gayle Martin, ADF&G – Habitat, on March 27, 2009 at 1:00 pm.
NOAA Resources at Risk Summary (March 26, 2009)

Resources at Risk for the Drift River Tank Farm, Cook Inlet, AK

I. Incident Information
This report was prepared at 1000 EST on 26 March 2009. Mt. Redoubt, located approximately 100 nm SW of Anchorage on the West Side of Cook Inlet erupted 5 times on 23 March 2009. These eruptions caused lahars, extensive flooding, and mud flows around the Drift River Tank Farm, where oil from the Cook Inlet fields is temporarily stored prior to shipping out aboard tankers. Currently, two of the four active tanks have 74,000 bbls of crude oil apiece. This report covers resources potentially at risk from the present time to 30 days from now.

II. Geographic Region Covered
The area covered by this report includes the Drift River, Rust Slough, and environs in Redoubt Bay, Cook Inlet. This area does not necessarily correspond to actual or potential oil locations. Consult other Hotline reports for oil location information.

III. Expected Behavior of the Spilled Material
Cook Inlet, Drift River Terminal Crude (API 34.1) is a light to medium weight crude oil. This product may coat the intertidal environment, as well as wildlife on the water surface. The product may also result in water column and benthic impacts if mixed into the water column, or if it strands in large amounts in shallow, sheltered areas. While the focus of this report is on resource impacts resulting from a crude oil release, the likelihood is that impacts would be unpredictable due the dynamic nature of a volcanic eruption and subsequent natural disasters, such as floods, mudslides, etc. If oil is released, chances are that it would be mixed with mud, water, debris (e.g., mud, gravel, trees, etc.), and potentially in very large volumes.

IV. Shoreline Resources at Risk
The shoreline along the Drift River, Rust Slough, and Redoubt Bay is predominantly extensive marsh. There are large exposed tidal flats extending 2 or more nm offshore of the Drift River in Redoubt Bay. There are pockets of sand/gravel beaches at the Drift River mouth and elsewhere along the coast. The tidal range is approximately 23 feet.

The most sensitive habitats in the area are coastal and riparian marshes, which are often highly productive, serving as important wildlife habitat for migratory and nesting birds, and nursery areas for fish and shellfish. The marsh vegetation is likely under a period of winter senescence (vegetation growth is dormant); therefore, the key concern at this time of year is if the lighter fractions of the oil penetrate into the marsh sediments and any wrack/litter. Lighter fractions of the oil may be acutely toxic to wetland vegetation, especially if oil penetrates into the sediments. Where wetland sediments are muddy and soft, it is important to prevent excessive disturbance and further mixing of oil into the substrate by foot traffic during cleanup activities, as this could
result in more severe and long-term impacts to the marshes. If large volumes of mud, water, and debris are introduced into the marshes, along with oil, damages to the habitat and associated species would be extensive.

Tidal flats are also sensitive habitats. Biological utilization of tidal flats is often high, and organisms that are buried in the sediments will likely be severely impacted. Oil usually does not penetrate into the sediments of tidal flats, because they are tightly packed and heavily water-saturated, but rather, oil will cover portions of the flats at low tide, and then be re-floated at high tide. Organisms living in the flats may be smothered during low tide.

Oil may penetrate into mixed sand and gravel beaches. This oil is difficult to remove and may become a source of chronic sheening. On mixed sand and gravel beaches oil may form a band of oil or a greasy stain on the substrate, especially along the high-tide line. Heavier accumulations could penetrate into the sediments. Lighter oils tend to penetrate deeper than heavy oils, and penetration is greatest in coarse, well-sorted sediments. Along exposed, high-energy areas, surface contamination may be quickly removed, while in low-energy areas, sheens may be released during high tide.

V. Biological Resources at Risk

Birds

While bird use of the area is likely limited in late winter, many migratory species arrive in spring (April-May). The Redoubt Bay Critical Habitat Area (268 square miles of wetlands and riparian habitat) provides spring resting and feeding habitat for hundreds of thousands of waterfowl on their way to northern nesting grounds. It is well known as the largest nesting area for the Tule white-fronted goose in the world. It is also heavily used for nesting by other geese and swan species (e.g., cackling Canada goose, Taverner’s Canada goose, lesser Canada goose, snow goose, and tundra and trumpeter swans). Diving and dabbling ducks arriving in the spring for summer breeding (tens of thousands) may include: pintail, mallard, green-winged teal, northern shoveler, canvasback, lesser scaup, bufflehead, redhead, gadwall, American wigeon, and common eider. Shorebirds utilizing the area during spring migration include: yellowlegs, snipe, godwits, whimbrels, sandpipers, plovers, dunlin, and phalaropes. Sandhill cranes (a few nesting pairs), ravens, and gulls may be present in spring. There is a bald eagle nest along the Drift River.

Waterfowl are usually at high risk during oil spills because they spend a lot of time on the water surface and in wetlands. Gulls and shorebirds can also be severely impacted by oil. Direct oiling of birds reduces the buoyancy, water repellency, and insulation provided by feathers, and may result in death by drowning or hypothermia. Preening of oiled feathers may also result in ingestion of oil resulting in irritation, sickness, or death. Oil brought back to the nests by adult birds may kill or injure eggs and young birds.

Fish

Coho salmon run up the Drift River in the summer and fall. Eggs hatch in early spring and embryos may be present in gravel until they emerge in May and June where they occupy shallow stream margins. Coho, pink, and sockeye salmon and Dolly Varden may be present in Rust Slough and Cannery Creek. Pink fry swim out of the gravel and migrate downstream in late
winter or spring. Sockeye fry also emerge in early spring and move to rearing areas. Dolly Varden eggs hatch in March with emergence in April or May followed by rearing in streams. Larval and juvenile fish are especially sensitive because they inhabit shallow waters, are less mobile, and are more sensitive to oil toxicity. Eggs and fry would be impacted by large additions of sediment, debris, etc. into the sloughs and rivers.

**Invertebrates**

Extensive razor clam beds occur off of Rust Slough and Cannery Creek. The largest razor clam fishery in Alaska occurs on the eastern beaches of Cook Inlet, which is on the opposite bank of the area of present concern. Most razor clam digging occurs from April through September (peak in early summer), and there is no limit on west side Cook Inlet beaches. Razor clams may be smothered by the crude oil and tainting from lighter fractions of the oil may be a concern. A large influx of sediment (mud) onto shellfish beds would cause smothering of the organisms.

**Marine Mammals**

Harbor seals, killer whales, harbor porpoises, beluga whales, and Dall’s porpoise are present in Redoubt Bay. Haul-outs, rookeries, and concentration areas for seals and whales occur in Cook Inlet, but fall outside the immediate area of concern at the present time.

**VI. Human-Use Resources at Risk**

The Redoubt Bay Critical Habitat Area (managed by ADF&G) occurs along the west side of Cook Inlet including Rust and Cannery Creeks and Drift River. Facilities in the area include: Drift River Terminal and Christy Lee Loading Facility.
### Drift River Terminal Tide Information (March 29- April 7, 2009)

<table>
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<tr>
<th>Date</th>
<th>Day</th>
<th>Time</th>
<th>Height</th>
<th>Time</th>
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<th>Time</th>
<th>Height</th>
<th>Time</th>
<th>Height</th>
</tr>
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<tbody>
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<td>03/29/2009</td>
<td>Sun</td>
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<td>0.9 L</td>
<td>06:15AM</td>
<td>20.8 H</td>
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<td>07:03PM</td>
<td>18.5 H</td>
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<tr>
<td>03/30/2009</td>
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<td>10:07PM</td>
<td>0.8 L</td>
</tr>
</tbody>
</table>

### Drift River Terminal

- **Elevation**: 0.000 ft
- **Scale**: 0.1 ft
- **Time Zone**: Local Daylight Saving Time
- **From Last Update**: 03/28/2009, **To Last Update**: 04/07/2009, **Number of Days**: 11

### Drift River Currents

- **Elevation**: 0.000 ft
- **Scale**: 0.1 ft
- **Time Zone**: Local Daylight Saving Time
- **From Last Update**: 03/28/2009, **To Last Update**: 04/07/2009, **Number of Days**: 11
Drift River, Alaska (99635) Conditions & Forecast: Weather Underground

Current Conditions
MARITIME, Nikiski, Alaska (PWS)
Updated: 52 min 22 sec ago

30° F
Scattered Clouds

Windchill: 15° F
Humidity: 78%
Dew Point: 24° F
Wind: 28 mph from the North
Wind Gust: 33.0 mph
Pressure: 29.29 in (Falling)
Visibility: 10.0 miles
UV: 3 out of 16
Clouds: Scattered Clouds 9500 ft (Above Ground Level)
Elevation: 52 ft
Rapid Fire Updates:

Source for Current Conditions:
- PWS & Airport
- Airport Only

Select a source for your current conditions:

MARITIME

Forecast for Western Kenai Peninsula
Updated: 9:01 am EDT on March 29, 2009

No Active Advisories (US Severe Weather)

Strong wind through late this afternoon...

Today
Cloudy. A chance of snow in the morning...then a chance of rain and snow in the afternoon. Around Kachemak Bay...occasional light snow mixing with rain in the afternoon. Little or no snow accumulation. Highs in the upper 30s. Northeast wind 15 to 30 mph with gusts to 45 mph along the mountains. Around Kachemak Bay...east wind 30 to 40 mph becoming south 15 to 25 mph in the afternoon.

Toni
Snow. Snow accumulation 1 to 2 inches. Lows in the lower to mid 20s. South wind 10 to 20 mph except southwest 15 to 30 mph around Kachemak Bay.

Monday
Mostly cloudy with scattered snow showers. Highs around 30. Southwest wind 15 to 25 mph...strongest along the inlet.

Monday Night
Mostly cloudy in the evening then becoming partly cloudy. Lows 10 to 20 above. South wind 10 to 20 mph except west 15 to 30 mph around Kachemak Bay.

Tuesday
Partly cloudy. Highs in the 30s. Light winds.

Tuesday Night
Partly cloudy. Lows 15 to 25.

Wednesday and Wednesday Night
Mostly cloudy with a chance of snow. Highs in the 30s. Lows 15 to 25.

Thursday
Partly cloudy. Highs in the 30s.

Thursday Night and Friday