



**BP EXPLORATION (ALASKA), INC.**

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**OIL DISCHARGE PREVENTION  
AND  
CONTINGENCY PLAN**

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**NORTHSTAR  
NORTH SLOPE, ALASKA**

**VOLUME 1 OF 2, RESPONSE ACTION PLAN**

**MARCH 2012**





**BP EXPLORATION (ALASKA), INC.**

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OIL DISCHARGE PREVENTION  
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**Volume 1 of 2, Response Action Plan**

**MARCH 2012**





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OIL DISCHARGE PREVENTION AND CONTINGENCY PLAN**

**MANAGEMENT APPROVAL AND RESOURCE COMMITMENT STATEMENT**

This plan is consistent with the requirements of the National Contingency Plan and the Alaska Federal/State Preparedness Plan for Response to Oil and Hazardous Substance Discharges / Releases (Area Contingency Plan). It is approved for implementation as herein described. Manpower, equipment and materials will be provided as required in accordance with this plan.

BPXA's approach to oil spill response will be based on the following priorities:

1. Safety of personnel
2. Protection of the environment
3. Protection of facilities

Bruce Price  
Area Operations Manager North

Date

  
\_\_\_\_\_

2-28-12  
\_\_\_\_\_

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## LIST OF ACRONYMS FOR VOLUME 1

AAC	Alaska Administrative Code
ACP	Area Contingency Plan
ACS	Alaska Clean Seas
ADEC	Alaska Department of Environmental Conservation
ADFG	Alaska Department of Fish and Game
ADNR	Alaska Department of Natural Resources
ADW	Alaska Drilling and Wells
AOGCC	Alaska Oil and Gas Conservation Commission
API	American Petroleum Institute
ARRT	Alaska Regional Response Team
ATV	all terrain vehicles
BAT	best available technology
bbl	barrels (42 gallons)
bbl/LF	barrels per linear foot
bbl/min	barrels per minute
BOPE	Blow out prevention equipment
BOP	blowout preventer
bopd	barrels of oil per day
boph	barrels of oil per hour
bpd	barrels per day
BPXA	BP Exploration (Alaska), Inc.
BSEE	Bureau of Safety and Environmental Enforcement
°C	degrees Celsius
CFR	Code of Federal Regulation
cm/s	centimeters per second
DOT	U.S. Department of Transportation
EPA	Environmental Protection Agency
°F	degrees Fahrenheit
FLIR	Forward Looking Infrared
FOSC	federal on-scene coordinator
GHz	gigahertz
GOR	gas-to-oil ratio
GPB	Greater Prudhoe Bay Unit
gpm	gallons per minute
HAZWOPER	Hazardous Waste Operations and Emergency Response
IBRRC	International Bird Rescue Research Center
IC	Incident Commander
ICS	Incident Command System
IMT	Incident Management Team



LEL	Lower Explosive Limit
LPC	Lisburne Production Center
MAD	Mutual Aid Drill
mPas	milliPascal seconds
NCP	National Contingency Plan
NIMS	National Incident Management System
NIST	National Institute of Standards and Technology
NPREP	National Preparedness for Response Exercise Program
NRC	National Response Center
NSSRT	North Slope Spill Response Team
ODPCP	Oil Discharge Prevention and Contingency Plan
OPA 90	Oil Pollution Act of 1990
OSHA	Occupational Safety and Health Administration
OSRO	Oil Spill Removal Organization
PPE	personal protective equipment
RPS	response planning standard
SOSC	state on-scene coordinator
SPCO	State Pipeline Coordinator's Office
SRT	Spill Response Team
UHF	Ultra High Frequency
USCG	U.S. Coast Guard
USFWS	U.S. Fish and Wildlife Service
VHF	Very High Frequency

## INTRODUCTION

This Oil Discharge Prevention and Contingency Plan (ODPCP) covers the Northstar Unit, which is located 12 miles northwest of Prudhoe Bay, Alaska and 6 miles north of the Alaska coast (Figure I-1). The Northstar facilities are comprised of a production Island in the Beaufort Sea and a crude oil transmission pipeline extending from the production island to Pump Station 1. BP Exploration (Alaska), Inc. (BPXA) operates the Northstar production facilities.

The ODPCP addresses oil spill prevention and response requirements promulgated by the State of Alaska in Title 18, Chapter 75 of the Alaska Administrative Code (AAC). It is comprised of five parts consistent with 18 AAC 75.425(d)(2). As allowed under 18 AAC 75.425(e)(2), the ODPCP is represented by two volumes: Volume 1, Response Action Plan, and Volume 2, Prevention Plan. The Response Action Plan (Volume 1) is contained herein.

The ODPCP also addresses federal oil spill planning regulations of the U.S. Department of the Interior, Bureau of Safety and Environmental Enforcement (BSEE), U.S. Coast Guard (USCG), and U.S. Department of Transportation (DOT).

The Response Action Plan, with the resources and equipment listed herein, is a planning document that demonstrates the potential response capability available to respond to an oil spill from tanks, pipelines, wells and other equipment covered by this plan. It is not a guarantee of what will occur, or the resource deployment sequencing that will be used in an actual spill event. Nothing in this plan is intended to limit the discretion of persons in charge of an actual spill response to take the actions deemed necessary to maximize the effectiveness of the response, consistent with safety considerations. Response operations in a spill event will be tailored to meet actual circumstances.

This plan incorporates by reference some information provided in the Alaska Clean Seas (ACS) *Technical Manual*.

## PLAN DISTRIBUTION

The Response Action Plan is maintained on the BPXA intranet website, accessible by BPXA employees and contractors. Hard copies of the plan or electronic copies on CD are distributed to regulatory agencies and emergency operations centers. Additional copies are in the Anchorage Crisis Center, the Safety & Operational Risk (S&OR) Department, and at ACS. A record of plan distribution is maintained by the S&OR Department.

## UPDATING PROCEDURES

The ODPCP is reviewed annually and revised and updated when changes occur. Below is a list of key factors that may cause revisions to the plan:

- New developments;
- Change to worst case discharge volume(s);



NS26 ■	WELL
○	WELL SLOT
X <sup>9</sup>	SURFACE ELEVATION
←	SURFACE FLOW
●	FIRE MONITOR STATIONS Level 2 Process Module and Along Pipe Rack

<b>BP EXPLORATION (ALASKA) INC.</b>		
<b>NORTHSTAR FACILITY SEAL ISLAND</b>		
DATE: April 2011	SCALE: 1" = 100'	FIGURE: I-1

- Change in commodities transported;
- Change in oil spill response organizations;
- Change in Qualified Individual;
- Change in a National Contingency Plan (NCP) or Area Contingency Plan (ACP) that has a significant impact on the appropriateness of response equipment or response strategies;
- Change in response procedures, and/or
- Change in ownership.

Routine updates are submitted for Alaska Department of Environmental Conservation (ADEC) review within 5 days after the date of a proposed change. Other modifications to the plan are considered amendments, reviewed and approved by ADEC.

Revisions to the plan are documented in the Record of Revisions table at the beginning of the plan and posted on the BPXA intranet site for BPXA employee and contractor reference. Hard copies of the changed pages or new CDs (for electronic copy holders) are distributed to plan recipients, including regulatory agencies and emergency operations centers. Upon receipt of revisions, the recipient replaces pages (hardcopy) or the previous CD, as instructed in the distribution letter. It is the responsibility of each plan recipient to ensure that updated pages are promptly incorporated into the plan and that previous CD revisions are discarded or archived.

## PLAN RENEWAL

The plan will be submitted for renewal to regulating agencies every five years, based on the ADEC renewal schedule.

The plan renewal cycle involves a number of state and federal approvals listed below.

REGULATING AGENCY	RENEWAL CYCLE	EXPIRATION DATE
ADEC	5 years	February 10, 2017
BSEE	5 years	June 28, 2012
USCG	Annual review by operator. Resubmit every 5 years.	August 27, 2012
USDOT	5 years	December 17, 2013



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# STATE OF ALASKA

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**DEPT. OF ENVIRONMENTAL CONSERVATION  
DEPARTMENT OF ENVIRONMENTAL CONSERVATION  
DIVISION OF SPILL PREVENTION AND RESPONSE  
INDUSTRY PREPAREDNESS PROGRAM**

February 10, 2012

File Number 305.30  
(BPXA Northstar)

## **OIL DISCHARGE PREVENTION AND CONTINGENCY PLAN APPROVAL**

Michael Bronson  
Eppie Hogan  
BP Exploration (Alaska), Inc.  
P.O. Box 196612  
Anchorage, AK 99519-6612

**Subject: BP Exploration (Alaska), Inc. Northstar Oil Discharge Prevention and Contingency Plan, North Slope, Alaska. Plan Number 11-CP-4136. Plan Approval**

Dear Mr. Bronson and Ms. Hogan:

The Alaska Department of Environmental Conservation (department) has completed our review of your renewal application for the above referenced Oil Discharge Prevention and Contingency Plan (plan) dated May 2011. The department coordinated the State of Alaska's public review for compliance with 18 AAC 75, using the review procedures outlined in 18 AAC 75.455.

This approval applies to the following plan:

Plan Title: **BP Exploration (Alaska), Inc. Northstar North Slope, Alaska, Oil Discharge Prevention and Contingency Plan**

Supporting Documents: **Alaska Clean Seas Technical Manuals consisting of three volumes as revised and updated**

Plan Holder: **BP Exploration (Alaska), Inc.  
P. O. Box 196612  
Anchorage, AK 99519-6612**

Covered Facilities:           **Production, Terminal, and Crude Oil Transmission Pipeline Operations**

**PLAN APPROVAL:** Approval of the referenced plan is hereby granted, **effective February 10, 2012.** A certificate of approval stating that the department has approved the plan is enclosed. **This approval is subject to the following terms and conditions:**

### **TERMS AND CONDITIONS**

The following items must be completed and/or received as specified to complete the plan in accordance with AS 46.04.030(e).

**1. Notice of Changed Relationship with Response Action Contractor.**

Because the plan relies on the use of response contractors for its implementation, BP Exploration (Alaska), Inc. (BPXA) must immediately notify us in writing of any change in the contractual relationship with the plan holder's response action contractors, and of any event including, but not limited to, any breach by either party to the response contract that may excuse a response contractor from performing, that indicates a response contractor may fail or refuse to perform, or that may otherwise affect the response, prevention, or preparedness capabilities described in the approved plan.

*This condition is reasonable and necessary because there are certain risks associated with allowing a plan holder to rely in part or total upon a response contractor instead of obtaining its own response capability. The risks arise, in part, because the certainty of the contractor's response is dependent upon the continuation of the legal relationship between it and the plan holder. Given this risk, the department must be promptly informed of any change of the contractual relationship between the plan holder and the response contractor, and of any other event that may arguably excuse the response contractor from performing or that would otherwise affect the response, prevention, or preparedness capabilities described in the approved plan. The department may seek appropriate modifications to the plan or take other steps to ensure that the plan holder has continuous access to sufficient resources to protect the environment and to contain, cleanup, and mitigate potential oil spills. 18 AAC 75.425(e)(3)(H) and 18 AAC 75.445(i).*

**2. Blowout Contingency Plan.** A copy of the Blowout Contingency Plan must be maintained at Northstar facility and made available to the department upon request.

*This condition is necessary to ensure that the plan holder is prepared to control a potential well blowout. The department will review the blowout*

*contingency plan when performing site inspections. 18 AAC 75.425(e)(1)(I), 18 AAC.445(d)(2), and 18 AAC 75.480.*

- 3. Final Copy of the Plan.** Within 30 days of this letter, the plan holder must submit to the department updated versions of the approved plan, including all revisions instituted during the recent plan review. BPXA must send two complete plan copies to the Exploration, Production & Refineries Section in Anchorage and one copy to the department's Fairbanks office. In addition, you must send an updated version of the plan to each reviewer and controlled document holder of your plan.

**EXPIRATION:** This approval **expires February 10, 2017**. After the approval expires, Alaska law prohibits operation of the facility until an approved plan is once again in effect.

**AMENDMENT:** Except for routine updates under 18 AAC 75.415(b), before a change to this plan may take effect, the plan holder must submit an Application for Amendment to the plan with any additional information needed to evaluate the proposed amendment. This is to ensure that changes to the plan do not diminish the plan holder's ability to respond to a discharge and to evaluate any additional environmental considerations that may need to be taken into account (18 AAC 75.415).

**RENEWAL:** To renew this approval, the plan holder must submit a completed renewal application and plan to the department no later than 180 days prior to the expiration of this approval. This is to ensure that the submitted plan is approved before the current plan in effect expires (18 AAC 75.420).

**REVOCATION, SUSPENSION OR MODIFICATION:** This approval is effective only while the plan holder is in "compliance with the plan" and with all of the terms and conditions described above. The department may, after notice and opportunity for a hearing, revoke, suspend, or require the modification of an approved plan if the plan holder is not in compliance with it, or for any other reason stated in AS 46.04.030(f). In addition, Alaska law provides that a vessel or facility that is not in "compliance with the plan" may not operate (AS 46.04.030). The department may terminate approval prior to the expiration date if deficiencies are identified that would adversely affect spill prevention, response, or preparedness capabilities.

**DUTY TO RESPOND:** Notwithstanding any other provisions or requirements of this plan, a person causing or permitting the discharge of oil is required by law to immediately contain and cleanup the discharge regardless of the adequacy or inadequacy of a plan (AS 46.04.020).

**NOTIFICATION OF NON-READINESS:** Within twenty-four (24) hours after any significant response equipment specified in the plan becomes non-operational or is removed from its designated storage location, the plan holder must notify the department in writing and provide a schedule for the equipment's substitution, repair, or return to service (18 AAC 75.475[b]).

**CIVIL AND CRIMINAL SANCTIONS:** Failure to comply with the plan may subject the plan holder to civil liability for damages and to civil and criminal penalties. Civil and criminal sanctions may also be imposed for any violation of AS 46.04, any regulation issued there under, or any violation of a lawful order of the department.

**INSPECTIONS, DRILLS, RIGHTS TO ACCESS, AND VERIFICATION OF EQUIPMENT, SUPPLIES AND PERSONNEL:** The department has the right to verify the ability of the plan holder to carry out the provisions of its plan and access to inventories of equipment, supplies, and personnel through such means as inspections and discharge exercises, without prior notice to the plan holder. The department has the right to enter and inspect the covered vessel or facility in a safe manner at any reasonable time for these purposes and to otherwise ensure compliance with the plan and the terms and conditions (AS 46.04.030[e] and AS 46.04.060). The plan holder shall conduct exercises for the purpose of testing the adequacy of the plan and its implementation (18 AAC 75.480 and 485).

**FAILURE TO PERFORM:** In granting approval of the plan, the department has determined that the plan, as represented to the department by the applicant in the plan and application for approval, satisfies the minimum planning standards and other requirements established by applicable statutes and regulations, taking as true all information provided by the applicant. The department does not warrant to the applicant, the plan holder, or any other person or entity: (1) the accuracy or validity of the information or assurances relied upon; (2) that the plan is or will be implemented; or (3) that even full compliance and implementation with the plan will result in complete containment, control, or cleanup of any given oil spill, including a spill specifically described in the planning standards.

The plan holder is encouraged to take any additional precautions and obtain any additional response capability it deems appropriate to further guard against the risk of oil spills and to enhance its ability to comply with its duty under AS 46.04.020(a) to immediately contain and clean up an oil discharge.

**COMPLIANCE WITH APPLICABLE LAWS:** If amendments to the approved plan are necessary to meet the requirements of any new laws or regulations, the plan holder must submit an application for amendment to the department at the above address. The plan holder must adhere to all applicable state



statutes and regulations as they may be amended from time to time. This approval does not relieve the plan holder of the responsibility for securing other federal, state, or local approvals or permits, and the plan holder is still required to comply with all other applicable laws.

**INFORMAL REVIEW OR ADJUDICATORY HEARING:** Any person who disagrees with this decision may request an adjudicatory hearing in accordance with 18 AAC 15.195 - 18 AAC 15.340 or an informal review by the Division Director in accordance with 18 AAC 15.185.

**Informal review requests** must be delivered to the Division Director, 410 Willoughby Avenue, Suite 303, PO Box 111800, Juneau, Alaska 99811-1800 within 15 days of the permit decision.

**Adjudicatory hearing requests** must be delivered to the Commissioner of the Department of Environmental Conservation, 410 Willoughby Avenue, Suite 303, PO Box 111800, Juneau, Alaska 99811-1800, within 30 days of the permit decision. If a hearing is not requested within 30 days, the right to appeal is waived. Anyone who submits a request for an informal review or an adjudicatory hearing should also send a copy of the request to the undersigned.

If you have any questions, please contact Bob Tisserand at 269-3060.

Sincerely,



Betty Schorr  
Program Manager

Attachment: Summary of Basis for Department Decision

Enclosure: Certificate of Approval, Number 12CER-007

Electronic cc w/o enclosure:

Scott Pexton, ADEC  
Laurie Silfven, ADEC  
Tom DeRuyter, ADEC  
John Ebel, ADEC  
Gordon Brower, NSB  
Roy Varner, Sr., NSB  
Hon. Charlotte Brower, NSB

**Jake Adams, NSB  
Richard Camilleri, NSB  
Gordon Matumeak, NSB  
Mike Thompson, JPO  
Jack Winters, ADFG  
Matt Carr, USEPA  
Melanie Barber, USDOT  
Pam Miller, Northern Alaska Environmental Center  
Susan Harvey, Harvey Consulting  
Legal Director, Trustees for Alaska  
Samantha Carroll, ADNR  
MST1 Brian Schughart, USCG Sector - Anchorage  
LCDR Bradley Clare, USCG Sector - Anchorage  
MSTC Shawn Erwin, USCG Sector - Anchorage  
Christy Bohl, BSEE**

# ALASKA DEPARTMENT



## of Environmental Conservation Certificate of Approval

### for Oil Discharge Prevention and Contingency Plan

Certificate Number: 12CER-007

Plan Number: 11-CP-4136

Name of Plan:

BP Exploration (Alaska), Inc. Northstar Oil Discharge Prevention and Contingency Plan

Covered Facilities:

Production, Terminal, and Crude Oil Transmission Pipeline Operations

Address:

BP Exploration (Alaska), Inc., P. O. Box 196612, Anchorage, AK 99519-6612

Telephone:

(907) 564-5111

Fax: (907) 564-5180

Region of Operation (18 AAC 75.495): North Slope, Alaska

Effective Date of Approval: February 10, 2012

Expiration Date: February 10, 2017

**This approval is subject to the terms and conditions of the applicable Alaska Department of Environmental Conservation contingency plan approval letter and continuing compliance with the requirements of AS 46.04 and 18 AAC 75.**

*Betty Schorr* 02-10-2012

Betty Schorr, Approving Authority Date  
Program Manager, Industry Preparedness Program





**STATEMENT OF CONTRACTUAL TERMS**


AS REQUIRED UNDER AS 46.04.30, AS 46.04.035 and 18 AAC 75.445(l) (1) in fulfillment of a requirement for registration of primary response action contractors and for approval of an Oil Discharge Prevention and Contingency Plan.

PLAN TITLE: Oil Discharge Prevention and Contingency Plan, Northstar Operations  
PLAN HOLDER: BP Exploration (Alaska), Inc.

This statement is a certification to the Alaska Department of Environmental Conservation summarizing the contract between BP Exploration (Alaska), Inc. the oil discharge prevention and contingency plan holder (hereinafter "PLAN HOLDER") and Alaska Clean Seas, the oil spill primary response action contractor or a holder of an approved oil discharge prevention and contingency plan under contract (hereinafter "CONTRACTOR"), executed July 1, 2005, and the original of which is located at Alaska Clean Seas, 4220 B Street, Anchorage, Alaska, as evidence of the PLAN HOLDER's access to the containment, control and/or cleanup resources required under standards at AS 46.04.030 and 18 AAC 75.400 - 18 AAC 75.495. The PLAN HOLDER and the CONTRACTOR attest to the Department that the provisions of this written contract clearly obligate the CONTRACTOR to:

- (A) provide the response services and equipment listed for the CONTRACTOR in the contingency plan;
- (B) respond if a discharge occurs;
- (C) notify the PLAN HOLDER immediately if the CONTRACTOR cannot carry out the response actions specified in this contract or the contingency plan;
- (D) give written notice at least 30 days before terminating this contract with the PLAN HOLDER;
- (E) respond to a Department-conducted discharge exercise required of the PLAN HOLDER; and
- (F) continuously maintain in a state of readiness, in accordance with industry standards, the equipment and other spill response resources to be provided by the CONTRACTOR under the contingency plan.

I hereby certify that as a representative of the PLAN HOLDER, I have the authority to legally bind the PLAN HOLDER in this matter. I am aware that false statements, representations, or certifications may be punishable as civil or criminal violations of law.

 7/14/05  
 Signature Date  
 Name: CRAIG L WIGGS  
 Title: DELIVERY UNIT MANAGER  
 For: BP Exploration (Alaska), Inc.  
 PLAN HOLDER

I hereby certify that as a representative of the CONTRACTOR, I have the authority to legally bind the CONTRACTOR in this matter. I am aware that false statements, representations, or certifications may be punishable as civil or criminal violations of law.

 7/14/05  
 Signature Date  
 Name: Brad Hahn  
 Title: President  
 For: Alaska Clean Seas, CONTRACTOR



## **PART 1. RESPONSE ACTION PLAN**

### **[18 AAC 75.425(e)(1)]**

#### **1.1 EMERGENCY ACTION CHECKLIST [18 AAC 75.425(e)(1)(A)]**

Table 1-1 lists immediate response actions for an oil spill. Figure 1-1 provides a flow chart for immediate oil spill notification and reporting. Figure 1-2 and Table 1-2 illustrate the Incident Management Team (IMT) structure.

A spill response operation on the North Slope falls into one of three categories outlined below.

A Level I spill has limited duration and impacts, and can be handled by a BP Exploration (Alaska) Inc. (BPXA) response organization of immediately available local resources. Typical characteristics of a Level I spill are as follows:

- Less than one shift of the IMT in duration,
- Does not require mutual aid from other operators, and
- No written Incident Action Plan.

Level II and III spills activate the Greater Prudhoe Bay (GPB) IMT, shown in Table 1-2. A Level II spill is more complex, longer in duration, and characterized by more widespread effects. The Incident Command Post (location where the IMT operates) is located in the Prudhoe Bay Operations Center (PBOC). The activation of a BPXA response organization involves response resources available in Alaska. Typical characteristics of a Level II spill are as follows:

- More than one shift of the IMT in duration,
- Team members drawn from off-duty North Slope-based personnel and Anchorage-based personnel,
- Agency involvement and formation of a Unified Command, and
- Written Incident Action Plan.

A Level III spill is major, complex or compound in nature, has pronounced impacts on people, the environment, and/or property, and involves response operations for an extended period. A Level III spill involves the activation of all elements of the Incident Command System (ICS), supplemented by response resources from inside and outside of Alaska.

The response organization structure described in this plan is based on the ICS and accommodates each level of response. All three levels involve activation of the Spill Response Team (SRT), an IMT, and/or the Business Support Team. As necessary, BPXA uses the resources of other North Slope operators through Alaska Clean Seas (ACS), Mutual Aid, spill response cooperatives, and contractors.



**TABLE 1-1: IMMEDIATE RESPONSE CHECKLIST**

<b>LEVEL I, II, &amp; III SPILLS</b>	
FIRST RESPONDER	<ul style="list-style-type: none"> <li><input type="checkbox"/> Assess safety of situation, determine whether source can be stopped, and stop the source of spill if possible. The first responder only takes action to the level they are trained to take.</li> <li><input type="checkbox"/> Immediately report the spill by calling Northstar Control Room at 670-3515 or calling on Northstar Harmony Channel 125. Immediately notify ACS and supervisory personnel after reporting the spill.</li> <li><input type="checkbox"/> Provide information on:               <ul style="list-style-type: none"> <li>• Personnel safety,</li> <li>• Source of the spill,</li> <li>• Type of product spilled,</li> <li>• Amount spilled, and</li> <li>• Status of control operations.</li> </ul> </li> </ul>
OPERATIONS SECTION CHIEF (DEPUTY OPERATIONS SECTION CHIEF DURING LEVEL II/III SPILLS)	<ul style="list-style-type: none"> <li><input type="checkbox"/> Report to scene.</li> <li><input type="checkbox"/> Make an initial assessment of the spill and associated safety and environmental issues.</li> <li><input type="checkbox"/> Stop the source of spill if possible.</li> <li><input type="checkbox"/> Initiate actions to report spill to agencies.</li> <li><input type="checkbox"/> Upon arrival on scene, begin response operations. If necessary, mobilize Northstar Response Team (NRT) and on-site equipment required to control and clean up spill.</li> <li><input type="checkbox"/> Assess response activities. If response is adequate, remain at Level 1. If additional capabilities are needed, go to Level II/III response.</li> <li><input type="checkbox"/> Supervise control and recovery operations. Upon completion, ensure appropriate storage and disposal of oily wastes/materials.</li> </ul>
<b>LEVEL II &amp; III SPILLS</b>	
INCIDENT COMMANDER/CONTROL ROOM	<ul style="list-style-type: none"> <li><input type="checkbox"/> Immediately notify:               <ul style="list-style-type: none"> <li>• NRT</li> <li>• Environmental Advisor</li> <li>• Area Operations Manager North</li> <li>• Northstar Offshore Installation Manager</li> </ul> </li> </ul>



**TABLE 1-1 (CONTINUED): IMMEDIATE RESPONSE CHECKLIST**

<b>LEVEL II &amp; III SPILLS (CONTINUED)</b>	
<b>SAFETY OFFICER</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Account for the safety of personnel.</li> <li><input type="checkbox"/> Ensure establishment of site-entry and exit procedures, including lower explosive limit (LEL) and air monitoring, and personnel and equipment decontamination.</li> <li><input type="checkbox"/> Determine if a threat of fire or explosion exists. If a threat exists, suspend control and/or response operations and notify Fire/Safety Department.</li> <li><input type="checkbox"/> Determine appropriate personal protective equipment (PPE) and brief site workers.</li> </ul>
<b>ENVIRONMENT TEAM</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Make immediate phone notification to the agencies.</li> <li><input type="checkbox"/> Initiate necessary permits for agency approval.</li> <li><input type="checkbox"/> Under GPB Environment Team oversight, prepare cleanup and waste management plan for agency approval.</li> <li><input type="checkbox"/> Ensure agency notifications are complete and maintain follow-up notifications on a periodic basis and whenever there is a significant change in the course of a reported incident.</li> </ul>
<b>INCIDENT COMMANDER</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Activate all or part of the IMT and the Command Post.</li> <li><input type="checkbox"/> Notify the BP Notification Center at 1-800-321-8642. The BP Notification Center will contact BPXA's Business Support Team Duty Officer and share information provided by the Incident Commander. Provide the BP Notification Center with a contact name and phone number.</li> <li><input type="checkbox"/> Notify Qualified Individual (QI)</li> <li><input type="checkbox"/> Continue internal and external notifications.</li> <li><input type="checkbox"/> Maintain communications with Anchorage Crisis Center.</li> <li><input type="checkbox"/> Coordinate staff activity.</li> <li><input type="checkbox"/> Manage incident operations and approve release of major resources and supplies.</li> </ul>
<b>OPERATIONS SECTION CHIEF</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Activate ACS 659-2405 (24 hours).</li> <li><input type="checkbox"/> Activate Mutual Aid through ACS as necessary. Establish staging areas as required.</li> <li><input type="checkbox"/> Provide the Logistics Section Chief with information on initial equipment, staff, material, and supply needs.</li> <li><input type="checkbox"/> Supervise control and recovery operations.</li> </ul>

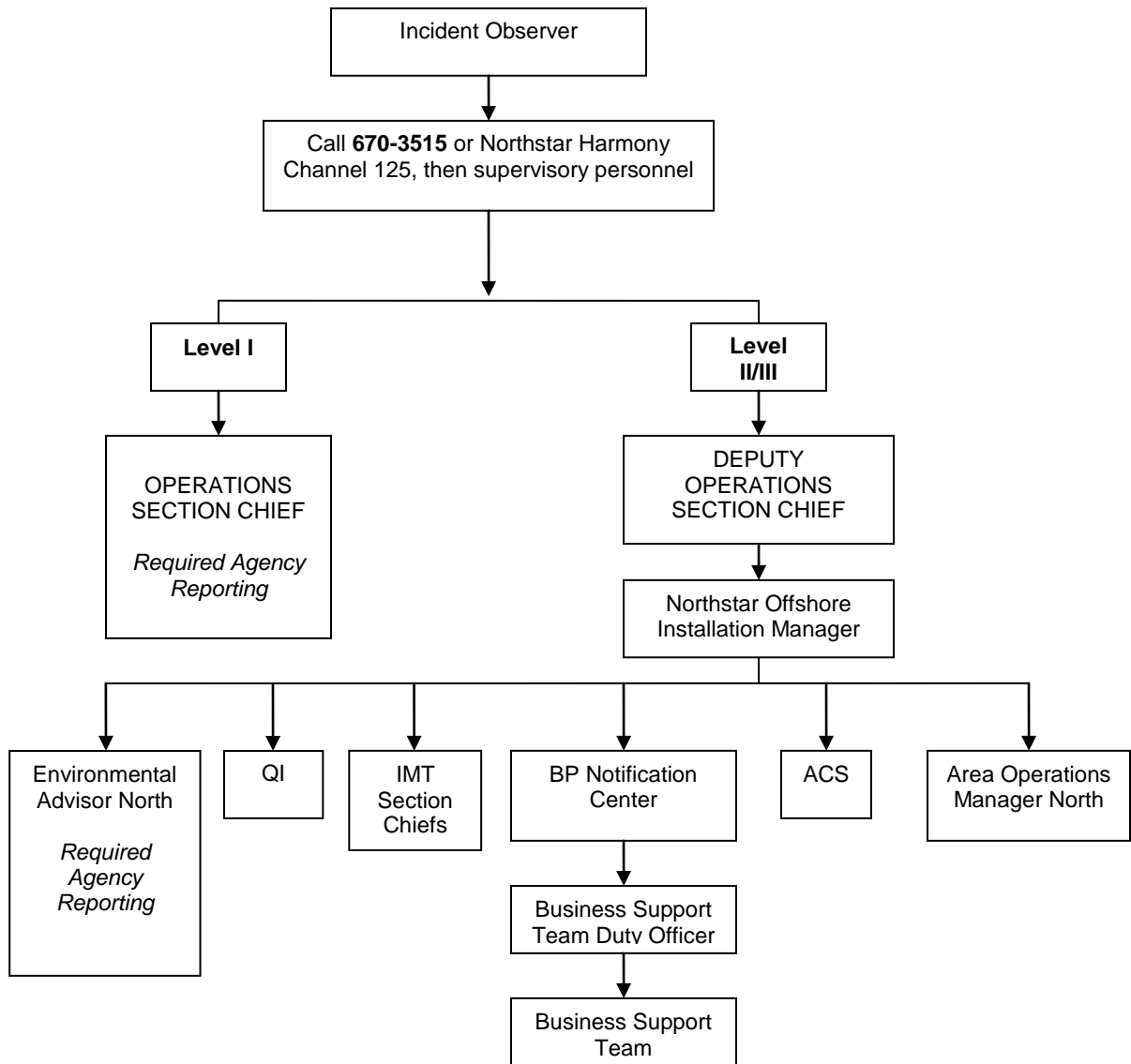


**TABLE 1-1 (CONTINUED): IMMEDIATE RESPONSE CHECKLIST**

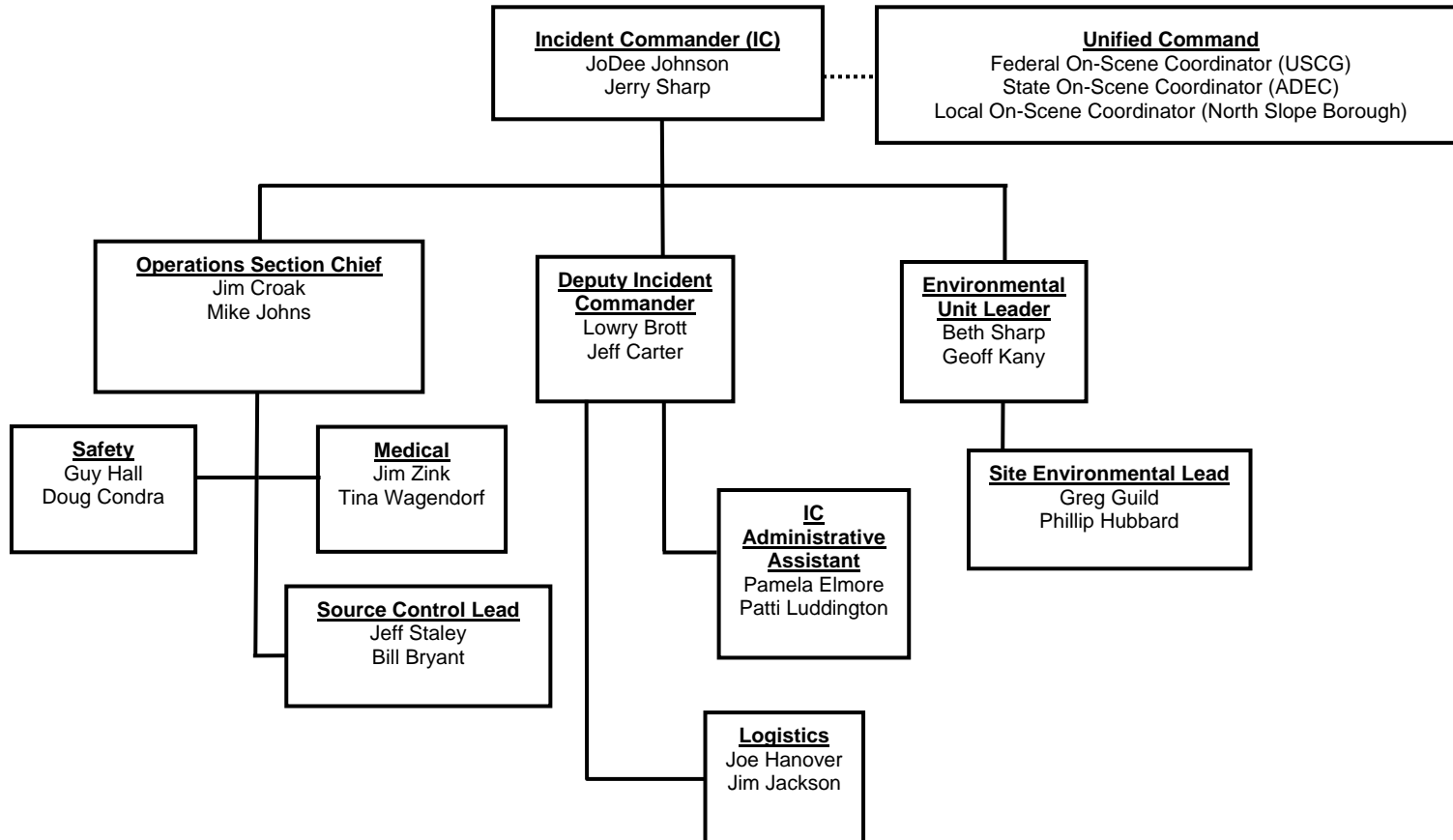
<b>LEVEL II &amp; III SPILLS (CONTINUED)</b>	
PLANNING SECTION CHIEF	<ul style="list-style-type: none"> <li><input type="checkbox"/> Ramp up Planning Section.</li> <li><input type="checkbox"/> Ensure Agency Notifications have been made and updates are provided.</li> <li><input type="checkbox"/> Compile and display status information in Command Post.</li> <li><input type="checkbox"/> Assist in development of planning process.</li> <li><input type="checkbox"/> Document aspects of the response.</li> <li><input type="checkbox"/> Provide environmental support as needed.</li> </ul>
LOGISTICS SECTION CHIEF	<ul style="list-style-type: none"> <li><input type="checkbox"/> Order equipment, personnel, material, and supplies as requested.</li> <li><input type="checkbox"/> Provide transportation support.</li> <li><input type="checkbox"/> Provide support for all field operations and Command Post operations.</li> </ul>
FINANCE SECTION CHIEF	<ul style="list-style-type: none"> <li><input type="checkbox"/> Issue cost code for tracking of expenses.</li> <li><input type="checkbox"/> Notify insurance representatives as warranted.</li> <li><input type="checkbox"/> Track expenditures and provide audit function as needed.</li> </ul>
DUTY OFFICER	<ul style="list-style-type: none"> <li><input type="checkbox"/> Activate Business Support Team as needed to support operation.</li> <li><input type="checkbox"/> Coordinate with the Incident Commander to mobilize backup resources.</li> <li><input type="checkbox"/> Activate the Anchorage Crisis Center to provide information distribution support.</li> <li><input type="checkbox"/> Coordinate Government and Public Affairs notification and information effort.</li> </ul>



**FIGURE 1-1: IMMEDIATE OIL SPILL NOTIFICATIONS**



**FIGURE 1-2: NORTHSTAR INCIDENT MANAGEMENT TEAM**



The IMT is activated by dispatch via Harmony radio system at the direction of the Incident Commander



**TABLE 1-2: GPB INCIDENT MANAGEMENT TEAM**

FACILITY	NAME	PHONE	TIER 2 INCIDENT COMMANDER	TIER 1 INCIDENT COMMANDER	IC ADMIN	LOGISTICS SECTION CHIEF	PLANNING SECTION CHIEF	FINANCE SECTION CHIEF	OPERATIONS SECTION CHIEF
ALL	Paulette Farmer Susie Holly	659-5222			✓				
ALL	Adrian McCaa Shawn Croghan	659-4490	✓						
ALL	Randy Selman TBD	659-8185	✓						✓
ALL	Michele O'Malia Tony Galloway	659-8769				✓			
ALL	Koreen Burrow Chuck Wheat	659-5196					✓		✓
ALL	Brad Campbell Drais Farnham	564-5582 564-5836 564-4268						✓	
GC1	James Fausett Jimmie McGallion	659-4476		✓					
	Joel Krueger Mike Schoonmaker	659-4087							✓
GC2	Winston Shero Brett Leach	659-4902		✓					
	TBD Tom Simpson	659-4916							✓
GC3	Kurt Horst Christopher Rhoads	659-7790		✓					
	Nelson Martin Cleve Pogue	659-4951							✓
FS1	Mike Bolkovatz Greg Cooke	659-8727		✓					
	Jerome Hines Mike Shelton	659-5392							✓

**TABLE 1-2 (CONTINUED): GPB INCIDENT MANAGEMENT TEAM**

FACILITY	NAME	PHONE	TIER 2 INCIDENT COMMANDER	TIER 1 INCIDENT COMMANDER	IC ADMIN	LOGISTICS SECTION CHIEF	PLANNING SECTION CHIEF	FINANCE SECTION CHIEF	OPERATIONS SECTION CHIEF
FS2 / COTU	Sohrab Tafreshi Tim Johnson	659-5489		✓					
	Skip Desaulniers Jackson Covey	659-5492							✓
FS3	John Ketchum Andy Burden	659-5590		✓					
	Kevin Smith Rob Endebrock	659-5592							✓
LPC / GPMA	Paul Jacobson Jeff Clopton	659-8290		✓					
	Rob Kruger Rob Henry	659-8641							✓
CPS	Michael Dobesh Jason Peterson	659-4709		✓					
	Matt Brose Christopher Ori	659-4707							✓
CCP / CGF	David Burgess Jeff Michels	659-5001		✓					
	Mitchell Wegner Tim Hendricks	CCP 659 5362							✓
	Carl Long Joseph Cabaniss	CGF 659-8682							✓
STP / SIP	Warrick Combs Ned Kimball	659-8998		✓					
	Vince Pokryfki TBD	659-8492							✓

## **1.2 REPORTING AND NOTIFICATION [18 AAC 75.425(e)(1)(B)]**

### **1.2.1 INTERNAL NOTIFICATION PROCEDURES**

It is BPXA policy for employees and contractors to report spills of oil or hazardous substances on BPXA leases regardless of size to a BPXA representative. See Table 1-1, Immediate Response Checklist. The Operations Section Chief or designee ensures that safety is considered and that internal notifications are made. See Table 1-3.

### **1.2.2 EXTERNAL NOTIFICATION PROCEDURES**

The Environmental Advisor notifies regulatory agencies per the “BPXA North Slope Event Reporting, Clean-up, and Disposal Procedure.” Agency notification requirements for oil spills are listed in Table 1-4. See Figure 1-3, North Slope Spill Report Form.

### **1.2.3 REPORTING REQUIREMENTS**

Immediate reports are made to the National Response Center (NRC) and other agencies verbally, and contain the information sought on the NRC online reporting report (to the extent known at the time of initial notification) or on the form found in Figure 1-3.

Depending upon the type and amount of the release, individual government agencies have written reporting requirements. See Table 1-4.

Written reports include the following:

- Date and time of discharge;
- Location of discharge;
- Name of facility, vessel or pipeline;
- Weather conditions on scene;
- 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, vessel or pipeline;
- Type and amount of each hazardous substance discharged;
- Cause of the discharge;
- Description of any environmental damage caused by the discharge, or containment, to the extent the damage can be identified;
- Description of cleanup actions taken;
- Estimated amount of hazardous substance cleaned up and hazardous waste generated;
- Date, location, and method of ultimate disposal of the hazardous substance cleaned up;
- Description of actions being taken to prevent recurrence of the discharge; and
- Other information the department requires to fully assess the cause and impact of the discharge.



**TABLE 1-3: BPXA CONTACT LIST**

POSITION	NAME	TELEPHONE
<b>VP Operations</b>	Bruce Williams	(907) 564-4632
<b>Environmental Team Lead (North Slope)</b>	Koreen Burrow / Chuck Wheat	(907) 659-5196
<b>ENDICOTT</b>		
Endicott OIM / Qualified Individual	Rick Rodriguez / Gary Herring	(907) 659-6555
Endicott OTL / Alternate Qualified Individual	Dan Harris / Max Hobson	(907) 659-6527
Environmental Advisor North	Geoff Kany / Beth Sharp	(907) 659-6810
ACS Environmental Tech. – Endicott	Vince Volpe / Lance Douglas	(907) 659-6541
<b>MILNE POINT UNIT (MPU)</b>		
MPU OSM / Qualified Individual	Kenton Schoch / Wayne Hauger	(907) 670-3323
MPU Field OTL / Alt. Qualified Individual	Mark O'Malley / Rob Handy	(907) 670-3330
MPU Facility O&M TL / Alt. Qualified Individual	Gregg Alexander / Richard Knox	(907) 670-3331
Environmental Advisor MPU	Stephan Gogosha / Deb Heebner	(907) 670-3382
ACS Environmental Tech – MPU	Rob Murray / Neil Hermon	(907) 670-3473
<b>NORTHSTAR</b>		
Northstar OIM / Qualified Individual	JoDee Johnson / Jerry Sharp	(907) 670-3576
Alt. Qualified Individual (GPB QI)	Adrian McCaa / Shawn Croghan	(907) 659-4490
Environmental Advisor North	Geoff Kany / Beth Sharp	(907) 659-6810
ACS Environmental Tech – Northstar	Philip Hubbard / Greg Guild	(907) 670-3508
<b>GREATER PRUDHOE BAY (GPB)</b>		
Campaign Maint. OSM / Qualified Individual	Adrian McCaa / Shawn Croghan	(907) 659-4490
Inspection Exec. TL / Alt. Qualified Individual	Randy Selman / TBD	(907) 659-8185
Environmental Advisor West	Bill Fletcher / Steve McKendrick	(907) 649-4789
Environmental Advisor East	Mike Villanova / Chrissy May	(907) 659-5999
Environmental Advisor Central	Todd Winkel / Alex Reyes	(907) 659-5893
ACS Environmental Tech – West	Fred Chace / Vic Richart	(907) 659-4159
ACS Environmental Tech – East	Cory Settle / Tommy Cumming	(907) 659-5800
<b>WELL CONTROL SPECIALISTS</b>	(800) BLOWOUT / (800) 256-9688	
Boots and Coots Services	(281) 931-8884	
<b>ALASKA CLEAN SEAS, OSRO</b>		
Prudhoe Bay Office, Pouch 340022	Ron Hocking / Fred McAdams,	(907) 659-2405
Prudhoe Bay, Alaska 99734	Operations Mgr.	
<b>BP Notification Center (Naperville)</b>		(800) 321-8642
The numbers below are 24-hour spill reporting numbers. Qualified Individuals can be reached via these and/or the numbers above.		
<b>Endicott</b>		(907) 659-2222
<b>Milne Point Unit</b>		(907) 670-3300
<b>Northstar</b>		(907) 670-3515
<b>Greater Prudhoe Bay</b>		(907) 659-5700
O&M – Operations and Maintenance	OTL – Operations Team Lead	
OIM – Offshore Installation Manager	TBD – To be determined	
OSM – Onshore Site Manager	TL – Team Lead	
OSRO – Oil Spill Response Organization		



**TABLE 1-4: AGENCY REPORTING REQUIREMENTS FOR OIL SPILLS**

AGENCY	LOCATION / RECEIVING ENVIRONMENT	SPILL SIZE	VERBAL REPORT	PHONE NUMBER	ALASKA CONTACT	WRITTEN REPORT
National Response Center (NRC) Notifies federal agencies as applicable. See specific federal agency below for guidance on reportable spill size.	Off pad to water or tundra	Any	Immediately	(800) 424-8802 (24 hr)	--	Not required – form is completed during phone notification process.
	To ice pad, ice road, or snow-covered tundra from an improperly functioning vessel/vehicle engine <sup>1</sup>	Any	Immediately			
U.S. Coast Guard (USCG)	In or threatening navigable waters	Any	Immediately	(907) 271-6700 (24 hr) (907) 271-6751 (FAX)	Anchorage Marine Safety Office USCG fax number	Not required but requested.
U.S. Department of Transportation (DOT), Pipeline and Hazardous Materials Safety Administration (PHMSA).	From a DOT-regulated pipeline and spill is not in or threatening navigable waters	≥5 gallons, resulting from an accident	Immediately <sup>2</sup>	(800) 424-8802	NRC and State Office of Pipeline Safety (Note: NRC notifies federal agencies)	Required within 30 days on DOT Form 7000-I (see form for details).
		≥210 gallons, resulting from pipeline maintenance activity <sup>3</sup>	Monthly written report			
	From a DOT-regulated pipeline and spill is in or threatening navigable waters	Any	Immediately	(800) 424-8802		Not required – form is completed during phone notification process
State Pipeline Coordinator's Office (Joint Pipeline Office) Anchorage, Alaska	Pipelines administered by the State Pipeline Coordinator's Office (SPCO) authorized under AS 38.35	Any	Immediately	(907) 257-1330 (direct) (907) 257-1300 (office) (907) 272-0690 (FAX)	Mike Thompson (State Pipeline Coordinator)	Not required.
U.S. Department of the Interior, Bureau of Safety and Environmental Enforcement (BSEE) Applicable to Endicott, Northstar and PM <sup>2</sup>	Marine waters	>42 gallons (1 barrel)	Immediately	(907) 334-5300 (24-hr) (907) 334-5302 (FAX)	Christy Bohl	Required within 15 days after spill is contained.
	All losses of well control	Any	Immediately			Required within 15 calendar days of incident



**TABLE 1-4 (CONTINUED): AGENCY REPORTING REQUIREMENTS FOR OIL SPILLS**

AGENCY	LOCATION / RECEIVING ENVIRONMENT	SPILL SIZE	VERBAL REPORT	PHONE NUMBER	ALASKA CONTACT	WRITTEN REPORT	
Alaska Department of Environmental Conservation (ADEC)/Alaska Department of Natural Resources (ADNR) <sup>4</sup> ADNR has the same spill reporting requirements as ADEC <sup>4</sup>	Off pad to water or tundra	Any	Immediately (within 30 minutes)	<u>ADEC</u> (907) 451-2121 (907) 451-2362 (FAX)	<u>ADEC</u> Tom DeRuyter ADEC fax number	Required within 15 days after spill containment and cleanup are completed, or if no cleanup occurs, within 15 days after discharge or release.	
	On gravel pad, gravel road, ice pad, ice road, or snow-covered tundra (Note: spills to snow, ice roads, and ice pads that do not penetrate to surface water or tundra are treated as spills to gravel pads)	<1 gallon	None		or <u>Alaska State Troopers</u> (800) 478-9300 (M-F after 5, Sat, Sun)		or <u>Alaska State Troopers</u> After-hours spills with immediate notification requirements
		1 to 10 gallons	Monthly written report				
		>10 to 55 gallons	Within 48 hours				
	>55 gallons	Immediately					
	Impermeable secondary containment areas or structures	>55 gallons	Within 48 hours	ADNR (907) 451-2678 (907) 451-2751 (FAX)	ADNR Spill Report Number ADNR fax number		
Alaska Oil and Gas Conservation Commission (AOGCC)	From wells or involving any crude loss Uncontrolled releases	Any >10 barrels or resulting in the shutdown of operations at production facilities	Immediately	(907) 279-1433 (24 hr) (907) 276-7542 (FAX) (907) 659-3607 (pager) (907) 659-2717 (FAX)	Dan Seamount John Norman Cathy Foerster	Required within 5 days of loss and Final report within 30 days	



**TABLE 1-4 (CONTINUED): AGENCY REPORTING REQUIREMENTS FOR OIL SPILLS**

AGENCY	LOCATION / RECEIVING ENVIRONMENT	SPILL SIZE	VERBAL REPORT	PHONE NUMBER	ALASKA CONTACT	WRITTEN REPORT
North Slope Borough	Off pad to water or tundra	Any	Immediately	(907) 852-0440 (907) 878-4843	Planning Department After hours	Copy of reports submitted as requested.
	On gravel pad, gravel road, ice pad, ice road, or snow-covered tundra	>55 gallons	Immediately		After hours (courtesy notification): Thomas Simmonds III (907) 878-4843	
	Impermeable secondary containment areas or structures	>55 gallons	Within 48 hours		Gordon Matumeak (907) 878-2194  Charles Russel (907) 878-4849  Tony Cabinboy (907) 878-2193  Roy Varner, Sr. (907) 852-0320	

<sup>1</sup> Oil spills from "properly functioning vessel" engines are not reportable to the NRC (exempt by 40 CFR 110.5). "Vessel" is defined as any artificial contrivance used or capable of being used as a means of transportation on water [33 U.S.C. §1311(a)(3)]. This includes trucks, rolling stock, and exploratory vehicles traveling on frozen tundra, but not equipment like light plants. Equipment used for traveling on ice roads, including vehicles, construction machinery, water trucks, and Rolligons, will be considered a "vessel" by EPA. "Improperly functioning" refers to mechanical problems such as a broken line or hose.

<sup>2</sup> The operator shall give verbal notice if the release:

- Caused a death or personal injury requiring hospitalization;
- Resulted in either a fire or explosion not intentionally set by the operator;
- Caused estimated property damage, including cost of cleanup and recovery, value of lost product, and damage to the property of the operator and/or others exceeding \$50,000;
- Resulted in pollution of any stream, river, lake, reservoir, or other similar body of water that violated applicable water quality standards, caused a discoloration of the surface of the water or adjoining shoreline, or deposited a sludge or emulsion beneath the surface of the water or upon adjoining shorelines; and
- If, in the operator's judgment, it was significant even though it did not meet the criteria.

<sup>3</sup> No report is required for a release less than 5 barrels resulting from a pipeline maintenance activity if the release is:

- Not otherwise reportable;
- Did not result in pollution of any stream, river, lake, reservoir, or other similar body of water that violated applicable water quality standards, caused a discoloration of the surface of the water or adjoining shoreline, or deposited a sludge or emulsion beneath the surface of the water or upon adjoining shorelines; and
- Confined to company property or pipeline right-of-way and cleaned up promptly.

<sup>4</sup> The low concentrations and volumes of scale inhibitors, corrosion inhibitors, or biocides that are contained in and being used for their intended purpose in brines, seawater, produced water, drilling fluids, or crude oil do not trigger a spill reporting requirement. Rather, the requirement to notify ADEC of the release shall consider the parent material without the inclusion of these substances. As with all spill reports, all materials released must be included in the report whether or not they would, on an individual basis, trigger a reporting requirement to the State.







#### 1.2.4 QUALIFIED INDIVIDUAL [33 CFR 154.1035(b)(3)(II)]

In the event of a spill requiring notification of the NRC, the Environmental Advisor or designee ensures the designated Qualified Individual (QI) is notified and is able to respond. In the event the primary QI is unavailable, the alternate QI will be contacted to respond. QIs are listed in Appendix A, Oil Pollution Act of 1990 Addendum.

The prerequisites for designation of a QI, as defined in 33 United States Code U.S.C. 1321(c)(4), are:

1. Available on a 24-hour basis,
2. Speak English fluently,
3. Located in the United States,
4. Trained as a Qualified and Alternate Qualified Individual under the response plan, and
5. Familiar with the emergency response plan and how to carry it out.

The QI must be trained and authorized to carry out the following responsibilities:

1. Activate and engage in contracting oil spill removal organization(s) and other response-related resources,
2. Act as a liaison with the Federal On-Scene Coordinator, and
3. Acquire funds to carry out response activities.

The QI and alternate QI are not responsible for:

1. The adequacy of the response plan prepared by the owner/operator, and
2. Acquiring funds for response resources beyond the full authority as designated by the owner/operator.

The QI or the QI's designee communicates to appropriate federal officials and response personnel if there is an oil spill requiring those communications (30 Code of Federal Regulations [CFR 254.53(a)(2)]). Many spill response duties are delegated to members of an IMT. The immediate duties are listed in Table 1-1.

### **1.3 SAFETY [18 AAC 75.425(e)(1)(C)]**

The BP Control of Work Requirements was developed to reduce the number and frequency of injuries and serious incidents that occur in the workplace. The requirements ensure that there is a formal approach to managing work risks. The requirements are a procedural form of control, consisting of 12 elements supported by mandatory requirements. They cover the means of safely controlling construction, maintenance, demolition, remediation, operating tasks and similar work activities and apply to BP employees and every employee of any other company engaged to perform work on BPXA premises. The requirements are detailed in the *2010 BP Team Alaska Safety Handbook*.

The steps to develop an incident-specific safety plan are outlined in the *ACS Technical Manual*, Tactics S-1 to S-6. The *ACS Technical Manual*, Tactics S-1 through S-6, incorporated here by reference, includes site entry procedures, site safety plan (ICS Form 201-5) development, and personnel protection procedures.

The *2010 BP Team Alaska Safety Handbook* covers the key standards and procedures used at BPXA that are essential to safely perform work. The handbook is distributed to BPXA employees and contractors.

The BPXA well plan prepared for each drilling operation conducted on the North Slope is designed to ensure drilling activities are performed in a safe and environmentally sound manner. Each plan identifies the procedures, systems, and equipment employed in drilling; uses the best technical information available concerning subsurface formation characteristics and pressures; and provides information critical to the success and safety of the drilling program.

Emergency response procedures are in place for evacuation in and around the facility in the event of a discharge or release of stored materials. The location of stored materials is presented in Part 3 and Appendix A. Hazards posed by discharged materials and a discussion of discharge flow direction, prevailing wind direction and speed, receiving environment, and emergency response actions are presented in the response scenarios in Part 1, and in tables and language in Parts 2 and 3.

Emergency response procedures are located on the BPXA intranet and are available to employees and contractors. The procedures cover alarm and notification systems, primary and alternate evacuation routes, designated safe areas, roll-call procedures, and initial identification and treatment of injured personnel, including transportation to medical facilities.



**1.4 COMMUNICATIONS [18 AAC 75.425(e)(1)(D)]**

The communications plan is designed for compatibility with the communications equipment available through BPXA's Anchorage office, BPXA's North Slope facilities, and ACS. Initially, Northstar will respond to incidents using the day-to-day communications system. Northstar has on site, at a minimum, the following radio equipment:

- Very High Frequency (VHF) oil spill repeater;
- Transmission line with connectors;
- VHF antenna;
- Tone remote controls (two each);
- Marine private coast station;
- VHF handheld radios (six each);
- Backboarded Spectra mobile radio, and
- Satellite phones.

Northstar uses the Eastern GPB repeater located at the Lisburne Production Center (LPC). The repeater provides for direct tie-in to the ACS communications system. With such repeaters installed across the North Slope, coverage is provided from Alpine to Badami. The range of each fixed repeater is approximately 10 to 20 miles depending on topography and antenna height. Microwave relays in Prudhoe Bay give an effective range of 30 to 50 miles. ACS solar-powered or generator-powered portable repeaters can also be deployed at the time of a spill. ACS will provide the repeater, coast station, antennas, handheld radios, and backboarded mobiles to allow for effective spill response, when necessary, in an emergency. Radio communications equipment is presented in Table 1-5.

**TABLE 1-5: RADIO COMMUNICATIONS EQUIPMENT**

CHANNEL NUMBER	USE	LOCATION	EQUIPMENT TRANSMITS (MHZ)	EQUIPMENT RECEIVES (MHZ)
OS-39	Oil Spill Repeater	Prudhoe Bay (Lisburne/Northstar)	158.325	153.185
OS-86	Coast Station Ch 80A	Northstar/Alpine	157.025	157.025

Spill response vehicles and the Mobile Command Center are equipped with frequency-agile, high-band VHF and ultra high frequency (UHF) radios. This capability coordinates the SRT with the North Slope Operating Area frequency plan, and includes access to mobile communication channels. Vehicles assigned to fire or medical responses are equipped with a Harmony radio system.

Mobile telephone services form an important part of the spill response communications. The Mobile Command Center, SRT Commander's truck, both Autocar™ tractors, SRT Tech truck, and Spill Van all have radio and bag phones available. If necessary, there is also a Harmony radio system available for



use. The SRT Command Van also has a permanently installed Bush Phone to provide a telephone line for a mobile fax machine. Finally, a portable two gigahertz (GHz) microwave shelter housing a six-channel microwave system has been mounted on a small vehicle trailer to provide communications to the mobile Staging Area Manager's Office. This includes one serial computer link with access to the computer network, one telephone line to connect a facsimile machine, and four standard telephone lines.

A detailed explanation of oil spill communications on the North Slope is provided in the *ACS Technical Manual*, Tactic L-5, incorporated here by reference.

**1.5 DEPLOYMENT STRATEGIES [18 AAC 75.425(e)(1)(E)]**

In this plan, mobilization means readying for travel. Deployment means readying for use at the site. Travel time is the period between mobilization and deployment.

Initial spill response transportation relies on the BPXA daily operations infrastructure. The extensive transportation infrastructure of personnel and equipment can support a small response and be enhanced for a major spill. Transportation options provide alternative methods in adverse weather. Options are summarized in Table 1-6.

**TABLE 1-6: SEASONAL TRANSPORTATION OPTIONS**

MODE	SEASONS		
	SUMMER	WINTER	BREAK-UP / FREEZE-UP
Vessels	X		Partial
Helicopters	X	X	X
Fixed-wing aircraft		X	
Vehicles		X	
Heavy all-terrain vehicles (Arctos)	X	X	X
Air boats	X	X	

The seasons listed in Table 1-6 are defined by sea surface conditions. They are described in detail in Sections 3.2 and 3.4 (DF Dickins et al., 2000, pp. 2-2 to 2-8). Freeze-up around Northstar generally begins about October 6. The ice typically becomes stable in mid-November, the point when freeze-up ice conditions can be considered as changing to winter ice conditions. Winter ice conditions, characterized by stable, fast consolidated ice, transition to break-up conditions with river overflowing, melt pools and decaying ice in late May. Break-up continues until open water (i.e., less than 10 percent ice coverage) typically beginning in mid-July. Summer spans the open water period until October.

The ACS *Technical Manual* Tactics L-3, L-4, and L-6 provide detailed information on transportation procedures. Their transportation information is incorporated here by reference.

Year-round air access to the Northstar field area is available. Northstar has a 55-foot square heli-deck that can accommodate landings of medium lift helicopters. Air operations can be limited by weather conditions. They are suited for movement of personnel and emergency movement of supplies or equipment to the field.

Air transportation to Northstar is provided year round by a contracted helicopter. Alyeska Pipeline Service Company also has a Bell 206-L helicopter on contract available to BPXA upon request. The helicopter is based at Pump Station 4.



Sea ice access is by winter ice roads. Ice roads are commonly used on the North Slope for winter travel from late December through mid-June for specific projects. Vehicle access across the sea ice can continue after the ice road season by means of tracked vehicles through June (Coastal Frontiers Corporation, 2001).

Marine vessel access is available from July through September. BPXA and ACS have contracts in place with the major North Slope marine contractors.

ACS is the primary response action contractor for BPXA. The 24-hour phone number for ACS is listed in Table 1-3.

Section 1.1 describes immediate response and notification actions, including notification of ACS. While ACS is mobilizing personnel and equipment to the spill site, on-site BPXA and ACS personnel will determine safety procedures, notify government agencies and BPXA personnel, and proceed with source-control measures. Off-site BPXA personnel may be consulted as necessary.

## **1.6 RESPONSE SCENARIOS AND STRATEGIES [18 AAC 75.425(e)(1)(F)]**

### **1.6.1 QUALIFIER STATEMENT**

Scenarios are developed in accordance with 18 Alaska Administrative Code (AAC) 75.425(e)(1)(F) and (I), 18 AAC 75.445(d). They describe equipment, personnel, and strategies that could be used to respond to an oil spill. The scenarios describe oil spill recovery by 100% mechanical means, as required by 18 AAC 75.425(e)(1)(F)(vii).

The scenarios are for illustration only and are not performance standards or guarantees of performance. Actual responses in an oil spill emergency depend on personnel safety considerations, weather and other environmental conditions, agency permits and priorities, and other factors. In an incident, considerations to ensure the safety of personnel will be given highest priority. The scenarios assume conditions only for the purposes of describing general procedures, strategies, tactics, and selected operational capabilities. The scenarios assume the agency on-scene coordinators and other agency officials will immediately grant required permits.

Although equipment is specified in the scenarios, it may be replaced by functionally similar equipment in the future. The response timelines are for illustration only. They do not limit the discretion of the people in charge of the spill response to select a specific sequence or take the time they deem necessary for an effective response without jeopardizing safety.

Some scenarios simulate heavy equipment operators, e.g., truck drivers and front end loader operators. Staff in the *equipment operator* category typically operate their equipment on a regular schedule on the North Slope unrelated to spill responses and are not members of the North Slope Spill Response Team (NSSRT).

In situ burning could be used in a spill response to reduce the quantity of oil, regardless of whether a scenario hypothesizes in situ burning.

The response strategies illustrate specific response measures that can reduce the risk, magnitude or environmental consequences of an oil spill during periods when mechanical spill response is limited, as described in 18 AAC 75.445(f) and 18 AAC 75.425(e)(3)(D). Section 3.4, Realistic Maximum Operating Limitations, and Section 3.7, Non-Mechanical Response Information, describe the capability of BPXA and ACS to effectively remove spilled oil by means of in situ burning in a range of ice conditions during spring break up and fall freeze-up.

### **1.6.2 RECOVERY PROCEDURES**

Recovery procedures and equipment presented in the following scenarios are adapted primarily from the ACS *Technical Manual*. The Crucial C Disc 13/30 skimmer, which is utilized in several spill response scenarios, currently is not presented in the ACS *Technical Manual*, but is scheduled to be included in a 2012 update.



### 1.6.3 WASTE DISPOSAL APPROVAL

The method of disposal for oil and contaminated materials from oil spill recovery operations must be approved by state and federal agencies before implementation. At the time of the spill, the Operations Section Chief, in consultation with the Environmental Unit Leader, will determine a reuse, recycle, or disposal method best suited to the condition of the oil, the degree of contamination of recovered debris, and the logistics involved. See Tactics D-1 through D-5 in the *ACS Technical Manual*.

When an IMT is not involved, spills of crude oil and exempt hazardous substances (e.g., refined fuels, lube and hydraulic oils, produced waters, seawater, source water, glycol, and drilling muds) of 200 gallons or less to gravel pads, roads, ice roads or ice pads can automatically use pre-approved permitted storage and disposal facilities. For spills above the threshold level, or to other receiving environments, approval for storage and disposal will be obtained from the State On-Scene Coordinator before material is removed to those facilities. The approval can be in the form of a verbal communication during initial spill notification.

An initial determination of exempt, hazardous, or non-hazardous must be made for classification of the waste. This classification must be made on a case-by-case basis. The Environmental Unit Leader will provide assistance in determining the classification should the status of the waste material be in question. The applicable guidelines are listed below.

- Spills from common carrier transportation pipelines are non-exempt, and it must be determined whether the material to be disposed of is hazardous;
- Spilled material that comes out of a well, either during drilling or workover operations, is exempt. Spilled material that did not come out of a well is non-exempt, and it must be determined whether the material to be disposed of is hazardous; and
- Spills of non-exempt fluids that occur during filling a tank (e.g., vehicle, storage, etc.) are non-exempt, even though they may occur on a well pad, and it must be determined whether the material to be disposed of is hazardous.

The preferred management option for recovered oil and diesel is to recycle it back into the production stream. If the material is not suitable for recycling, it will be determined whether it is hazardous. If hazardous, it will be placed in drums and stored on site until it is shipped to an approved hazardous waste treatment, storage, or disposal facility. The Environmental Advisor will determine the appropriate management method.

Guidelines for handling and managing oil and contaminated materials from oil spill recovery operations or for oily waste from normal operations are found in the “Alaska Waste Disposal and Reuse Guide.”



#### 1.6.4 RESPONSE SCENARIOS AND STRATEGIES

Response scenarios and strategies are presented in this section. The scenarios show that the plan meets the Response Planning Standard (RPS) volumes described in Part 5.

- Scenario 1: Oil Storage Tank Rupture
- Scenario 2: Well Blowout Under Typical Summer Conditions
- Scenario 3: Well Blowout Under Typical Winter Condition
- Scenario 4: Crude Oil Transmission Pipeline Release
- Response Strategy #1: Well Blowout During Typical Spring Conditions
- Response Strategy #2: Crude Oil Transmission Pipeline Rupture During Spring Break-Up
- Response Strategy #3: Crude Oil Transmission Pipeline Rupture During Summer
- Response Strategy #4: Crude Oil Transmission Pipeline Rupture During Fall
- Response Strategy #5: Crude Oil Transmission Pipeline Rupture During Winter

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**SCENARIO 1**

**OIL STORAGE TANK RUPTURE**



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**TABLE 1-7: OIL STORAGE TANK RUPTURE  
SCENARIO CONDITIONS**

PARAMETER	PARAMETER CONDITIONS
<b>Spill Location</b>	Northstar Production Island
<b>Spill Date and Time</b>	July 15, 6:00 a.m.
<b>Cause and Source of Spill</b>	Diesel storage tank failure, Tank T-S3-8202
<b>Quantity of Spill</b>	Adjusted RPS volume = 758 barrels (bbl) which are released from the storage tank. No oil reaches open water. Refer to Part 5 for detailed explanation of RPS.
<b>Weather</b>	Overcast, 48°F
<b>Visibility</b>	Two miles
<b>Wind Direction and Speed</b>	>10 knots, wind from the WNW
<b>Spill Trajectory</b>	<p>Of the 758 barrels that escape the oil storage tank, 100 barrels remains in the tertiary containment area and 298 barrels are contained within the tank truck loading area, leaving 360 barrels to flow across the gravel pad and under the module.</p> <p>Assuming an absorption rate of 0.125 bbl per cubic yard (ACS Technical Manual Tactic R-5), the spill impacts approximately 2,880 cubic yards of gravel. See Figure 1-4. No oil enters open water.</p>



**TABLE 1-8: OIL STORAGE TANK RUPTURE RESPONSE STRATEGY**

ADEC REQUIREMENT	RESPONSE STRATEGY	ACS TECHNICAL MANUAL TACTIC
<b>(i) Stopping Discharge at Source</b>	<p>A plant operator requests lines flowing into the tank be closed. The tank shut-in procedure is evaluated to ensure possible sources have been secured.</p> <p>Notification procedures begin, along with SRT mobilization. A staging area and field command post are established.</p> <p>Within the first few hours of the spill, production supervisors prepare a team to perform repairs to the tank, and initiate fluid transfer from the damaged tank to the process stream.</p>	<p>A-1, A-2, L-2</p> <p>BPXA Incident Management System (IMS) Manual</p>
<b>(ii) Preventing or Controlling Fire Hazards</b>	<p>Throughout the first few hours of the spill, the On-Scene Commander with the assistance of the Site Safety Officer verifies that sources of ignition are shut down or removed from the area. The Site Safety Officer and Operations Section Chief perform a visual inspection of the tank and a site safety assessment.</p> <p>After declaring the area clear, the Safety Officer begins to prepare a site safety plan (ICS Form 201-5) including PPE requirements. The first draft of site safety plan focuses on the delineation, containment and source control teams. It quickly evolves to include spill recovery teams. Access to the spill site is carefully controlled and the scene is secured by designated personnel. Monitoring protocol is established by the Site Safety Officer for all work areas to ensure personnel protection.</p>	<p>S-1 through S-6</p>
<b>(iv) Surveillance and Tracking of Oil; Forecasting Shoreline Contact Points</b>	<p>Once safety zones and a decontamination unit have been set up by Hour 4, the contaminated area is delineated. The extent of oil on the pad and tundra is delineated on land with lathe and/or hand-held global positioning systems (GPS) units.</p>	<p>T-1, T-2</p>
<b>(v) Protection of Environmentally Sensitive Areas and Areas of Public Concern</b>	<p>The Environmental Unit Leader identifies priority protection sites, relying on the ACS <i>Technical Manual</i> descriptions and the Alaska Regional Response Team's North Slope Subarea Plan list of areas of major concern. No priority protection sites are within the plume.</p> <p>The area is monitored for birds that may be at risk from the spill throughout the spill response.</p>	<p>W-6, ACS Map Atlas Sheet 99</p>
<b>(vi) Spill Containment and Control Actions</b>	<p>By Hour 4, the decontamination area is set up. By Hour 5, berms are constructed around the soiled perimeter of the spill to deflect and contain diesel.</p>	<p>C-4</p>
	<p>A staging area is established in the southeastern part of the production pad by Hour 4.</p>	<p>L-2</p>



**TABLE 1-8 (CONTINUED): OIL STORAGE TANK RUPTURE RESPONSE STRATEGY**

ADEC REQUIREMENT	RESPONSE STRATEGY	ACS TECHNICAL MANUAL TACTIC
(vii) <b>Spill Recovery Procedures</b>	Starting on Day 1, crews set up hoses and pumps in series to collect diesel from pad depressions and the tertiary containment area.	R-24
	Starting on Day 2, after a majority of the liquid phase recovery is complete, contaminated gravel from the pad and the tank truck loading area is recovered with a front-end loader and hauled to a stockpile. Hand shovelers also recover contaminated gravel from underneath the module.	R-26
	Gravel areas are cleaned over 30 days to the satisfaction of ADEC.	R-9, R-26
(viii) <b>Lightering Procedures</b>	Not applicable.	Not applicable
(ix) <b>Transfer and Storage of Recovered Oil/ Water; Volume Estimating Procedure</b>	Recovered diesel suitable for freeze-protection is stored on site for later use or is processed through Northstar's processing center for hydrocarbon recycling.	D-1
	Diesel volume in solids is estimated with grab samples. Oiled gravel is stockpiled in the lined containment cell (20' x 10' x 4' = 800 ft <sup>3</sup> ) on the north side of the island. An additional containment cell (75' x 10' x 4' = 3,000 ft <sup>3</sup> ) is constructed on the southeastern part of the pad.	D-4
(x) <b>Plans, Procedures, and Locations for Temporary Storage and Disposal</b>	<p>The Waste Management Team completes the following tasks:</p> <ol style="list-style-type: none"> <li>1. Fill out and sign manifests,</li> <li>2. Measure liquid and other waste, and</li> <li>3. Submit a plan to ADEC for waste management.</li> </ol> <p>Unsuitable diesel that tests hazardous is drummed, stored and then shipped to an EPA-approved disposal facility.</p>	D-1
	Used sorbents are collected in plastic bags or other leak-proof storage containers, barged and disposed of by incineration in Deadhorse.	D-2
	Contaminated gravel is stockpiled in the lined, bermed containment areas on site until it can be transported to GPB Grind and Inject (G & I) facility via the ice road in winter.	D-4
(xi) <b>Wildlife Protection Plan</b>	Immediate response activities include the preparation of wildlife deterrent systems. The area is monitored for birds and mammals that may be at risk from the spill throughout the spill response.	W-1, W-2B, W-3, W-4
(xii) <b>Shoreline Cleanup Plan</b>	Not applicable.	Not applicable.

**TABLE 1-9: OIL STORAGE TANK RUPTURE  
OIL RECOVERY CAPABILITY**

<b>A</b> <b>SPILL RECOVERY TACTIC, ACS TECH MANUAL TACTICS DESCRIPTION</b>	<b>B</b> <b>NUMBER OF RECOVERY SYSTEMS</b>	<b>C</b> <b>RECOVERY SYSTEM</b>	<b>D</b> <b>DERATED OIL RECOVERY RATE PER UNIT BARRELS PER HOUR (BOPH) OR CUBIC YARDS (YD<sup>3</sup>)</b>	<b>E</b> <b>MOBILIZATION, DEPLOYMENT AND TRANSIT TIME TO SITE<sup>1</sup> (HOURS)</b>	<b>F</b> <b>OPERATING TIME (HOURS PER 24-HOUR SHIFT)</b>	<b>G</b> <b>OIL RECOVERY CAPACITY (BOPD OR YD<sup>3</sup>) B X D X F</b>
R-24	1	3" Diaphragm Pump with 3" Suction and 3" Discharge Hoses	357 <sup>2</sup>	5	20	7,140
R-24	1	2" Trash Pump with 2" Suction and 2" Discharge Hoses	314 <sup>3</sup>	5	20	6,280
R-26	1	Front-end Loader	9 <sup>4</sup>	Day 2	20	180

<sup>1</sup> The sum of the mobilization, deployment, and transit time is not the fastest time possible; rather, it is the time that each specific tactic is first employed in this specific scenario.

<sup>2</sup> Diaphragm pump pumping capacity of 250 gallons per minute (gpm) / 42 gallons x 60 minutes = 357 boph. See Tactic L-6.

<sup>3</sup> Trash pump pumping capacity of 220 gpm / 42 gallons x 60 minutes = 314 boph. See Tactic L-6.

<sup>4</sup> Loader recovery calculation:  $Tc / (Lt + Tt + Ut) = 3 \text{ yd}^3 / [0.25 \text{ hour} + (0.08 \text{ mile from spill site to stockpile site} \times 2 \text{ trips} / 10 \text{ mph}) + 0.08 \text{ hour}] = 9 \text{ yd}^3/\text{hour}$ , where,  
 Tc = Loader Capacity  
 Lt = Load Time  
 Tt = Travel Time  
 Ut = Unload Time



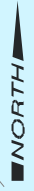
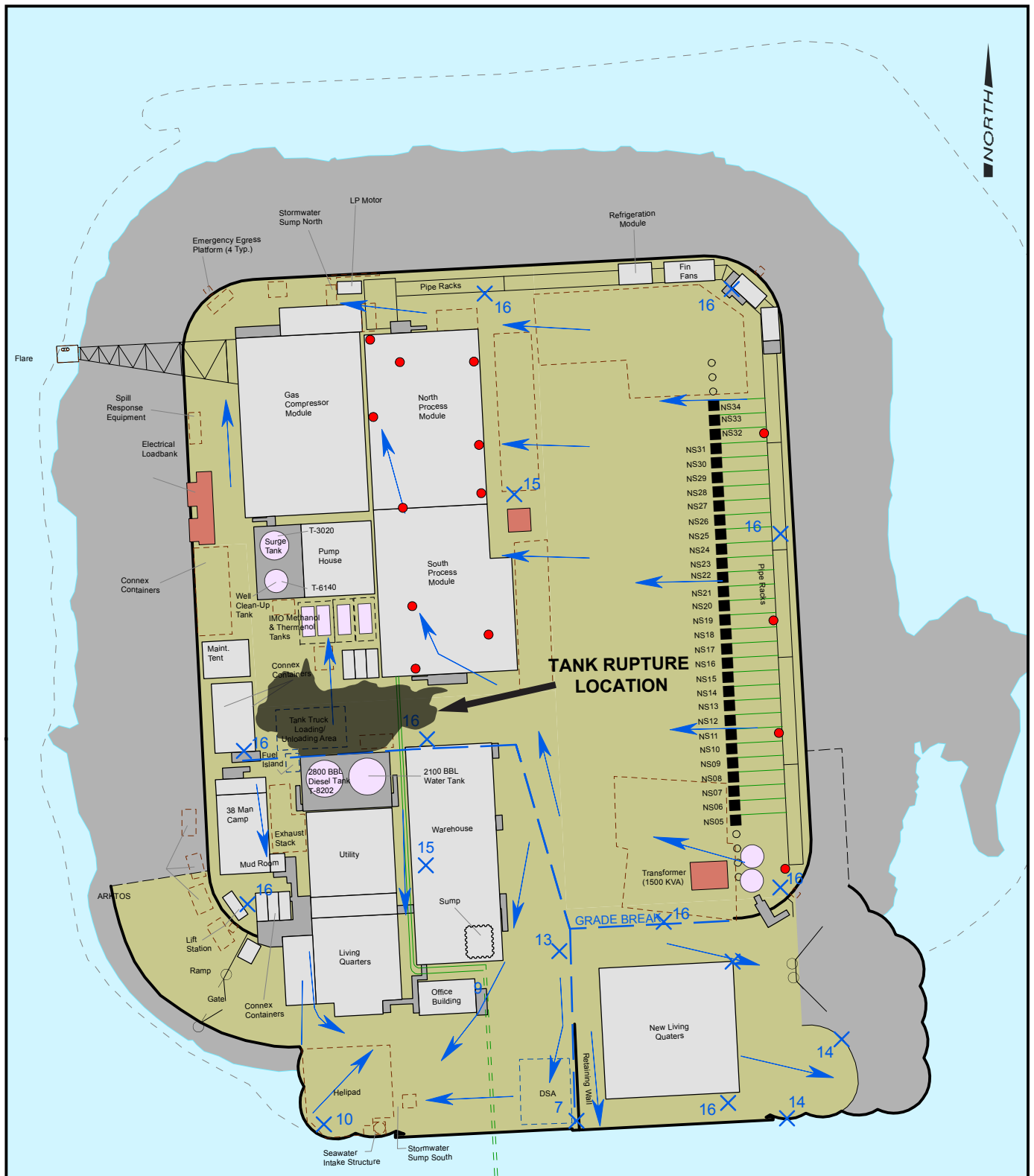
**TABLE 1-10: OIL STORAGE TANK RUPTURE  
MAJOR OIL CONTAINMENT AND RECOVERY EQUIPMENT EQUIVALENTS**

RECOVERY TACTIC	NO. TACTICAL UNITS	EQUIPMENT PER TACTICAL UNIT	TOTAL QUANTITY
C-4	1	Loader	1 Loader
R-24	1	3" Diaphragm Pump 2" Trash Pump 2" and 3" Suction Hose 2" and 3" Discharge Hose Fastank	1, 3" Diaphragm Pump 1, 2" Trash Pump Suction Hose Discharge Hose 1 Fastank
R-26	1	Loader	1 Loader

**TABLE 1-11: OIL STORAGE TANK RUPTURE  
PERSONNEL TO OPERATE OIL CONTAINMENT AND RECOVERY EQUIPMENT**

LABOR CATEGORY	TACTIC	NO. TACTICAL UNITS	NO. STAFF PER UNIT	DAY 1, NO. STAFF PER SHIFT	DAYS 2-30, NO. STAFF PER SHIFT
Equipment Operator	C-4	1	1	1	0
	R-26	1	1	0	1
Team Leader	R-26	1	1	1	1
General Technician	R-26	1	6	6	6
<b>Total</b>				8	8





NS26 ■	WELL
○	WELL SLOT
X <sup>9</sup>	SURFACE ELEVATION
←	SURFACE FLOW
●	FIRE MONITOR STATIONS Level 2 Process Module and Along Pipe Rack

<b>BP EXPLORATION (ALASKA) INC.</b>		
<b>NORTHSTAR OIL STORAGE TANK RUPTURE LOCATION MAP</b>		
DATE: February 2011	SCALE: 1" = 100'	FIGURE: 1-4

## **SCENARIO 2**

### **WELL BLOWOUT UNDER TYPICAL SUMMER CONDITIONS**



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**TABLE 1-12: WELL BLOWOUT UNDER TYPICAL SUMMER CONDITIONS  
SCENARIO CONDITIONS**

<b>INITIAL CONDITIONS</b>					
<b>Spill Location</b>	Northstar Production Island, Well NS-30				
<b>Spill Date and Time</b>	August 1, 12:00 am, 15 days				
<b>Cause and Source of Spill</b>	Although the production wells have blowout preventers and are covered with a well house, this scenario assumes an uncontrolled well blowout occurs through an unobstructed, open orifice.				
<b>Quantity of Oil Spilled</b>	2,295 barrels of oil per day (bopd) is discharged for 15 days The total quantity released is 34,425 barrels Northstar crude				
<b>Typical Summer Weather</b>	Sunny, 40° F, visibility is <1/2 nautical mile 18 percent of the time. No ice coverage 1/10 or greater.				
<b>Sea Surface</b>	Sea surface current is wind-driven and deflected by shorelines.				
<b>Average Wind Speed and Predominant Direction</b>	<p>During summer, the average wind speed is 11 knots.</p> <p>The predominant wind directions were determined as the 16 cardinal compass directions that blow over 10 percent of the time. For May to October, the predominant wind directions at Northstar are from the east-northeast and east. See Figure 1-5.</p> <p>The wind data were retrieved from the Nearshore Beaufort Sea Meteorological Monitoring and Data Synthesis (Velkamp, B. and Wilcox, 2007). The weather data presented were collected during the summers of 2000 through 2006.</p>				
<b>Spill Trajectory</b>	<p>The discharged oil takes the form of an aerial plume extending from the well to the west-southwest and west with the direction of prominent winds (ACS <i>Technical Manual</i> Tactic T-6). The S.L. Ross model (1997) indicates that 10 percent of the discharged oil is in the form of drops so small (50 µm or less) that they do not fall to the ground but are held aloft by atmospheric turbulence. For response planning purposes, the oil predicted by the model to remain airborne is proportionally distributed within the projected blowout plume footprint.</p> <p>The scenario location was selected per ADEC regulations (18 AAC 75,434(e)). Well NS-30 was the highest producing well according to AOGCC's production reports from January 2010 through December 2010. Simulated oil flows from the 4-inch (inner diameter) open orifice well at the rate of 2,295 bopd with gas-to-oil ratio (GOR) of approximately 20,670 standard cubic feet per barrel. In these circumstances, the dimensions of the blowout footprint represent the maximum gas flow through a 4-inch (inner diameter) opening.</p> <p>The maximum plume dimensions are 4.9 miles long and 0.7 miles wide. See Figure 1-6. Approximately 15 percent (5,320 bbl) of the oil falls to the Northstar production island. Approximately 80% of the discharged oil falls within 0.7 miles of the well. If left unrecovered for 15 days, the average thickness of the discharged oil deposited between 0.7 and 4.9 miles is 0.003 inches. This sheen would be visible as a blue-black sheen on the water surface (ACS <i>Technical Manual</i> Tactic T-7.)</p> <p>The oil is deposited into two plumes over a 15 day period. The volumes deposited are projected to be the following:</p> <table style="margin-left: 20px;"> <tr> <td>Days 1 to 9.1</td> <td>20,970 bbls are deposited to the west-southwest</td> </tr> <tr> <td>Days 9.2 to 15</td> <td>13,455 bbls are deposited to the west</td> </tr> </table> <p>After it has been deposited to the ocean surface, oil forms into windrows. Floating oil moves at the same speed as the underlying water plus three percent of the wind speed. The direction and speed of the oil can be predicted by vector addition. (See ACS <i>Technical Manual</i> Tactic T-5, incorporated by reference.)</p>	Days 1 to 9.1	20,970 bbls are deposited to the west-southwest	Days 9.2 to 15	13,455 bbls are deposited to the west
Days 1 to 9.1	20,970 bbls are deposited to the west-southwest				
Days 9.2 to 15	13,455 bbls are deposited to the west				



**TABLE 1-13: WELL BLOWOUT UNDER TYPICAL SUMMER CONDITIONS  
RESPONSE STRATEGY**

ADEC REQUIREMENT	RESPONSE STRATEGY	ACS TECHNICAL MANUAL TACTIC
<b>(i) Stopping Discharge at Source</b>	<p>The On-Site Company Representative takes the roll of Initial On-Scene IC, calls the emergency phone number, and notifies the Drilling Superintendent, NS Well Operations Team lead, and the affected Alaska Drilling and Wells (ADW) Team Lead. The IMT is activated. The affected ADW Well Manager calls well control specialists to obtain guidance for source control.</p> <p>Production is shut down, closing in the wells at the surface and subsurface. The Operations Team Lead assumes Surface Control leadership and plans initial surface controls.</p>	<p>A-1, A-2, L-2 BPXA IMS Manual</p>
<b>(ii) Preventing or Controlling Fire Hazards</b>	<p>The Operations Section Chief sets up access zones and routes and firefighting operations to protect assets and workers. Throughout the first few hours of the spill, the Operations Section Chief, with the assistance of the Site Safety Officer and Fire Chief, verify no ignition sources in the area.</p> <p>The Site Safety Officer determines response workers' PPE needs and provides hot and warm zone access information. The first draft of site safety plan (ICS Form 201-5) focuses on the delineation, containment and source control teams. It quickly evolves to include spill recovery teams. Monitoring protocol is established by the Site Safety Officer at work areas for personnel protection. The monitoring protocol establishes safety zones according to applicable Occupational Safety and Health Administration (OSHA) and fire hazard standards.</p> <p>Containment and recovery operations are conducted in accordance with site entry procedures. Recovery operations and oil field operations are disallowed downwind of the blowout well in areas where personnel may become exposed to flash fire hazard or oil particulate matter at concentrations greater than permissible exposure limits.</p> <p>Firewater coverage is set up by source control specialists.</p>	<p>S-1 through S-6</p>
<b>(iv) Surveillance and Tracking of Oil; Forecasting Shoreline Contact Points</b>	<p>By Hour 4 an aircraft is dispatched to monitor for oil. The slick is tracked by the aircraft, which records with a forward looking infrared radar (FLIR) system. Approximately 4 hours after the aircraft has finished the survey, the infrared data is overlain on a digital map of the area, resulting in a detailed map of the spill. The system works during day or night conditions.</p> <p>The deployment of tracking buoys is considered. The buoys are capable of transmitting position information and other pertinent data to satellites for retransmission to Unified Command.</p> <p>Field data are used to periodically update the trajectory maps.</p>	<p>T-4 through T-7</p>



**TABLE 1-13 (CONTINUED): WELL BLOWOUT UNDER TYPICAL SUMMER CONDITIONS  
RESPONSE STRATEGY**

ADEC REQUIREMENT	RESPONSE STRATEGY	ACS TECHNICAL MANUAL TACTIC
<p><b>(v) Protection of Environmentally Sensitive Areas and Areas of Public Concern</b></p>	<p>The Unified Command approves the activities and tactics used to protect environmentally sensitive areas and areas of public concern.</p> <p><b>Priority Protection Sites.</b> Based on the Alaska Regional Response Team's (ARRT's) "North Slope Sub-Area Plan," the barrier islands from Long Island to Bodfish Island are identified as environmentally sensitive areas and areas of public concern. See Figure 1-6.</p>	<p>W-6</p>
	<p><b>Protection Strategies.</b> The Environmental Unit issues an advisory with the concurrence of the State Historic Preservation Officer. The Operations Chief directs that crews avoid the cultural sites as noted by the ACS <i>Technical Manual</i> Map Atlas and Alaska Heritage Resource Survey data. Catalogued cultural resource sites are listed on the maps that cover their vicinity in the spill area. The <i>Technical Manual</i> lists are adapted from the "North Slope Subarea Plan."</p>	<p>Map Atlas Sheets 33, 34, 38, 56, 57 and 58</p>
	<p>The first strategy to protect environmentally sensitive areas and areas of public concern by mechanical response is to remove oil quickly and where it still lies in thick layers close to the spill source. Targeting that area can most effectively reduce the quantity of oil available to move into sensitive areas later.</p> <p>A further strategy is to deploy deflection boom at selected shoreline sites in the path of the oil.</p> <p><b>Shoreline Protection: Task Force 1.</b> Two airboats tow boom from West Dock and anchor it in shallow water. See Figure 1-6. Deflection booming tactics, including equipment lists, personnel numbers, procedures, and mobilization and deployment times, are described in ACS <i>Technical Manual</i>, Tactic C-14 . The features of the vessels and boom are outlined in Tactic L-6.</p>	<p>C-14 (2)</p>
<p><b>(vi) Spill Containment and Control Actions</b></p>	<p>Mechanical on-water response equipment is mobilized on Day 1 at West Dock and Deadhorse. Vessel-based systems comprising containment boom and skimmers recover oil from the water. See Figure 1-7.</p> <p>Containment boom is deployed along the south face of the production island.</p>	
<p><b>(vii) Spill Recovery Procedures</b></p>	<p>The capabilities of mechanical oil containment and recovery equipment listed in Table 1-14 meet the response planning standards that involve an unreduced RPS volume. The equipment is further described in ACS <i>Technical Manual</i>, Volume 1, Logistics Section, particularly in Tactic L-6.</p>	<p>S-1, S-2, S-3, S-5,</p>
	<p>Throughout the first few hours of the spill, the Site Safety Officer determines PPE requirements, establishes a monitoring protocol for personnel protection, and lays out warm and hot access zones. The monitoring protocol establishes safety zones according to Occupational Safety and Health Administration (OSHA) and fire safety standards. Decontamination zones and safety zones are established at West Dock and Northstar. Access to the spill site is carefully controlled and the scene is secured by designated personnel.</p>	<p>L-2</p>
	<p>A vessel provides crew change and supplies to on-water task forces at the end of the first shift, Hour 12.</p>	<p>L-12</p>



**TABLE 1-13 (CONTINUED): WELL BLOWOUT UNDER TYPICAL SUMMER CONDITIONS  
RESPONSE STRATEGY**

ADEC REQUIREMENT	RESPONSE STRATEGY	ACS TECHNICAL MANUAL TACTIC
<p><b>(vii) Spill Recovery Procedures</b>  <b>(Continued)</b></p>	<p><b>On-Water Recovery: Task Force 2.</b> Task Force 2 mobilizes, transits, and deploys in 8 hours. It is comprised of one Bay Boat with two Crucial skimmers and two side boom arms. Two Island Boats tow an open apex containment boom configuration with a 300-foot wide boom sweep positions downwind of the well. One offshore landing craft (Class E Vessel) and one Munson boat (Class D vessel) shuttle four mini-barges and provides crew change support. See Figure 1-7.</p>	R-20C
	<p><b>On-Water Recovery: Task Force 3.</b> At the beginning of Day 2, Task Force 3 deploys southwest of Northstar. It is comprised of one Bay Boat with two Crucial skimmers and two side boom arms. Two Island Boats tow an open apex containment boom configuration with a 300-foot wide boom sweep positions. One offshore landing craft (Class E Vessel) and one Munson boat (Class D vessel) shuttle four mini-barges and provides crew change support. See Figure 1-7.</p>	R-20C
	<p><b>On-Water Recovery: Task Force 4.</b> At the beginning of Day 2, Task Force 4 deploys southwest of the island. The Task Force is comprised of one Bay boat with one Crucial skimmer and one side boom arm. As conditions permit, the vessel operates between the barrier islands and the coast.</p> <p>Unified Command also considers hook boom to skimmer tactics for recovery along the shoreline of the barrier islands.</p>	R-32A  R-17
	<p><b>Land-based Fluid Transfer: Task Force 5.</b> Once the laden mini-barges arrive at West Dock, the recovered fluids are offloaded to vacuum trucks. Refer to section (ix) for details of fluid transfer.</p> <p>On Day 9, the wind shifts, and is blowing out of the east. The shoreline protection and on-water recovery task forces shift as necessary.</p> <p>By Day 15, well control is achieved.</p> <p>By Day 18, Task Forces 2 through 5 cease operations.</p>	R-28
	<p><b>Production Island Liquid Recovery: Task Force 6.</b> On Day 15, a task force arrives at the island by deck barge to remove pools of oil and oiled gravel. Free oil is removed with vacuum trucks.</p>	S-6, S-7  R-6
	<p><b>Production Island Oiled Gravel Recovery: Task Force 7.</b> Once the liquid oil is removed and the infrastructure is cleaned and/or removed, a bulldozer and backhoe remove oiled gravel. Two front-end loaders each place the gravel into lined, open-ended containers. The containers are transported via deck barge to West Dock.</p>	R-26
<p><b>(viii) Lightering Procedures</b></p>	<p>Mini-barges are lightered to vacuum trucks at West Dock.</p>	R-28



**TABLE 1-13 (CONTINUED): WELL BLOWOUT UNDER TYPICAL SUMMER CONDITIONS  
RESPONSE STRATEGY**

ADEC REQUIREMENT	RESPONSE STRATEGY	ACS TECHNICAL MANUAL TACTIC
<p><b>(ix) Transfer and Storage of Recovered Oil/Water; Volume Estimating Procedure</b></p>	<p>The combined liquid transfer capacity of Task Forces 2 through 4 is 6,650 barrels per day (bpd). The transfer rate exceeds the RPS oil volume rate. See Table 1-15.</p> <p>Oil on water subject to recovery is not likely emulsified (S.L. Ross, 2006). Oil recovered from the water and in storage is accompanied by water that is less than 15 percent of the volume of the oil. Free water is decanted from mini-barges with approval from the Unified Command and EPA. Decanted liquids are pumped into recovery booms until oil is observed.</p> <p>Mini-barges can transfer stored liquids from the recovery system at rates greater than the liquids become available. Shuttle boats haul loaded mini-barges to West Dock, 16 nautical miles round trip at 5 knots on average. A shuttling mini-barge can deliver 831 bpd. Four mini-barges have a capacity of 3,325 bpd, greater than the rate at which oily liquid becomes available for storage and transfer.</p>	D-1, R-28
	<p><b>Land-based Fluid Transfer: Task Force 5.</b> At West Dock, three vacuum trucks operating 20 hours per day have the capacity to offload stored liquid from mini-barges at a rate of 5,040 bpd. See Table 1-15. The trucks haul liquids to Flow Station 1. Recovered fluids in vacuum trucks are manifested accordingly.</p>	D-1, R-28
	<p>From West Dock, oiled gravel removed from the island is hauled by lined end dump trucks to GPB G &amp; I and placed in stockpiles. Gravel volume estimates and measurements of the fraction of oil in gravel yield oil volume estimates.</p>	D-4
<p><b>(x) Plans, Procedures, and Locations for Temporary Storage and Disposal</b></p>	<p>The Environmental Unit includes a three-person Waste Management Team to:</p> <ol style="list-style-type: none"> <li>1. Fill out and sign manifests,</li> <li>2. Measure liquid and other waste, and</li> <li>3. Submit a plan to ADEC for waste management.</li> </ol>	
	<p>Vacuum trucks haul recovered liquids to Flow Station 1 for recycling.</p>	D-1
	<p>Non-liquid oily wastes are classified and disposed of as described in the disposal tactics of the ACS <i>Technical Manual</i>. Oiled gravel stockpiles are treated under an ADEC-approved long-term plan.</p>	D-2, D-4
	<p>Non-oily wastes are classified and disposed of accordingly.</p>	D-3
<p><b>(xi) Wildlife Protection Plan</b></p>	<p>A wildlife protection task force is mobilized on Day 1. The Wildlife Stabilization Center is made available to agency biologists and veterinarians standing by for potential reports of oiled wildlife. Hazing equipment is deployed on shore and on water as conditions allow.</p> <p>Two teams, each with three persons and a Type B vessel, operate at the spill scene. The hazing team deploys noise-making buoys in the oil slick on the first shift.</p>	

**TABLE 1-13 (CONTINUED): WELL BLOWOUT UNDER TYPICAL SUMMER CONDITIONS  
RESPONSE STRATEGY**

ADEC REQUIREMENT	RESPONSE STRATEGY	ACS TECHNICAL MANUAL TACTIC
<p><b>(xi) Wildlife Protection Plan</b>  (Continued)</p>	<p>Oiled animals are captured, stabilized and treated by specialists using ACS equipment, including the wildlife stabilization facility at Prudhoe Bay. Animals requiring further treatment are transported to the Alaska Wildlife Rehabilitation Center in Anchorage.</p> <p>Marine and coastal bird and mammal populations occupying the path of the spilled oil described in the Trajectory section potentially could be affected by oiling. Many of the birds and mammals are important both ecologically and economically. The ACS <i>Technical Manual</i>, Volume 2, lists the marine mammal groups and marine bird groups potentially exposed to the scenario's oil and describes their seasonal distribution in the spill vicinity. Threatened and endangered species protection notes are also provided in the <i>Technical Manual's</i> map descriptions. In addition, the types of coastal habitats exposed to the oil are listed by level of concern and depicted on maps of the spill area.</p>	<p>W-1 to W-6</p>
	<p>To protect birds and mammals, the main strategy is removing oil from the environment. The primary strategy for direct wildlife protection is hazing and collection of oiled carcasses. Beginning in the early hours of the spill response, hazing is carried out with ACS equipment and trained personnel under the direction and permits of the Alaska Department of Fish and Game (ADFG) and the U.S. Fish &amp; Wildlife Service (USFWS).</p> <p>See ACS <i>Technical Manual</i> Tactics W-1 to W-6 for decision-making and field procedures.</p>	
<p><b>(xii) Shoreline Cleanup Plan</b></p>	<p>A Shoreline Cleanup Plan is submitted to and approved by Unified Command in the first week. The plan proposes that beaches found oiled by joint industry and agency Shoreline Cleanup Assessment Teams are cleaned to the satisfaction of the regulatory agencies during the summer by teams using the following methods: Manual recovery of heavier pockets of oil, ambient low pressure water deluge, and passive recovery with sorbents. Shoreline assessment is conducted to assess beach impact.</p> <p>Oiled surfaces on Long Island are cleaned up to the satisfaction of ADEC between August 16 and September 30.</p>	<p>SH-1 SH-2 SH-3 SH-5 SH-7</p>



**TABLE 1-14: WELL BLOWOUT UNDER TYPICAL SUMMER CONDITIONS  
OIL RECOVERY CAPACITY**

A	B	C	D	E	F	G
SPILL RECOVERY TACTIC	NUMBER OF RECOVERY SYSTEMS	RECOVERY SYSTEM	DERATED OIL RECOVERY RATE (YD <sup>3</sup> /DAY OR BOPH)	MOBILIZATION, DEPLOYMENT AND TRANSIT TIME TO SITE <sup>1</sup> (HOURS)	OPERATING TIME (HOURS IN A 24-HOUR SHIFT)	DAILY DERATED OIL RECOVERY CAPACITY (YD <sup>3</sup> /DAY OR BOPD) (B X D X F)
Task Force 2 R-20C	2	Crucial C Disc 13/30 Skimmer	236 <sup>2</sup>	8	20	9,440 bopd
Task Force 3 R-20C	2	Crucial C Disc 13/30 Skimmer	236	24	20	9,440 bopd
Task Force 4 R-32A	1	Crucial C Disc 13/30 Skimmer	236	24	20	4,720 bopd
Task Force 6 R-6	2	Vacuum Truck	48 <sup>3</sup>	Day 15	20	1,920 bopd
Task Force 7 R-26	4	2 Front-end Loader with 4 Dump Trucks	4.9 <sup>4</sup>	Day 15	20	392 yd <sup>3</sup> /day

<sup>1</sup> The sum of the mobilization, deployment, and transit time is not the fastest time possible; rather, it is the time that each specific tactic is first employed in this specific scenario.

<sup>2</sup> Based on the pump's throughput capacity of 1,181 boph, the derated recovery rate for this skimmer is 236 boph. Although the skimmer capacity in this scenario is enhanced by containment boom operations, the recovery rate for this scenario is assumed to be 20% of the pump's throughput rate (20% x 1,181 boph = 236 boph).

<sup>3</sup> Vacuum truck recovery calculation:  $Time = (miles\ to\ disposal * 2) / 5\ mph + 2(Tc / Sr)$ ,  
 Time = (8 nautical miles from Northstar to West Dock \* 2 trips / 5 knots + 10 miles from West Dock to Flow Station 1 \* 2 trips/35 mph) + 2(300 bbl / 200 boph) = 6.8 hours, where,  
 Miles to disposal = 8 nautical miles from Northstar to West Dock \* 2 trips / 5 knots + 10 miles from West Dock to Flow Station 1 \* 2 trips/35 mph  
 Tc = Vacuum Truck Capacity = 300 bbl  
 Sr = Suction Rate = 200 boph  
 Oil recovery rate (ORR) = (vacuum truck capacity/time),  
 ORR = (300 bbl/6.2 hours) = 48 boph

<sup>4</sup> Dump recovery calculation for gravel:  $Tc / (Lt + Tt + Ut) =$   
 $20\ yd^3 / [0.25\ hour + (8\ nautical\ miles\ from\ Northstar\ to\ West\ Dock * 2\ trips / 5\ knots + 10\ miles\ from\ West\ Dock\ to\ GPB\ G\ \&\ I * 2\ trips / 35\ mph) + 0.08\ hour] = 4.9\ yd^3 / hour$ , where,  
 Tc = Truck Capacity = 20 yd<sup>3</sup>  
 Lt = Load Time = 0.25 hours  
 Tt = Travel Time = 8 nautical miles from Northstar to West Dock \* 2 trips at 5 knots and 10 miles from West Dock to GPB G & I \* 2 trips at 35 mph  
 Ut = Unload Time = 0.08 hours



**TABLE 1-15: WELL BLOWOUT UNDER TYPICAL SUMMER CONDITIONS  
LIQUID HANDLING CAPACITY**

A	B	C	D	E	F	G	H	I	J	K
NUMBER OF STORAGE SYSTEMS	STORAGE CAPACITY DESCRIPTION	STORAGE CAPACITY <sup>1</sup> (bbl)	TIME TO FILL <sup>2</sup> (hrs)	OFFLOADING MECHANISM	OFFLOADING RATE <sup>3</sup> (bbl/hr)	TRANSIT TIME - BOTH WAYS <sup>4</sup> (hrs)	OFF-LOADING TIME (hrs)	TOTAL TRANSIT TIME (hrs) =D+G+H	HANDLING RATE CAPACITY (boph) =Ax(C/I)	HANDLING RATE CAPACITY (bopd) =Jx20
<b>Task Force 2 – Marine Recovery</b>										
4	Mini-barge	237	1.3	R-28	200	3.2	1.2	5.8	164	3,325
<b>Task Force 3 – Marine Recovery</b>										
4	Mini-barge	237	1.3	R-28	200	3.2	1.2	5.8	164	3,325
<b>Task Force 3 – Land-based Fluid Transfer (West Dock to FS1 via Vacuum Truck)</b>										
3	Vacuum truck	300	1.5	R-28	200	0.6	1.5	3.6	252	5,040

<sup>1</sup> The effective storage capacity of a 249-bbl mini-barge is 237 bbls (ACS Tactic R-28).

<sup>2</sup> The time to fill equals the storage capacity divided by the recovery rate. For the mini-barge, the time to fill = 237 bbls / (2 x 90 boph). For the vacuum truck, the time to fill = 300 bbls / (200 boph)

<sup>3</sup> For the vacuum truck, the offload rate is 200 boph.

<sup>4</sup> The mini-barges travel 16 nautical miles round trip at 5 knots. The transit time is 3.2 hours. Vacuum trucks travel 10 miles each way from West Dock to Flow Station 1 at a speed of 35 mph. The transit time is 0.6 hours.



**TABLE 1-16: WELL BLOWOUT UNDER TYPICAL SUMMER CONDITIONS  
MAJOR OIL CONTAINMENT AND RECOVERY EQUIPMENT EQUIVALENTS**

TASK FORCE / TACTIC	QUANTITY
Task Force 1 / C-14	2 Type A Workboat (i.e. <i>Bullet</i> and <i>Snow White</i> ) 2 Airboat 4,000 feet boom
Task Force 2 / R-20C	2 Crucial C Disc 13/30 Skimmer 1 Workboat Type E, Run skimmer and pump; tow mini-barge (i.e. <i>Agviq</i> ) 2 Island Boats, Tow boom for open apex 1,000 feet boom 1 Workboat Type D, Tow mini-barges (i.e. <i>Arctic Rose</i> ) 1 Bay Boat, Tow mini-barges, crew change, and logistics 4 Mini-barges (to keep up with maximum recovery rate for 20 hours a day)
Task Force 3 / R-20C	2 Crucial C Disc 13/30 Skimmer 1 Workboat Type E, Run skimmer and pump; tow mini-barge (i.e. <i>Big Dipper</i> ) 2 Island Boats, Tow boom for open apex 1,000 feet boom 1 Workboat Type D, Tow mini-barges (i.e. <i>Fireweed</i> ) 1 Bay Boat, Tow mini-barges, crew change, and logistics 4 Mini-barges (to keep up with maximum recovery rate for 20 hours a day)
Task Force 4 / R-32A	1 Crucial C Disc 13/30 Skimmer 1 Bay Boat, Run skimmer and pump; tow mini-barge while loading 2 Workboat Type C, tow mini-barge (or D Class <i>North Star</i> ) 2 Mini-barges
Task Force 5 / Land-Based Fluid Transfer	2 Vacuum Trucks
Task Force 6 / R-6	2 Vacuum Trucks
Task Force 7 / R-26	1 Bulldozer 1 Backhoe 2 Front-end Loaders 2 x 10 cubic yard open-ended containers (or equivalent)
Wildlife Protection / W-1	2 Workboat Type B
Decontamination of Vessels / S-7	2 Water Truck 2 Steam Cleaning Unit 1 Trash Pump (2-inch) Suction Hose and Discharge Hose (2-inch) Workboat Type B Boom



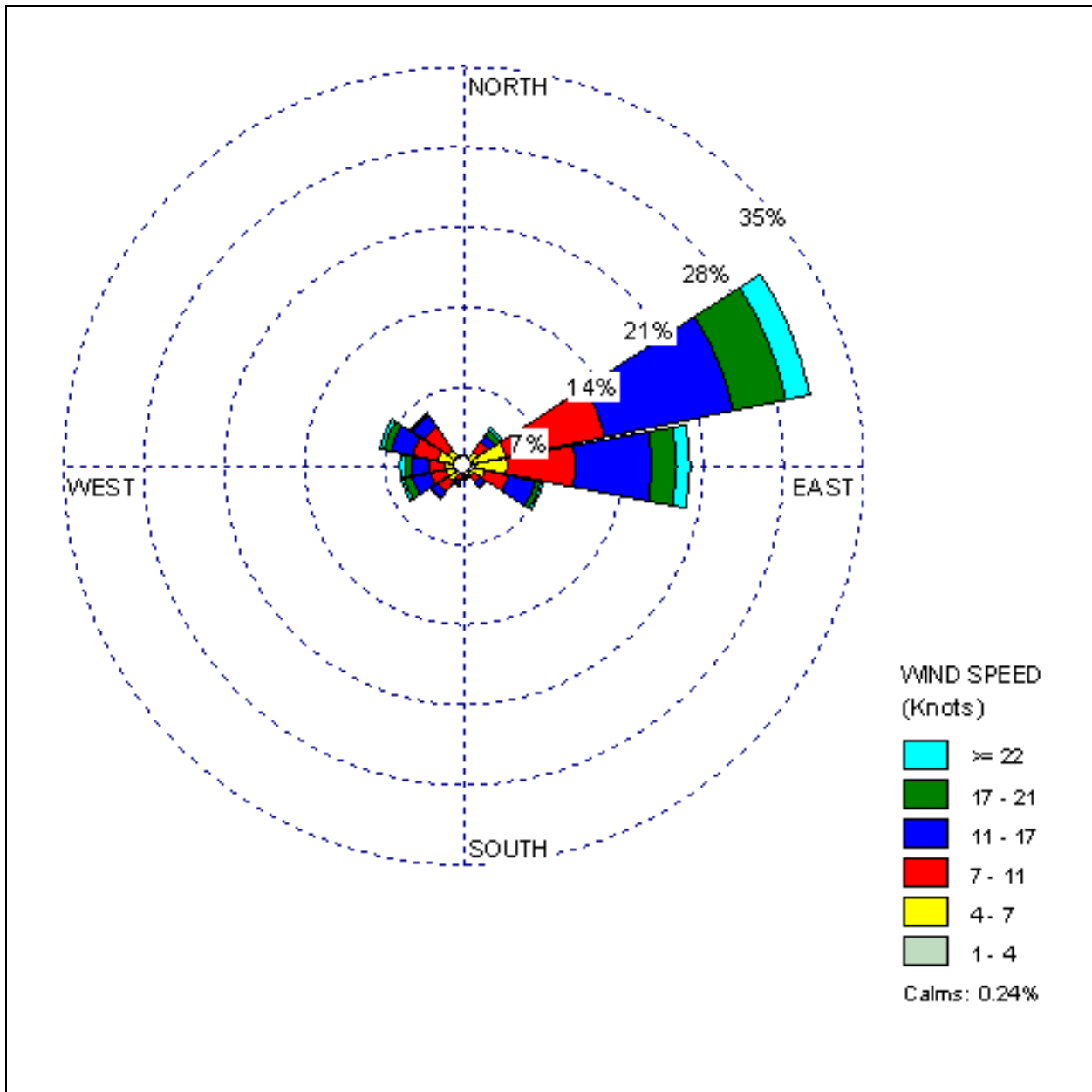
**TABLE 1-17: WELL BLOWOUT UNDER TYPICAL SUMMER CONDITIONS  
PERSONNEL TO OPERATE OIL CONTAINMENT AND RECOVERY EQUIPMENT**

TASK FORCE / TACTIC	LABOR CATEGORY	NO. OF STAFF PER SHIFT DAY 1	NO. OF STAFF PER SHIFT DAYS 2 – 15	NO. OF STAFF PER SHIFT AFTER BLOWOUT ENDS
Task Force 1 / C-14	Small Vessel Operator (also the Team Lead)	4	2	2
	Skilled Technician	6/3*	12	2
Task Force 2 / R-20C	Large Vessel Operator (also the Team Lead)	3	3	3
	Small Vessel Operator	2	2	2
	Skilled Technician	7	7	7
Task Force 3 / R-20C	Large Vessel Operator (also the Team Lead)	0	3	3
	Small Vessel Operator	0	2	2
	Skilled Technician	0	7	7
Task Force 4 / R-32A	Large Vessel Operator (also the Team Lead)	0	2	2
	Small Vessel Operator	0	1	1
	Skilled Technician	0	2	2
Task Force 5 / R-6 (Transfer)	Equipment Operator	2	2	2
	General Technician	2	2	2
Task Force 6 / R-6 (Island Recovery)	Large Vessel Operator (also the Team Lead)	0	0	1
	Equipment Operator	0	0	2
	General Technician	0	0	2
Task Force 7 / R-26 (Island Recovery)	Large Vessel Operator (also the Team Lead)	0	0	1
	Equipment Operator	0	0	4
	General Technician (Spotters)	0	0	2
Wildlife Protection / W-1	Small Vessel Operator (also the Team Lead)	2	2	2
	Skilled Technician	6	6	6
Decontamination of Vessels / S-7	Small Vessel Operator (also the Team Lead)	1	1	1
	Skilled Technician	2/1*	1	1
	General Technician	2	2	2
	Equipment Operator	2	2	2
Staging Area / L-2	Skilled Technician	4	4	4
	General Technician	16	16	16
<b>Totals:</b>		<b>61/57</b>	<b>81</b>	<b>83</b>

\* Asterisk denotes number of staff to set up tactic/number of staff to maintain tactic.

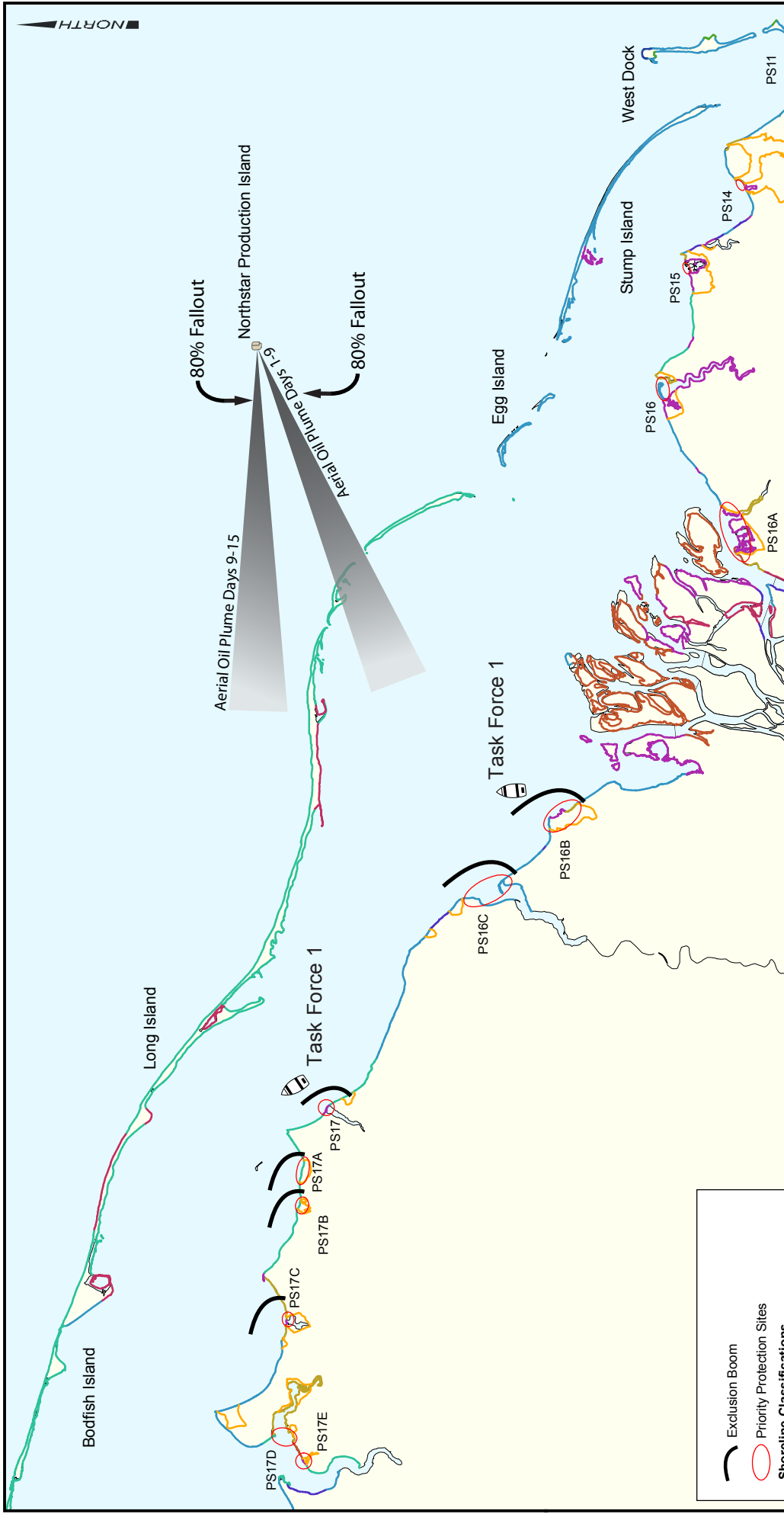


FIGURE 1-5: NORTHSTAR AVERAGE WIND DIRECTION, MAY – OCTOBER



**Notes:**

Per convention, the wind rose illustrates direction of wind origin (i.e., where the wind is coming from). The wind data were retrieved from the Nearshore Beaufort Sea Meteorological Monitoring and Data Synthesis (Veltkamp and Wilcox, 2007).



**BP EXPLORATION (ALASKA) INC.**  
**NORTHSTAR WELL BLOWOUT**  
**UNDER TYPICAL**  
**SUMMER CONDITIONS**  
**VICINITY MAP**

DATE: February 2011	SCALE: 1" = 2 Miles	FIGURE: 1-6
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- Exclusion Boom
- Priority Protection Sites
- Shoreline Classifications**
- Inundated Low-lying Tundra Shoreline
- Man-made Solid Structure
- Mixed Sand/Gravel Beach
- Mud Flat
- Peat Shoreline
- Pebble/Cobble Beach
- Sand Beach
- Sand Flat
- Tundra Cliff
- Vegetated Low Banks and Slopes
- Salt Marsh

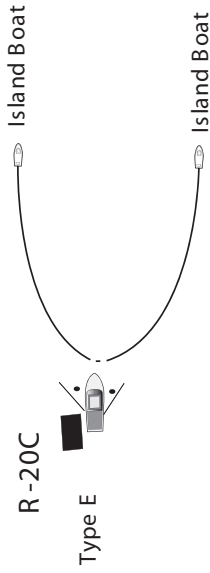
Figure denotes the lateral extent of blowout plumes, as calculated by the SL Ross model (SL Ross, 1997) and predominant wind directions. Although all production wells are enclosed within facilities, the illustrated extent assumes an unobstructed blowout.



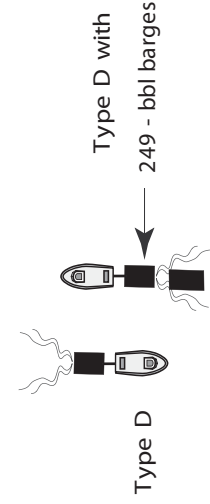
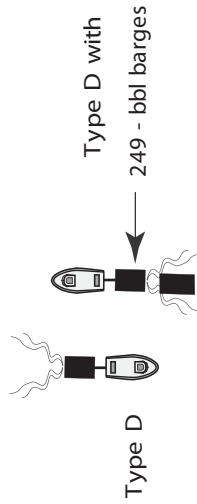
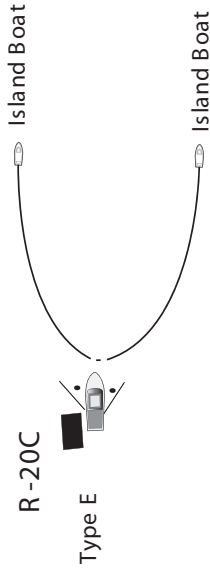
OFFSHORE



Task Force 2



Task Force 3



BARRIER ISLANDS

Task Force 4  
R-32A



Type D



Type C

bp



Northstar Well Blowout  
Under Typical  
Summer Conditions  
On-Water Task Forces

Filename:  
N1-701051707

Not to Scale

Figure:  
1-7

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## **SCENARIO 3**

### **WELL BLOWOUT UNDER TYPICAL WINTER CONDITIONS**



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**TABLE 1-18: WELL BLOWOUT UNDER TYPICAL WINTER CONDITIONS  
SCENARIO CONDITIONS**

PARAMETER	PARAMETER CONDITIONS
<b>Spill Location</b>	Northstar Production Island, Well NS-30.
<b>Spill Date and Time</b>	January 15, 3:00 pm, 15 days
<b>Cause and Source of Spill</b>	Uncontrolled well blowout through an unobstructed, open orifice
<b>Quantity of Oil Spilled</b>	2,295 barrels of oil per day (bopd) is discharged for 15 days. The total quantity released is 34,425 barrels Northstar crude.
<b>Typical Winter Weather and Visibility</b>	Overcast, -15°F. Unrestricted (See “Oil Spills in Ice Discussion Paper” by Dickins, Vaudrey and SL Ross, 2000, for seasonal air temperatures and visibility discussions.)
<b>Average Wind Speed and Predominant Direction</b>	<p>During winter, the average wind speed is 10 knots.</p> <p>The predominant wind directions were determined as the 16 cardinal compass directions that blow over 10 percent of the time. For November to April, there are five predominant wind directions at Northstar. See Figure 1-8.</p> <p>The wind data were retrieved from the Nearshore Beaufort Sea Meteorological Monitoring and Data Synthesis (Veltkamp, B. and Wilcox, 2007). The weather data presented were collected during the winters of 2000 through 2005.</p>
<b>Surface</b>	Snow depth is 0 to 36 inches, average 12 inches, over ice. Ice is continuous and 6 feet thick. Ice rubble lies within 1,000 feet of the production island. The shear zone, where the moving Arctic ice pack rubbles against the shorefast ice, lies 20 miles north of Seal Island and beyond the reach of the aerial oil. (See “Oil Spills in Ice Discussion Paper,” by Dickins, Vaudrey and SL Ross, 2000, pages 2-15 to 2-18 for descriptions of ice at Northstar. Also See Brower et al., 1988, <i>Climatic Atlas of the Outer Continental Shelf Waters and Coastal Regions of Alaska</i> , Volume III. National Oceanic & Atmospheric Administration and AEIDC for seasonal shear zone locations.) As typical for the season, the ice road bears wheeled traffic until June 1.
<b>Spill Trajectory</b>	<p>The discharged oil takes the form of an aerial plume extending from the well in the direction of prominent winds (ACS <i>Technical Manual</i> Tactic T-6). The S.L. Ross model (1997) indicates that 10 percent of the discharged oil is in the form of drops so small (50 µm or less) that they do not fall to the ground but are held aloft by atmospheric turbulence. For response planning purposes, the oil predicted by the S.L. Ross model to remain airborne is proportionally distributed within the projected blowout plume footprint.</p> <p>The scenario location was selected per ADEC regulations (18 AAC 75.434(e)). Well NS-30 was the highest producing well according to AOGCC’s production reports from January 2010 through December 2010.</p> <p>Simulated oil flows from the 4-inch (inner diameter) open orifice well at the rate of 2,295 bopd with gas-to-oil ratio (GOR) of approximately 20,670 standard cubic feet per barrel. These parameters are above the maximum threshold for a 4-inch diameter opening; consequently, the maximum footprint dimensions from the SL Ross model are used.</p> <p>The maximum plume dimensions are 4.9 miles long and 0.7 miles wide. See Figure 1-9. Approximately 13 percent (4,526 bbl) of the oil falls to the Northstar production island. Approximately 80% of the discharged oil falls within 0.7 miles of the well. If left unrecovered for 15 days, the average thickness of the discharged oil deposited between 0.7 and 4.9 miles is 0.003 inches. This sheen would be visible as a blue-black sheen on the water surface (ACS <i>Technical Manual</i> Tactic T-7.)</p>



**TABLE 1-18 (CONTINUED): WELL BLOWOUT UNDER TYPICAL WINTER CONDITIONS  
SCENARIO CONDITIONS**

PARAMETER	PARAMETER CONDITIONS										
<b>Spill Trajectory (Continued)</b>	<p>The oil is deposited into 5 plumes over a 15 day period. The volumes deposited are projected to be the following:</p> <table> <tr> <td>Days 1 to 2.2</td> <td>4,950 bbls are deposited to the west.</td> </tr> <tr> <td>Days 2.3 to 8.1</td> <td>13,454 bbls are deposited to the west-southwest</td> </tr> <tr> <td>Days 8.2 to 10.0</td> <td>4,440 bbls are deposited to the southwest</td> </tr> <tr> <td>Days 10.1 to 13.1</td> <td>6,911 bbls are deposited to the east</td> </tr> <tr> <td>Days 13.2 to 15.0</td> <td>4,427 bbls are deposited to the east-northeast</td> </tr> </table> <p>Oil falling to the island and other surfaces largely stays in place in the snow and gravel. No oil enters open water.</p>	Days 1 to 2.2	4,950 bbls are deposited to the west.	Days 2.3 to 8.1	13,454 bbls are deposited to the west-southwest	Days 8.2 to 10.0	4,440 bbls are deposited to the southwest	Days 10.1 to 13.1	6,911 bbls are deposited to the east	Days 13.2 to 15.0	4,427 bbls are deposited to the east-northeast
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**TABLE 1-19: WELL BLOWOUT UNDER TYPICAL WINTER CONDITIONS RESPONSE STRATEGY**

ADEC REQUIREMENT	RESPONSE STRATEGY	ACS TECHNICAL MANUAL TACTIC
(i) <b>Stopping Discharge at Source</b>	<p>The On-Site Company Representative takes the roll of Initial On-Scene IC, calls the emergency phone number, notifies the Drilling Superintendent, NS Well Operations Team lead, and the affected ADW Team Lead. The IMT is activated. The affected ADW Well Manager calls well control specialists to obtain guidance for source control.</p> <p>Production is shut down, closing in the wells at the surface and subsurface. The Operations Team Lead assumes Surface Control leadership and plans initial surface controls.</p>	<p>A-1, A-2, L-2</p> <p>BPXA IMS Manual</p>
(ii) <b>Preventing or Controlling Fire Hazards</b>	<p>The Operations Section Chief sets up access zones and routes and firefighting operations to protect assets and workers. Throughout the first few hours of the spill, the Operations Section Chief, with the assistance of the Site Safety Officer and Fire Chief, verify no ignition sources in the area.</p> <p>The Site Safety Officer determines response workers' PPE needs and provides hot and warm zone access information. The first draft of site safety plan (ICS Form 201-5) focuses on the delineation, containment and source control teams. It quickly evolves to include spill recovery teams. Monitoring protocol is established by the Site Safety Officer at work areas for personnel protection. The monitoring protocol establishes safety zones according to applicable Occupational Safety and Health Administration (OSHA) and fire hazard standards.</p> <p>Containment and recovery operations are conducted in accordance with site entry procedures. Recovery operations and oil field operations are disallowed downwind of the blowout well in areas where personnel may become exposed to flash fire hazard or oil particulate matter at concentrations greater than permissible exposure limits.</p> <p>Firewater coverage is set up by source control specialists.</p>	<p>S-1 through S-6</p>
(iv) <b>Surveillance and Tracking of Oil; Forecasting Shoreline Contact Points</b>	<p>The extent of oil on the snow is delineated starting Day 2 so that it can be found if subsequent snowfall or blowing snow covers the spill.</p> <p>Oil is expected to stay in place and not move to shorelines.</p>	<p>T-1</p>
	<p>Aerial surveillance for spilled oil continues through overflow, break-up, and open water seasons.</p>	<p>T-4, T-4A</p>
(v) <b>Environmentally Sensitive Areas and Areas of Public Concern</b>	<p>Based on the ARRT's North Slope Sub-Area Plan, the areas of major concern published in the ACS <i>Technical Manual</i> and in the spill trajectory are identified. No priority protection sites lay within the spill trajectories. The presence of ice between the spill and shoreline makes it unlikely that the spilled oil will impact sensitive shoreline resources.</p> <p>The barrier islands are identified as ARRT areas of concern. On Day 1, the Environmental Unit issues an advisory with the concurrence of the State Historic Preservation Officer, and the Operations Chief directs that crews avoid the cultural sites as noted in the ACS <i>Technical Manual</i> Map Atlas and Alaska Heritage Resource Survey data. Work is scheduled to minimize response activity disturbance at seal holes under the oversight of National Marine Fisheries Service.</p>	<p>W-6, ACS Map Atlas, Sheets 57-62</p>



**TABLE 1-19 (CONTINUED):  
WELL BLOWOUT UNDER TYPICAL WINTER CONDITIONS RESPONSE STRATEGY**

ADEC REQUIREMENT	RESPONSE STRATEGY	ACS TECHNICAL MANUAL TACTIC
<b>(vi) Spill Containment and Control Actions</b>	The capabilities of mechanical oil containment and recovery equipment listed in Table 1-20 meet the response planning standards. The equipment is further described in ACS <i>Technical Manual</i> , Volume 1, Logistics Section, particularly in Tactic L-6.	L-2
<b>(vii) Spill Recovery Procedures</b>	A BPXA Field Command Post, decontamination site, and staging area are established at the West Dock Staging Pad. The Unified Command's recovery operations objective is to remove oil from the Northstar Production Island and surrounding sea ice by February 15. Staff and equipment for recovery and transfer of oil in those environments come from in-region spill response resources outlined in ACS <i>Technical Manual</i> Tactics L-6, L-8, and L-9.	L-1
	By Day 3, the ice road from West Dock to the island is smoothed with water lifts and supports truck and other wheeled traffic. A four-mile ice road is constructed around the island by Day 12, to assist access by heavy equipment to the oiled areas. Two feet of ice are added to the sea ice to make the ice road. Two crews per shift and two shifts per day build the road at the rate and with the equipment described in ACS <i>Technical Manual</i> Tactic C-10.	L-1 L-2
	Rolligons with augers build a 2-acre ice pad with seawater from Days 2-12, thickening the sea ice to 8 feet. The pad then supports a staging area for heavy equipment, decontamination, warm-up and security, but not waste storage. The normal sea ice supports static loads up to 75 tons and moving multiple-loading area equipment that creates resonant waves and weighs up to 90 tons (see Sandwell Engineering, Inc. 2001, "Ice Access Guidelines for Spill Responders." For ACS, Prudhoe Bay, Alaska). Consequently, the equipment with payloads on the ice and listed in Table 3, Tactic L-7, ACS <i>Technical Manual</i> can be supported by the untreated ice. For safety, on-ice work is guided by recommendations of an ice specialist.	L-1, L-7, S-6
	Days 1 to 15: <b>Task Force 1.</b> Beginning on Day 2, as conditions allow, a task force with earth moving equipment constructs snow berms and digs trenches on or near the island. They divert flowing oil away from the wells and toward low-lying areas where the oil is accessible to vacuum truck hoses.	C-1
	<b>Task Force 2.</b> Vacuum trucks pump accumulated oil from the trenches on the island beginning on Day 2. Loaders and dump trucks recover oiled snow and haul it to interim storage pits at the West Dock Staging Pad beginning on Day 1.	R-6 R-3
	<b>Task Force 3.</b> Beginning on Day 4, a sea ice task force with earth moving equipment constructs berms of snow. At heavier oiled areas, trenches are dug in the sea ice surface to direct oil flow to collection points. At lightly oiled areas, snow fencing is erected on the downwind and upwind sides of the oiled snow to keep the wind from spreading the oil. Two crews each supporting a Ditch Witch and one crew supporting a trimmer make the cuts in two shifts. The objective is to divert surface oil to containment pools.	R-24





**TABLE 1-19 (CONTINUED):  
WELL BLOWOUT UNDER TYPICAL WINTER CONDITIONS RESPONSE STRATEGY**

ADEC REQUIREMENT	RESPONSE STRATEGY	ACS TECHNICAL MANUAL TACTIC
<p><b>(vii) Spill Recovery Procedures</b>  (Continued)</p>	<p><b>Task Force 4.</b> Beginning on Day 4, vacuum trucks recover oil collected in pools near the island, and in trenches with hoses and pumps in series. Heavy equipment recovers lightly oiled snow, and hand shovelers remove oil from hard-to-reach locations in ice rubble. Loaders and dump trucks recover oiled snow and haul it to lined, interim storage pits at the West Dock Staging Pad.</p> <p>The recovery targets for each Task Force are detailed in Table 1-20.</p>	<p>R-6 R-1 R-2</p>
	<p>Days 16 to 30:</p> <p><b>Task Force 5.</b> After the blowout has stopped, earth moving equipment and surface cleaning equipment clean up the Northstar Production Island and its structures. After the surface structures have been cleaned, the oil-contaminated gravel is removed by a trimmer and backhoe. Loaders place gravel in lined dump trucks that haul it to GPB G &amp; I.</p>	<p>R-1 R-2 R-5 R-26</p>
<p><b>(viii) Lightering Procedures</b></p>	<p>Not applicable</p>	<p>Not applicable</p>
<p><b>(ix) Transfer and Storage of Recovered Oil/Water; Volume Estimating Procedure</b></p>	<p>Vacuum trucks take recovered oil to Flow Station 1 for offloading.</p>	<p>D-1</p>
	<p>Lined end dump trucks transfer oiled snow from the spill site to lined interim storage areas at the West Dock Staging Pad. Estimates of the loads' volumes and oil content are logged by waste specialists in the Environmental Unit.</p>	<p>D-5</p>
	<p>Oiled gravel is hauled in lined end dump trucks and taken to GPB G &amp; I for disposal.</p>	<p>D-4</p>
<p><b>(x) Plans, Procedures, and Locations for Temporary Storage and Disposal</b></p>	<p>The Environmental Unit includes a three-person Waste Management Team to:</p> <ol style="list-style-type: none"> <li>1. Fill out and sign manifests,</li> <li>2. Measure liquid and other waste, and</li> <li>3. Submit a plan to ADEC for waste management.</li> </ol>	
	<p>A plan to implement the stockpiling of snow in lined pits and liquid removal is submitted and approved by Unified Command.</p>	<p>D-1, D-5, R-6</p>
	<p>A temporary, lined pit 30 feet by 100 feet composed of timber walls and liner, holding up to 667 cubic yards on the island's concrete mat holds snow recovered by shovelers Days 2 and 3.</p>	<p>D-3</p>



**TABLE 1-19 (CONTINUED):  
WELL BLOWOUT UNDER TYPICAL WINTER CONDITIONS RESPONSE STRATEGY**

<b>ADEC REQUIREMENT</b>	<b>RESPONSE STRATEGY</b>	<b>ACS TECHNICAL MANUAL TACTIC</b>
<p><b>(x) Plans, Procedures, and Locations for Temporary Storage and Disposal</b></p> <p><b>(Continued)</b></p>	<p>Task Forces deliver contaminated snow to the West Dock Staging Pad for interim storage. There, the snow is stored 12 feet deep in temporary, gravel-bermed, lined pits covering 2.1 acres (1.1 million cubic feet / 12 feet deep / 43,560 ft<sup>2</sup> per acre = 2.1 acres). The oiled snow melts in the spring. Liquids are pumped off with vacuum trucks as they become available and transported to Flow Station 1 for hydrocarbon recycling. The temporary storage pits are continuously monitored until liquids have been processed. Excavated gravel is hauled to GPB G &amp; I. There, the gravel undergoes long-term treatment under a plan approved by ADEC for soil stockpiles.</p> <p>Non-liquid oily wastes are classified and disposed of accordingly.</p> <p>Non-oily wastes are classified and disposed of accordingly.</p>	<p>D-4</p> <p>D-2</p>
<p><b>(xi) Wildlife Protection Plan</b></p>	<p>Polar bear guards, security staff trained by government biologists, are assigned to protect bears and workers. The Wildlife Stabilization Center is made available to agency biologists and veterinarians standing by for potential reports of oiled wildlife. Seal holes are identified with trained dogs beginning Day 2 and activities in their vicinity are restricted. No wildlife becomes oiled. Hazing equipment is deployed as spring approaches.</p>	<p>W-1</p> <p>W-2</p>
<p><b>(xii) Shoreline Cleanup Plan</b></p>	<p>A shoreline cleanup plan is submitted to Unified Command before break-up in case oiled shorelines are discovered after break-up. At break-up, SCAT teams monitor the tundra and adjacent shorelines for oiling according to the plan and find none.</p>	<p>SH-1</p>



**TABLE 1-20: WELL BLOWOUT UNDER TYPICAL WINTER CONDITIONS OIL RECOVERY CAPABILITY**

A SPILL RECOVERY TACTIC	B NUMBER OF SYSTEMS	C RECOVERY OR TRANSFER SYSTEM	D RECOVERY AND TRANSFER RATE	E MOBILIZATION AND TRANSIT TIME TO SITE (hours)	F OPERATING TIME (hours per day)	G DAILY HANDLING CAPACITY (yd <sup>3</sup> or bopd) B x D x F
R-6, Task Force 2	2	Vacuum Truck	62.5 boph <sup>1</sup>	24	20	2,500 bopd
R-3, Task Force 2	4	Dozer/Front-end Loader with Two Dump Trucks	24 yd <sup>3</sup> /hour <sup>2</sup>	24	20	1,920 yd <sup>3</sup>
R-24, Task Force 4	2	Vacuum Truck	62.5 boph	24	20	2,500 bopd
	2	4-inch Trash Pump with Suction Hose and Discharge Hose	Transfer by vacuum truck	24	20	Transfer by vacuum truck
R-6, Task Force 4	2	Vacuum Truck	62.5 boph <sup>1</sup>	24	20	2,500 bopd
R-1, Task Force 4	3	Front-end Loader with Dump Truck	24 yd <sup>3</sup> /hour <sup>2</sup>	24	20	1,440 yd <sup>3</sup>
R-2, Task Force 4	1	Front-end Loader with Dump Truck	24 yd <sup>3</sup> /hour <sup>2</sup>	24	20	480 yd <sup>3</sup>
R-1, R-26, Task Force 5 <sup>3</sup>	4	Front-end Loader with Five Dump Trucks	24 yd <sup>3</sup> /hour <sup>2</sup>	24	20	1,920 yd <sup>3</sup>
R-2, R-26, Task Force 5 <sup>3</sup>	1	Front-end Loader with Dump Truck	24 yd <sup>3</sup> /hour <sup>2</sup>	24	20	480 yd <sup>3</sup>
R-5, Task Force 5 <sup>4</sup>	4	Trimmer/Front-end Loader/Dump Truck	24 yd <sup>3</sup> /hour <sup>2</sup>	24	20	1,920 yd <sup>3</sup>

<sup>1</sup> Vacuum truck recovery calculation:  $Time = (miles\ to\ disposal * 2) / 35\ mph + 2(T_c / S_r)$ ,  
 Time = (14 miles from Northstar to Flow Station 1 \* 2 / 35 mph) + 2(300 bbl / 150 boph) = 4.8 hours, where,  
 Miles to disposal = 14 miles from West Dock to Flow Station 1 \* 2 trips at 35 mph  
 $T_c =$  Vacuum Truck Capacity = 300 bbl  
 $S_r =$  Suction Rate = 150 boph  
 Oil recovery rate (ORR) = (vacuum truck capacity/time),  
 ORR = (300 bbl/4.8 hours) = 62.5 boph

<sup>2</sup> Dump recovery calculation for snow:  $T_c / (L_t + T_t + U_t) = 20\ yd^3 / [0.17\ hour + (10\ miles\ from\ Northstar\ to\ West\ Dock\ Staging\ Pad * 2\ trips / 35\ mph) + 0.08\ hour] = 24\ yd^3 / hour$ , where,  
 $T_c =$  Truck Capacity  
 $L_t =$  Load Time  
 $T_t =$  Travel Time  
 $U_t =$  Unload Time

<sup>3</sup> Front-end loaders and dump trucks in use for Tactics R-1 and R-2 under Task Force 13 are used to load excavated gravel into dump trucks and transport to GPB G & I.

<sup>4</sup> Front-end loaders and dump trucks in use for Tactics R-1 and R-2 are used to load trimmed snow into dump trucks and transport to snow stockpiles at West Dock Staging Pad.



**TABLE 1-21: WELL BLOWOUT UNDER TYPICAL WINTER CONDITIONS  
MAJOR OIL CONTAINMENT AND RECOVERY EQUIPMENT EQUIVALENTS**

TACTIC	NO. TACTICAL UNITS	TOTAL QUANTITY
C-1, Task Forces 1-3 <sup>1</sup>	3	3 Front-end Loaders*
R-6, Task Forces 4-6	2	2 Vacuum Trucks
R-3, Task Forces 4-6	4	4 Dozers 4 Front-end Loaders 8 Dump Trucks
C-1, Task Forces 7-9 <sup>2</sup>	3	3 Front-end Loaders
C-11, Task Forces 7-9 <sup>2</sup>	3	3 Ditch Witches** 200' Boom
C-12, Task Forces 7-9 <sup>2</sup>	3	3 Ditch Witches 3 Backhoes
C-19, Task Forces 7-9	4	10,000' Snow Fencing T –Posts and Wire Ties
R-24, Task Forces 10-12	2	2 Vacuum Trucks 2 Fastanks 2 trash pumps
R-6, Task Forces 10-12	2	2 Vacuum Trucks
R-1, Task Forces 10-12	3	3 Dozers 3 Front-end Loaders 6 Dump Trucks
R-2, Task Forces 10-12	1	1 Front-end Loader 1 Dump Truck 3 Snowmachines
R-1, Task Force 13	4	4 Dozers 4 Front-end Loaders 20 Dump Trucks
R-2, Task Force 13	1	1 Front-end Loader 1 Dump Truck 3 Snowmachines
R-5, Task Force 13	4	4 Trimmers 4 Front-end Loaders 4 Dump Trucks
R-26, Task Force 13	1	1 Front-end Loaders 1 Dump Trucks

<sup>1</sup> Front-end loaders used in C-1 for Task Force 1 are also used in C-1 for Task Force 3.

<sup>2</sup> Ditch Witches used in C-11 are also used in C-12.



**TABLE 1-22: WELL BLOWOUT UNDER TYPICAL WINTER CONDITIONS  
PERSONNEL TO OPERATE OIL CONTAINMENT AND RECOVERY EQUIPMENT**

LABOR CATEGORY	TACTIC	NO. TACTICAL UNITS	NO. STAFF PER UNIT	NO. STAFF PER SHIFT DAYS 1 - 4	NO. STAFF PER SHIFT DAYS 5 - 8	NO. STAFF PER SHIFT DAYS 9 - 12	NO. STAFF PER SHIFT DAYS 13 - 15	NO. STAFF PER SHIFT DAYS 16 - 30
Team Lead	C-11, Task Force 3	3	1	1	1	1	1	0
	C-12, Task Force 3 <sup>1</sup>	3	1	0	0	0	0	0
	C-19, Task Force 3	4	1	1	1	1	1	0
	R-24, Task Force 4 <sup>2</sup>	2	1	2	2	2	2	0
	R-2, Task Force 4	1	1	1	1	1	1	0
	R-2 Task Force 5	1	1	0	0	0	0	1
Equipment Operator	C-1, Task Force 1	3	1	3	3	3	3	0
	R-6, Task Force 2	2	2	4	4	4	4	0
	R-3, Task Force 2	4	4	16	16	16	16	0
	C-1, Task Force 3 <sup>3</sup>	3	1	0	0	0	0	0
	C-12, Task Force 3	3	1	3	3	3	3	0
	R-24, Task Force 4	2	1	2	2	2	2	0
	R-6, Task Force 4	2	2	4	4	4	4	0
	R-1, Task Force 4	3	4	12	12	12	12	0
	R-2, Task Force 4	1	2	2	2	2	2	0
	R-1, Task Force 5	4	7	0	0	0	0	28
	R-2, Task Force 5 <sup>4</sup>	1	2	0	0	0	0	0
	R-5, Task Force 5 <sup>4</sup>	4	3	0	0	0	0	0
	R-26, Task Force 5 <sup>4</sup>	1	3	0	0	0	0	0



**TABLE 1-22 (CONTINUED): WELL BLOWOUT UNDER TYPICAL WINTER CONDITIONS  
PERSONNEL TO OPERATE OIL CONTAINMENT AND RECOVERY EQUIPMENT**

LABOR CATEGORY	TACTIC	NO. TACTICAL UNITS	NO. STAFF PER UNIT	NO. STAFF PER SHIFT DAYS 1 - 4	NO. STAFF PER SHIFT DAYS 5 - 8	NO. STAFF PER SHIFT DAYS 9 - 12	NO. STAFF PER SHIFT DAYS 13 - 15	NO. STAFF PER SHIFT DAYS 16 - 30
<b>General Technician</b>	C-11 Task Force 3	3	1	3	3	3	3	0
	C-12, Task Force 3 <sup>1</sup>	3	1	0	0	0	0	0
	C-19, Task Force 3	4	6	6	6	6	6	0
	R-24, Task Force 4 <sup>5</sup>	2	10/5	10/5	10/5	10/5	10/5	0
	R-2, Task Force 4	3	9	27	27	27	27	0
	R-2, Task Force 5	3	9	0	0	0	0	27
<b>Total</b>	-	-	-	97/92	97/92	97/92	97/92	56

<sup>1</sup> Team Leads and General Technicians used for C-11 are also used in C-12.

<sup>2</sup> One Team Leader supervises four tactical units.

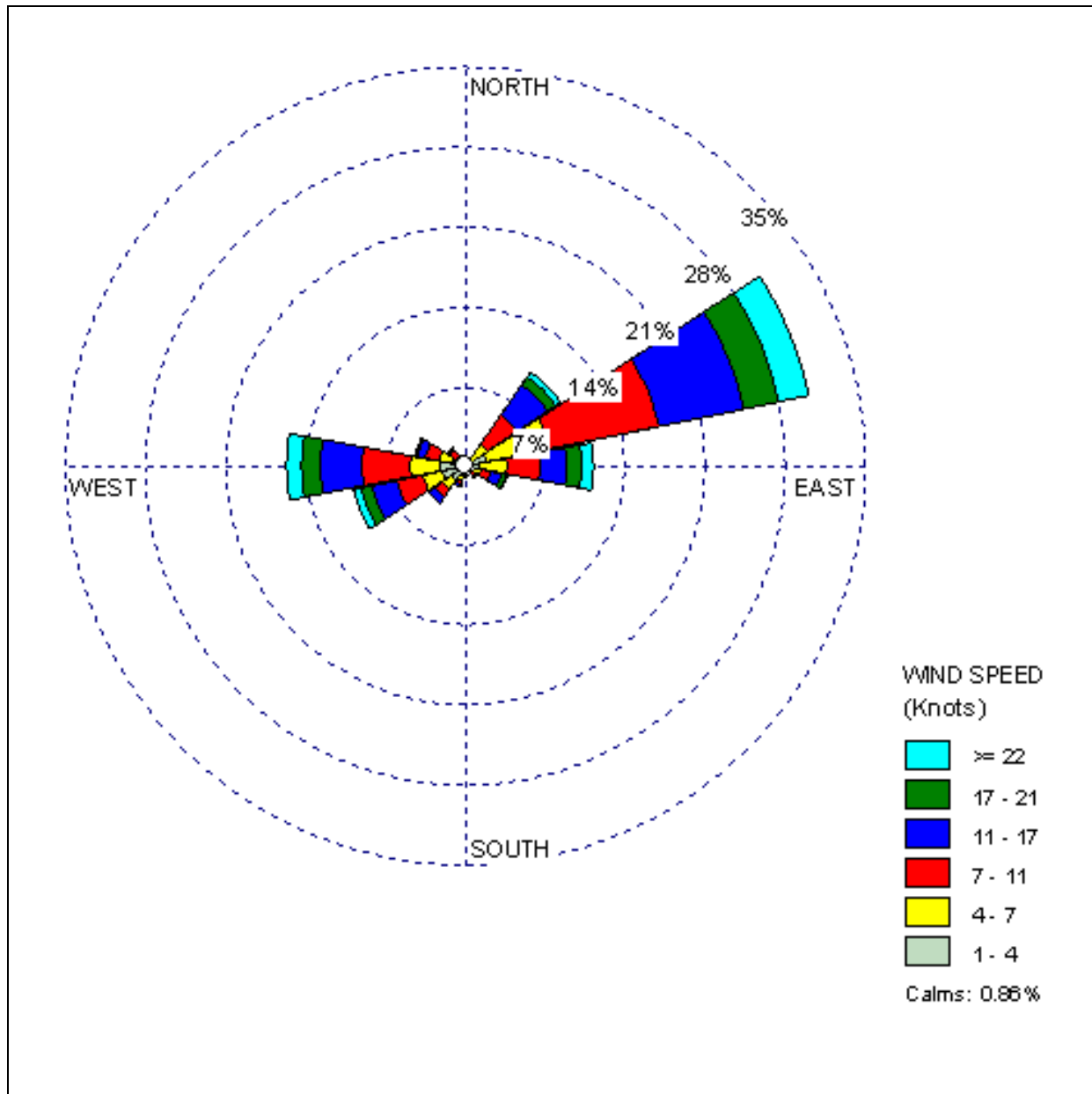
<sup>3</sup> Equipment operators used for C-1 in Task Force 1 are also used in C-1 in Task Force 3.

<sup>4</sup> Equipment operators for dozers, front-end loaders and dump trucks in used in Task Forces 1-4 are used in Task Force 5.

<sup>5</sup> Number of set up staff on Shift 1, followed by maintenance and operations staff on Shift 2 through Day 15.

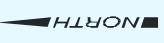
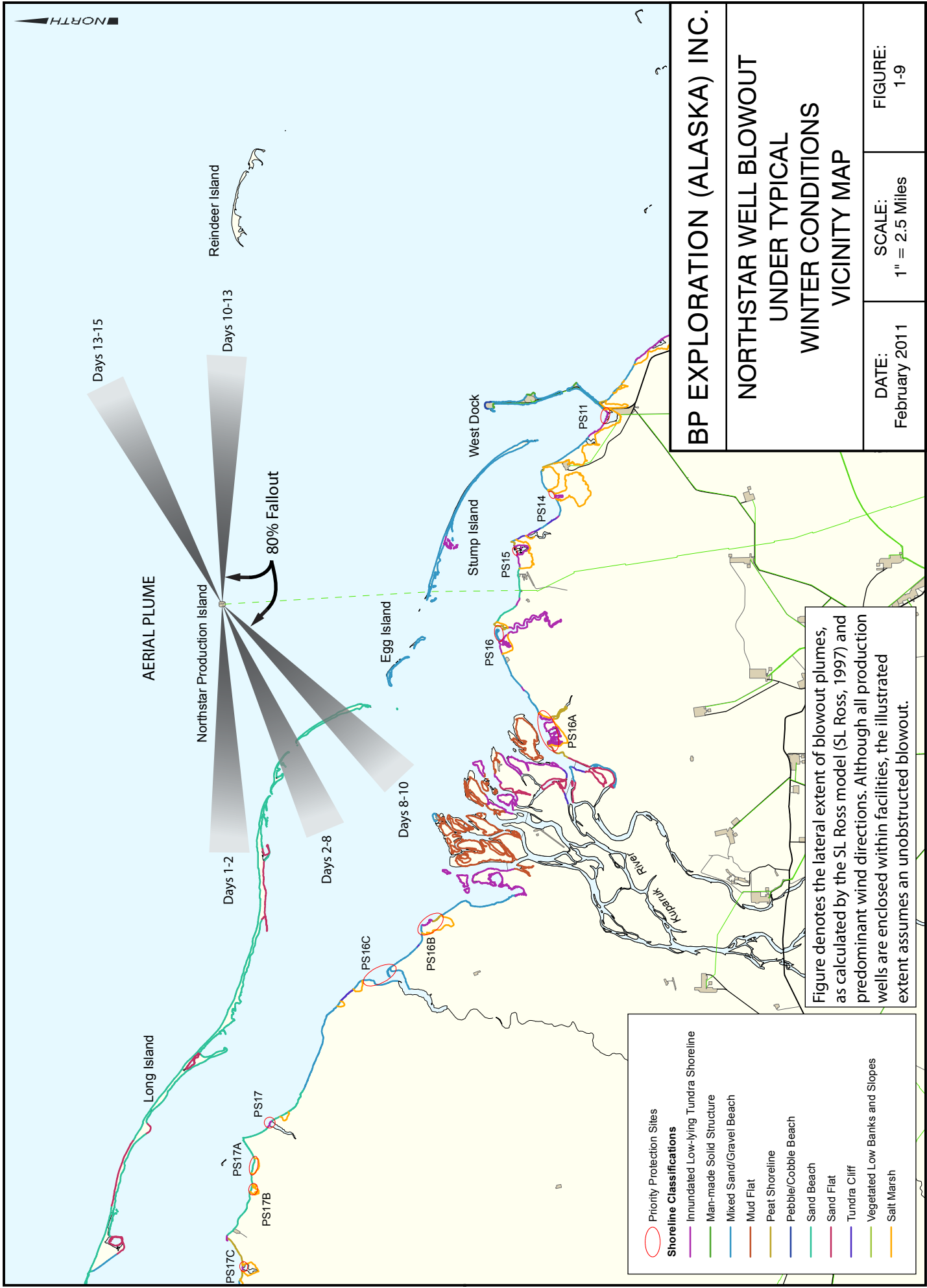


FIGURE 1-8: NORTHSTAR AVERAGE WIND DIRECTION, NOVEMBER – APRIL



**Notes:**

Per convention, the wind rose illustrates direction of wind origin (i.e., where the wind is coming from). The wind data were retrieved from the Nearshore Beaufort Sea Meteorological Monitoring and Data Synthesis (Veltkamp and Wilcox, 2007).



**BP EXPLORATION (ALASKA) INC.**

**NORTHSTAR WELL BLOWOUT  
UNDER TYPICAL  
WINTER CONDITIONS  
VICINITY MAP**

DATE: February 2011	SCALE: 1" = 2.5 Miles	FIGURE: 1-9
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Figure denotes the lateral extent of blowout plumes, as calculated by the SL Ross model (SL Ross, 1997) and predominant wind directions. Although all production wells are enclosed within facilities, the illustrated extent assumes an unobstructed blowout.

- Priority Protection Sites
- Shoreline Classifications**
- Inundated Low-lying Tundra Shoreline
- Man-made Solid Structure
- Mixed Sand/Gravel Beach
- Mud Flat
- Peat Shoreline
- Pebble/Cobble Beach
- Sand Beach
- Sand Flat
- Tundra Cliff
- Vegetated Low Banks and Slopes
- Salt Marsh



## **SCENARIO 4**

### **CRUDE OIL TRANSMISSION PIPELINE RELEASE**



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**TABLE 1-23: CRUDE OIL TRANSMISSION PIPELINE RELEASE  
SCENARIO CONDITIONS**

<b>INITIAL CONDITIONS</b>	
<b>Spill Location</b>	Northstar crude oil transmission pipeline. Approximately 5,000 feet south of shoreline automatic valve. See Figure 1-10.
<b>Spill Date and Time</b>	August 1, 3:00 pm.
<b>Cause and Source of Spill</b>	Catastrophic pipeline rupture.
<b>Quantity of Spill</b>	4,446 barrels
<b>Weather</b>	45°F, overcast with isolated showers.
<b>Wind Speed and Direction</b>	Less than 10 knots from the east-northeast.
<b>Spill Trajectory</b>	Assuming the crude is absorbed by the tundra at approximately 3 gallons per square foot, the crude oil moves across the surrounding tundra, affecting an estimated 62,244 square feet. The affected area is circular in shape, with a radius of approximately 145 feet.



**TABLE 1-24: CRUDE OIL TRANSMISSION PIPELINE RELEASE  
RESPONSE STRATEGY**

ADEC REQUIREMENT	RESPONSE STRATEGY	ACS TECHNICAL MANUAL TACTIC
(i) <b>Stopping Discharge at Source</b>	<p>The Control Room Operator reports the alarm to the Communications Operator and closes the shutdown valves. The source is controlled by shut-in of operations and temporary repairs to the line.</p> <p>Notification procedures begin, along with SRT mobilization.</p>	<p>A-1, A-2, L-2</p> <p>Section 1.2, Reporting and Notification</p>
(ii) <b>Preventing or Controlling Fire Hazards</b>	<p>The Site Safety Officer provides access zone information and determines PPE requirements. The first draft of site safety plan (ICS Form 201-5) focuses on the delineation, containment and source control teams. It quickly evolves to include spill recovery teams. Containment and recovery operations are conducted in accordance with site entry procedures.</p>	<p>S-1 through S-6</p>
(iv) <b>Surveillance and Tracking of Oil; Forecasting Shoreline Contact Points</b>	<p>The control room operator assesses the situation and dispatches Security to perform aerial surveillance of the pipeline. Once safety zones and a decontamination unit have been set up, the oiled area is delineated. An aircraft is dispatched to perform aerial surveillance of the spill and monitor for oil in open water. Location information is digitized and transferred to IMT and Operations Section Chief for response planning and trajectory modeling. Field data are used to periodically update the trajectory map.</p>	<p>T-1</p> <p>T-2</p> <p>T-4</p>
(v) <b>Environmentally Sensitive Areas and Areas of Public Concern</b>	<p>No environmentally sensitive areas or areas of public concern are identified.</p>	<p>Map Atlas Sheet 62</p>
(vi) <b>Spill Containment and Control Actions</b>	<p>A primary staging area, complete with decontamination facilities, is established at West Dock on Day 1.</p> <p><b>Task Force 1.</b> On Day 1 a Shoreline Protection Task Force deploys exclusion boom at two lakes near the spill site. They also place a Fastank under the pipeline's leak source.</p> <p><b>Task Force 2.</b> On Day 1, the SRT places shoresal boom around the perimeter of the spill to contain the contaminated area.</p>	<p>L-2, S-6</p> <p>C-5</p> <p>C-4</p>
(vii) <b>Spill Recovery Procedures</b>	<p><b>Task Force 3.</b> Task Force 3 sets up hoses and pumps in series on the first shift. Pumps pump oil from tundra depressions to Fastanks. Oil is transferred from Fastanks to Rolligons with 10,000 gallon tanks on trailers for delivery to West Dock Staging Area to vacuum trucks.</p>	<p>R-24, R-23</p>
	<p>Rope mop skimmers are employed to skim oil from shallow pools not otherwise collected by pumping on Day 2.</p>	<p>R-8</p> <p>B-2</p>
	<p>Contaminated vegetation is burned to clean up oil left on tundra vegetation.</p> <p>The pipeline and vertical support members are washed.</p>	<p>R-21</p>
(viii) <b>Lightering Procedures</b>	<p>Not applicable</p>	<p>Not applicable.</p>



**TABLE 1-24 (CONTINUED): CRUDE OIL TRANSMISSION PIPELINE RELEASE  
RESPONSE STRATEGY**

ADEC REQUIREMENT	RESPONSE STRATEGY	ACS TECHNICAL MANUAL TACTIC
<b>(ix) Transfer and Storage of Recovered Oil/Water; Volume Estimating Procedure</b>	<p>Rolligons transfer fluids to vacuum trucks at West Dock Staging Pad. Vacuum trucks take recovered fluids to Flow Station 1 for hydrocarbon recycling.</p> <p>The volumes of stored fluids are gauged with ullage tape and Coliwasa tubes in the tanks and recorded on waste manifests.</p>	R-28
<b>(x) Plans, Procedures, and Locations for Temporary Storage and Disposal</b>	<p>The Environmental Unit includes a three-person Waste Management Team to:</p> <ol style="list-style-type: none"> <li>1. Fill out and sign manifests,</li> <li>2. Measure liquid and other waste, and</li> <li>3. Submit a plan to ADEC for waste management.</li> </ol>	D-1
	<p>The Waste Management Team tallies the quantities and types of waste at the interim storage site at West Dock.</p> <p>Solid and liquid waste from DOT pipelines are disposed of in accordance with the "Alaska Waste Disposal and Reuse Guide" and consultation with the Environmental Advisor.</p>	D-2, D-3
<b>(xi) Wildlife Protection Plan</b>	<p>Wildlife monitoring and deterrents to protect animals are put in place at the spill scene during containment and recovery operations.</p> <p>International Bird Research and Rescue is put on stand-by in the event the wildlife treatment facility is required.</p> <p>A wildlife stabilization and treatment center is made operational and available to agency biologists and veterinarians standing by to respond to potential reports of oiled wildlife. No oiled wildlife is encountered.</p> <p>An aircraft monitors wildlife twice daily at the spill scene.</p>	W-1 through W-6
<b>(xii) Shoreline Cleanup Plan</b>	<p>Tundra is cleaned over 30 days to the satisfaction of ADEC. An assessment is conducted to understand the nature and extent of oiling. Based on the assessment, priorities for cleanup are established. A monitoring program is established for oiled tundra.</p>	R-9, B-2, SH-1, 7, 10 and 11



**TABLE 1-25: CRUDE OIL TRANSMISSION PIPELINE RELEASE  
OIL RECOVERY CAPABILITY**

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 (bopd) B x D x F
R-24	2	4" Trash Pump with 4" Suction and Discharge Hoses	1,071 <sup>1</sup>	12	20	42,840
R-23	2	Rolligon with 10,000 Gallon Tank on Trailer	33 <sup>2</sup> (Transfer)	12	20	1,320 (Transfer)
	2	4" Trash Pump with 4" Suction and Discharges Hoses	1,071 <sup>1</sup>	12	20	42,840
R-8	3	Rope Mop Skimmer	3 <sup>3</sup>	12	20	180
B-2	6	Weed Burner	Not applicable	12	20	Not applicable

<sup>1</sup> Trash pump pumping capacity of 750 gpm / 42 gallons x 60 minutes = 1,071 boph. See Tactic L-6.

<sup>2</sup> The 10,000-gallon tank is loaded with a 4-inch trash pump. The rolligon travels West Dock Staging Area to offload to vacuum truck. The vacuum truck transfers recovered fluids to Flow Station 1 for recycling. See Tactic R-23.

<sup>3</sup> Rope mop skimmers' nameplate capacity is 14 boph x 20% derated capacity = 3 boph.



**TABLE 1-26: CRUDE OIL TRANSMISSION PIPELINE RELEASE  
MAJOR OIL CONTAINMENT AND RECOVERY EQUIPMENT EQUIVALENTS**

TACTIC	NO. TACTICAL UNITS	TOTAL
C-5	1	1,500 feet
C-4	1	1,500 feet
R-24	2	2, 4" Trash Pumps Suction Hose Discharge Hose 4 Fastanks
R-23	2	2 Rolligons 2, 10,000-Gallon Tanks 2, 4" Trash Pumps Suction Hose Discharge Hose
R-8	3	3 Rope Mop Skimmer, 2-3E
B-2	6	6 Weed Burners with Propane Tank 6 Rakes 6 Fire Extinguishers

**TABLE 1-27: CRUDE OIL TRANSMISSION PIPELINE RELEASE  
PERSONNEL TO OPERATE OIL CONTAINMENT AND RECOVERY EQUIPMENT**

LABOR CATEGORY	TACTIC	NO. STAFF PER TACTICAL UNIT	NO. TACTICAL UNITS	DAY 1, NO. OF STAFF PER SHIFT	DAYS 2 - 30, NO. OF STAFF PER SHIFT
Team Leader	C-5	1	1	1	1
	C-4	1	1	1	0
	R-23/R-24	1	2	1	1
General Technician	C-5	3	1	3	3
	C-4	4	4	4	0
	R-24	12/6	2	12	6
	R-23	2	2	4	4
Equipment Operator	R-23	1	2	2	2
Skilled Technicians	R-8	2	3	0	6/3 <sup>1</sup>
	B-2	1	6	0	5
Total	-	-	-	28	28/25

<sup>1</sup> Quantity represents number of personnel necessary to set up equipment/personnel necessary to maintain equipment.





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**RESPONSE STRATEGY 1**

**WELL BLOWOUT DURING TYPICAL SPRING CONDITIONS**

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## RESPONSE STRATEGY PARAMETERS

The following response description is not an ADEC-required response planning standard scenario. Rather, it is an ADEC-required response strategy to account for variations in receiving environments and seasonal conditions according to 18 AAC 75.425(e)(1)(F).

The simulated blowout begins on June 21. At that time, Northstar and the east side of the West Dock causeway are surrounded by sea ice but the west side of the West Dock causeway is open water. Well control is achieved by well capping methods on Day 15 (July 5). By that time, breakup has begun at Northstar and the east side of the West Dock causeway. By July 26, the entire area is ice free. The response begins on Day 1, before spring break up, and continues throughout break up to open water conditions.

The following response description is for illustration only. It is not a performance standard or a guarantee of performance. Some details are examples. Although some equipment is named, it may be replaced by functionally similar equipment. The response timelines are for illustration only. They do not limit the discretion of the persons in charge of the spill response to select any sequence or take whatever time they deem necessary for an effective response without jeopardizing safety.

Actual responses are determined by the Unified Command, and depend on safety considerations, weather, and other environmental conditions, agency permits, response priorities, and other factors. In any incident, consideration for personnel safety is the highest priority. The response description assumes the agency on-scene coordinators and other agency officials immediately grant permits.

Larger responses than illustrated in this response description can be mounted with additional in-region resources and with the mobilization of out-of-region resources.

**TABLE 1-28: WELL BLOWOUT UNDER TYPICAL SPRING CONDITIONS RESPONSE STRATEGY**

<b>ADEC REQUIREMENT</b>	<b>RESPONSE STRATEGY</b>	<b>ACS TECHNICAL MANUAL TACTIC</b>
<b>(i) Stopping Discharge at Source</b>	<p>The On-Site Company Representative takes the role of Initial On-Scene IC, calls the emergency phone number, notifies the Drilling Superintendent, NS Well Operations Team lead, and the affected ADW Team Lead. The IMT is activated. The affected ADW Well Manager calls well control specialists to obtain guidance for source control.</p> <p>Production is shut down, closing in the wells at the surface and subsurface. The Operations Team Lead assumes Surface Control leadership and plans initial surface controls.</p>	<p>A-1, A-2, L-2 BPXA IMS Manual</p>



**TABLE 1-28 (CONTINUED)  
WELL BLOWOUT UNDER TYPICAL SPRING CONDITIONS RESPONSE STRATEGY**

<b>ADEC REQUIREMENT</b>	<b>RESPONSE STRATEGY</b>	<b>ACS TECHNICAL MANUAL TACTIC</b>
<b>(ii) Preventing or Controlling Fire Hazards</b>	<p>The Operations Section Chief sets up access zones and routes and firefighting operations to protect assets and workers. Throughout the first few hours of the spill, the Operations Section Chief, with the assistance of the Site Safety Officer and Fire Chief, verify no ignition sources in the area.</p> <p>The Site Safety Officer determines response workers' PPE needs and provides hot and warm zone access information. The first draft of site safety plan (ICS Form 201-5) focuses on the delineation, containment and source control teams. It quickly evolves to include spill recovery teams. Monitoring protocol is established by the Site Safety Officer at work areas for personnel protection. The monitoring protocol establishes safety zones according to applicable Occupational Safety and Health Administration (OSHA) and fire hazard standards.</p> <p>Containment and recovery operations are conducted in accordance with site entry procedures. Recovery operations and oil field operations are disallowed downwind of the blowout well in areas where personnel may become exposed to flash fire hazard or oil particulate matter at concentrations greater than permissible exposure limits.</p> <p>Firewater coverage is set up by source control specialists.</p> <p>The IMT submits an ARRT in situ burning application and associated safety plan. The Site Safety Officer approves the plan and passes it to the Incident Commander and the Unified Command for approval.</p>	<p>S-1 through S-6</p> <p>B-1</p>
<b>(iv) Surveillance and Tracking of Oil; Forecasting Shoreline Contact Points</b>	<p>Oil movement is tracked using a combination of visual observation and remote sensing techniques. Oil on snow is marked with survey lathe or satellite ice beacons deployed from a helicopter based in Deadhorse. When access allows, crews look for oil under ice by opening auger holes in select areas of interest.</p> <p>As breakup occurs, the Kuparuk Twin Otter with FLIR records the location of the oil within the ice leads using onboard equipment. Oil location information is transferred to the IMT and Operations Section Chief for response planning and trajectory modeling.</p> <p>Vector addition and trajectory modeling are used to forecast oil and ice movement.</p>	<p>T-1, T-2, T-4</p> <p>T-5, T-6</p>
<b>(v) Exclusion Procedures; Protection of Sensitive Resources</b>	<p>Potential oil impact sites and priority protection sites are identified with the help of the monitoring, tracking, and forecasting work. Due to the presence of ice between the spill and sensitive resources, Unified Command predicts it is unlikely that the oil will impact these areas.</p> <p>As breakup occurs, sensitive areas are monitored. Once conditions allow, airboats deploy from West Dock and anchor boom in shallow water near priority protection sites down current of the impacted areas. Deflection booming is the primary tactic as oil is not expected at the sites.</p> <p>The Environmental Unit issues an advisory and the Operations Chief directs that response crews avoid cultural sites on Long Island. The Environmental Unit Leader identifies that the barrier islands constitute the Area of Major Concern, listed in the ARRT's North Slope Sub-Area Plan that lies closest to the spill.</p>	<p>Map Atlas Sheets 58-62</p> <p>C-14</p> <p>W-6</p>



**TABLE 1-28 (CONTINUED)  
WELL BLOWOUT UNDER TYPICAL SPRING CONDITIONS RESPONSE STRATEGY**

<b>ADEC REQUIREMENT</b>	<b>RESPONSE STRATEGY</b>	<b>ACS TECHNICAL MANUAL TACTIC</b>
<b>(vi) Spill Containment and Control Actions</b>  <b>and</b> <b>(vii) Spill Recovery Procedures</b>  <b>(continued)</b>	<p>As access allows, mechanical recovery from vessels begins. The first recovery tactics involve free skimming. Bay Boats use rope mops and small 'over-the-side' skimmers. As conditions allow, Crucial skimmers and side boom arms are deployed.</p> <p>As the ice continues to recede, Island Boats tow an open apex containment boom configuration in front of the Bay Boats. Offshore landing craft (Class E Vessel) and Munson boats (Class D vessel) shuttle mini-barges and provide crew change support.</p>	<p>R-31, R-32A</p> <p>R-20</p>
	<p>By July 26, the entire area is ice free. Marine-based recovery operations have unrestricted access.</p> <p>A task force arrives at the island by deck barge to remove pools of oil and oiled gravel. Free oil is removed with vacuum trucks.</p> <p>Once the liquid oil is removed and the infrastructure is cleaned and/or removed, a bulldozer and backhoe remove oiled gravel. Two front-end loaders each place the gravel into lined, open-ended containers. The containers are transported via deck barge to West Dock.</p>	<p>R-20</p> <p>R-6</p> <p>R-26</p>
<b>(viii) Lightering Procedures</b>	<p>Mini-barges are lightered to vacuum trucks at West Dock.</p>	<p>R-28</p>
<b>(ix) Transfer and Storage of Recovered Oil/Water; Volume Estimating Procedure</b>	<p>A Liquid Transfer Task Force assembles at West Dock.</p> <p>The residue quantity is estimated by volume measurements at West Dock.</p> <p>Mini-barges have the capacity to store the spilled oil plus more in the form of collected water without off-loading.</p> <p>The recovered liquids are off-loaded by vacuum trucks at West Dock.</p> <p>The volumes of stored oil emulsion and free water are gauged with approved methods.</p>	<p>R-22</p> <p>B-6</p> <p>R-28</p> <p>D-1</p>
<b>(x) Plans, Procedures, and Locations for Temporary Storage and Disposal</b>	<p>The Environmental Unit includes a Waste Management Team to:</p> <ol style="list-style-type: none"> <li>1. Fill out and sign manifests,</li> <li>2. Measure liquid and other waste, and</li> <li>3. Submit a plan to ADEC for waste management.</li> </ol> <p>Vacuum trucks haul recovered liquids to Flow Station 1 for recycling.</p> <p>Non-liquid oily wastes are classified and disposed of as described in the disposal tactics of the ACS <i>Technical Manual</i>. Oiled gravel stockpiles are treated under an ADEC-approved long-term plan.</p>	<p>D-1</p> <p>D-2</p> <p>D-3</p> <p>D-4</p>



**TABLE 1-28 (CONTINUED)  
WELL BLOWOUT UNDER TYPICAL SPRING CONDITIONS RESPONSE STRATEGY**

<b>ADEC REQUIREMENT</b>	<b>RESPONSE STRATEGY</b>	<b>ACS TECHNICAL MANUAL TACTIC</b>
<b>(xi) Wildlife Protection Plan</b>	<p>Daily overflights beginning Day 1 monitor the spill scene for animals at risk. A wildlife task force is mobilized to exclude mammals from entering oiled areas, monitor the oil trajectory area, recover oiled carcasses, and/or capture oiled wildlife, as necessary.</p> <p>The International Bird Rescue Research Center (IBRRC) is put on standby in the event the wildlife treatment facility should be required. A wildlife stabilization and treatment center is made operational and available to agency biologists and veterinarians standing by to respond to potential reports of oiled wildlife.</p> <p>As breakup conditions continue, teams with three persons and a 29-foot hull class vessel deploys noise-making buoys as bird deterrents.</p>	<p>W-1</p> <p>W-2B</p> <p>W-3</p> <p>W-4</p> <p>W-5</p>
<b>(xii) Shoreline Cleanup Plan</b>	<p>Once conditions allow, shoreline assessment is conducted to assess potential impact to shorelines.</p> <p>A Shoreline Cleanup Plan is submitted to and approved by Unified Command. The plan proposes that beaches found oiled by joint industry and agency Shoreline Cleanup Assessment Teams are cleaned to the satisfaction of the regulatory agencies using the following methods: Manual recovery of heavier pockets of oil, ambient low pressure water deluge, passive recovery with sorbents, and natural recovery.</p>	<p>SH-1</p> <p>SH-2</p> <p>SH-3</p> <p>SH-5</p> <p>SH-7</p>

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## **RESPONSE STRATEGY 2**

### **CRUDE OIL TRANSMISSION PIPELINE RUPTURE DURING SPRING BREAK-UP**

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**RESPONSE STRATEGY PARAMETERS**

The following response strategy illustrates procedures and methods that may be taken in response to a hypothetical oil spill from Northstar’s sub-sea crude oil transmission pipeline at the beginning of spring break-up. See Figure 1-11 and Figure 1-12.

**TABLE 1-29: CRUDE OIL TRANSMISSION PIPELINE RUPTURE DURING SPRING BREAK-UP**

<b>ADEC REQUIREMENT</b>	<b>RESPONSE STRATEGY</b>	<b>ACS TECHNICAL MANUAL TACTIC</b>
(i) <b>Stopping Discharge at Source</b>	<p>The Control Room Operator reports the alarm to the Communications Operator and closes the shutdown valves. The source is controlled by shut-in of operations and temporary repairs to the line.</p> <p>Notification procedures begin, along with SRT mobilization.</p>	<p>A-1, A-2, L-2 BPXA IMS Manual</p>
(ii) <b>Preventing or Controlling Fire Hazards</b>	<p>The Site Safety Officer characterizes the spill site and distributes a Site Safety Plan. Operations are conducted in accordance with site entry procedures. Monitoring protocol is established by the Site Safety Officer on work vessels to ensure proper personnel protection.</p>	S-1 through S-6
	<p>The IMT submits an ARRT in situ burning application and associated safety plan. The Site Safety Officer approves the plan and passes it to the Incident Commander and the Unified Command for approval.</p>	B-1
(iv) <b>Surveillance and Tracking of Oil; Forecasting Shoreline Contact Points</b>	<p>Oil movement is tracked using a combination of visual observation and remote sensing techniques. Satellite ice beacons are deployed from a helicopter based in Deadhorse. The Kuparuk Twin Otter with FLIR geocodes the location of the oil within the ice leads using onboard equipment. Oil location information is digitized and transferred to the IMT and Operations Section Chief for response planning and trajectory modeling.</p> <p>Vector addition and trajectory modeling are used to forecast oil and ice movement.</p>	<p>T-4A T-4 T-5</p>
(v) <b>Exclusion Procedures; Protection of Sensitive Resources</b>	<p>Potential oil impact sites and priority protection sites are identified with the help of the monitoring, tracking, and forecasting work. Due to the presence of ice between the spill and sensitive resources, Sit Sat predicts it is unlikely that the oil will impact these areas.</p>	Map Atlas Sheets 58-62
	<p>The Environmental Unit issues an advisory and the Operations Chief directs that response crews avoid cultural sites on Long Island. The Environmental Unit Leader identifies that the barrier islands constitute the Area of Major Concern, listed in the ARRT’s North Slope Sub-Area Plan that lies closest to the spill.</p>	W-6
(vi) <b>Spill Containment and Control Actions</b>	<p>An in situ burning team is mobilized in anticipation of Unified Command approval to burn. A deployment team readies Heli-torch units. A helicopter is mobilized through ACS Master Agreements or through an ACS member company and outfitted with a Heli-torch unit on the first shift.</p>	B-3
	<p>Vessels and mini-barges mobilize at West Dock on Day 1 and deploy at the spill scene as ice allows (Bronson, 2000).</p>	R-31, Option B

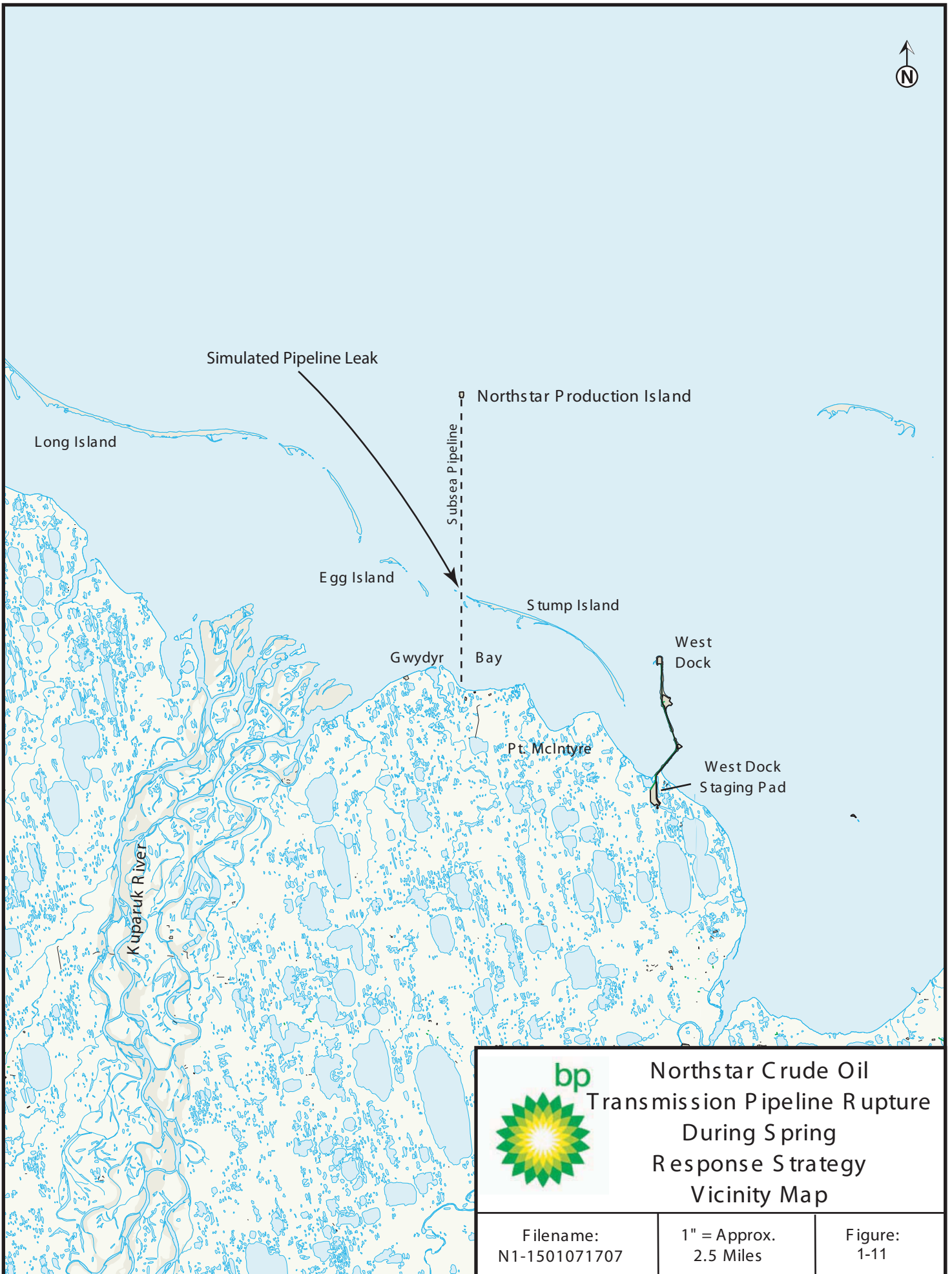



**TABLE 1-29 (CONTINUED):  
CRUDE OIL TRANSMISSION PIPELINE RUPTURE DURING SPRING BREAK-UP**

<b>ADEC REQUIREMENT</b>	<b>RESPONSE STRATEGY</b>	<b>ACS TECHNICAL MANUAL TACTIC</b>
<b>(vii) Spill Recovery Procedures</b>	Following Unified Command approval to burn at Hour 6, the helicopter travels to the spill site and burns surface oil by dropping flaming gelled gasoline over the entire oiled area. The helicopter burns oil as it emerges until the on-water task forces deploy at the spilled oil.	B-3
	A primary staging area, complete with decontamination facilities, is established at West Dock on Day 1.	L-2
	In greater ice concentrations, detached configurations free-skim with Crucial C Disc 13/30 skimmers. Oil and water are stored immediately in mini-barges. As regional ice coverage decreases, free-skimming systems convert to boom containment tactics. The boom containment and skimmer configurations follow paths between ice.	R-31, Option B
	An additional Type D offshore workboat not assigned to oil removal or oil transfer tasks carries supplies and replacement crew members to the offshore teams.	R-17
<b>(viii) Lightering Procedures</b>	Not applicable.	
<b>(ix) Transfer and Storage of Recovered Oil/Water; Volume Estimating Procedure</b>	A Liquid Transfer Task Force assembles at West Dock.	R-22
	The residue quantity is estimated by volume measurements at West Dock.	B-6
	Mini-barges have the capacity to store the spilled oil plus more in the form of collected water without off-loading.	R-28
	The recovered liquids are off-loaded by vacuum trucks at West Dock.  The volumes of stored oil emulsion and free water are gauged with ullage tape and Coliwasa tubes.	D-1
<b>(x) Plans, Procedures, and Locations for Temporary Storage and Disposal</b>	<p>The Environmental Unit includes a 3-person Waste Management Team to</p> <ol style="list-style-type: none"> <li>1. Fill out and sign manifests,</li> <li>2. Measure liquid and other waste, and</li> <li>3. Submit a plan to ADEC for waste management.</li> </ol> <p>The Waste Management Team tallies the quantities and types of waste at the interim storage site at West Dock.</p> <p>Solid and liquid waste from DOT pipelines are disposed of in accordance with the "Alaska Waste Disposal and Reuse Guide" and consultation with the Environmental Advisor.</p>	<p>D-1</p> <p>D-2</p> <p>D-3</p>

**TABLE 1-29 (CONTINUED):  
CRUDE OIL TRANSMISSION PIPELINE RUPTURE DURING SPRING BREAK-UP**

<b>ADEC REQUIREMENT</b>	<b>RESPONSE STRATEGY</b>	<b>ACS TECHNICAL MANUAL TACTIC</b>
<b>(xi) Wildlife Protection Plan</b>	<p>Daily overflights beginning Day 1 monitor the spill scene for animals at risk. A helicopter deploys noise-making buoys as bird deterrents in the floating oil as oiled leads appear before Day 3.</p> <p>A wildlife task force excludes birds and mammals from entering oiled areas on water, monitors the oil trajectory area, recovers oiled carcasses and captures oiled wildlife. Teams with three persons and a 29-foot hull class vessel operate at the spill scene beginning on Day 3.</p> <p>International Bird Research and Rescue, Inc. (IBRRC) is put on standby in the event the wildlife treatment facility should be required.</p> <p>A wildlife stabilization and treatment center is made operational and is made available to agency biologists and veterinarians standing by to respond to potential reports of oiled wildlife.</p>	<p>W-1</p> <p>W-2B</p> <p>W-3</p> <p>W-4</p> <p>W-5</p>
<b>(xii) Shoreline Cleanup Plan</b>	<p>Although no shoreline impact is anticipated, development of a Shoreline Cleanup Plan is initiated. Once complete open water arrives, shoreline assessment is conducted to assess beach impact, and beaches found oiled are marked to be cleaned and techniques to be used are determined.</p>	<p>SH-1</p>



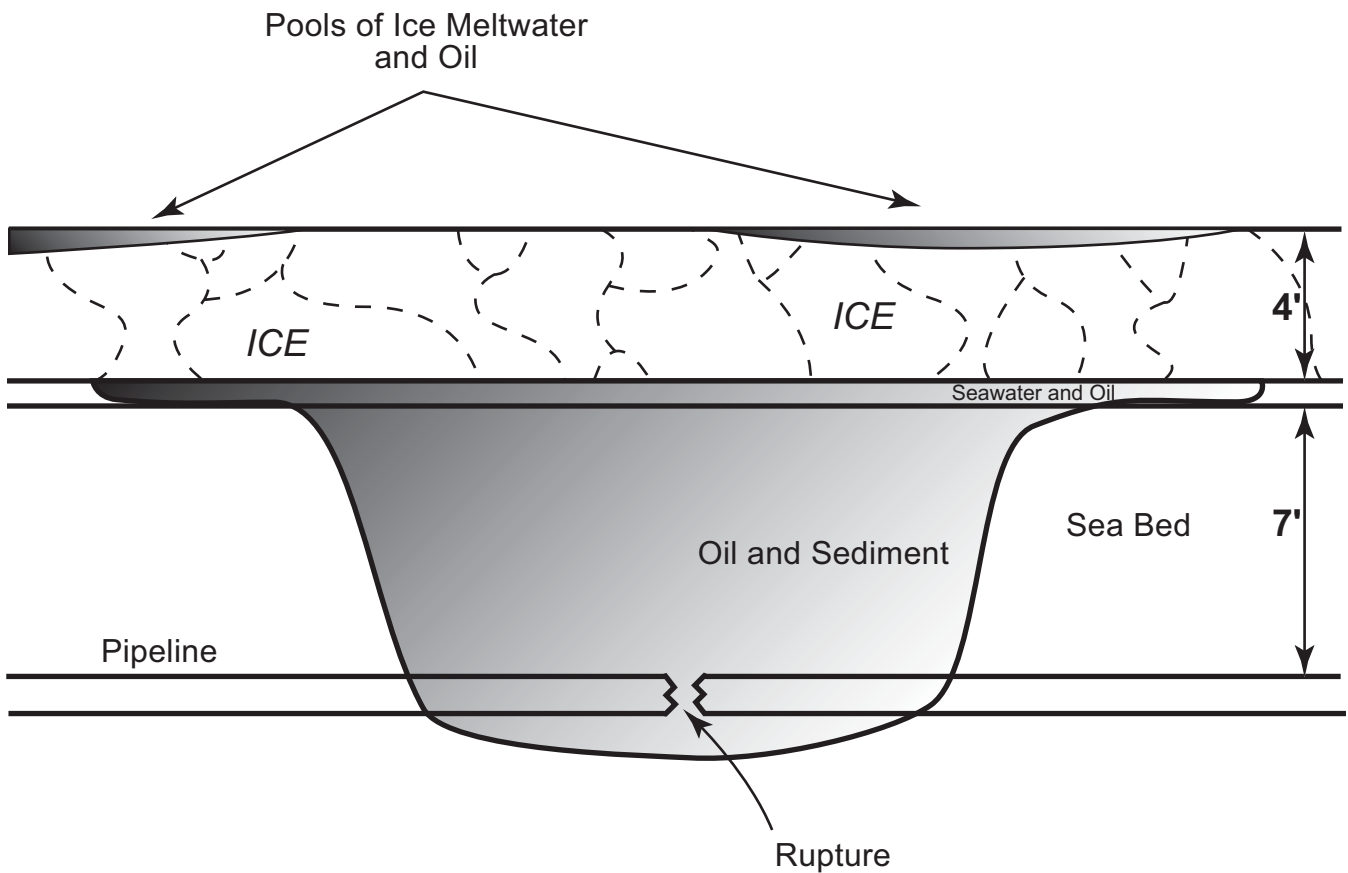
 Northstar Crude Oil  
Transmission Pipeline Rupture  
During Spring  
Response Strategy  
Vicinity Map

Filename:  
N1-1501071707

1" = Approx.  
2.5 Miles

Figure:  
1-11





Northstar Crude Oil  
Transmission Pipeline Rupture  
During Spring Response Strategy  
Simulated Oil Distribution

Filename:  
N1-1601071707

1" = Approx.  
5 Feet

Figure:  
1-12

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## **RESPONSE STRATEGY 3**

### **CRUDE OIL TRANSMISSION PIPELINE RUPTURE DURING SUMMER**

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## RESPONSE STRATEGY PARAMETERS

The following response strategy illustrates procedures and methods that may be taken in response to a hypothetical oil spill from Northstar’s sub-sea crude oil transmission pipeline during summer. See Figure 1-13.

**TABLE 1-30: CRUDE OIL TRANSMISSION PIPELINE RUPTURE DURING SUMMER**

ADEC REQUIREMENT	RESPONSE STRATEGY	ACS TECHNICAL MANUAL TACTIC
(i) <b>Stopping Discharge at Source</b>	<p>The Control Room Operator reports the alarm to the Communications Operator and closes the shutdown valves. The source is controlled by shut-in of operations and temporary repairs to the line.</p> <p>Notification procedures begin, along with SRT mobilization.</p>	<p>A-1, A-2</p> <p>Section 1.2, Reporting and Notification</p>
(ii) <b>Preventing or Controlling Fire Hazards</b>	<p>The Site Safety Officer characterizes the spill site and distributes a Site Safety Plan. Operations are conducted in accordance with site entry procedures. Monitoring protocol is established by the Site Safety Officer on work vessels to ensure proper personnel protection.</p>	<p>S-1 through S-6</p>
(iv) <b>Surveillance and Tracking of Oil; Forecasting Shoreline Contact Points</b>	<p>Oil movement is tracked using a combination of visual observation and remote sensing techniques. The Kuparuk Twin Otter with FLIR geocodes the location of the oil using onboard equipment. Oil location information is digitized and transferred to the IMT and Operations Section Chief for response planning and trajectory modeling. The lead downwind recovery vessel deploys tracking buoys at Hour 3.</p>	<p>T-4</p>
	<p>Vector addition and trajectory modeling are used to forecast oil and ice movement.</p>	<p>T-5</p>
(v) <b>Exclusion Procedures; Protection of Sensitive Resources</b>	<p>Potential oil impact sites and priority protection sites are identified with the help of monitoring, tracking and forecasting work. The Environmental Unit Leader identifies that the barrier islands constitute the Area of Major Concern, listed in the ARRT’s North Slope Sub-Area Plan that lies closest to the spill.</p>	<p>Map Atlas Sheets 58-62</p>
	<p>On Day 1 a Shoreline Protection Task Force deploys exclusion boom at the four PS locations in Gwydyr Bay lagoon. Teams, traveling by small workboats and airboats from West Dock, each place boom in the quantities described and with the boom described in ACS <i>Technical Manual</i> Map Atlas Sheet 62.</p>	<p>C-14</p>
	<p>The Environmental Unit issues an advisory and the Operations Chief directs that response crews avoid the cultural sites on the barrier islands and the mainland shore that are noted in the ACS <i>Technical Manual</i>.</p>	<p>W-6</p>



**TABLE 1-30 (CONTINUED): CRUDE OIL TRANSMISSION PIPELINE RUPTURE DURING SUMMER**

ADEC REQUIREMENT	RESPONSE STRATEGY	ACS TECHNICAL MANUAL TACTIC
<p>(vi) <b>Spill Containment and Control Actions</b></p> <p>and</p> <p>(vii) <b>Spill Recovery Procedures</b></p>	<p>Vessels and mini-barges mobilize at Northstar Island and West Dock and deploy as recovery task forces at the spill scene at Hour 6.</p>	<p>R-20, Option B</p>
	<p><b>Task Force 1.</b> Its objective is to recover oil as it surfaces and begins to move from the leak site.</p> <p>If the water depth and ocean currents are amendable, the task force deploys boom in a diamond shape, encircling the area where the discharged oil first appears at the ocean surface.</p> <p>If the diamond configuration is not possible, a vessel-based boom-skimmer system deploys directly downwind of the leak. Upon reaching the spill scene, the open apex boom and the following boom-skimmer configuration deploy 4,000 feet from the leak site where the oil swath is 1,000 feet wide. Then the system moves upwind, recovering oil, and positions its open apex boom containment area centrally over the leak site (see Figure 1-14).</p>	<p>R-30</p> <p>R-17</p>
	<p><b>Task Force 2.</b> J-boom skimmer teams deploy downwind of Task Force 2 at Hour 6. The objective is to recover the scattered oil that surfaced in the first hours and moved from the leak vicinity (see Figure 1-14). A primary staging area, complete with decontamination facilities, is established at West Dock on Day 1.</p>	<p>L-2, S-6</p>
<p>(viii) <b>Lightering Procedures</b></p>	<p>Not applicable.</p>	<p>Not applicable</p>
<p>(ix) <b>Transfer and Storage of Recovered Oil/Water; Volume Estimating Procedure</b></p>	<p>Mini-barges load less than their tank capacity to avoid grounding in the shallow water. A Liquid Transfer Task Force assembles. The stored liquids are off-loaded from mini-barges to vacuum trucks at West Dock.</p> <p>The volumes of stored oil emulsion and free water are gauged with ullage tape and Coliwasa tubes in the barge tanks and recorded on waste manifests.</p>	<p>R-28</p>
<p>(x) <b>Plans, Procedures, and Locations for Temporary Storage and Disposal</b></p>	<p>The Environmental Unit includes a three-person Waste Management Team to:</p> <ol style="list-style-type: none"> <li>1. Fill out and sign manifests,</li> <li>2. Measure liquid and other waste, and</li> <li>3. Submit a plan to ADEC for waste management.</li> </ol> <p>The Waste Management Team tallies the quantities and types of waste.</p> <p>Solid and liquid waste from DOT pipelines are disposed of in accordance with the "Alaska Waste Disposal and Reuse Guide" and consultation with the Environmental Advisor.</p>	<p>D-1</p> <p>D-2</p> <p>D-3</p>



**TABLE 1-30 (CONTINUED): CRUDE OIL TRANSMISSION PIPELINE RUPTURE DURING SUMMER**

<b>ADEC REQUIREMENT</b>	<b>RESPONSE STRATEGY</b>	<b>ACS TECHNICAL MANUAL TACTIC</b>
<b>(xi) Wildlife Protection Plan</b>	<p>Wildlife monitoring and deterrents to protect animals are put in place at the spill scene during recovery operations. Teams with three persons and Type B vessels, operate at the spill scene on Day 1. The hazing team deploys noise-making buoys in the oil slick on the first shift.</p> <p>A wildlife task force excludes birds and mammals from entering oiled areas on water, monitors the oil trajectory area, recovers oiled carcasses and captures oiled wildlife.</p> <p>A wildlife stabilization and treatment center is made operational and is made available to agency biologists and veterinarians standing by to respond to potential reports of oiled wildlife.</p> <p>An aircraft monitors wildlife twice daily at the spill scene.</p>	<p>W-1</p> <p>W-2, L-6</p> <p>W-3</p> <p>W-4</p> <p>W-5</p>
<b>(xii) Shoreline Cleanup Plan</b>	<p>Shorelines, tundra and gravel areas are cleaned to the satisfaction of ADEC. Monitoring programs are established for these areas.</p>	<p>R-9, R-26, SH-1, SH-2, SH-3, SH-4, SH-5, SH-7, SH-10 and SH-11</p>



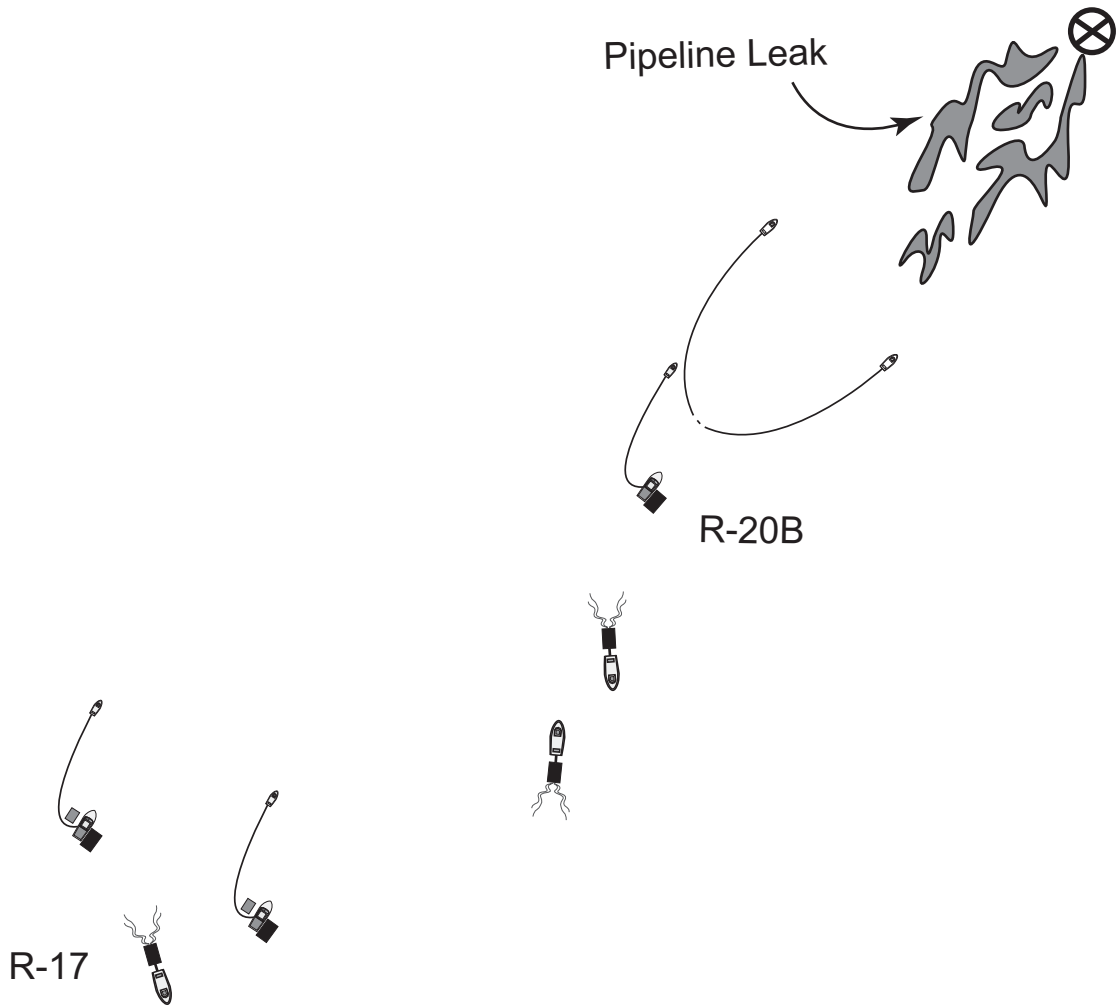
Northstar Crude Oil  
Transmission Pipeline Rupture  
During Summer  
Response Strategy  
Vicinity Map

Filename:  
N1-1701071707

1" = Approx.  
2.5 Miles

Figure:  
1-13





Northstar Crude Oil  
Transmission Pipeline Rupture  
During Summer Response Strategy  
Simulated Recovery Tactics

Filename:  
N1-1801071707

Not to  
scale

Figure:  
1-14

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## **RESPONSE STRATEGY 4**

### **CRUDE OIL TRANSMISSION PIPELINE RUPTURE DURING FALL**

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**RESPONSE STRATEGY PARAMETERS**

The following response strategy illustrates procedures and methods that may be taken in response to a hypothetical oil spill from Northstar’s sub-sea crude oil transmission pipeline during fall. See Figure 1-15.

**TABLE 1-31: CRUDE OIL TRANSMISSION PIPELINE RUPTURE DURING FALL**

ADEC REQUIREMENT	RESPONSE STRATEGY	ACS TECHNICAL MANUAL TACTIC
(i) <b>Stopping Discharge at Source</b>	<p>The Control Room Operator reports the alarm to the Communications Operator and closes the shutdown valves. The source is controlled by shut-in of operations and temporary repairs to the line.</p> <p>Notification procedures begin, along with SRT mobilization.</p>	<p>A-1, A-2</p> <p>Section 1.2, Reporting and Notification</p>
(ii) <b>Preventing or Controlling Fire Hazards</b>	<p>The Site Safety Officer characterizes the spill site and distributes a Site Safety Plan. Operations are conducted in accordance with site entry procedures. Monitoring protocol is established by the Site Safety Officer on work vessels to ensure proper personnel protection.</p>	<p>S-1 through S-6</p>
(iv) <b>Surveillance and Tracking of Oil; Forecasting Shoreline Contact Points</b>	<p>Oil movement is tracked using a combination of visual observation and FLIR. The Kuparuk Twin Otter visually tracks the oil. Wind and current vector addition and trajectory modeling are used to forecast oil and ice movement.</p>	<p>T-4, T-5</p>
	<p>On-site observers to coordinate the surveillance program. Site-specific weather forecasts are given to Unified Command. Satellite imagery support services are notified and activated as needed.</p>	
	<p>As the ice consolidates and thickens, crews delineate the oiled areas. Using ice augers, crews drill a pattern of holes in the ice to track oil on the undersurface of the ice. Underwater lights lowered through auger holes to determine the location of oil pockets.</p> <p>Additionally, existing commercial GPR systems can be used from a low-flying helicopter to detect oil trapped under snow on the ice and to detect oil trapped under solid ice (Sørstrøm et al., 2010).</p>	<p>T-3</p>
(v) <b>Environmentally Sensitive Areas and Areas of Public Concern</b>	<p>Potential oil impact sites and priority protection sites are identified with the help of the monitoring and tracking and forecasting work. Projected oil trajectory does not indicate landfall near sensitive sites.</p>	<p>Map Atlas Sheets 58-62</p>
	<p>The Environmental Unit issues an advisory and Operations Chief directs that response crews avoid cultural sites on Long Island. The Environmental Unit Leader identifies that the barrier islands constitute the Area of Major Concern, listed in the ARRT’s North Slope Sub-Area Plan that lies closest to the spill.</p>	<p>W-6</p>
(vi) <b>Spill Containment and Control Actions and</b>  (vii) <b>Spill Recovery Procedures</b>	<p>Workboats with ocean containment boom, fireboom, skimmers, and mini-barges mobilize from West Dock and deploy at the spill scene on the first shift in &gt;1/10 ice coverage.</p>	<p>R-30</p>
	<p><b>Team 1 at Initial Oil Slug.</b> A pair of ACS workboats tows 1,000 feet of boom and deploys the boom. The boom encircles the leading area of oiled ice. Inside the boom, the ice becomes a single mass of slush over several hours as the pieces encounter resistance by the boom.</p>	

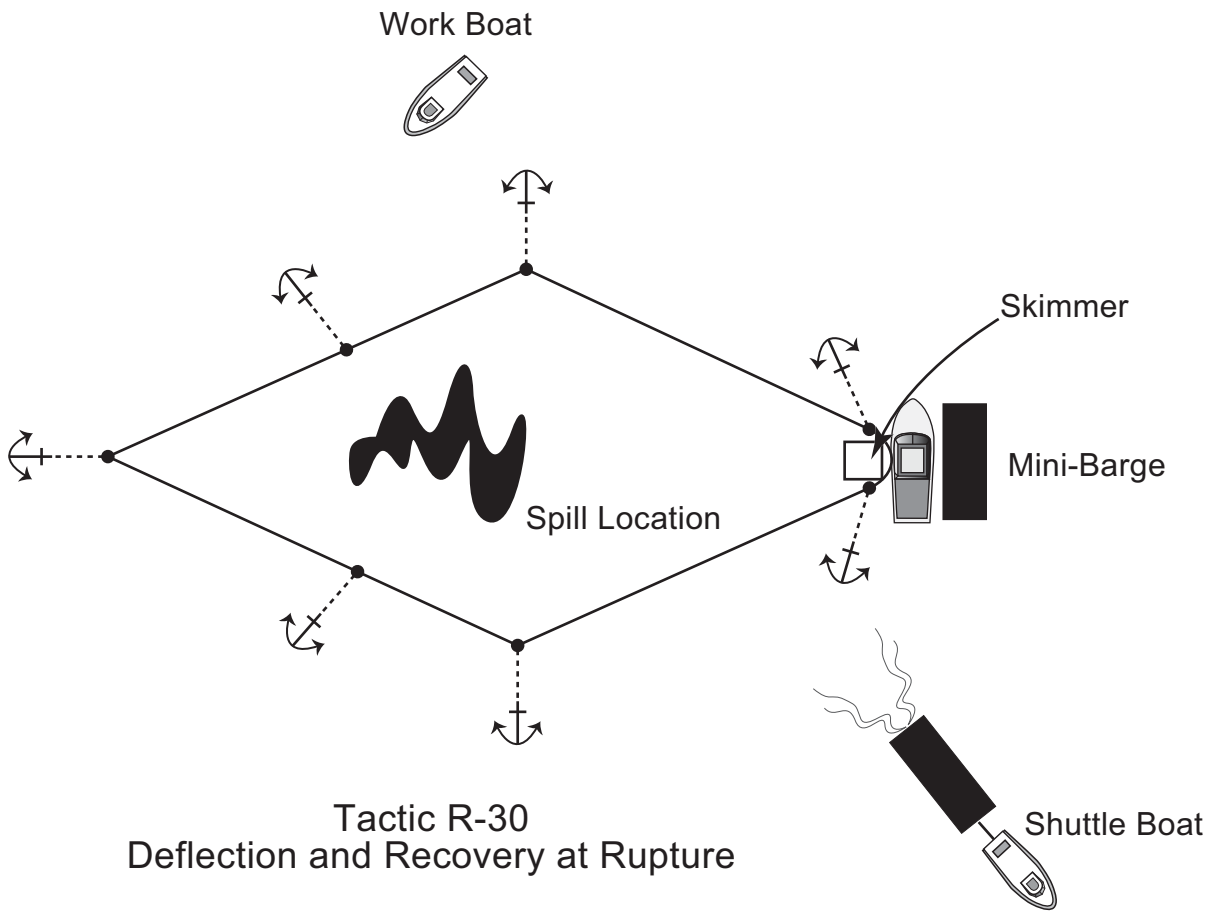
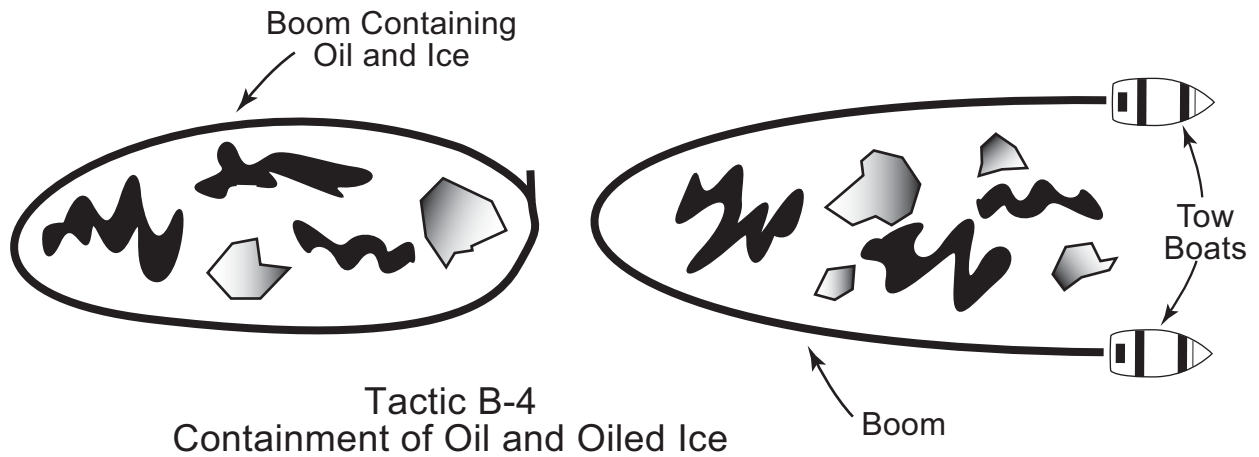


**TABLE 1-31 (CONTINUED):  
CRUDE OIL TRANSMISSION PIPELINE RUPTURE DURING FALL**

ADEC REQUIREMENT	RESPONSE STRATEGY	ACS TECHNICAL MANUAL TACTIC
<p>(vi) <b>Spill Containment and Control Actions and</b></p> <p>(vii) <b>Spill Recovery Procedures</b></p> <p>(Continued)</p>	<p><b>Team 2 at Body of the Oil Slick.</b> Towing vessels in pairs travel close abeam to avoid collecting ice until they encounter oil. As they encounter the oil, the workboats open the boom sweep to match the swath of the narrow oil slick. When the boom becomes full of ice, the boom ends are connected and released from the tow boats. Each of the two pairs of workboats tows 2,000 feet of boom, to encircle two sections of the oil slick downwind of leak source (See Figure 1-15).</p>	R-30
	<p><b>Team 3 at Source.</b> A workboat anchors an ice-deflection boom configuration, 100 feet on each side on the first shift. The objectives are to deflect oncoming ice away from the surfacing oil and from a containment-skimming system and to direct oil to the containment system. As a consequence of ice deflection, the skimmer encounters the oil in ice-free water.</p> <p>A primary staging area, complete with on-water and on-land decontamination facilities, is established at West Dock.</p>	R-30
	<p>Aerial and on-water observers report that grease and slush ice predominate in the spill zone at Hour 3.</p> <p><b>Team 3 at Leak Site.</b> Above the leak, oil rising to the surface after Team 3 deploys is targeted for skimmer recovery. A pair of workboats deploys boom to concentrate the oil that exits the chevron deflection boom. The anchored deflection boom area releases no ice into the vessel-based boom. A workboat with a Crucial C Disc 13/30 skimmer, boom arm, and mini-barge is positioned down current and in the apex of the boom. The skimmer vessel's boom arm directs oil into the skimmer until the leak stops.</p> <p>Workboats shuttle mini-barges from the skimming vessels. Operations continue through the night with deck lights illuminating the immediate vicinity of the vessels. Workboats shuttling mini-barges also carry supplies and crew members from West Dock to the on-water teams.</p>	R-30
	<p><b>Team 4 for Oil Entrapped in Fast Ice.</b> Stationary, stable, consolidated shorefast ice (Condition 4) traps the oil in Teams 1 and 2 booms. In December, ice roads are built to access the scattered oil marked by booms and beacons. Oil marked with boom and beacons is excavated soonest. The scattered oil excavation relies on efforts to find the oil. Trimmers remove the oiled ice by April 1.</p>	R-29
<p>(viii) <b>Lightering Procedures</b></p>	<p>Not applicable</p>	

**TABLE 1-31 (CONTINUED):  
CRUDE OIL TRANSMISSION PIPELINE RUPTURE DURING FALL**

<b>ADEC REQUIREMENT</b>	<b>RESPONSE STRATEGY</b>	<b>ACS TECHNICAL MANUAL TACTIC</b>
<b>(ix) Transfer and Storage of Recovered Oil/Water; Volume Estimating Procedure</b>	Team 3 mini-barges shuttle recovered liquids from the skimmer operations to West Dock.  The recovered oil is stored by the end of Day 1 when the leak and on-water recovery cease. Mini-barges are off-loaded at West Dock on Day 2 on a non-emergency schedule.	R-28
	Once a disposal method has been determined and approved, a Liquid Transfer Task Force off-loads the mini-barge's stored liquids to vacuum trucks. Recovered fluids in vacuum trucks are manifested accordingly.	R-6
	Oily ice is stockpiled in temporary, lined containment cells at the West Dock staging area. Once a disposal method has been determined and approved, a Liquid Transfer Task Force uses vacuum trucks to transfer the oil-water mixture to an approved disposal facility. Recovered fluids in vacuum trucks are manifested accordingly.	R-6
	Oil separating from the melted ice is gauged on waste manifests.	
<b>(x) Plans, Procedures, and Locations for Temporary Storage and Disposal</b>	The Environmental Unit includes a three-person Waste Management Team to: <ol style="list-style-type: none"> <li>1. Fill out and sign manifests,</li> <li>2. Measure liquid and other waste, and</li> <li>3. Submit a plan to ADEC for waste management.</li> </ol>	D-1  D-2
	The Waste Management Team tallies the quantities and types of waste at the interim storage site at West Dock.  Solid and liquid waste from DOT pipelines are disposed of in accordance with the "Alaska Waste Disposal and Reuse Guide" and consultation with the Environmental Advisor.	
<b>(xi) Wildlife Protection Plan</b>	Wildlife monitoring and deterrents to protect animals and workers are put in place at the spill scene, including the nearby shoreline, during recovery operations. Two teams, each with three persons and one workboat, operate at the spill scene on Days 1 and 2.	W-1  W-2B
	A wildlife stabilization and treatment center is made operational and is made available to agency biologists and veterinarians standing by to respond to potential reports of oiled wildlife.	W-4
	Daily overflights monitor wildlife in the area.	W-5
<b>(xii) Shoreline Cleanup Plan</b>	Although no shoreline impact occurs, development of a Shoreline Cleanup Plan is initiated. Assessment is conducted to assess beach impact. If shorelines are found oiled, they are marked and cleaned.	SH-1



Northstar Crude Oil  
Transmission Pipeline Rupture  
During Fall  
Containment of Oil and Oiled Ice and  
Deflection and Recovery at Rupture

Filename:  
N1-1901071707

Not to  
scale

Figure:  
1-15



## **RESPONSE STRATEGY 5**

### **CRUDE OIL TRANSMISSION PIPELINE RUPTURE DURING WINTER**

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## RESPONSE STRATEGY PARAMETERS

The following response strategy illustrates procedures and methods that may be taken in response to a hypothetical oil spill from Northstar’s sub-sea crude oil transmission pipeline during winter. See Figure 1-16.

**TABLE 1-32: CRUDE OIL TRANSMISSION PIPELINE RUPTURE DURING WINTER**

ADEC REQUIREMENT	RESPONSE STRATEGY	ACS TECHNICAL MANUAL TACTIC
(i) <b>Stopping Discharge at Source</b>	<p>The Control Room Operator reports the alarm to the Communications Operator and closes the shutdown valves. The source is controlled by shut-in of operations and temporary repairs to the line.</p> <p>Notification procedures begin, along with SRT mobilization.</p>	<p>A-1, A-2</p> <p>Section 1.2,</p> <p>Reporting and Notification</p>
(ii) <b>Preventing or Controlling Fire Hazards</b>	<p>The Site Safety Officer characterizes the spill site and distributes a Site Safety Plan. Operations are conducted in accordance with site entry procedures.</p>	<p>S-1 through S-6</p>
(iv) <b>Surveillance and Tracking of Oil; Forecasting Shoreline Contact Points</b>	<p>Once safety zones and a decontamination unit have been set up, the oiled area is delineated. A pattern of drill holes in the ice around the discovery hole encounters oil on the undersurface of the ice. Underwater lights lowered to determine the location of oil pockets. Leaked oil is reported trapped on the rough undersurface of the continuous ice over the leak point.</p> <p>Existing commercial GPR systems can be used from a low-flying helicopter to detect oil trapped under snow on the ice and to detect oil trapped under solid ice (Sørstrøm et al., 2010).</p>	<p>T-3</p>
(v) <b>Environmentally Sensitive Areas and Areas of Public Concern</b>	<p>The Environmental Unit issues an advisory and the Operations Chief directs that response crews avoid cultural sites on Long Island. The Environmental Unit identifies that the barrier islands constitute the Area of Major Concern listed in the ARRT’s North Slope Sub-Area Plan. Trajectory forecasts predict that the oil will not move with the under ice current to shorelines.</p>	<p>ACS Technical Manual Map Atlas Sheets 60 and 62</p> <p>W-6</p>
(vi) <b>Spill Containment and Control Actions</b>	<p>Oil becomes trapped in the rough undersurface of the ice, and by ice growth at the periphery of the oiled area and beneath the oil.</p>	<p>Not applicable</p>
(vii) <b>Spill Recovery Procedures</b>	<p>A decision is made to make the recovery of spilled oil the first priority. The objective is removing the oil before July 1. Once containment and recovery of the majority of the oil has been achieved, work will commence on a pipeline repair. Oil remaining trapped in the ice is to be removed in coordination with pipeline repair operations.</p>	
	<p>Ice road and pad construction prepares the site for temporary staging of vehicles and storage tanks. An ice road and an ice pad staging area and decontamination area are built on bottom fast ice as a contingency. The ice road extends 1,000 feet onto floating fast ice to the spill site. Moving and short-term parking loads up to 50 tons (e.g., bulldozer) are supported on the floating shorefast ice at the spill site. Static (long-term) loads up to 25 tons (e.g., loader) are supported as well.</p>	<p>L-1</p> <p>C-10</p> <p>L-2, S-6</p>
	<p>The snow is cleared from the ice surface in the contaminated area using a dozer on Day 1.</p>	<p>L-7</p>

**TABLE 1-32 (CONTINUED):  
CRUDE OIL TRANSMISSION PIPELINE RUPTURE DURING WINTER**

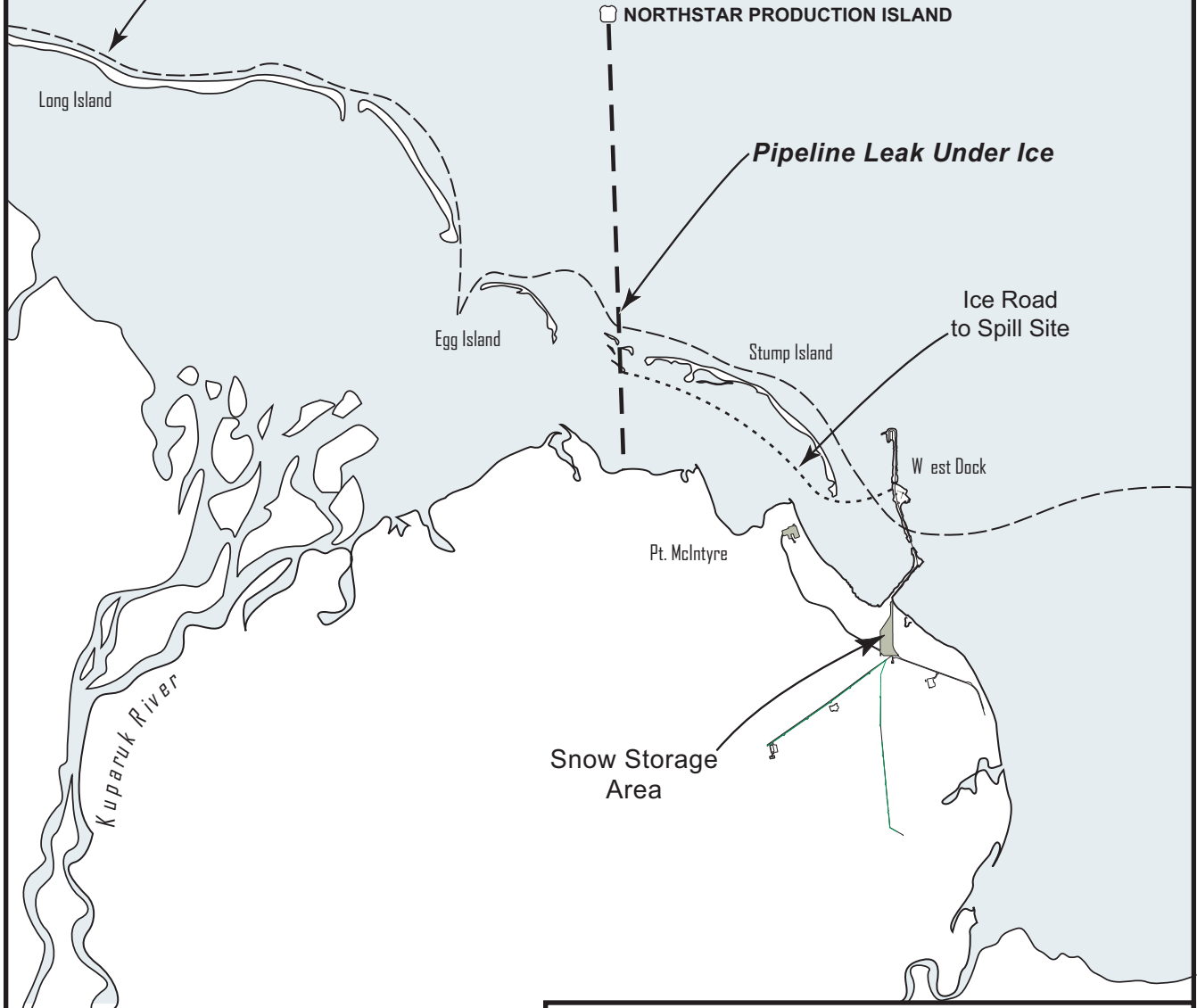
ADEC REQUIREMENT	RESPONSE STRATEGY	ACS TECHNICAL MANUAL TACTIC
<p><b>(vii) Spill Recovery Procedures</b>  (Continued)</p>	<p><b>Recovery with Sumps.</b> Recovery teams are mobilized to the site on Day 2. Teams construct a series of recovery sumps throughout the contaminated area with Rube Witches and Ditch Witches; each sump is approximately 10 feet on a side and 1.5 feet deep. Three to five holes within each sump allow effective recovery of the trapped oil in the vicinity of the sump (Dickins, D. F., 1997). Recovery sumps are cut throughout the contaminated area. See Figure 1-17. Based on recovery tests in Prudhoe Bay, the estimated recovery efficiency is 95 percent (Nelson, W. G. and A. A. Allen, 1982).</p>	<p>R-14</p>
	<p><b>Ice Block Removal.</b> Once the recovery sumps have been completed and as much oil as possible has been removed from below the ice by early March, the removal of oiled ice and the pipeline repair operation commence. Equipment and staff for oiled ice removal and for pipeline repair are mobilized in February concurrent with sub-surface oil recovery.</p>	
	<p>Contaminated soil excavated from the pipeline trench is taken to temporary, lined containment cells at the West Dock staging area for waste classification and treatment under a contaminated soil stockpile treatment plan approved by the Unified Command and ADEC. During the oiled ice removal and the pipeline repair crew's operations in March, sorbents are used to collect oil that appears on the water surface.</p>	
	<p>The oil-contaminated ice is removed by trencher machines, backhoe, front-end loader, and dump trucks. Ice blocks 4-feet by 4-feet by 6-feet deep (3.6 cubic yards) are cut and lifted.</p>	<p>D-4 R-9</p>
<p><b>(viii) Lightering Procedures</b></p>	<p>Not applicable</p>	<p>Not applicable</p>
<p><b>(ix) Transfer and Storage of Recovered Oil/Water; Volume Estimating Procedure</b></p>	<p>Oil and water from recovery operations are temporarily stored in Fastanks on the temporary staging ice pads. Vacuum trucks remove the recovered fluids to temporary tanks trucked to the West Dock staging area.</p>	<p>R-22 S-6</p>
	<p>Excavated, oiled ice is loaded into dump trucks and taken to a lined storage pit at West Dock Staging Area. A lined temporary storage area is constructed to store contaminated ice excavated from the operation. The 1-acre area is constructed at West Dock Staging Area where snow and ice is piled. Liner is compatible with crude oil.</p>	<p>D-5</p>
	<p>Liquid transfers are manifested at the West Dock staging area. Water and oil cut gauged with Coliwas tube is logged. Measures of ice and snow end dump loads are logged.</p>	<p>D-1</p>
<p><b>(x) Plans, Procedures, and Locations for Temporary Storage and Disposal</b></p>	<p>The Environmental Unit includes a three-person Waste Management Team to:</p>	
	<p>1. Fill out and sign manifests,</p>	<p>D-1</p>
	<p>2. Measure liquid and other waste, and 3. Submit a plan to ADEC for waste management.</p>	<p>D-2 D-3</p>

**TABLE 1-32 (CONTINUED):  
CRUDE OIL TRANSMISSION PIPELINE RUPTURE DURING WINTER**


<b>ADEC REQUIREMENT</b>	<b>RESPONSE STRATEGY</b>	<b>ACS TECHNICAL MANUAL TACTIC</b>
<p><b>(x) Plans, Procedures, and Locations for Temporary Storage and Disposal</b></p> <p><b>(Continued)</b></p>	<p>The Waste Management Team tallies the quantities and types of waste at the interim storage site at West Dock.</p> <p>Solid and liquid waste from DOT pipelines are disposed of in accordance with the “Alaska Waste Disposal and Reuse Guide” and consultation with the Environmental Advisor.</p>	<p>D-5</p>
<p><b>(xi) Wildlife Protection Plan</b></p>	<p>Polar bear and seal hole monitoring and deterrents to protect polar bears, foxes, and workers are put in place at the spill scene during recovery operations beginning Day 1. No wildlife becomes oiled.</p>	<p>W-1</p>
	<p>Trained dogs begin locating seal holes on Day 2 to support activity restrictions in their vicinity.</p>	<p>W-2</p>
<p><b>(xii) Shoreline Cleanup Plan</b></p>	<p>Not applicable</p>	<p>Not applicable</p>



Typical Maximum  
Extent of Bottomfast  
Ice Zone

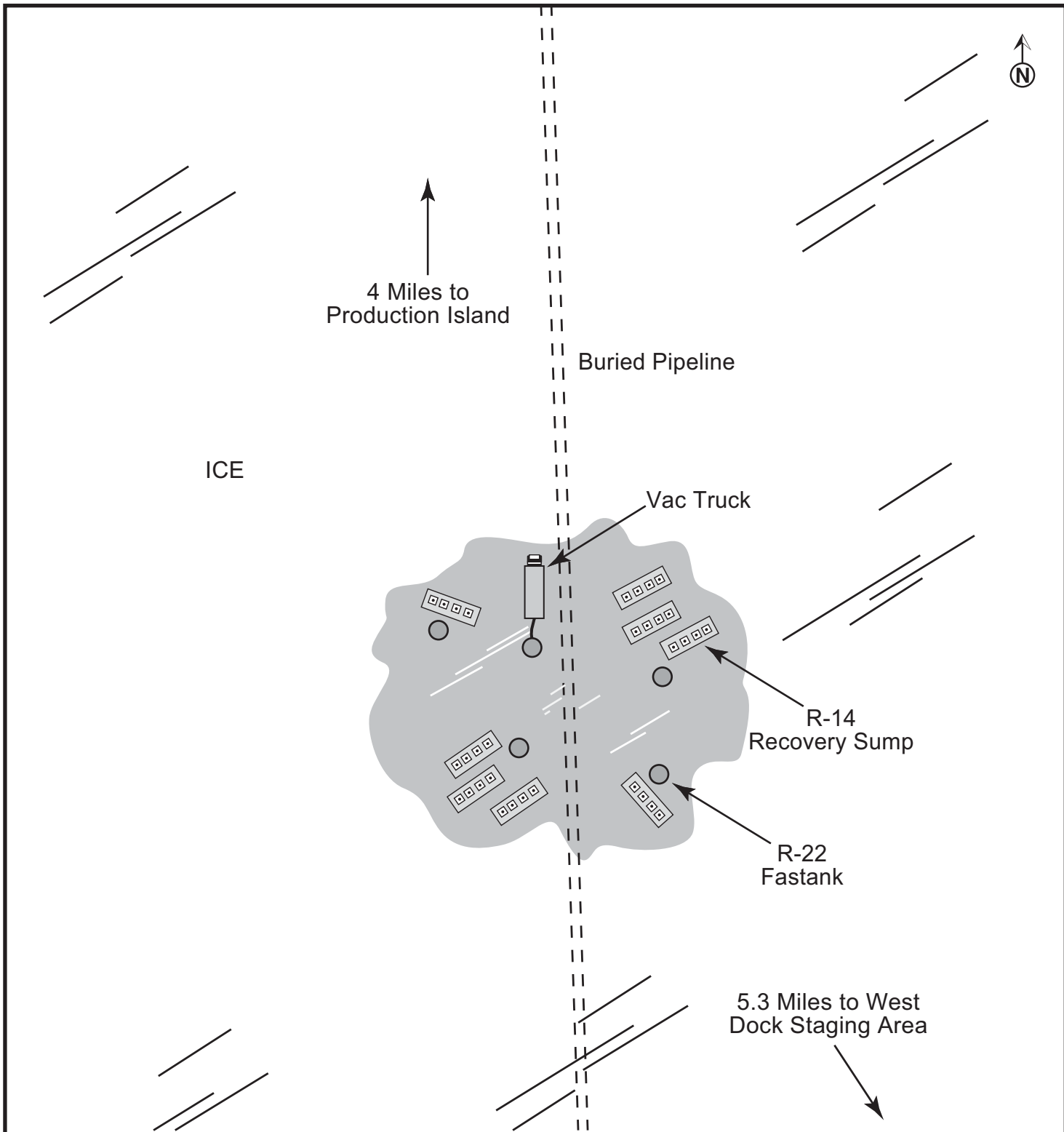



	Undersea Pipeline
	Ice Road
	Bottomfast Ice Extent

	<b>Northstar Crude Oil Transmission Pipeline Rupture During Winter Vicinity Map</b>	
	Filename: N1-2001071707	Figure: 1-16

1" = Approx.  
2.5 Miles

Figure:  
1-16




**Northstar Crude Oil  
Transmission Pipeline Rupture  
During Winter  
Under-Ice Recovery Tactics**

Filename:  
N1-2101071707

Not to  
scale

Figure:  
1-17

## **1.7 NON-MECHANICAL RESPONSE OPTIONS [18 AAC 75.425(e)(1)(G)]**

BPXA will request approval for in situ burning from the State and Federal On-Scene Coordinator (SOSC and FOSC, respectively) when mechanical response methods prove ineffective or as a tool to minimize environmental damage.

Burning will not be initiated without approval of state and federal agencies. As directed by the on-scene coordinators, BPXA, and ACS will receive authorization to burn after completing the “Application and Burn Plan” form in Revision 1 of the “In Situ Burning Guidelines” within Annex F of the Alaska Federal/State Preparedness Plan for Response to Oil and Hazardous Substance Discharges/Releases (Unified Plan), Volume 1. The forms are retrieved via the internet at [www.akrrt.org](http://www.akrrt.org) and [www.state.ak.us](http://www.state.ak.us), respectively.

In situ burning of spilled oil will be considered under conditions such as the following:

- Mechanical recovery is impractical or ineffective,
- Shorelines are threatened,
- Burning would augment the oil elimination capacity of mechanical recovery,
- Present and forecast wind conditions will carry the smoke plume away from populated areas, and
- A successful test burn has been conducted.

If the BPXA Incident Commander decides to use in situ burning and obtains the necessary authorization, ACS will carry out the response. ACS maintains the equipment and personnel for in situ burning. The equipment and personnel are described in the ACS *Technical Manual*, incorporated here by reference. See detailed descriptions in Sections 3.4 and 3.7.





**1.8 FACILITY DIAGRAMS [18 AAC 75.425(e)(1)(H)]**

Facility diagrams are located in Volume 2 of the Northstar ODPCP.



## **1.9 RESPONSE SCENARIO FOR AN EXPLORATION OR PRODUCTION FACILITY [18 AAC 75.425(e)(1)(I)]**

### **1.9.1 RESPONSE STRATEGY FOR WELL BLOWOUT CONTROL**

A summary of planned methods, equipment, logistics, and time frames to control a well blowout within 15 days, required by 18 AAC 75.425(e)(1)(I), is provided below.

The estimated timeframe to secure a well blowout by means of a well-capping program is 15 days, excluding weather days and other contingencies. Mobilization of specialist teams, initial equipment and initiation of well intervention planning would be expected to take 2 days. On-site preparations would take another 3 to 4 days. Concurrently, access and safety, well capping engineering and well re-entry would be planned and decontamination facilities and off-site operations facilities would be set up. Uncontrolled fluids may be diverted for collection and handling to create a safe working environment and minimize pollution. The blow out prevention equipment (BOPE) would be removed from the well if necessary. The capping stack would be installed within several days to provide containment, and the uncontrolled release of hydrocarbons is terminated by Day 15.

Well control specialists will be notified immediately in the event of a well control situation with the potential to escalate. BPXA Alaska Drilling and Wells currently has an agreement with Boots and Coots Services, a single point of contact to provide services for well control response. Such services include, but are not limited to, firefighting equipment and services, specialty blowout control equipment and services, directional drilling services, high-pressure pumping services, and specialty fluids, chemicals and additives. The 24-hour phone numbers for Boots and Coots are found in Table 1-3.

BPXA maintains and has available fulltime on the North Slope most of the major equipment for well firefighting, to initiate well-capping, or other surface control options. Additional equipment, which may be required on a case by case basis, will be supplied through well control specialists or other vendors. Specialized equipment for well firefighting and well-capping is summarized in Table 1-33. BPXA may loan well control equipment to other North Slope operators in emergencies. The equipment mobilization and travel times in Table 1-33 do not apply to equipment loaned to other operators.

The equipment list provided in Table 1-33 presents a broad spectrum of resources that could be used during a well blowout response. Not all pieces of equipment are required to be at the staging area concurrently. The well capping team conducts activities in a preferred sequence, so tools and deliverables are on site when they are needed in the well capping process. The mobilization and travel times presented in Table 1-33 are not based upon "zero hour" of an uncontrolled release, but are estimates of the periods between the original request by the user and the equipment's arrival at the emergency staging area. The estimates exclude weather contingencies.

Northstar's firewater system draws water from an EDG-powered seawater pump in a sump in the warehouse. There are several firefighting stations on the island for use in the event of a fire.

The decision logic regarding well-capping response to a blowout at surface is described in Figure 1-18.

BPXA certifies that it maintains a separate well blowout contingency plan applicable for Northstar that is not part of this plan. It will be made available to ADEC upon request for inspection as stipulated by 18 AAC 75.425(e)(1)(l), .445(d)(2) and .480.

### **1.9.2 RESPONSE SCENARIOS FOR WELL BLOWOUTS**

As a preventive measure, Northstar operations prohibit the drilling of new wells or sidetracks from existing wells into major liquid hydrocarbon zones at its drill sites during the defined periods of broken ice. The first period begins June 1 and ends July 20. The second period begins October 1 and ends with 18 inches of continuous ice cover for one-half mile in all directions from the Northstar production island.

Operations will present reservoir information to the AOGCC for an AOGCC determination of which stratigraphic zones represent major liquid hydrocarbon accumulations. The AOGCC determination will be submitted to ADEC for concurrence and approval of broken ice drilling programs. The purpose of the drilling moratorium is to eliminate the environmental risk associated with a well blowout to the Beaufort Sea during broken ice conditions.

Drilling restrictions do not apply the rest of the year. Section 1.6.4 shows that the well blowout response planning standards are met in winter conditions of fast sea ice and under summer conditions of less than one-tenth sea ice coverage.

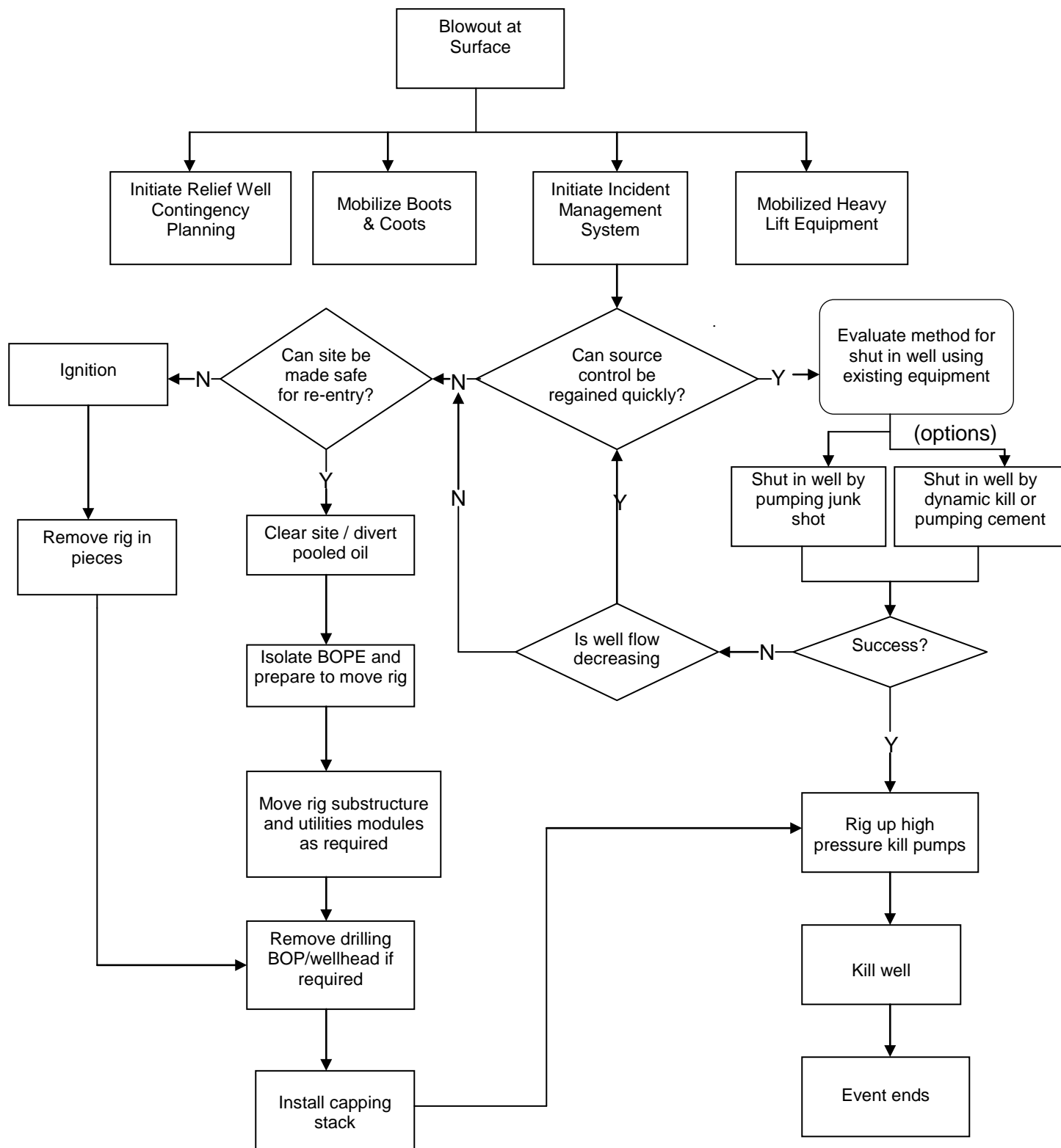


**TABLE 1-33: WELL FIREFIGHTING AND CAPPING EQUIPMENT LIST**

<b>COMPONENT(S)</b>	<b>WELL CAPPING USAGE</b>	<b>LOCATION</b>	<b>MOBILIZATION AND TRAVEL TIME</b>
Installed Fire Water Pump and Fire Monitors	Fire and heat suppression	Northstar	On site as part of facility infrastructure
Athey Wagon	Tractorized boom for manipulation of tools in and around blowout well	Northstar	On site
D8 Bulldozer	Power for Athey wagons and backup for heavy equipment, rig moving. Can also be used for constructing berms to aid in spill containment.	Northstar	On site
Backhoe	Drainage ditch, berm construction	Northstar / North Slope	Staged on island during shoulder seasons for immediate use, otherwise ≤8 hours
100-200 ton Crane	Heavy equipment lifting capability.	Northstar	On site
50-75 ton Crane	Smaller, mobile units for spotting support equipment	Northstar	On site
500 ton Drilling Block	Block and tackle system for moving or dragging heavy equipment	Northstar	On site
Drilling Line	Component of block and tackle system if crane is inoperable	Northstar	On site
20-inch and 30-inch Casing	Used to construct Venturi tubes to divert blowing well bore fluids (ignited and un-ignited).	Northstar	On site
Miscellaneous Equipment	High pressure chucks, flexible hoses, valves, containment boom, absorbent, hand tools	North Slope	≤8 hours
Junk Shot Manifold	Manifold system constructed to pump small leak sealing materials into well	North Slope	≤8 hours
Hot Tap Tool	Manifold used to gain safe access to pressurized tubulars at surface	North Slope	≤8 hours
Crimping Tool	Sized device used to pinch tubulars closed to seal off internal flow	Houston, Texas	≤48 hours
Abrasive Cutter	High pressure cutting tool used to sever leaking BOPs	Duncan, Oklahoma	≤48 hours
Kill Pumps	Used to attempt dynamic kill	North Slope	Staged on island during shoulder seasons for immediate use, otherwise ≤10 days
Capping Stack	Various high pressure BOP stacks (to replace leaking, damaged or severed primary BOPs)	Houston, Texas	≤10 days
Heavy Lift Helicopter	Lifting 18,000 to 21,000 pound loads into remote or offshore locations	US Pacific Northwest	≤10 days



FIGURE 1-18: WELL CAPPING DECISION TREE



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**PART 2. PREVENTION PLAN  
[18 AAC 75.425(e)(2)]**

**Part 2, Prevention Plan, is in Volume 2.**







## **PART 3. SUPPLEMENTAL INFORMATION**

### **[18 AAC 75.425(e)(3)]**

#### **3.1 FACILITY DESCRIPTION AND OPERATIONAL OVERVIEW**

##### **[18 AAC 75.425(e)(3)(A)]**

See Volume 2, Prevention Plan.

#### **3.2 RECEIVING ENVIRONMENT [18 AAC 75.425(e)(3)(B)]**

##### **3.2.1 POTENTIAL ROUTES OF DISCHARGES [18AAC 75.425(e)(3)(B)(i)]**

The Alaska Clean Seas (ACS) *Technical Manual*, Map Atlas provides maps and information on the potential routes of oil discharged from BPXA's operations, identifies containment sites, distinguishes sensitive receiving environments, and shows the latitude and longitude coordinates. ACS *Technical Manual*, Map Atlas Sheets 67, 73, 74, 78, 79, 80, 83, 86, 87, 89, 90, and 91 are incorporated by reference. Drainage from the production island and the COTP route are illustrated on the diagrams in Volume 2 (Prevention Plan), Appendix B.

##### **3.2.1.1 OIL IN WATER AND ICE**

Movement of oil released into marine waters would be primarily in response to wind, currents, and spreading mechanisms. Because currents in the area are generally wind-driven, a qualitative estimate of the likely trajectory of spilled oil under open water conditions can be determined by inspecting the wind roses for Prudhoe Bay. These data show that wind blows from the east to northeast about 60 percent of the time. Easterly winds cause a westward movement of water, creating upwelling conditions across bays, a depressed shoreline water surface, and subsequent surface water movement to the north. Winds from the west cause the water to move eastward, creating downwelling conditions, elevated water levels (+1 m) nearshore, and subsequent surface water movement to the south (shoreward).

Assuming 10-knot winds from the northeast, oil spilled at Northstar could reach the barrier island shores of Long Island. If not contained, oil moving inland through the barrier island cuts could reach the Kuparuk River Delta.

Under westerly wind conditions, oil released and not contained at Northstar Production Island would tend to move to the east. If westerly winds are sustained, downwelling conditions will be initiated in the bay and the oil will follow surface flows to the south-southeast toward Stump Island and into Prudhoe Bay. It is likely that the West Dock Causeway could block a significant portion of the onshore movement of oil.

Under prevailing easterly winds, spills along the offshore portion of the pipeline route will move toward the west and onshore toward the Kuparuk River Delta. Freshwater outflow from the Kuparuk River may cause localized changes in the movement of the oil and could keep the oil off the river delta and cause the oil to move farther toward the west and eventual landfall on the western shores of Gwydyr Bay. Under westerly winds, oil would move onshore toward Pt. McIntyre and continue east toward the West Dock area.



Oil released into the water column under a floating solid ice cover would rise and gather in pools or lenses at the bottom of the ice sheet. Oil may become trapped or entrained as new ice grows beneath the oil. Currents approaching 26 centimeters per seconds (cm/s), or 0.5 knots, would be needed to remove and transport exposed oil in subsurface depressions prior to entrainment. Typical under-ice currents along the Northstar pipeline are unlikely to exceed an average of 2 cm/s; however, currents of 10 cm/s do occur. These winter under-ice currents are unlikely to spread spilled oil beyond the initial point of contact with the ice under-surface. Research indicates that typical under-ice containment capacity for first-year landfast ice representative of the Northstar pipeline route ranges from 0.012 barrels per square foot for 25-inch-thick ice in December to 0.026 barrels per square foot for 60-inch-thick ice in April. This is equivalent to about one million barrels per square mile. As the natural containment capacity increases with ice thickness, the area to contain a given spill volume decreases steadily throughout the winter.

In broken drift ice conditions, oil will rise to the surface and either collect in the interstices or openings between individual floes, or be trapped underneath the floes themselves. During the early period of broken ice in the spring, that portion of the oil rising beneath the floes will naturally migrate through the rotting ice and appear on the ice surface within a matter of hours. In the case of oil trapped under newly forming pancakes or sheet ice in the fall, the likely fate will be rapid entrapment, with new ice quickly growing beneath the oil. The fate of oil trapped between floes will depend largely on the ice concentration and time of year.

During freeze-up, the oil will most likely be entrained in the solidifying grease ice and slush present on the water surface prior to forming an ice sheet. Storm winds at this time often break up and disperse the newly forming ice, leaving the oil to spread temporarily in an open water condition until it becomes incorporated in the next freezing cycle. At break-up, ice concentrations are highly variable from hour to hour and over short distances. In high ice concentrations, oil spreading is reduced and the oil is partially contained by the ice. As the ice cover loosens, more oil could escape into larger openings as the floes move apart. Eventually, as the ice concentration decreases, the oil on the water surface behaves essentially as an open water spill, with localized patches being temporarily trapped by wind against individual floes. Oil present on the surface of individual floes will move with the ice as it responds to winds and nearshore currents.

### **3.2.1.2 OIL ON ICE**

Oil spilled on the ice surface in the winter is prevented from spreading rapidly by the presence of snow and natural small-scale ice-roughness features. Although the following summary is oriented to winter incidents, similar findings apply to oil on ice at freeze-up and/or break-up. It is important to note that due to the high porosity of ice at break-up, oil will lie either in the water among the floes and brash, or on the ice surface. Very little oil is likely to remain under or in the ice during break-up. Depending on the condition of the surface of the floes, oil spilled on the surface of melting broken ice may run off the surface of the hard snow-free ice and into the surrounding water or openings in the ice cover.

The spreading of oil on ice is similar to spreading of oil on land or snow. The rate is controlled by the density and viscosity of the oil, and the final contaminated area is dictated by the surface roughness of the ice. As the ice becomes rougher, the oil pools get smaller and thicker. Oil spilled on ice spreads much more slowly than on water and covers a smaller final area. As a result, slicks on stable solid ice tend to be much thicker than equivalent slicks on water. The effective containment provided by even a minimal

degree of ice roughness (inches) translates to far less cleanup time with the need for fewer resources than would be needed to deal with the equivalent spill on open water.

### **3.2.2 ESTIMATE OF RESPONSE PLANNING STANDARD VOLUME TO REACH OPEN WATER [18 AAC 75.425(e)(3)(B)(ii)]**

Zero percent of the oil from an oil storage tank on Northstar Production Island would reach open water. Approximately 85 percent, or 29,105 barrels, of the oil from a production well blowout during summer would be discharged to open water. It is estimated that approximately 2,000 barrels of the 5,320 barrels that is deposited to the production island during a summer blowout may be at risk of flowing to open water. Zero percent of the oil from a production well blowout during solid sea ice conditions would reach open water. Zero percent of the oil from a crude oil transmission pipeline spill would reach open water. See Section 1.6 for details of projected spill trajectories provided in response planning standard (RPS) volume calculations and site-specific scenarios.

### **3.2.3 NORTHSTAR RECEIVING ENVIRONMENT**

Freeze-up occurs first in the calm, shallow water of the protected bays and lagoons, such as Simpson Lagoon, south of Long and Stump islands (October 1,  $\pm 7$  days), with a range of mid-September to mid-October. The ice sheet in Simpson Lagoon remains very smooth because the area is confined by Long, Egg, and Stump islands on the north and the shoreline on the south. The ice in this area of Simpson Lagoon can be considered part of the landfast ice zone from the initial freeze-up date throughout the entire ice season.

The initiation of freeze-up at Northstar ranges from the third week of September to the fourth week in October, with a median date of October 6,  $\pm 9$  days (Coastal Frontiers, 1996; Vaudrey, 1996). The vicinity of Northstar, located offshore of the barrier islands, becomes entirely ice-covered within one week after freeze-up begins.

During the nilas stage of ice growth between Stump Island and the Northstar Production Island, the ice is very susceptible to movement from strong winds. Strong winds are not unusual during freeze-up; in fact, the winds blow greater than 20 knots about 20 percent of the time during October. Assuming that these winds occur as three storms, each lasting two days, there is a 50 percent probability that at least one storm (>20 knots) will occur during the first week after freeze-up.

The young first-year ice (4 to 12 inches thick) around Northstar Island remains very susceptible to movement and deformation by winds in October. For example, on October 19-20, 1982, the 8-inch-thick young ice moved more than 20 nautical miles to the east past Seal Island, driven by 30- to 40-knot westerly winds (it should be noted that the wind direction is defined as the direction from which the wind is blowing, while the ice movement direction is defined as the direction to which the ice is moving). The rafting, minor ridging, brash ice, and refreezing open water were due to an easterly wind on October 16. During the strong westerly storm on October 19, all of the ice was blown away from the area around Seal Island.

The waves around Seal Island were at least 3 feet high during the 48-hour period (October 19-20) when the wind speeds remained between 20 and 40 knots. After the storm abated on October 21, 2 to 3 inches of ice grew within 24 hours when the air temperatures ranged from +5 degrees Fahrenheit (°F) to -5°F.

During the westerly storm on October 19-20, 1982, a number of barges broke free of their moorings along the east side of West Dock and were blown offshore of the barrier island chain east of Prudhoe Bay. While this particular storm is probably the worst in the last 20 years and may be considered to have a return period of 15 to 20 years, numerous other ice pile-up events occurred during the first 4 years of Seal Island's existence and in the region prior to island construction.

Ice pile-up events are of interest because they indicate that significant ice movement occurred around and against offshore structures and islands.

The newly forming ice sheet north of the barrier islands, especially in the vicinity of the Northstar Island, is very susceptible to deformation and movement during the 6 weeks after freeze-up occurs. The most likely scenario for freeze-up at Northstar is that a young, solid (10-tenths concentration) ice sheet will grow until conditions are present to create ice movement. All ice movement is initiated by wind stress over the ice surface; however, the single most important parameter influencing significant ice motion is the loss of confinement by the ice cover. Consequently, storm intensity and duration do not contribute as much to initiate ice movement as reversal of the wind direction, which reduces confinement through crack or lead formation. For example, an easterly wind may create an open water lead offshore of the Northstar Island and disrupt the ice sheet surrounding the island, making the ice more susceptible to movement from a southwesterly wind. In addition to loss of confinement, ice thickness and storm intensity and duration are important secondary parameters that produce ice movement. Susceptibility to ice movement is also extremely site-dependent, with exposed coasts or man-made islands in relatively deep water more at risk than protected shores of shallow bays and lagoons.

If the young ice at Northstar moves as a result of a storm with wind from the southwest, typically large ice floes (thousands of feet across) will break free of the coastline or landfast ice edge and move quickly away. This scenario tends to create open water and not necessarily broken ice around the island. Depending on how cold it is, the open water will start to refreeze, usually within a few hours to one day. This scenario may be repeated several times during freeze-up from October through mid-November, depending on the ice thickness, storm intensity, and wind direction. The broken-ice condition that occurs when the ice cracks and movement starts may be relatively short-lived; and an open-water lead, one to several miles across, usually forms in a few hours.

After the sheet ice reaches a thickness greater than 18 inches, typically by mid-November, the ice cover offshore of the barrier islands between Stump Island and the Northstar Island becomes relatively stable. In 12 years of observations, there was only one year during which an ice movement greater than 100 feet occurred during mid- to late November. Typically, by mid- to late December when the first-year ice sheet reaches a thickness of 2.5 to 3 feet, the ice in the vicinity of the Northstar Island can be considered part of the landfast ice zone.

### **3.2.4 WINTER ICE CONDITIONS**

#### **3.2.4.1 LATE FREEZE-UP ICE MOVEMENT**

Depending on the location, the entire ice regime along the coast in the Prudhoe Bay region makes the transition from freeze-up to winter ice conditions between mid-November and late December. The onset of winter is subjective, but is usually determined by the reduced likelihood of ice movement in the floating landfast ice sheet. For instance, typical ice movement would be small (tens of feet) to nonexistent in Simpson Lagoon and along the shoreline at the Pt. McIntyre PM1 pad after the young ice sheet becomes several inches thick. There is a small but finite likelihood of large ice movements (100 feet or more) in the corridor between the Northstar Island and Stump Island or West Dock during the late freeze-up season (from mid-November to late November) when the ice thickness is usually 1.5 to 2.0 feet.

Based on six freeze-up studies from 1980 to 1985 (Vaudrey, 1981a-1986a), five years of satellite imagery collected during freeze-up in 1987-1991, and personal observations in 1995 (Coastal Frontiers, 1996), there was only one year (1983) out of 12 in which the 20-inch-thick ice moved 100 to 200 feet in this region. Note that an ice movement of a few hundred feet in November is not going to produce a broken ice situation.

Typically by mid- to late December when the first-year ice sheet becomes about 2.5 to 3 feet thick, the ice near Northstar Island becomes relatively stable, and the region becomes part of the stable landfast ice zone, which extends well beyond all of the operations sites. Ice movement on the order of 10 to 15 feet can be expected during December when the natural ice sheet is 2 to 3 feet thick.

After January 1, the risk and magnitude of ice movement is reduced significantly, as the ice sheet becomes thicker and more stable. There still is a small likelihood of a major ice movement event occurring during the winter, as documented during the late February storm in 1989. Wind speeds of 94 knots during the storm were the largest ever measured at the Deadhorse airport.

#### **3.2.4.2 ICE SURFACE ROUGHNESS**

When the ice becomes permanently landfast in the nearshore zone, it records the last major ice movement as a series of ridges, rubble formations, individual upturned blocks, and rafted ice sheets. For example, the landfast ice in central Stefansson Sound and offshore of the barrier islands at the Northstar development typically contains occasional ridges (several feet high), light rubbing, and numerous upturned ice blocks. In some years, the landfast ice is more heavily deformed. At other times, the landfast ice remains relatively flat.

The winter ice regime offshore of shoreline and causeway sites, such as Pt. McIntyre, West Dock, Niakuk, and Endicott, typically is flat indicating little or no ice motion after freeze-up. The ice surface roughness of the landfast ice varies considerably from site to site and from year to year.

#### **3.2.4.3 MID-WINTER ICE MOVEMENT**

During the landfast ice condition of winter, rapid changes in temperature may produce thermally-induced shrinkage cracks in the sheet ice, usually propagating from sources of stress concentration, such as man-

made gravel islands, or promontories along the coast. In addition, a working tidal crack can be expected around any grounded ice feature or structure, such as the Northstar Production Island. Other than these minor cracking events, the first-year sheet ice in the nearshore region around the Prudhoe Bay area remains virtually motionless throughout the winter.

### 3.2.4.4 LANDFAST ICE THICKNESS

After the transition from freeze-up to winter, the landfast ice sheet continues to grow in situ from December through April. The sheet ice growth is generally about 1 foot per month, after achieving a thickness of about 2 feet by December 1. The landfast ice sheet attains an average maximum ice thickness of about 6 feet by April 1. Growth after April 1 slows due to warming air temperatures, but the landfast ice may add another 6 inches of thickness by the end of May.

**TABLE 3-1: PREDICTED LANDFAST ICE SHEET THICKNESS**

DATE	10-YEAR MINIMUM ICE THICKNESS (INCHES)	AVERAGE LANDFAST ICE THICKNESS (INCHES)	100-YEAR MAXIMUM ICE THICKNESS (INCHES)
November 1	9	13	23
December 1	21	25	36
January 1	30	36	49
February 1	41	48	62
March 1	51	60	75
April 1	61	71	84
May 1	68	77	89
June 1	72	79	90

The pipeline route from the Northstar Development is buried beneath the bottomfast ice zone prior to reaching its landfall location.

### 3.2.5 BREAK-UP ICE CONDITIONS

The transition from winter to break-up season begins in late April or early May, when daylight hours and air temperatures increase. Break-up is defined as the time when the ice concentration goes from 10-tenths to 9-tenths or less.

#### 3.2.5.1 RIVER OVERFLOOD

Before the sea ice starts to show apparent signs of deterioration, melting snow in early May helps swell the upland river channels. During late May or early June, the ice in the northern Alaska rivers (e.g.,

Kuparuk, Sagavanirktok) breaks up about a month before the nearshore sea ice. In the shallow water depths (less than 6 feet deep) offshore of the river deltas, the landfast ice sheet typically freezes to the sea floor during the winter. This bottomfast ice forms a dam, which causes the river water to overflow the sheet ice. The overflow stage of the spring melt period is defined as Condition 5 for oil spill scenario evaluation.

The overflow water (typically 2 to 5 feet deep) on top of the floating landfast ice (in water depths of 6 to 30 feet) quickly drains through holes and cracks. The overflow water on top of the bottomfast ice (frozen to the sea floor) loosens it and allows the ice to pop up to the surface. In both cases, the top of the ice in the overflow zone is usually covered with a thin layer of silt deposited by the flood water. Typically by mid-June, about two to three weeks after the flooding has ceased, most of the landfast ice within the overflow zone will have melted in place from a combination of the fresh, relatively warm water and the increased heat absorption by the dirty ice.

### 3.2.5.2 SHEET ICE DETERIORATION

Warm air temperatures initiate melt pool formation on the top of the landfast ice sheet, especially where the surface is contaminated with dirt. Increased absorption of solar radiation in the dirt and meltwater, as compared to clean snow and ice, accelerates melt pond formation. However, in late May or early June at the time of river overflow, melt pools usually cover less than 10 percent of the landfast ice area beyond the overflow limits. By late June just before break-up, the number of melt pools has increased dramatically, covering approximately 40 to 50 percent of the sheet ice surface. Melt pools have a definite alignment in the direction of the principal winds (east-west orientation) since they occur in the valleys between snow drift patterns. The sheet ice deterioration stage of the spring melt period is defined as Condition 6 for oil spill scenario evaluation.

Many melt pools develop holes all the way through the sheet ice, due to enlargement of brine drainage channels. The water depths in the melt pools are highly variable, typically ranging from a few inches to slightly over 1 foot, in those areas where brine drainage holes do not exist. If the sheet ice has a typical thickness of 6 feet at the end of May, the ice loses roughly 2 feet, reaching a final thickness of about 4 feet by the time the ice breaks up around July 1. However, the “final” sheet ice thickness of 4 feet takes into account the thickness *between* melt pools (4.5 feet) and the thickness *beneath* melt pools (3.5 feet).

### 3.2.5.3 BREAK-UP MECHANISM

The break-up mechanism for sheet ice is related to lines of weakness that develop along a series of melt pools or old thermal or stress cracks in concert with in situ sheet ice deterioration. Initially, the sheet ice melts away from the shoreline due to river overflowing or solar radiation of dark sediment incorporated into the ice cover. Since melting of the landfast ice out to 1 to 3 miles offshore reduces confinement, wind stress may cause break-up along a line of melt pools or along existing cracks. During late June or early July, any 20-knot wind that begins to blow, probably will initiate break-up of the floating landfast ice in Steffanson Sound and offshore of the barrier island chain west of Prudhoe Bay.



#### **3.2.5.4 TRANSITION PERIOD FROM BREAK-UP TO OPEN WATER**

If the storm or strong winds that caused break-up are intense or sustained, rafting often occurs when thinner melt pool ice breaks loose and overrides the surrounding sheet ice floes. The rafting increases the amount of open water between ice floes, causing accelerated deterioration and melting by waves and currents. The period during the initial stages of break-up is defined as Condition 7 for oil spill scenario evaluation.

Once break-up occurs, the winds usually shift from one direction to the other. Broken ice floes and pans, in response to the shifting winds, move back and forth in belts and patches of varying concentrations, all the while melting rapidly. The broken ice inside the barrier islands and northwest of Prudhoe Bay moves about 0.4 to 0.5 knots during the short break-up season, but peak rates may reach 0.8 to 1.0 knots (Vaudrey and Dickins, 1996). Usually, within two to three weeks of break-up, the region around most of the bays and lagoons, such as Prudhoe Bay and Steffanson Sound, will become open water. The period during the final stages of break-up is defined as Condition 8 for oil spill scenario evaluation.

Open water is defined as 1-tenth or less ice coverage concentration. The extended summer open-water season is defined as Condition 9 for oil spill scenario evaluation.

#### **3.2.5.5 SITE-SPECIFIC ICE CONDITIONS**

The transition from winter to summer begins with the break-up of the ice in upland rivers and overflowing of the bottomfast and floating sea ice just offshore of the river deltas during late May or early June. The average date that the Kuparuk River begins to overflow the sea ice in Simpson Lagoon and offshore of Egg and Stump islands is May 29, with a standard deviation of six days, based on 16 years of data (1974-78 and 1980-90). Within a few days after the flooding begins, the water flows to the east between the coast and Stump Island and overflows the ice along the entire west side of the West Dock Causeway. During years of heavy flooding, the water can extend to a portion of the east side of the West Dock Causeway by coming around the north end of West Dock and by flowing through the 650-foot breach. The offshore boundary of the overflow is usually the 25- to 30-foot water depth range from the north end of West Dock to eastern Long Island.

Because the shallow water along the shoreline of the PM1 pad of the Pt. McIntyre Development is within the Kuparuk River overflow zone, the bottomfast ice located here will melt in situ from the relatively warm-water discharge. By mid-June, open water exists between the Pt. McIntyre PM1 pad and Stump Island and along the shoreline to West Dock.

By early July when break-up typically occurs, there may be little or no ice in eastern Simpson Lagoon and along the west side of the West Dock Causeway; in contrast, it is likely that a completely intact, 10-tenths ice cover will exist on the east side of West Dock. Of course, the landfast ice sheet along the east side of West Dock and around the Pt. McIntyre PM2 pad will be very deteriorated, with approximately 40 to 50 percent of its surface covered by melt pools.

Break-up of the remaining floating landfast ice in Prudhoe Bay (including the east side of West Dock) and in the vicinity of the Northstar development typically occurs between the last week of June and the second week of July, with a median date of July 4. Ice concentrations during the break-up season vary



considerably, depending on the wind direction and intensity during July. As the winds shift from one direction to the other, the broken ice floes and pans will move back and forth in belts and patches of varying concentrations, all the while melting rapidly.

The area around West Dock and in the nearby bays, such as Prudhoe Bay and Stefansson Sound, usually becomes open water (1-tenth or less ice concentration) within three weeks after the initial break-up. Typically, open water extends from the shoreline to Seal Island by late July.

After first open water, ice invasions of greater than 1-tenth ice concentration can occur almost every summer in the area around Northstar, just offshore of the barrier islands. In severe summers, two to three ice invasions are likely to occur. One or more such invasions of 3-tenths or 5-tenths ice concentration have a 56 percent or 35 percent chance of occurrence, respectively, at the Northstar development. Summer ice invasions are less likely, but certainly do occur, in and around West Dock. There are typically 73 days between first open water and freeze-up, but the total number of days of open water is dependent on the number and duration of summer ice invasions.



### **3.3 COMMAND SYSTEM [18 AAC 75.425(e)(3)(C)]**

The oil spill response command system is compatible with the Alaska Regional Response Team (ARRT) *Alaska Federal/State Preparedness Plan for Response to Oil and Hazardous Substance Discharges / Releases (Unified Plan)*. The organizational structure is based on the National Incident Management System. It provides clear definition of roles and lines of command, together with the flexibility for expansion or contraction of the organization. Details of the management structure in a spill response are provided in the BPXA Incident Management System (IMS), incorporated here by reference. The BPXA IMS describes the Incident Command System (ICS) position roles and responsibilities. Note that the Spill Response Team (SRT) fulfills the function of the Tactical Response Team discussed in Volume 3 of the *ACS Technical Manual*.

In most Tier I incidents, the SRT can control the incident. The Environmental Advisor fulfills the role of On-Scene Commander. The SRT steps down into the Operations Section and additional personnel become involved to fill support roles.

Tier II/III responses are initiated by the On-Scene Commander. The Incident Management Team (IMT) is activated and begins to provide support to the field responders (Operations Section) and coordinate the collection and distribution of information. The Incident Command Post is located in the Prudhoe Bay Operations Center (PBOC). ACS provides personnel and equipment resources from Deadhorse to assist in spill containment and recovery. The BPXA Business Support Team may be activated to provide additional support to the IMT. See Section 1.1 for titles of IMT members and their contact information.

ACS will be activated to stand by for spills until an assessment is performed. Once the assessment is complete, ACS is either released or mobilized. The North Slope operators coordinate with ACS to ensure a reserve of trained personnel is available for an extended spill response.

The North Slope operators view Unified Command as a structure that is created at the time of an incident to bring together the Incident Commanders of each major organization involved in response operations. For the North Slope Subarea, the Unified Command is typically comprised of the Federal On-Scene Coordinator (FOSC), the State On-Scene Coordinator (SOSC), the Local On-Scene Coordinator (LOSC), and the Responsible Party Incident Commander (RPIC). The North Slope Borough is the LOSC.

The primary responsibilities of the Unified Commanders are as follows:

- Establish objectives and priorities,
- Review and approve tactical plans developed to address objectives and priorities,
- Ensure the full integration of response resources, and
- Resolve conflicts.

These responsibilities are typically exercised through periodic, highly-focused Unified Command meetings with attendance typically restricted to Unified Command members.

The role of the agency representatives on the Unified Command is to fulfill their legal responsibilities (i.e., to direct and/or monitor response operations), while allowing the Responsible Party to manage emergency response operations.

When an incident occurs, the Unified Command structure may be established and superimposed at the top of the IMT. In this position, the On-Scene Coordinators are ideally situated to carry out the responsibilities cited above. They provide overall direction by establishing strategic objectives and response priorities addressed by the IMT through the planning process. Moreover, they review and approve the products of the planning process (i.e., Incident Action Plans) developed by the IMT to address the objectives and priorities.

The Unified Command position at the top of the IMT also facilitates the appropriate integration of response resources. For the agency representatives, it allows them to determine the appropriate role(s) for agency personnel and to position them optimally within the IMT structure. For the Responsible Party, it ensures members of the IMT have access to valuable expertise without diluting their ability to manage response operations.



## **3.4 REALISTIC MAXIMUM RESPONSE OPERATING LIMITATIONS [18 AAC 75.425(e)(3)(D)]**

### **3.4.1 INTRODUCTION**

Realistic maximum response operating limitations that might be encountered at the facility are described in the ACS *Technical Manual*, Volume 1, Tactic L-7, which is incorporated into the plan by reference. Tactic L-7 analyzes the frequency and duration, expressed as a percentage of time, of limitations that would render mechanical response methods ineffective, as required by 18 AAC 75.425(e)(3)(D). The analysis considers weather, sea conditions, ice, daylight hours, and other environmental conditions that might influence the efficiency of the oil spill response.

This section describes additional specific response measures that will be taken to reduce the environmental consequences of an oil spill to ice conditions.

### **3.4.2 WEATHER AND ICE CONDITIONS DURING THE SHOULDER SEASONS**

The following general description of break-up and freeze-up describes typical marine conditions in the Prudhoe Bay region. They cover the chronology of break-up and freeze-up. See Dickins et al., (2000) and tables in Atwater (1991) for further site-specific details.

#### **3.4.2.1 MAY**

The Sagavanirktok River and Kuparuk River overflows (Condition 5) commence on average May 20 and 27, respectively, based on 16 years of analysis. See DF Dickins Associates et al., (2001) for descriptions of seasonal ice conditions.

#### **3.4.2.2 JUNE**

June 1-10: Landfast ice is intact (Condition 4) beyond the Kuparuk River and Sagavanirktok River overflow boundaries. Within the overflow zones immediately off the river deltas, fast ice lifts off the bottom of the Beaufort Sea and rapidly melts in place from the relatively warm water discharge (Conditions 6 and 7). The peak of major flooding occurs during the period June 4-7 ( $\pm 6$  days), at which point the Kuparuk River overflow may reach within one mile of the Northstar Island (Condition 5). Routine ice road operations might cease at this time. First open water appears offshore of the Sagavanirktok River and Kuparuk River by June 6 to 13, respectively, on average. Fast ice beyond the overflow zones and outside the barrier islands is still intact and more than 5 feet thick in early June.

June 15-20: Nearshore lagoon areas affected by the Kuparuk overflow and shallow waters off the Sagavanirktok delta become mostly free of ice (Condition 9). Fast ice offshore remains intact (e.g., Stump Island to Northstar) and continues to melt (Condition 7). Solid ice 4 to 5 feet thick still surrounds Northstar Island. The soft surface is 25 percent covered by meltwater pools (Condition 6).

Air temperatures average 35°F and range from 20° to 40°F. The wind is variable, but blows 60 percent of the time from the east and northeast, averaging 10 knots.

The ice can support response vehicles up to several weeks before break-up. The effect of deteriorating sea ice on access with specific equipment is illustrated in ACS *Technical Manual*, Tactic L-7, based on field trials by Coastal Frontiers (2001).

### **3.4.2.3 JULY, AUGUST AND SEPTEMBER**

July 1: A completely intact, deteriorated ice cover 3 to 4 feet thick, with many cracks and approximately 40 to 50 percent of its surface covered by melt pools and holes still exists in deeper water in the vicinity of Northstar (Condition 6).

July 4 (Typical): Break-up begins with fracturing and movement in the floating landfast ice (Condition 7).

July 8-12: Remaining fast ice outside the barrier islands, off the Sagavanirktok River delta and in Prudhoe Bay decreases to less than 7 tenths coverage (Condition 8).

July 15-26: Open, ice-free water out to Northstar and surrounding West Dock and Endicott causeway (Condition 9).

Air temperatures average 40°F in July.

The median number of days with flooded and/or broken ice at break-up at production facilities ranges from 12 days at Point McIntyre to 22 days at Northstar.

### **3.4.2.4 OCTOBER**

Oct 4,  $\pm 8$  days: Freeze-up begins along shore in shallow water. Ice becomes shore fast for the season within one week following freeze-up in the nearshore lagoons (e.g., Point McIntyre 2 and Niakuk) and by October 25 offshore.

Additional time is required for the young ice sheet to gain sufficient thickness and stability to be judged safe for over-ice operations. Time from initial freeze-up to being able to commence on-ice operations with response equipment ranges on average from 40 to 43 days at coastal or nearshore locations such as Point McIntyre 1, Niakuk, and Endicott, to 55 days at the Northstar.

Air temperatures at freeze-up range from 5°F to 15°F. Daylight is 9 to 10 hours per day.

### **3.4.3 IN SITU BURNING RESPONSE MEASURES TO REDUCE ENVIRONMENTAL CONSEQUENCES OF A SPILL IN ICE CONDITIONS**

Oil spill removal during the shoulder seasons can be greatly enhanced by in situ burning. Cold water and ice provide containment and slow the weathering process, thereby concentrating the oil for burning and recovery. In situ burning in shoulder season ice conditions generally involves selective burning of oil on melt pools and in leads between floes, followed by manual recovery of residue.



### 3.4.3.1 OPERATIONAL CAPABILITY FOR IN SITU BURNING IN ICE

ACS maintains an inventory of specialized equipment for in situ burning operations during shoulder season ice conditions.

The ACS *Technical Manual* describes response strategies, procedures, and equipment to implement a successful burn in a mix of solid ice, broken ice and open water situations. The tactics descriptions are listed below and are incorporated by reference into the plan.

- B-1 In Situ Burning Plan
- B-2 Burning Oily Vegetation
- B-3 In Situ Burning with Helitorch and Other Igniters
- B-4 Deployment and Use of Fire Containment Boom
- B-5 Burning Oil Pools on any Solid Surface
- B-6 Residue Recovery
- B-7 Burn Extinguishment on Water (applicable to fire booms in light ice cover)

ACS conducts spill response training courses involving classroom and field exercises to practice the burn tactics described in the ACS *Technical Manual* several times per year at North Slope locations.

The training involves a classroom course and a field demonstration with burn pans. The Helitorch is discussed in the classroom and shown in the warehouse. Demonstrations can also involve creating and igniting gelled fuel. Alyeska Pipeline Service Company has pilots familiar with the Helitorch operations and its helicopter is set up for the Helitorch attachment.

The ACS inventory of specialized response equipment on hand to support a large scale burning operation is summarized in Table 3-2.

**TABLE 3-2: BURNING EQUIPMENT**

EQUIPMENT	QUANTITY
Helitorch	7
Helitorch Surefire gel	1,200 pounds
Air deployable igniters	1,480
Helitorch batch gel mixers	2

Adapted from ACS inventory – Response Equipment Specifications, ACS *Technical Manual*, Tactic L-6

In addition, ACS maintains over 18,000 feet of fire-resistant boom ranging in overall height from 20 to 30 inches, together with specialized logistics vehicles to access spill sites over a rotting and/or flooded ice surface in May and June (e.g., airboats). See Tactic L-6 tables describing boom and vessels.



Once state and federal approval is granted, the following steps are taken to implement the response:

1. Collect and concentrate the oil using fire-resistant booms in light ice cover or utilize naturally occurring pools of thicker oil in high ice concentrations and on surface melt pools on solid ice break-up, and in slush and new ice at freeze-up.
2. Ignite the oil using the Helitorch or hand-held igniters, following established safety procedures to avoid flashback or ignition of any ongoing spill source.
3. Monitor the burn, maintaining constant watch on the fire and smoke plume, condition of containment booms (if used), and other safety hazards and issues.
4. Recover and dispose of the burn residue.

Safety procedures and planning in accordance with established guidelines are emphasized throughout the training, preparation, and conduct of in situ burning operations.

In situ burns are monitored to ensure that fire does not spread to adjacent combustible material. Care is taken to control the fire and to prevent secondary fires. Personnel and equipment managing the process are protected. The safe working distances from an in situ fire on water depend on the size of the fire and the exposure time, and are summarized in Table 3-7.

Aerial ignition with gel by Helitorch or other ignition methods is coordinated, taking into account prevailing weather conditions, oil pool size and distribution, and the need for strict adherence to established safety distances. A detailed discussion of the determination of safety distances can be found in Chapter 3 of the “In Situ Burning Guidelines for Alaska, Revision 1” (ADEC, U.S. Environmental Protection Agency [EPA] and USCG, March 2008).

Crews practice the techniques involved with in situ burning at sea that could involve several vessels working in close proximity.

#### **3.4.3.2 EFFECTIVENESS OF IN SITU BURNING IN ICE**

The consensus of research on spill response in broken ice conditions is that in situ burning is an effective response technique, with removal rates exceeding 90 percent in many situations (Shell et al., 1983; SL Ross, 1983; SL Ross and DF Dickins, 1987; Singsaas et al., 1994; SL Ross et al., 1998; DF Dickins et al., 2000; Sørstrøm et al., 2010). The research includes several smaller-scale field and tank tests (SL Ross et al., 2003; Shell et al., 1983; Brown and Goodman, 1986; Buist and Dickins, 1987; Smith and Diaz, 1987; Bech et al., 1993; Guénette and Wighus, 1996; Sørstrøm et al., 2010) and a few large field tests (Singsaas et al., 1994 and Sørstrøm et al., 2010). Most of the tests involved large volumes of oil placed in a static test field of broken ice, resulting in substantial slick thicknesses for ignition. The few tests in unrestricted ice fields or in dynamic ice have indicated that the efficacy of in situ burning is sensitive to ice concentration and dynamics. Important variables include: the tendency for the ice floes to naturally contain the oil, the thickness (or coverage) of oil in leads between floes, and the presence or absence of brash or frazil ice which can absorb the oil.



Brash ice is the debris created when larger ice features interact and degrade. Frazil ice is the “soupy” mixture of very small ice particles that form as seawater freezes.

Oil spilled on solid ice or among broken ice in concentrations equal to or greater than 6-tenths has a high probability of becoming naturally contained in thicknesses sufficient for combustion. In lower ice concentrations, oil spill response methods can be used to create and maintain sufficient film thickness to facilitate burning. Fire-resistant booms are examples. Field experience has shown that it is the small ice pieces (e.g., the brash and frazil, or slush, ice) that accumulate with the oil against the edges of larger ice features (floes) and control the concentration (e.g., thickness) of oil in an area, and control the rate at which the oil subsequently thins and spreads. Other factors affecting burn effectiveness include oil weathering processes (e.g., evaporation and emulsification) and mixing energy from waves.

The following discussion summarizes the scientific principles and physical processes involved for in situ burning of oil on melt pools during the ice melt phase in June or on water between floes during the break-up period in July, based on SL Ross et al., (2003). Further discussion also covers in situ burning of thinner slicks in mobile broken ice comprised of brash or frazil ice during the freeze-up shoulder season in October.

The success of an in situ burning operation is highly dependent upon slick thickness.

For an oil slick on water or ice to become ignited, the oil must be thick enough to insulate itself from the water beneath it. The igniter can heat the surface of thickened oil to the flash point temperature at which the oil produces sufficient vapors to ignite. The rules of thumb for minimum ignition thickness are listed in Table 3-3.

**TABLE 3-3: MINIMUM IGNITABLE THICKNESS ON WATER  
ADAPTED FROM BUIST ET AL. (2003)**

<b>OIL TYPE</b>	<b>MINIMUM THICKNESS</b>
Light Crude and Gasoline	1 millimeter (mm) (0.04 inch)
Weathered Crude and Middle-Distillate Fuel Oils (Diesel and Kerosene)	2 to 3 mm (0.08 to 0.12 inch)
Residual Fuel Oils and Emulsified Crude Oils	10 mm (0.4 inch)

The oil removal rate for in situ oil fires is a function of fire size (or diameter), slick thickness, oil type and ambient environmental conditions. For most large (greater than 3-meter diameter) fires of unemulsified crude oil on water, the “rule- of-thumb” is a burning consumption rate of 3.5 millimeters per minute (mm/min). Lighter fuels burn faster, and heavier oils and emulsions burn slower, as shown in Table 3-4.



**TABLE 3-4: BURN/REMOVAL RATES FOR LARGE FIRES ON WATER  
ADAPTED FROM BUIST ET AL., (2003)**

OIL TYPE/CONDITION	BURN/REMOVAL RATE
Gasoline >10 mm (0.4 inch) thick	4.5 mm/min (0.18 inch per minute)
Distillate Fuels (diesel and kerosene) >10 mm (0.4 inch) thick	4.0 mm/min (0.16 inch per minute)
Crude Oil >10 mm (0.4 inch) thick	3.5 mm/min (0.14 inch per minute)
Heavy Residual Fuels >10 mm (0.4 inch) thick	2.0 mm/min (0.08 inch per minute)
Slick 5 mm thick <sup>1</sup>	90 percent of rate stated above
Slick 2 mm thick <sup>1</sup>	50 percent of rate stated above
Emulsified oil (percent of water content) <sup>2</sup>	Slower than above rates by a factor equal to the water content percent

Estimates of burn/removal rate based on experimental burns and should be accurate to within ±20 percent.

<sup>1</sup> Thin slicks will naturally extinguish, so this reduction in burn rate only applies at the end of a burn.

<sup>2</sup> If ignited, emulsions will burn at a slower rate almost proportional to their water content (a 25 percent water-in-crude-oil emulsion burns about 25 percent slower than the unemulsified crude).

Burn rate is also a function of the size of the fire. Crude oil burn rates increase from 1 mm/min with 3-foot diameter fires to 3.5 mm/min for 15-foot fires and greater. In situ burns on melt pools typically consume oil at 1 mm/min. For very large fires, on the order of 50 feet in diameter and larger, burn rates may decrease slightly because there is insufficient air in the middle of the fire to support combustion at 3.5 mm/min. As fire size grows to the 50-foot range, oil type ceases to affect burn rate for the same reason.

An in situ oil fire extinguishes naturally when the slick burns down to a thickness that allows enough heat to pass through the slick to the water to cool the surface of the oil below the temperature required to sustain combustion. The thickness at which an oil fire on water extinguishes is related to the type of oil and initial slick thickness. The rules of thumb are presented in Table 3-5. Other secondary factors include environmental effects, such as wind (winds greater than 20 knots preclude in situ burning in most cases) current herding of slicks against barriers, and oil weathering.



**TABLE 3-5: FIRE EXTINGUISHING SLICK THICKNESS  
ADAPTED FROM BUIST ET AL., (2003)**

OIL TYPE/INITIAL SLICK THICKNESS	EXTINGUISHING THICKNESS
Crude Oil up to 20 mm (0.8 inch) thick	1 mm (0.04 inch)
Crude Oil 50 mm (2 inches) thick	2 to 3 mm (0.08 to 0.12 inch)
Distillate Fuels any thickness	1 mm (0.04 inch)

With an estimate of the initial thickness of a fully-contained slick, or a measure of the burn time, it is relatively easy to estimate oil removal efficiency by burning. If not all the slick area is on fire; the calculations need to account for this.

Oil removal efficiency by in situ burning may be summarized as a function of the following key factors:

- Initial thickness of the slick,
- Thickness of the residue remaining, and
- Amount of the slick's surface that was on fire.

Oil thickness is maintained by water current in the apex of a fire-resistant boom under tow or against an ice edge in wind or current. When burning in a current, the fire slowly decreases in area until it reaches a size that can no longer support combustion. This herding effect can increase overall burn efficiencies, but it extends the time required to complete each burn.

The residue from a typical, efficient (greater than 85 percent removal) in situ burn of crude oil 10 to 20 millimeters thick is a semi-solid, tar-like layer that has an appearance similar to the skin on an old, poorly-sealed can of latex paint that has gelled. For thicker slicks, typical of what might be expected in a towed fire boom (about 150 to 300 millimeters), the residue can be a solid. Burn residue is usually denser than the original pre-burn oil, and usually it does not spread due to its increased viscosity or solid nature.

Tests indicate that the burn residues from efficient burns of heavier crude oils, <32 degrees API, may sink once the residue cools, but their acute aquatic toxicity is very low or nonexistent. The “In Situ Burning Guidelines for Alaska, Revision 1” (ADEC, U.S. Environmental Protection Agency and USCG, March 2008) state:

“In general, however, the effects [biological effects of burn residues] are less severe than those from a large, uncontained oil spill, and no specific biological concerns have been identified to date (ASTM, 2003).”



Compared with unemulsified slicks, emulsions are much more difficult to ignite and, once ignited, display reduced flame spreading and more sensitivity to wind and wave action. Stable emulsion water contents are typically in the 60 to 80 percent range with some up to 90 percent. The oil in the emulsion cannot reach a temperature higher than 100 degrees Celsius (°C) until the water is either boiled off or removed. The heat from the igniter or from the adjacent burning oil is used initially to boil the water rather than heat the oil.

The following points summarize the effect of water content on the removal efficiency of weathered crude emulsions:

- Little effect on oil removal efficiency (i.e., residue thickness) for water contents up to 12.5 percent by volume;
- A noticeable decrease in burn efficiency with water contents above 12.5 percent, the decrease being more pronounced with weathered oils;
- Zero burn efficiency for emulsion slicks having water contents of 25 percent or more; and
- Some crudes form meso-stable emulsions that can burn efficiently at much higher water contents. Paraffinic crudes appear to fall into this category.

Fortunately, emulsion formation is slowed dramatically by high ice concentrations and may not be a significant operational factor in planning in situ burns on solid ice or naturally contained in higher concentrations of broken ice.

SL Ross et al., (2003) provides guidelines for burning thin slicks in broken ice with brash and slush, particularly relevant during the break-up and freeze-up shoulder seasons. General rules for minimum ignitable thickness and oil removal rates for burning thin slicks of crude oils on brash and/or slush with broken ice are as follows:

- The minimum ignitable thickness for fresh crude on frazil ice or small brash ice pieces is up to double that on open water, or about 1 to 2 millimeters.
- The minimum ignitable thickness for weathered crude oil on frazil ice or small brash ice pieces can be higher than on open water, but is still within the range quoted for weathered crude on water, about 3 millimeters with gelled gasoline igniters.
- For a given spill diameter, the burn rate in calm conditions is about halved on relatively smooth frazil/slush ice and halved again on rougher, brash ice. Wave action slightly reduces the burn rate on open water, but the halving rule appears to apply in waves as well.
- The residue remaining on broken ice in calm conditions is about 50 percent greater than that on open water, or 1.5 millimeters. The residue remaining on brash or frazil ice in waves is slightly greater than in calm conditions, at about 2 millimeters.

In summary, in situ burning of oil is efficient and rapid in broken ice conditions under the following conditions:

- The spilled oil is thicker than the minimum ignitable thickness (a thickness of 2 millimeters to 3 millimeters results in 50 to 66 percent removal efficiency: 10-millimeter thickness, a typical thickness for wind-herded slicks on melt ponds on ice, gives 90 percent removal efficiency);
- Larger areas can be ignited (a 100-square-foot slick on a melt pool will burn at 3.5 barrels of oil per hour [boph]; a 50-foot diameter, 10-millimeter thick slick will burn at 300 boph, and a 100-foot diameter slick will burn at 1,200 boph);
- The oil is not more than 25 percent emulsified; and
- Herding in a current and enlarging fire diameters can increase burning rates.

### **3.5 LOGISTICAL SUPPORT [18 AAC 75.425(e)(3)(E)]**

BPXA has an existing logistical support infrastructure for its operations on the North Slope. Transportation equipment, coordination procedures, and maintenance procedures are in place under normal operations. BPXA has contracts for operational logistical support to support a spill response.

ACS *Technical Manual* Tactics L-3, L-4, and L-8 through L-10 are incorporated here by reference.



## **3.6 RESPONSE EQUIPMENT [18 AAC 75.425(e)(3)(F)]**

### **3.6.1 EQUIPMENT LISTS**

Contracted or other oil discharge containment, control, cleanup, storage, transfer, lightering, and related response equipment to meet the applicable RPS in Part 1, and to protect environmentally sensitive areas and areas of public concern identified in Part 3, and that may be reasonably expected to suffer an impact from a spill of the RPS volume as described in Part 1, is listed as required by 18 AAC 75.425(e)(3)(F)(i) to (vii). The location, inventory, and ownership of ACS-managed equipment listed in the RPS scenarios in Part 1 is listed in the ACS *Technical Manual* Tactic L-6, and in the *Technical Manual's* tactics descriptions incorporated by reference in the scenarios in Part 1. The time frame for delivery and startup of response equipment and trained personnel located outside the North Slope is outlined in the response scenarios in Part 1. The manufacturer's rated capacities, limitations, and operational characteristics for each item of oil recovery equipment listed in the scenarios in Part 1 are listed in the ACS *Technical Manual* Tactic L-6 and in the *Technical Manual* tactics descriptions incorporated by reference in the scenarios. Each vessel and the equipment for transferring oil from tanks mentioned in the scenarios in Part 1 is listed in Tactic L-6 as well.

A list of dedicated oil spill response equipment positioned on Northstar is provided in Table 3-6.

### **3.6.2 MAINTENANCE AND INSPECTION OF RESPONSE EQUIPMENT**

Response equipment is routinely inspected, maintained, and tested by ACS according to written standard operating procedures.

ACS holds the following Oil Spill Removal Organization (OSRO) classifications for facilities and vessels:

- River/Canal and Inland – MM, W1, W2, and W3; and
- Nearshore, Offshore, and Open Ocean – MM, W1, and W2.

ACS has fulfilled the equipment maintenance and testing criteria that the classifications require.

### **3.6.3 PRE-DEPLOYED AND PRE-STAGED EQUIPMENT**

Oil spill preparedness includes boom pre-deployment and the staging of spill response equipment at selected areas. SRT personnel deploy diversionary and exclusion boom in rivers each summer. With each year's experience operating in rivers, the staging of equipment and sites has varied. The goal is to strategically locate the staged equipment in proximity to potential leak sources, and in areas that are easily accessible, allowing for the quick deployment of additional equipment if needed. Gravel pads near the rivers can be used as additional staging areas. Additional boom deployment sites, boat launches, and staging areas are evaluated annually.

Due to seasonal changes of the river channels and to weather conditions causing fluctuating river currents, specific boom-laying configurations, and footage lengths of boom pre-staged at each site vary. Boom sections and anchors are staged on the shoreline in a manner that optimizes their use for containment and recovery.

Pre-staged equipment is described in the *ACS Technical Manual*, Volume 2, Sheets 67, 73, 74, and 79, which are incorporated here by reference.

**TABLE 3-6: NORTHSTAR ON-SITE SPILL RESPONSE EQUIPMENT**

QUANTITY	UNIT OF MEASURE	DESCRIPTION	LOCATION
2	each	Boat, Spill Response, 24-feet. Aluminum Hull	Northstar in summer Prudhoe in winter
2	each	Boat, Spill Response, 42-feet. (Bay Class)	West Dock
2	each	249 bbl Mini Barges	West Dock
2	each	LORI LSC-3 Skimmer	West Dock
500	foot	Boom, Fire 12-inches x 18-inches	West Dock
2,000	foot	Boom, Ro-Boom (2 reels) 27-inches x 32-inches	Northstar
2,000	foot	NOFI Fast Deployment Boom	Northstar
2	each	Bird Scare Cannons	Northstar
1	each	Wildlife Hazing Kit	Northstar
1	each	Wildlife Capture and Stabilization Kit	Northstar
10	each	Breco Bird Scare Buoys	Eight at ACS Base Two at Northstar
2	each	2,400 Gallon Fastank	Northstar
1	each	All-terrain Vehicles (ATV) with tracks	Northstar
2	each	Connex, Storage Container 20-feet x 8-feet	Northstar
1	each	Connex, Insulated & Wired Shop 20-feet x 8-feet	Northstar
1	each	Portable Drum Skimmer (dual surface interchangeable)	Northstar
1	each	Vertical Rope Mop, 2 Mop	Northstar
1	each	100 Gallon Fuel Tank	Northstar
2	each	Hand Held Global Positioning System	Northstar
2	each	Light Stand and Cords	Northstar
2	each	Generator, 6 kW and 4.5 kW Diesel	Northstar
1	each	Pump, Diaphragm 3-inch Diesel	Northstar
1	each	Pump, Marine Trash 2-inch Diesel	Northstar
2	each	Pump, Trash 3-inch Diesel	Northstar
200	foot	Hose, 2-inch Discharge, Arctic Grade	Northstar



**TABLE 3-6 (CONTINUED): NORTHSTAR ON-SITE SPILL RESPONSE EQUIPMENT**

QUANTITY	UNIT OF MEASURE	DESCRIPTION	LOCATION
100	foot	Hose, 2-inch Suction, Arctic Grade	Northstar
700	foot	Hose, 3-inch Discharge	Northstar
500	foot	Hose, 3-inch Suction	Northstar
10	each	MISC. Kamlok Adapters	Northstar
1	each	Fold-a-Tank, 1500 gallon	Northstar
2	each	18-inch x 18-inch Surface Liner	Northstar
2	each	36-inches x 42-inches Surface Liner	Northstar
4	each	4-foot x 5-foot surface liners	Northstar
2	roll	20-foot x 100-foot Reinforced Visqueen	Northstar
10	each	Rolls, Sorbent 36-inches x 150-foot	Northstar
4	each	Bundles, Glycol Sorbent Pads 18-inch x 18-inch	Northstar
12	each	Bundles, Sorbent Boom 8-inch x 10-foot, 40-foot per Bundle	Northstar
13	each	Bundles, Sorbent Pads 18-inch x 18-inch	Northstar
18	each	Bundles, Sorbent Pads 36-inch x 36-inch	Northstar
2	each	Fence Post Driver (Northstar)	Northstar
24	each	Fence Posts (Northstar)	Northstar
1	each	Rope, 1/2-inch Polypropylene, 600-feet per Roll	Northstar
2	each	Rope, 3/4-inch Polypropylene, 600-feet per Roll	Northstar
4	each	Rake, Steel Garden	Northstar
4	each	Shovels, Aluminum Scoop	Northstar
4	each	Shovels, Round Point	Northstar
4	each	Shovels, Square Nose	Northstar
4	lot	Survey Lathe and Flagging	Northstar
10	each	Hand-held Ignitors for In Situ Burn	Northstar
1	each	Snowblower	Northstar
1	each	Chain Saw	Northstar
1	each	Ice Auger	Northstar
1	each	Vicoma Power Vac Unit	Northstar
1	each	Multi - Gas Meter	Northstar





**TABLE 3-6 (CONTINUED): NORTHSTAR ON-SITE SPILL RESPONSE EQUIPMENT**

QUANTITY	UNIT OF MEASURE	DESCRIPTION	LOCATION
<b>COMMUNICATION EQUIPMENT</b>			
1	each	Marine Private Coast Station	Northstar
6	each	MT2000 Hand-held Radios	Northstar
1	each	Backboarded Spectra Mobile Radios	Northstar
<b>GWYDYR BAY EQUIPMENT</b>			
3	each	Connex	West Dock
2,000	foot	Delta Boom, 8-in. x 6-in.	West Dock
2,000	foot	NOFI 250 EP Boom Bag	West Dock
3	each	Anchoring System (tote, two 66 lb. Bruce anchors, line, buoys)	West Dock
12	each	Anchors (40 lb. with rigging)	West Dock



### **3.7 NON-MECHANICAL RESPONSE INFORMATION [18 AAC 75.425(e)(3)(G)]**

In situ burning equipment inventory and deployment is described in the ACS *Technical Manual Tactics* L-6 and B-1 through B-7, which are incorporated here by reference.

The Northstar sales oil exhibits properties making it amenable to burning (ACS, 2010). Its density ranges from 0.80 grams per cubic centimeter for fresh oil at 15 degrees Celsius (°C) to 0.88 grams per cubic centimeter for 55 percent weathered oil at 1°C. The oil's viscosity ranges from 1.7 milliPascal seconds (mPas) when fresh and at 15°C to 5,363 mPas when weathered 55 percent and at 1°C. The American Society for Testing and Materials Standard D97 pour point is below the method limit for fresh oil; the pour point is 18°C for 55 percent weathered oil. Fresh oil is unlikely to emulsify regardless of whether it is near freezing or at higher ambient temperatures. Weathered oil that has lost almost half its mass to evaporation has some emulsification likelihood at near-freezing temperature and may have a water content from 17 percent to 49 percent. Maximum weathering (i.e., 55 percent loss) makes the oil more likely to form an emulsion with water content of approximately 35 to 39 percent.

#### **3.7.1 ENVIRONMENTAL CONSEQUENCES**

The environmental consequences of in situ burning will be assessed by monitoring the downwind trajectory of the smoke. A trial burn will indicate the path of the smoke. Monitoring the downwind position of the smoke plume will be accomplished by a ground- or air-based member of the IMT.

Appropriate measures as required by the Unified Command, natural resource agencies, and public safety agencies will be carried out to protect nearby human populations and environmentally sensitive areas. In situ burns will be limited to sites that are a minimum safe distance, generally several miles upwind of human populations. The safe distance will be plotted as outlined in the "In Situ Burning Guidelines for Alaska, Revision 1" (ADEC, EPA, USCG, 2008). The determination takes into account a trial burn, wind conditions, and size of the expected burn area. In addition, public notifications and warnings will be issued in cooperation with agency emergency staff.

In situ burns conducted according to the Unified Plan are not expected to harm environmentally sensitive areas and areas of public concern. Heat from in situ burning affects only the upper few centimeters of the water column in contact with the oil. Smoke has not been found harmful to wildlife populations. In situ burning smoke is reduced to concentrations that are safe to people by means of burning only at safe distances.

In situ burn operations receive constant visual monitoring of the smoke plume's behavior. The burn operations team visually monitors the smoke plume. The federal and state on-scene coordinators may authorize a trial burn to confirm anticipated plume drift direction and dispersion distances downwind before authorizing the proposed burn. Burn operations may be stopped if the plume contacts or threatens to contact the ground in a populated area.

A step-by-step process in establishing safe distances for burning is fully presented in the "In Situ Burning Guidelines for Alaska, Revision 1" (ADEC, EPA, and USCG, 2008). The state and federal on-scene coordinators determine whether the burn lies at a safe distance from human populations. In situ burning is not authorized if it does not meet public health regulatory standards. The safe distance separating human

populations from in situ oil burns is the downwind radius from the fire at which smoke particulate matter concentrations at the ground diminish to limits established by National Ambient Air Quality Standards. The safe distance guidelines are based on the predictions of a National Institute of Standards and Technology (NIST) computer model, ALOFT-Flat Terrain model. The safe distance meets the National Ambient Air Quality Standards for particulate matter over a one-hour time period and is also used as the indicator that human populations will not be exposed to unsafe levels of all other smoke components. Table 3-7 lists the general safe distances separating an in situ burn and downwind, populated areas in flat terrain.

**TABLE 3-7: SAFE DISTANCES BETWEEN IN SITU BURNS AND DOWNWIND HUMAN POPULATIONS IN FLAT TERRAIN: LOCATION OF FIRE ZONES**

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	>1mile	Not applicable	<1 mile

Burning at a green zone safe distance from the public is acceptable following public notification.

The “In Situ Burning Guidelines for Alaska, Revision 1” allows the results of the NIST modeling to be used to authorize burning on the North Slope. The results show that for fires up to 10,000 square feet in area (about 100 feet in diameter, in all wind speeds modeled over land or water in typical winter and summer atmospheric conditions), the surface concentrations of particulate matter decline below the target concentration in less than 0.6 mile of the burn. Fifty-six scenarios in Cook Inlet and the North Slope were modeled using the ALOFT-FT computer model, and the worst-case predictions were used to develop the safe distances for those specific locations.

### 3.7.2 OPERATIONAL CAPABILITY

ACS maintains specialized equipment to conduct in situ burning operations during all seasons and all ice conditions. The extensive inventory of response equipment is specifically designed to support a large-scale burning operation. See Section 3.4.3, In Situ Burning Response Measures to Reduce Environmental Consequences of a Spill in Ice Conditions, for details.

### 3.7.3 EFFECTIVENESS OF IN SITU BURNING IN ICE

The consensus of research on spill response in broken ice conditions is that in situ burning is an effective response technique with removal rates exceeding 85 percent in many situations (Shell et al. 1983, SL Ross 1983, SL Ross and DF Dickins 1987, Singaas et al. 1994, SL Ross et al. 1998, DF Dickins et al. 2000, Sørstrøm et al. 2010). See Section 3.4.3, In Situ Burning Response Measures to Reduce Environmental Consequences of a Spill in Ice Conditions, for details).



### **3.8 RESPONSE CONTRACTOR INFORMATION [18 AAC 75.425(e)(3)(H)]**

BPXA will activate ACS and the North Slope members of ACS to provide the initial manpower and resources for a large or lengthy spill response. The address and phone number for ACS is shown in Part 1. If additional resources are required, they will be accessed through Master Services Agreements maintained by ACS. BPXA's Statement of Contractual Terms with ACS is provided in the Introduction.



**3.9 TRAINING AND DRILLS FOR SPILL RESPONSE PERSONNEL  
[18 AAC 75.425(e)(3)(I)]**

**3.9.1 NORTH SLOPE SPILL RESPONSE TEAM TRAINING**

The North Slope Spill Response Team (NSSRT) consists of workers who volunteer as emergency spill response personnel. Each team member is required to have initial emergency response training and annual refresher training, which meets or exceeds the requirements in the Hazardous Waste Operations and Emergency Response (HAZWOPER) regulations, 29 CFR 1910.120(q). Annual requirements for HAZWOPER refreshers, medical physicals, and respiratory fit tests are tracked by ACS through weekly reports from the database. At intervals not exceeding 15 months, but at least once each year, BPXA makes changes to its emergency response training program to maintain its effectiveness in compliance with 49 CFR 195.403(b). The NSSRT training program is provided to responders from all production units on the North Slope.

Response training and attendance is documented and available for review. The yearly training schedule is also available at the facility and ACS Base. Current NSSRT training schedules are posted on the ACS web site.

The minimum NSSRT staffing levels on the North Slope are illustrated in Table 3-8. The staffing levels represent the largest shift demand within the first 72 hours for each responder classification derived from the scenarios presented in Section 1.6. Responders are classified into five categories each with minimum training requirements as noted below.

**TABLE 3-8: SPILL RESPONSE TEAM MINIMUM STAFFING LEVELS**

<b>RESPONDER CLASSIFICATION</b>	<b>NUMBER</b>
General Technician	58
Skilled Technician	51
Team Leader <sup>1</sup>	Included among vessel operators
Vessel Operator-Nearshore	10
Vessel Operator-Offshore	9
Total Technicians and Operators	128

<sup>1</sup> Team Leaders number are included among Vessel Operators.

**3.9.1.1 GENERAL TECHNICIAN**

The General Technician 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 a current 24-hour (or higher) HAZWOPER certificate.

Over time, the NSSRT training program brings NSSRT members from General Technician to at least the Skilled Technician level.

### **3.9.1.2 SKILLED TECHNICIAN**

The Skilled Technician is a responder who has experience in spill response activities at a higher level through specific training, related activities as part of regular employment, or 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 have documentation of training as listed below:

- Minimum training requirements for the General Technician, and
- 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, and
- Completion of 16 hours of actual spill response, response exercise, or field deployment time in any combination of the following positions:
  - 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, and
- Ten completed equipment proficiency checks.

### **3.9.1.3 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 is described as an individual who has attended additional training in the actions, responsibilities, and tasks associated with managing portions of an incident. Responders in this classification have documentation of training as follows:

- Training requirements for the General Technician,



- Training requirements for the Skilled Technician,
- Current 8-hour (or higher) HAZWOPER Supervisor certification, and
- Twenty completed equipment proficiency checks.

#### **3.9.1.4 VESSEL OPERATOR-NEARSHORE**

Responders qualified as Vessel Operator-Nearshore, are tasked with safe operation of vessels less than 30 feet in length. The vessels have a hull design and electronics primarily intended 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 have documentation of training as listed below:

- Training requirements for the General Technician, and
- Criteria for any one of the following categories:
  - 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 smaller or greater than 30 feet including navigation, charting, vessel electronics, and docking and maneuvering procedures;
  - Current USCG Operator Uninspected Passenger Vessel, or higher license; and
- Completion of Nearshore Vessel proficiency check.

#### **3.9.1.5 VESSEL OPERATOR-OFFSHORE**

Responders qualified as Vessel Operator-Offshore are tasked with the safe operation of vessels larger than 30 feet in length. The vessels have a hull design and electronics capable of sustaining operations in an offshore environment. Typical duties include the 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 have documentation of training as follows:

- Training requirements of the General Technician, and
- 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; and
  - Current USCG 25-Ton Near Coastal or larger license; and
- Completion of Offshore Vessel proficiency check.



### **3.9.1.6 ACTIVE MEMBER REQUIREMENTS**

NSSRT members must complete minimum annual training activities to be considered an active member of the NSSRT. The training requirements include 8-hour HAZWOPER refresher certification and plan review.

The NSSRT training program offers weekly classes at each field. The classes emphasize hands-on experience, field exercises, and team-building drills. The courses are selected by the ACS Environmental Lead Technician in conjunction with field management and use BPXA, ACS, and external training consultants. Table 3-9 lists typical NSSRT training courses. Many are divided by subject area and taught in the two- or three-hour time frame of an NSSRT meeting.





**TABLE 3-9: NORTH SLOPE SPILL RESPONSE TEAM TRAINING PROGRAM COURSES**

<b>CATEGORY</b>	<b>COURSE TITLE</b>
<b>Communication</b>	ICS Basic Radio Procedures
<b>Decontamination</b>	Decontamination Procedures
<b>Environmental</b>	Environmental Awareness
	Wildlife Hazing
<b>Equipment</b>	Basic Hydraulics for Spill Responders
	Boom Construction and Design
	Fastanks and Bladders
	Skimmer Types and Application
	Snow Machines and ATV Operations
	90 Spill Response Equipment Proficiency Checks
<b>Management</b>	Incident Command System
	Quarterly Drill and Exercises
	Staging Area Management
<b>Miscellaneous</b>	Global Positioning System
<b>Response Tactics</b>	In Situ Burning
	Nearshore Operations
	Summer Response Tactics
	Winter Oil Spill Operations
	Winter Response Tactics
<b>Safety/Survival</b>	Arctic Cold Weather Survival
	Arctic Safety
	HAZWOPER
	Spill Site Safety
	Weather Port and Survival Equipment
	Arctic Cold Water Survival
<b>Vessel-Related</b>	Airboat Operations
	Boat Safety and Handling
	Boom Deployment on Rivers
	Captain/Crewman Vessel Training
	Charting and Navigation
	Deckhand/Knot Tying
	River Response School
	Swiftwater Survival



### 3.9.2 INCIDENT MANAGEMENT TEAM MEMBER TRAINING

A description of the North Slope IMT training program is provided in Volume 3, Section 6.0, of the ACS *Technical Manual*, incorporated by reference. The training program meets or exceeds the National Preparedness for Response Exercise Program (NPREP) guidelines. The training program is also compliant with the National Incident Management System (NIMS). All ACS Training Specialists are NIMS Certified 300 and 400 level trainers. ACS provides ICS training for its own personnel and for some BPXA North Slope IMT personnel. The training includes an introduction to the Incident Command System (ICS-100), Basic Incident Command System (ICS-200), Intermediate Incident Command System (ICS-300), Advanced Incident Command System (ICS-400), Incident Command System position-specific training workshops, tabletop exercises, and deployment drills. As new training needs are identified, they are developed and incorporated into the ACS ICS training program.

The incident management system training program includes an introduction to new members of the IMT, position-specific training, and the process flow. The program is designed to be provided in a progressive manner that leads personnel through the entire operational planning period for an incident. Table 3-10 provides a summary of the training modules.

Tabletop exercises and drills test knowledge and competency of the system. When additional training or response procedures are identified, training programs or workshops are designed to address the identified issue. Current training schedules are available at the facility and on the ACS website.

Full training records of NSSRT response team members and contractors are maintained and available for inspection at the ACS Base in Deadhorse.

BPXA trains its IMT members based in Anchorage, called the Alaska Response Team. BPXA maintains a database of the training courses taken by each employee. Training includes ICS overview, section-specific training, and tabletop drills. Records are kept for a minimum of three years or for the entire time that the employee is assigned responsibilities in this plan. The database provides a brief description of the course and the date completed. Current training status of employees is available upon request.

**TABLE 3-10: NORTH SLOPE INCIDENT MANAGEMENT SYSTEM TRAINING MODULES**

<b>MODULE NUMBER</b>	<b>COURSE</b>
ICS-100	Introduction to the Incident Command System
ICS-200	Basic Incident Command System
ICS-300	Intermediate Incident Command System
ICS-400	Advanced Incident Command System
ICS-236	Stating Area Manager Workshop
ICS-341	Incident Response Planning Workshop
ICS-342	Documentation Unit Leader Workshop
ICS-346	Situation Unit Leader Workshop
ICS-348	Resources Unit Leader Workshop
ACS-1	Plan Development Unit Leader Workshop
ACS-2	Tabletop Exercise
ACS-3	Integrated Field Deployment and IMT Tabletop Exercise



### 3.9.3 SPILL RESPONSE EXERCISES

BPXA has adopted the NPREP guidelines. Participation in the NPREP and use of its guidelines ensure federal exercise requirements mandated by the Oil Pollution Act of 1990 (OPA 90) are met.

Internal exercises are conducted within BPXA to test the components of this plan for response to a spill. Components tested through the exercise program are as follows:

- Quarterly Qualified Individual Notification Drills are conducted to ensure the Qualified Individual is able to be reached on a 24-hour basis in a spill response emergency and carry out assigned duties.
- Annual Spill Management Team Tabletop Exercises are conducted to ensure personnel are familiar with the contents of this plan, including the Incident Command System, crisis response procedures, mitigating measures, notification telephone numbers and procedures, and individual roles in the response structure.
- Semi-Annual Equipment Deployment Exercises are conducted to ensure internal and contractor-operated response equipment is fully functional and can be deployed in an efficient and productive manner.
- A triennial exercise of the entire plan is conducted.
- Government-initiated unannounced exercises are conducted.

The North Slope Crisis Management / Emergency Response (CM/ER) Coordinator is responsible for ensuring that an internal unannounced exercise meeting NPREP requirements occurs annually. The Planning Section Chief is responsible for documenting actions taken during an actual event for NPREP credit if it involves one of the following:

- Use of emergency procedures to mitigate or prevent a discharge or threat of a discharge,
- Activation of the field IMT, or
- Deployment of spill response equipment.

With the exception of government-initiated unannounced exercises, the internal exercises are self-evaluated and self-certified. Documentation, including a description of the exercise, objectives met, and results of evaluations, is maintained for a minimum of 5 years. Exercise documentation is in written form, signed by the ACS Environmental Lead Technician for each exercise, and available for review upon request. The CM/ER Coordinator will be responsible for coordinating exercise documentation.

The North Slope CM/ER Coordinator and the ACS Environmental Lead Technician or designee are responsible for the scheduling, development and evaluation of oil spill response training programs and exercises, and for ensuring that regulatory requirements are met.

External exercises involve efforts outside of BPXA to test the interaction between BPXA and the response community. The external exercises also test the plan and the coordination between BPXA and the



response community. The response community comprises the OSRO (ACS); state, federal, and local agencies; and local community representatives.

BPXA participates in an annual Mutual Aid Drill (MAD). In addition to actively participating in the MAD, federal, state, and local agencies are involved in the development and evaluation of the drill. Components tested through the MAD exercise are as follows:

- Organizational Design
  - Notifications (includes training on 24-hour notifications and reporting to the National Response Center),
  - Staff mobilization, and
  - Ability to operate within the response management system described in the plan;
- Operational Response
  - Discharge control;
  - Assessment of discharge;
  - Containment of discharge;
  - Recovery of spilled material;
  - Protection of economically and environmentally sensitive areas;
  - Disposal of recovered product, and
- Response Support
  - Communications;
  - Transportation;
  - Personnel support;
  - Equipment maintenance and support;
  - Procurement, and
  - Documentation.

### **3.10 PROTECTION OF ENVIRONMENTALLY SENSITIVE AREAS [18 AAC 75.425(e)(3)(J)]**

Northstar crude oil is a persistent product. Many of its aromatic hydrocarbon compounds are toxic to fish, wildlife, and humans at various exposures.

Priority protection sites, sensitivities, surface water flow directions, wildlife protection strategies, and natural resources are described in the ACS *Technical Manual Map Atlas*, Volume 2, and are subject to confirmation by the resource agencies.

Mapped predictions of oil spill trajectories are provided in the scenarios in Part 1. The effect of seasonal conditions on the sensitivity of wildlife and areas to be given priority attention are depicted in “Information on Seasonal Sensitivities” and on Sheets 58 through 62, respectively, in the ACS *Technical Manual Map Atlas*, Volume 2.

On a regional scale, environmentally sensitive areas are incorporated by reference from the North Slope Subarea Contingency Plan. The maps include (but are not limited to): geographic response strategy (GRS) sites, biologically sensitive areas, Most Environmentally Sensitive Areas (MESA), and the Environmental Sensitivity Index (ESI). The most current maps can be accessed at the following link:

<http://www.asgdc.state.ak.us/maps/cplans/subareas.html#northslope>

### **3.11 ADDITIONAL INFORMATION [18 AAC 75.425(e)(3)(K)]**

Not Applicable.

### 3.12 BIBLIOGRAPHY [18 AAC 75.425(e)(3)(L)]

- Alaska Clean Seas. 2010. *Technical Manual*. Prudhoe Bay, Alaska.
- Alaska Department of Environmental Conservation, U.S. Environmental Protection Agency and United States Coast Guard. *The Alaska Federal/State Preparedness Plan for Response to Oil and Hazardous Substance Discharge/Releases – Unified Plan*.
- Alaska Department of Environmental Conservation, U.S. Environmental Protection Agency and United States Coast Guard. 2008. In Situ Burning Guidelines for Alaska. Revision 1. ; within Annex F of the Unified Plan, Volume 1. Anchorage. [http://www.akrrt.org/ISB\\_GuidelinesRev1/Final/Final-Aug-08.pdf](http://www.akrrt.org/ISB_GuidelinesRev1/Final/Final-Aug-08.pdf)
- Alaska Regional Response Team (ARRT). 1999. North Slope Subarea Contingency Plan. <http://www.akrrt.org/NSplan/nstoc.shtml> and <http://www.asgdc.state.ak.us/maps/cplans/subareas.html#northslope>
- ARRT. 2002. Wildlife Protection Guidelines for Alaska, Annex G, Rev. 4. Alaska Federal/State Preparedness Plan for Response to Oil and Hazardous Substance Discharges/Releases (Unified Plan, Volume 1). <http://www.akrrt.org/UnifiedPlan/index.shtml>
- Atwater, S.G. 1991. 1990 Endicott Environmental Monitoring Program Final Report: Ice Break-up and Freeze-up. Prepared by SAIC for the U.S. Army Corps of Engineers, Anchorage AK.
- Atwater, S.G., 1991. 1989 Endicott Environmental Monitoring Program Final Report: Ice Break-up and Freeze-up. Prepared by SAIC for the U.S. Army Corp of Engineers, Anchorage, AK.
- BP Exploration (Alaska), Inc. 2010. *2010 BP Team Alaska Safety Handbook*, Anchorage, Alaska.
- Bech, C., P. Sveum, and I. Buist. 1993. The Effect of Wind, Ice and Waves on the In Situ Burning of Emulsions and Aged Oils. Proceedings of the Sixteenth Arctic and Marine Oilspill Program Technical Seminar, Calgary, AB. pp 735-748.
- Bronson, M. 1998. In Situ Burning Safe Distance Predictions with ALOFT-FT Model. Prepared by EMCON Alaska, Inc., for the Alaska Department of Environmental Conservation.
- Bronson, M. 2000. Oil Spill Equipment Tests in Alaska Beaufort Sea, Spring 2000. Prepared for Alaska Clean Seas.
- Bronson, M. 2000. Oil Spill Equipment Tests in Alaska Beaufort Sea, Fall 2000. Prepared for Alaska Clean Seas
- Bronson, M., Thompson, E, McAdams F. and J. McHale. 2002. Ice Effects on Barge-based Oil Spill Response Systems in the Alaskan Beaufort Sea. Proceedings 25th Arctic and Marine Oilspill Program Technical Seminar (AMOP), Calgary, pp 1253-1268.



- Brown, H.M. and R.H. Goodman. 1986. In Situ Burning of Oil in Experimental Ice Leads. Environmental Studies Revolving Funds Report 064. National Energy Board, Calgary.
- Buist, I.A. and D.F. Dickins. 1987. Experimental Spills of Crude Oil in Pack Ice. Proceedings of the 1987 Oil Spill Conference, April 6-9, Baltimore, Maryland. American Petroleum Institute, Washington, D.C. pp 373-382.
- Buist, I., T. Coe, D. Jensen, S. Potter, L. Anderson, K. Bitting and K. Hansen. 2003. In Situ Burn Operations Manual. USCG Report CG-D-06-03, U.S. Coast Guard Research and Development Center, Groton, CT. pp 157.
- Campbell, T.E., Taylor, E. and D. Aurand. 1994. Ecological Risks Associated with Burning as a Spill Countermeasure in a Marine Environment. Proceedings of the 17th AMOP Technical Seminar, June 8-10, Vancouver, British Columbia, pp. 707-716.
- Coastal Frontiers Corporation. August 2001. Spring Breakup Equipment Access Test Program. For BP Exploration (Alaska) Inc., Anchorage.
- ConocoPhillips Alaska, Inc. and BP Exploration (Alaska) Inc. 2005. North Slope Environmental Field Handbook. February.
- Danenberger, E.P. Minerals Management Service. 1993. Outer Continental Shelf Drilling Blowouts 1971 – 1991. Presented at the 25th Annual Offshore Technology Conference in Houston, Texas, U.S.A., 3-6 May 1993.
- DF Dickins Associates Ltd., Vaudrey & Associates Inc., and SL Ross Environmental Research Limited. 2000. *Oil Spills in Ice Discussion Paper*. Prepared for Alaska Clean Seas, Prudhoe Bay, Alaska.
- Dickins, D.F. and K. Vaudrey. 2000. Typical Environmental Conditions During Freeze-Up in Nearshore Alaskan Beaufort Sea. Prepared for Alaska Clean Seas.
- Dickins, D.F. Associates Ltd. 1997. Late Winter Spill Response & Pipeline Repair,
- Dickins, D.F. Associates Ltd. 2001. "Summary Tables – Wind Speed, Direction and Persistence." Memo report to BP Exploration (Alaska) Inc.
- Izon, D., Danenberger, E.P. and Mayes, M.. Minerals Management Service. 2007. Absence of Fatalities in Blowouts Encouraging in MMS Study of OCS Incidents 1992-2006. Article based on a presentation for the IADC Well Control Conference of the Americas, 28-29 August 2007, Galveston, Texas.
- Guénette, C.C. and R. Wighus. 1996. In Situ Burning of Crude Oil and Emulsions in Broken Ice. Proceedings of the 19th AMOP Technical Seminar. Calgary, AB. pp 895-906.
- McCourt, J., I. Buist, S. Buffington. 2001. Results of laboratory tests on the potential for using in situ burning on seventeen crude oils. Proceedings of the 2001 International Oil Spill Conference, pp. 529 to 532.



- Nelson, W. G. and A. A. Allen, 1982. The Physical Interaction and Cleanup of Crude Oil with Slush and Solid First Year Ice, Proceedings of the Fifth Arctic Marine Oil Spill Program Technical Seminar, pp 37-59.
- Potter, S. 2006. Investigations of Conditions for Flow of Weathered Endicott Crude Oil: Endicott Slump Test. SL Ross Environmental Research Ltd. for BP Exploration (Alaska) Inc. 18 pp.
- SL Ross Environmental Research Ltd. 1983. Evaluation of Industry's Oil Spill Countermeasures Capability in Broken Ice Conditions in the Alaskan Beaufort Sea, for Alaska Department of Environmental Conservation, Anchorage.
- SL Ross Environmental Research Ltd. and DF Dickins Associates Ltd. 1987. Field Research Spills to Investigate the Physical and Chemical Fate of Oil in Pack Ice. Environmental Studies Revolving Funds Report No. 062. 95 p.
- SL Ross Environmental Research Ltd. 1997. Oil Deposition Modeling for Surface Oil Well Blowouts. June.
- SL Ross Environmental Research Ltd., 2000. In-air Evaporative Losses of Oil from Surface Blowouts. Prepared for Alaska Clean Seas, Prudhoe Bay, Alaska.
- SL Ross Environmental Research Ltd. 2001. Spill Related Properties and Dispersant Effectiveness of Northstar NS-31 Crude Oil. Prepared for BP Exploration (Alaska) Inc.
- SL Ross Environmental Research Ltd., 2006. Spill Related Properties of Eleven Crude Oils from the North Slope of Alaska. For Alaska Clean Seas, Prudhoe Bay.
- SL Ross Environmental Research Ltd., DF Dickins Associates Ltd. and Alaska Clean Seas. 2003. Tests to Determine the Limits of In Situ Burning of Thin Oil Slicks in Broken Ice. Report prepared for the US Minerals Management Service and ExxonMobil Upstream Research.
- SL Ross Environmental Research Ltd., D.F. Dickins and Associates Ltd., and Vaudrey and Associates, Inc. 1998. Evaluation of cleanup capabilities for large blowout spills in the Alaskan Beaufort Sea during periods of broken ice. Alaska Clean Seas and Dept. of the Interior Minerals Management Service on behalf of the North Slope Spill Response Project Team. Prudhoe Bay, Alaska.
- SL Ross Environmental Research Ltd. and Energetex Engineering. 1986. Decision-Making Aids for Igniting or Extinguishing Well Blowouts to Minimize Environmental Impacts. Environmental Studies Revolving Funds, Report No. 051. Environment Canada
- Sandwell Engineering Inc. 2001. Ice Access Guidelines for Spill Responders, Report prepared for ACS.
- Scandpower A/S. 2001. Blowout frequency assessment of Northstar. Report No. 27.83.01/R1. July 2, 2001. By H. Johnen, T. E. Nielsen and J. Olsen for BP Exploration (Alaska), Inc. 40 pages and appendices.



- Scandpower A/S. 2010. Blowout and Well Release Frequencies based on SINTEF Offshore Blowout Database 2009. Report No. 80.005.003/2010/R2. October 8, 2010. By T. Nordvik. 67 pages.
- Shell Oil Company, Sohio Alaska Petroleum Company, Exxon Company, U.S.A., Amoco Production Company. 1983. Oil Spill Response in the Arctic - Part 2: Field Demonstrations in Broken Ice., Shell Oil Company, Sohio Alaska Petroleum Company, Exxon Company, U.S.A., Amoco Production Company. Anchorage, Alaska.
- Singsaas, I., P. Brandvik, P. Daling, M. Reed and A. Lewis. 1994. Fate and Behaviour of Oils Spilled in the Presence of Ice - A comparison of the results from recent laboratory, meso-scale flume and field tests. Proceedings of the 17th AMOP Technical Seminar, June 8-10, Vancouver, British Columbia, pp 355-370.
- Smith, N.K. and A. Diaz. 1987. In-Place Burning of Crude Oils in Broken Ice. Proceedings of the 1987 Oil Spill Conference, April 6-9, Baltimore, Maryland. American Petroleum Institute, Washington, D.C. pp 383-387.
- Sørstrøm, S.E., P.J. Brandvik, I. Buist, P. Daling, D. Dickins, L. Faksness, S. Potter, J.F. Rasmussen and I. Singaas. 2010. Oil in Ice – Joint Industry Program on Oil Spill Contingency for Arctic and Ice Covered Waters, Summary Report.
- Veltkamp, B. and Wilcox, J.R. 2007. Nearshore Beaufort Sea Meteorological Monitoring and Data Synthesis Project. Prepared for the U.S. Department of the Interior, Minerals Management Service, Alaska OCS Region. September.
- Zhang, T., T. E. Osterkamp, and K. Stamnes, 1996. Some characteristics of the climate in northern Alaska, Arctic and Alpine Res., 28(4), 509-518.

## **PART 4. BEST AVAILABLE TECHNOLOGY [18 AAC 75.425(e)(4)]**

Part 4 addresses best available technology (BAT) requirements in 18 Alaska Administrative Code (AAC) 75.425(e)(4)(A), (B), and (C). This Part also addresses technologies not subject to response planning standards or performance standards in 18 AAC 75.445(k)(1) and (2). The discussion of each technology complies with the requirement to analyze applicable technologies and to provide justification that the technology is the best available.

### **4.1 COMMUNICATIONS [18 AAC 75.425(e)(4)(A)(i)]**

The communications system for use in a spill response is described in the Alaska Clean Seas (ACS) *Technical Manual*, Volume 1, Tactic L-11, incorporated here by reference.

### **4.2 SOURCE CONTROL [18 AAC 75.425(e)(4)(A)(i)]**

#### **4.2.1 WELL SOURCE CONTROL**

The two methods of regaining well control once an incident has escalated to a surface blowout scenario described in Part 1 are well capping and relief well drilling. BP Exploration (Alaska), Inc. (BPXA) investigations indicate that well capping constitutes the BAT for source control of a blowout.

##### **4.2.1.1 WELL CAPPING**

Well capping techniques have proven efficient and effective in regaining well control and reducing environmental impacts. BPXA conducted a thorough investigation of well capping to regain control of a well blowout. The investigation used the response planning standard (RPS) conditions for exploration or production drilling as the evaluation case. Inherent in this evaluation are the assumptions that primary and secondary levels of well control have failed and that all dynamic and mechanical attempts to regain primary or secondary well control have been ineffective. The assessment considered best available techniques and methods to control a deep well blowout with the potential of releasing liquid hydrocarbons to the surface.

Well capping response operations are highly dependent on the severity of the well control situation. BPXA has the ability to move specialized personnel and equipment, e.g., capping stack or cutting tools, to North Slope locations upon declaration of a well control event. The materials to execute control (e.g., junk shots, hot tapping, freezing, or crimping), are small enough that they can be quickly made available to remote locations, even by aircraft, as necessary.

BPXA has an inventory of well control firefighting equipment warehoused on the North Slope. This equipment includes two 6,000 gallons per minute (gpm) fire pumps, associated piping, lighting, transfer pumps, Athey wagons, specialized nozzles, and fire monitor shacks. The equipment represents a standard array of firefighting and well control equipment normally mobilized by well control specialists in a

blowout event. Maintaining this equipment on the North Slope significantly minimizes the time to mobilize and transport well control response equipment in an actual blowout event.

Other equipment for well capping operations are commonly available items on the North Slope, e.g., cranes, tanks, pumps, block and tackle, and large diameter casing. Well capping equipment available to Northstar operations is described in Section 1.9.

Well capping is both compatible and feasible with drilling operations because the technology is applied at the surface. There are no sensitivities to well types, e.g., extended reach drilling, horizontal, or location. Well capping techniques have been applied both on land and at offshore locations and have historically proven successful in regaining well control within a short duration. Well capping techniques are preferred over the more time-consuming alternative of drilling a relief well.

BPXA maintains an operating agreement with Boots and Coots Services, a worldwide well control specialist organization that can assist in the intervention and resolution of a well control emergency. This alliance of global service providers gives BPXA access to the best fit-for-purpose technology in response to a variety of emergency responses.

In an actual blowout event, well capping operations would commence with BPXA's activation of Boots and Coots Services and mobilization of key Incident Management Team personnel, as well as deployment of select equipment. Dynamic and surface well control methods may continue in the interim only if it is approved and safe to do so. If the well capping option were selected and approved, safe re-entry to the wellhead area would be established and well capping operations would commence.

Other than the initial cost of the well control equipment currently stationed on the North Slope, maintaining an open contract with Boots and Coots Services is a minimal annual cost. Additional services required during an actual response would be provided at previously agreed upon rates.

The U.S. Bureau of Safety and Environmental Enforcement (BSEE) and SINTEF Civil and Environmental Engineering (Norway) data indicate that well capping technologies provide the shortest duration and most effective option for regaining well control and minimizing environmental impacts. This is seen in the more consistent application of well capping in response to well control events and the correspondingly shorter durations to successfully regain well control as compared to the few relief wells that have been attempted.

BPXA, in conjunction with well control experts from Boots and Coots Services, developed a schedule of events for conducting a well capping operation. This estimate does not take into account the high probability that well flow may be significantly reduced or stopped in the interim by formation bridging, dynamic kill operations, or surface well control actions. Forward plans require an iterative review process as well conditions change.

If involuntary ignition has not occurred, voluntary ignition of the blowout may also be considered as a method to reduce the volume of oil that falls to water as well as reduce the potential of secondary explosive events. The decision of voluntary ignition must be a carefully considered option as it may result in an explosive event due to trapped compartmentalized gasses within the well house. Voluntary ignition with subsequent explosive events may impact safe access to the wellhead area, which may in turn alter response operations.

#### 4.2.1.2 RELIEF WELL DRILLING

Relief well drilling technology is compatible to North Slope drilling operations although it may be sensitive to both the well location and well types. Multiple drilling rigs are under contract on the North Slope. Downhole and surface equipment, e.g., tubulars and wellheads, to support relief well drilling operations are also available.

Relief well drilling is similar to current methods used to drill and complete North Slope wells today, and advances in directional drilling technology allow more precise wellbore placement, increasing the likelihood of success of a relief well. However, relief well attempts would be more sensitive to blowout well locations or blowout well types for a facility having unique logistical challenges. For extended reach wells or remote locations, relief well drilling would be both challenging and time consuming.

Well control events where relief well drilling would be the preferred source control method involve events in which the potential to release liquid hydrocarbons to the surface is highly unlikely, e.g., shallow gas, compromised surface casing or surface casing cement jobs, broaching or reasonable concern of broaching, inaccessible wellhead and/or casing.

Government (Danenberger, 1993; and Izon, Danenberger, Mayes, 2007) and industry data (Scandpower A/S, 2001 and 2010) indicate that for a vast majority of the occurrences well control was regained through conventional dynamic kill procedures, surface control measures, well capping, or by natural means, e.g., formation bridging.

Optimal surface locations are rarely available on the North Slope and, as such, relief well drilling is often the least desirable option.

Relief well drilling to a deep zone blowout below surface casing can be a time consuming and costly process. If access to the blowout location is unavailable, alternative locations must be sourced and/or constructed, e.g., access roads, gravel pads in the summer, or ice pads in the winter. After permitting, site construction, well planning and rig mobilization, the relief well must still be drilled. Onshore North Slope relief well durations are often estimated in the 40- to 90-day range. These lengthy timelines add to the overall environmental impact (spill volume) of the blowout well. Based on historical data (Scandpower A/S, 2001), it is estimated that more than 97 percent of blowouts would be under control by other means by the time the relief well drilling rig could be mobilized.

Relief wells provide the longest duration alternative of effectively regaining well control. In addition to the longer blowout duration, the relief well itself introduces additional environmental risks. If access to a site near the blowout well is limited, a new gravel or ice site must be quickly constructed. If gravel is required, there would be an impact to the tundra where gravel is placed. During equipment mobilization or relief well drilling operations, additional risks of spills and tundra impacts are possible. During the drilling of the relief well itself, the risk for a second well control event is introduced.

BPXA believes well capping constitutes BAT for well source control. In the event of a blowout, BPXA deems it prudent to also activate a separate team to pursue a relief well plan parallel and independent of the primary well capping plan. This action is to ensure an alternate plan is being formulated and maturing for quick implementation if required. Table 4-1 summarizes well capping as BAT. Historical evidence

clearly indicates well capping has greater reliability and application for well blowout control compared to that of relief well drilling.

**TABLE 4-1: BEST AVAILABLE TECHNOLOGY ANALYSIS  
WELL BLOWOUT SOURCE CONTROL**

<b>BAT EVALUATION CRITERIA</b>	<b>EXISTING METHOD: WELL CAPPING</b>	<b>ALTERNATE METHOD: RELIEF WELL DRILLING</b>
<b>AVAILABILITY:</b> Whether technology is best in use in other similar situations or is available for use by applicant	Well capping is in use globally. Fit-for-purpose well capping and well control equipment is located on the North Slope. Additional equipment can be on location within a few days.	Relief well drilling equipment (rigs, downhole tools, etc.) is available, though not widely USED. If extended reach drilling is required to intercept the affected wellbore rig selections become limited.
<b>TRANSFERABILITY:</b> Whether each technology is transferable to applicant's operations	Equipment is currently available on North Slope or on retainer via Boots and Coots Services contract.	Multiple drilling rigs are currently under contract and current rig-sharing agreement has been signed by North Slope operators.
<b>EFFECTIVENESS:</b> Whether there is a reasonable expectation each technology will provide increased spill prevention or other environmental benefits	Numerous global companies provide successful applications of well capping. After natural bridging and conventional methods (BOP, mud, cementing, equipment repairs, etc.), well capping is most frequent blowout control measure. Application of well capping provides best opportunity for minimizing pollution impacts.	Rare successful application of relief well drilling has been documented in industry. Industry data suggest a very small percentage of blowouts are successfully controlled with this technique. Relief well drilling at 40 to 90 days is the longest pollution mitigation measure possible. Relief wells may be preferred response method in some well control events (shallow gas, compromised surface casing or surface casing cementing, broaching, etc.), but these events are highly unlikely to result in the release of liquid hydrocarbons.
<b>COST:</b> The cost to the applicant of achieving BAT, including consideration of that cost relative to the remaining years of service of the technology in use by the applicant	Fit-for-purpose equipment is already owned or under long-term contract. Well capping requires the maintenance of open-end contracts with trained specialists to implement well control/capping operations.	Time and cost of permitting, location construction, well planning and executing relief wells is estimated at 2 to 3 times the cost of well capping, excluding any lost production.
<b>AGE AND CONDITION:</b> The age and condition of technology in use by the applicant	Well capping technology has made improvements since its frequent application during the Iraq-Kuwait conflict in the early 1990s. Firefighting equipment is in place on the North Slope.	Relief well drilling technology is similar to current methods used to drill and complete North Slope wells. Potentially sensitive to blowout well types (extended reach drilling) and location.

**TABLE 4-1 (CONTINUED): BEST AVAILABLE TECHNOLOGY ANALYSIS  
WELL BLOWOUT SOURCE CONTROL**

<b>BAT EVALUATION CRITERIA</b>	<b>EXISTING METHOD: WELL CAPPING</b>	<b>ALTERNATE METHOD: RELIEF WELL DRILLING</b>
<b>COMPATIBILITY:</b> Whether each technology is compatible with existing operations and technologies in use by the applicant	Technology is compatible and applied at surface (no sensitivity to well type).	Technology is compatible though potentially sensitive to blowout well types (extended reach drilling, remote locations, etc.). Survey uncertainty on high departure wells may result in problems intersecting target wellbore.
<b>FEASIBILITY:</b> The practical feasibility of each technology in terms of engineering and other operational aspects	Method is feasible with all drilling operations. Applied at surface – no sensitivities to well type (extended reach drilling, remote locations, etc.). Prior proven success in offshore environments. Demonstrated success in historical well control efforts.	Method feasibility contingent upon geographical access near area of blowout. Lack of year-round access to some locations (offshore Beaufort) limits application. Very little evidence of successful application of relief well drilling as the primary mitigation measure of control. Relief wells may be preferred response method in some well control events (shallow gas, compromised surf casing or surf casing cementing, broaching, etc.), but these events are highly unlikely to result in the release of liquid hydrocarbons.
<b>ENVIRONMENTAL IMPACTS:</b> Whether other environmental impacts of each technology, such as air, land, water pollution, and energy requirements, offset any anticipated environmental benefits	Technology provides the best-proven opportunity to quickly reduce environmental impacts. Estimated duration is significantly less than conventional alternative technologies. Impacted area is localized to the affected well site and surrounding area.	Technology provides additional exposure and environmental risks during application (additional well control problems). Technology application may be seasonally limited, leading to durations of 60 to 180 days. Relief wells may require additional gravel placement and mobilization or demobilization pressures on the local environment. Drilling a relief well is accompanied by the additional risk of a second well control event.

**4.2.2 CRUDE OIL TRANSMISSION PIPELINE SOURCE CONTROL**

The pipeline source control procedures, required by 18 AAC 75.425(e)(4)(A)(i), involve the placement of automatic shutdown valves at each terminus and at the shore crossing to stop the flow of oil or product/gas into the Northstar pipelines. Additionally, the oil pipeline across the Putuligayuk River includes a manual valve on both sides of the river.

There are two technology options for the valves: automatic ball valves and automatic gate valves. Both valve options, when installed in new condition, are similar in terms of availability, transferability, cost, compatibility, and feasibility. In terms of effectiveness, ball valves typically have slightly faster closure times than gate valves. For Northstar, automatic ball valves (block and bleed type) are used. As required by 18 AAC 75.055(b), the flow of oil or product/gas can be completely stopped by these valves within one hour after a discharge has been detected. The valve closure time for these types of valves is usually on the order of 2 to 3 minutes. See Table 4-2.



**TABLE 4-2: BEST AVAILABLE TECHNOLOGY ANALYSIS  
CRUDE OIL TRANSMISSION PIPELINE SOURCE CONTROL**

<b>BAT EVALUATION CRITERIA</b>	<b>EXISTING METHOD: AUTOMATIC LEAK DETECTION, PRESSURE SWITCH SHUTDOWN AND ISOLATION VALVES</b>	<b>ALTERNATE METHOD: ADDITIONAL AUTOMATIC SHUTDOWN VALVES</b>
<b>AVAILABILITY:</b> Whether technology is best in use in other similar situations or is available for use by applicant	The sales oil pipeline has automated leak detection, a low pressure shutdown switch, and three automated isolation valves as well as two manual isolation valves, one on each side of the Putuligayuk River.	Additional shutdown valves could be added to the system.
<b>TRANSFERABILITY:</b> Whether each technology is transferable to applicant's operations	Currently installed.	Method is transferable.
<b>EFFECTIVENESS:</b> Whether there is a reasonable expectation each technology will provide increased spill prevention or other environmental benefits	The existing source prevention method provides a means of rapidly identifying leaks and for quickly depressurizing the line and isolating the source.	Additional automated valves would afford little additional source control since the Northstar pipeline is relatively short and since little oil would leak from the line once it was depressurized; therefore, automation would not significantly improve source control.
<b>COST:</b> The cost to the applicant of achieving BAT, including consideration of that cost relative to the remaining years of service of the technology in use by the applicant	The system described is installed and is a base case for comparison.	Additional automation would cost in excess of \$300,000.
<b>AGE AND CONDITION:</b> The age and condition of technology in use by the applicant	Method is current.	Method is current.
<b>COMPATIBILITY:</b> Whether each technology is compatible with existing operations and technologies in use by the applicant	Will be installed.	Method is compatible.
<b>FEASIBILITY:</b> The practical feasibility of each technology in terms of engineering and other operational aspects	Method is feasible.	Method is feasible.
<b>ENVIRONMENTAL IMPACTS:</b> Whether other environmental impacts of each technology, such as air, land, water pollution, and energy requirements, offset any anticipated environmental benefits	There are no offsetting environmental impacts.	The addition of automated shutdown valves could increase the probability that an inadvertent operation would result in a spill and would increase the risk of leaks from gaskets and seals.



#### 4.2.3 TANK SOURCE CONTROL

The tank source control BAT review is provided in Table 4-3. Source control procedures for purposes of this BAT analysis also relate to the emergency shutdown valves on the fill line for oil-containing tanks to prevent a catastrophic release. The valve type selected for this service is a soft-seated ball valve that meets American Petroleum Institute (API) standard API-598 (valve leakage class equivalent to Class VI), which is the best available technology. The valves are equipped with air or electrically powered actuators that include a spring return action resulting in a closed-in arrangement. This valve was selected for the following reasons:

- An inlet ball valve is a soft-seated ball valve meeting API-598 valve leakage class (or equivalent to Class VI), which is the best available,
- The actuator is a pneumatic/electric actuator with a spring return action, and
- The valve fails closed and is fire-safe.



**TABLE 4-3: BEST AVAILABLE TECHNOLOGY ANALYSIS TANK SOURCE CONTROL  
DIESEL STORAGE TANK, WELL CLEANOUT TANK, PRODUCED WATER TANK**

<b>BAT EVALUATION CRITERIA</b>	<b>EXISTING METHOD: AUTOMATIC BALL VALVE</b>	<b>ALTERNATE METHOD: MANUAL CLOSURE</b>
<b>AVAILABILITY:</b> Whether technology is best in use in other similar situations or is available for use by applicant	Technology exists to do this, and it is commonly done in piping systems.	Not applicable.
<b>TRANSFERABILITY:</b> Whether each technology is transferable to applicant's operations	This technology is applicable to these tank systems.	Not applicable.
<b>EFFECTIVENESS:</b> Whether there is a reasonable expectation each technology will provide increased spill prevention or other environmental benefits	This is an effective means of preventing releases where operator error may occur.	Not applicable.
<b>COST:</b> The cost to the applicant of achieving BAT, including consideration of that cost relative to the remaining years of service of the technology in use by the applicant	Not applicable; this technology is proposed by the applicant.	Not applicable.
<b>AGE AND CONDITION:</b> The age and condition of the technology in use by the applicant	Not applicable; this is a new installation with new equipment.	Not applicable.
<b>COMPATIBILITY:</b> Whether each technology is compatible with existing operations and technology in use by the applicant	Compatible with the new systems planned for this new installation.	Not applicable; this is a new installation.
<b>FEASIBILITY:</b> The practical feasibility of each technology in terms of engineering and other operational aspects	This technology is feasible to implement.	This technology is feasible to implement.
<b>ENVIRONMENTAL IMPACTS:</b> Whether other environmental impacts of each technology, such as air, land, water pollution and energy requirements, offset any anticipated environmental benefits	Inadvertent valve closure could cause an increase in pressure in the hose or piping connection to the tank inlet. Connections to the well cleanout tank and produced water tank will be hard piped with appropriate pump and pressure controls. The diesel fueling hose from the barge or truck could be at risk. To mitigate this risk, the shut-off valve will close slowly to prevent inadvertent pressure surges. In addition, the barge connection includes a pressure relief to prevent hose rupture. Proper procedures and communications will also be in place to prevent occurrence.	No backup provision for operator error.
<b>OTHER:</b>	Acceptable under the Uniform Fire Code.	Unacceptable under the Uniform Fire Code.



### **4.3 TRAJECTORY ANALYSIS AND FORECASTS [18 AAC 75.425 (e)(4)(A)(i)]**

Trajectory analyses and forecasts are described in the ACS Technical Manual, Tactics T-1 to T-6 and L-11, which are incorporated here by reference.

In the event of a spill, trajectory models will be based on observed and modeled currents, wind speed and direction, and observed oil tracking data. Vector addition and trajectory modeling are used to forecast oil movement on a real-time basis.

Several research and development programs are improving industry's capability to track environmental conditions real time. An industry- and agency-funded program is developing the capability of measuring ocean current speed and direction using high frequency radar. In 2009, the data was available real-time via the internet (Weingartner, 2010).

Under certain conditions, satellite-based Synthetic Aperture Radar (SAR) could be used to track large slicks on water in very open ice cover (<4/10). The current generation of all-weather SAR satellites can resolve targets to 1 meter resolution or less independent of cloud cover or light conditions. Consequently, SAR can play a valuable role in mapping detailed ice conditions and directing marine resources safely and efficiently (Sørstrøm et al., 2010). Existing commercial GPR systems can be used from a low-flying helicopter to detect oil trapped under snow on the ice and to detect oil trapped under solid ice (Sørstrøm et al., 2010).

### **4.4 WILDLIFE CAPTURE, TREATMENT, AND RELEASE PROGRAMS [18 AAC 75.425(e)(4)(A)(i)]**

Wildlife capture, treatment, and release programs are described in the ACS *Technical Manual*, Volume 1, Tactics W-1 to W-3, W-5, W-6 and L-11, which are incorporated here by reference. The wildlife protection strategies are based on the *Wildlife Protection Guidelines for Alaska* (Annex G of the Alaska Regional Response Team Unified Plan).



See Volume 2 (Prevention Plan) for BAT analyses pertaining to:

- Cathodic Protection for Field-Constructed Oil Storage Tanks (Section 4.5)
- Leak Detection System for Field-Constructed Oil Storage Tanks (Section 4.6)
- Liquid Level Determination for Oil Storage Tanks (Section 4.7)
- Maintenance Practices for Buried Facility Oil Piping (Section 4.8)
- Protective Coatings and Cathodic Protection for Facility Oil Piping (Section 4.9)
- Maintenance Practices for Buried Facility Oil Piping – Corrosion Surveys (Section 4.10)
- Leak Detection for Crude Oil Transmission Pipelines (Section 4.11)



## **PART 5. RESPONSE PLANNING STANDARD**

### **[18 AAC 75.425(e)(5)]**

Calculations of the applicable response planning standards set out in 18 AAC 75.432, .434, and .436, including a detailed basis for the calculation reductions to be applied to the response planning standards, are presented below.

#### **5.1 STORAGE TANK [18 AAC 75.432]**

The adjusted RPS volume for the diesel storage tank, Tank T-S3-8202, is calculated below. The tank's double wall design and tertiary containment area is sufficient to contain 110 percent of the tank volume and prevent oil from reaching open water.

Prevention credits applied to the tank rupture scenario are as follows:

- 60 percent adjustment for secondary containment,
- 25 percent adjustment for liner under tank/double bottom,
- 5 percent prevention credit for instrumented on-line leak detection system, and
- 5 percent adjustment for drug and alcohol testing program.

Adjusted RPS volume = 2,800 bbl x 40% x 75% x 95% x 95% = 758 bbl

Of the 758 barrels that escape the oil storage tank, 100 barrels remain in the tertiary containment area and 298 barrels are contained within the tank truck loading area, leaving 360 barrels to flow across the gravel pad and under the module.

#### **5.2 WELL BLOWOUT [18 AAC 75.434]**

The 34,425-barrel RPS volume for a production well blowout simulation is based on a discharge rate of 2,295 barrels of oil per day (bopd) for 15 days.

The daily discharge rate reflects the average annual daily production volume for the maximum oil producing well at Northstar in 2010, based on data available through the Alaska Oil and Gas Conservation Commission (AOGCC). At ADEC's direction, the RPS oil volume is not adjusted for portions that are predicted by S.L. Ross Environmental Research, Ltd., to remain aloft and not enter receiving environments of land and water surfaces.



### 5.3 CRUDE OIL TRANSMISSION PIPELINE [18 AAC 75.436]

The initial RPS volume is calculated using the equation from 18 AAC 75.436.

$$\text{RPS volume} = [(L - H) \times C] + [\text{FR} \times (\text{TD} + \text{TSD})]$$

Where,

L = pipeline length between automatic pumping or receiving station valves

H = pipeline hydraulic characteristics due to terrain profile

C = pipeline capacity in barrels per linear measure

FR = pipeline flow rate in barrels per time period

TD = estimated time to detect a spill event

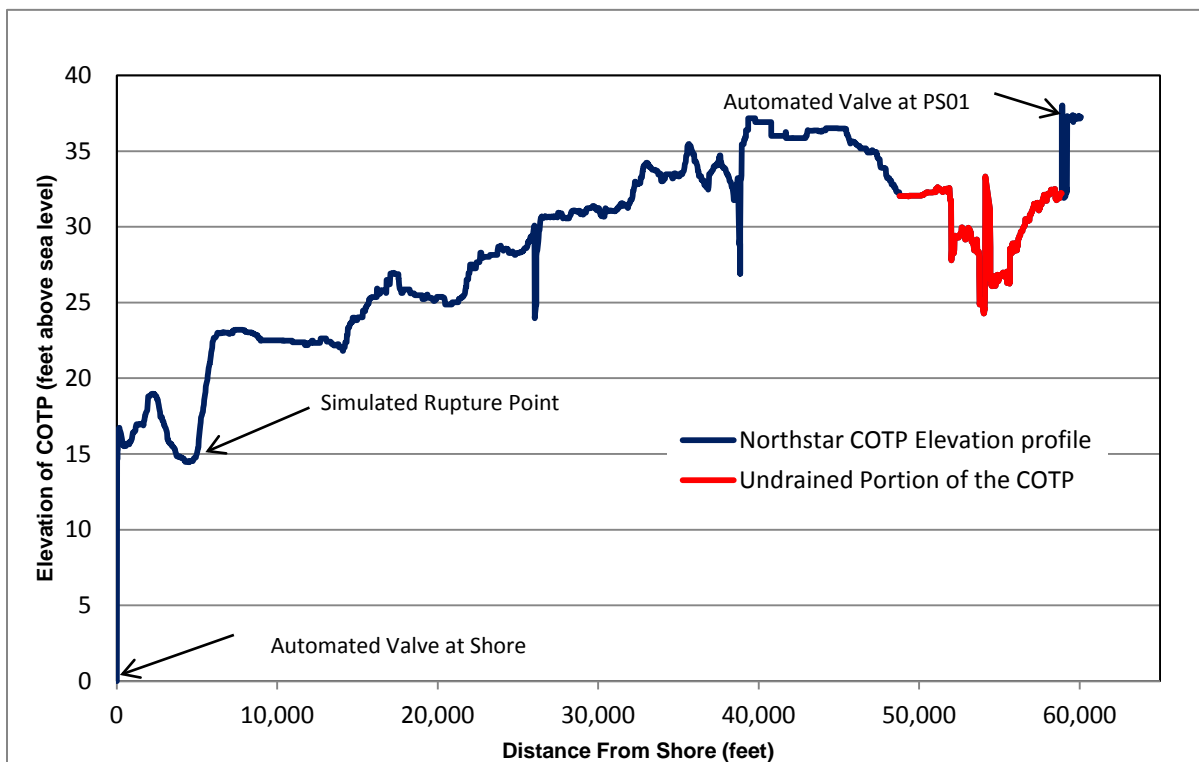
TSD = time needed to shut down the pipeline pump or system

In the event of a catastrophic rupture, the board operator would immediately detect a change in pipeline operating pressures while simultaneously sensing a total loss of flow to Pump Station 1 (PS01) and no reduction in flow from the facility. The crude oil transmission pipeline (COTP) would be shut in immediately. Subsequent signal verification, shutdown support, and field verification would follow. For planning purposes, 45 minutes is assumed for detection and shutdown combined, although the period may be a few minutes.

Automatic valves are located at the shore near the Defense Early Warning and at PS01. The distance between the two automatic valves is 60,570 feet. In the event of a catastrophic rupture, all but 10,107 feet of the line would drain (Figure 1-1). The flow rate is based on a maximum instantaneous rate of 42,000 bopd, which is significantly higher than the current throughput (approximately 18,419 bopd in 2010).



FIGURE 1-1: NORTHSTAR COTP ELEVATION PROFILE



Therefore,

L = 60,570 feet

H = 10,107 feet

C = 0.089 barrels per linear foot (bbl/LF)

FR = 29 barrels per minute (bbl/min) (based on a maximum instantaneous rate of 42,000 bopd)

TD = 30 minutes

TSD = 15 minutes

Therefore,

Initial RPS volume =  $[(60,570 - 10,107) \times (0.089)] + [29 \times (15+30)] = 5,796$  bbl

Prevention credits applied to the crude oil transmission pipeline scenario are as follows:

- 5 percent prevention credit for drug and alcohol testing (discussed in Part 2),
- 5 percent prevention credit for on-line leak detection system (discussed in Parts 2 and 4), and
- 15 percent prevention credit for instrumented in-line cleaning and diagnostic equipment (discussed in Part 2).

Adjusted RPS volume = 5,796 bbl x 95% x 95% x 85% = 4,446 bbl



**FEDERAL**  
**FACILITY RESPONSE PLANS**

**OPA 90 ADDENDUM**

**U.S. DEPARTMENT OF TRANSPORTATION  
U.S. BUREAU OF SAFETY AND ENVIRONMENTAL ENFORCEMENT  
U.S. COAST GUARD**

**The Northstar facility will be constructed, operated, and maintained in compliance with the terms and conditions of the U.S. Fish and Wildlife Service Letter of Authorization 06-02 regarding the incidental “take” of polar bears and walrus issued to BPXA on August 10, 2006.**



**U.S. DEPARTMENT OF TRANSPORTATION**



**NORTHSTAR OPERATIONS  
OIL DISCHARGE PREVENTION AND CONTINGENCY PLAN**

**CROSS REFERENCE TO  
U.S. DEPARTMENT OF TRANSPORTATION RESPONSE PLAN REQUIREMENTS  
[49 CFR 194, Subpart B]**

REGULATION SECTION (49 CFR)	SECTION TITLE	PLAN SECTION
<b>194.109</b>	<b>Submission of state response plans</b>	
(b)(1)	Have an information summary required by §194.113;	U.S. DOT Information Summary
(b)(2)	List the names or titles and 24-hour telephone numbers of the qualified individual(s); and	Volume 1, Table 1-3 in State of Alaska Oil Discharge Prevention and Contingency Plan (ODPCP)
(b)(3)	Ensure through contract or other approved means the necessary private personnel and equipment to respond to a worst case discharge or a substantial threat of such a discharge.	Volume 1, Section 3.8 in ODPCP and Statement of Contractual Terms with oil spill response organization in Introduction of ODPCP

**Certification of Response Preparedness**

BP EXPLORATION (ALASKA) INC.  
NORTHSTAR CRUDE OIL TRANSMISSION PIPELINE

Response Plans Officer  
Pipeline and Hazardous Materials Safety Administration  
U.S. Department of Transportation  
400 Seventh Street, SW, Room 2103  
Washington, DC 20590

BP Exploration (Alaska) Inc. hereby certifies to the Pipeline and Hazardous Materials Safety Administration of the U.S. Department of Transportation that it has identified, and ensured by contract or other means to be approved by the Pipeline and Hazardous Materials Safety Administration the availability of private personnel and equipment to respond, to the maximum extent practicable, to a worst case discharge or a substantial threat of such a discharge.

*Mike Utsler*

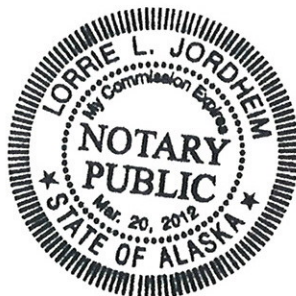
for VP Operations  
BP Exploration (Alaska) Inc.

7/23/2010  
Date

This certification of Response Preparedness was acknowledged before me on July 23, 2010,  
by ~~Mike Utsler~~ Bruce Williams on behalf of said corporation.

*Joni Jordani*

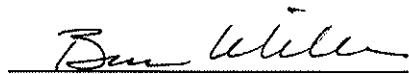
3-20-12  
Date commission expires



**NCP / ACP Consistency Certification**

BP EXPLORATION (ALASKA) INC.  
NORTHSTAR CRUDE OIL TRANSMISSION PIPELINE

BP Exploration (Alaska) Inc. hereby certifies to the Pipeline and Hazardous Materials Safety Administration of the U.S. Department of Transportation that it has reviewed the National Contingency Plan (NCP) and applicable Area Contingency Plans (ACPs) and found the Northstar Oil Discharge Prevention and Contingency Plan to be consistent with them. The NCP/ACPs reviewed include the NCP as set forth in 40 CFR 300, as published in 59 FR 47416, September 15, 1994 and the *Alaska Federal/State Preparedness Plan for Response to Oil and Hazardous Substance Discharge/Releases* (Unified Plan), Volume I and Volume II (North Slope Subarea Contingency Plan).



For Mike Utsler  
VP Operations  
BP Exploration (Alaska) Inc.

7/23/2010  
Date

## U.S. DOT INFORMATION SUMMARY

### Name and Address of Operator

BP Exploration (Alaska) Inc.  
P.O. Box 196612  
Anchorage, AK 99519-6612  
Phone: (907) 564-5111

Street Address:  
900 East Benson Boulevard  
Anchorage, AK 99508  
Fax: (907) 564-5180

### Response Zone Description

BPXA's Northstar Unit consists of a single response zone containing the Northstar crude oil transmission with both offshore and onshore pipelines. The offshore pipeline is approximately six miles long and buried in the seabed. The onshore pipeline is approximately 11 miles long and ties into Pump Station 1 of the Trans Alaska Pipeline System in the North Slope Borough of Alaska.

### Name and Telephone Number of Qualified Individual

See Table 1-3 (BPXA Contact List) in the Northstar Oil Discharge Prevention and Contingency Plan for the names and telephone numbers of Qualified Individuals.

### Worst-Case Discharge

In accordance with 49 CFR 194.105(b)(1), the worst-case discharge (WCD) for the pipeline is equal to the pipeline's maximum release time ( $RT_{max}$ ) in hours plus the maximum shutdown response time ( $ST_{max}$ ) in hours multiplied by the maximum flow rate ( $F_{max}$ ) expressed in barrels (bbl) per hour (bph) (based on maximum daily capacity of the pipeline) plus the largest pipeline drainage volume ( $PV_{max}$ ) after shutdown of the line section(s) in the response zone expressed in bbl or:

$$WCD = [(RT_{max} + ST_{max}) * F_{max}] + PV_{max}$$

Where:

$RT_{max}$	=	0.5 hour
$ST_{max}$	=	0.25 hours
$F_{max}$	=	2,520 boph
$PV_{max}$	=	4,774 bbl

The calculation assumes that 53,640 lineal feet of Alaska North Slope crude oil drains from the lowest point between two valves. An automatic valve is located at the shore near the Defense Early Warning site. A manual valve is located on the north side of the to the Putuligayuk river. The length between the two valves is 53,640 feet. The automatic valve is at an elevation of zero feet, and the manual valve is at an elevation of 20 feet. See Section 1.6.2.

The Northstar crude oil transmission pipeline DOT WCD is:

$$[(0.5 \text{ hr} + 0.25 \text{ hr}) * 2,520 \text{ boph} + 4,774 \text{ bbl} = 6,664 \text{ bbl}]$$



## **Substantial Threat**

Events and conditions that can pose a substantial threat of a WCD and procedures to eliminate or mitigate threat of a discharge are identified in BP Pipelines (Alaska) Inc., "Northstar Pipeline USDOT Operations Manual," Part III, Abnormal Operations. Adverse weather conditions do not affect the time to detect a spill and to shut down the pipeline.

## **Description of the Line Sections**

The Northstar sales line is 17 miles in length running between the Northstar Production Island and Trans Alaska Pipeline System. The pipeline has automatic shutdown valves at Northstar, each terminus, and at the shore crossing in addition to the manual shutdown valves on each side of the Putuligayak River.

## **Basis for Determination of Significant and Substantial Harm**

The pipeline is expected to pose significant and substantial harm in the event of an oil spill. The pipeline lies within one mile of seabird concentration areas.

## **Certification of Response Personnel and Equipment**

Sufficient response personnel and equipment is available to respond to a WCD or threat of such a discharge. This information is provided in Sections 1.6.4, Response Scenarios and Strategies; 3.5, Logistical Support; 3.6, Response Equipment; and 3.8, Response Contractor Information.

## **Drinking Water and Camp Emergency Response**

Oil Spill Fate and Transport (F&T) Analyses were conducted for BPXA crude oil transit pipelines in December 2006. The F&T Analyses for the crude oil transit pipelines showed that the maximum release volume from any individual location along the pipelines would not impact more than one drinking water source. Alternative drinking water sources are permitted and available in the areas where a drinking water high consequence area may be impacted.

The F&T Analyses also evaluated impacts to personnel camps, i.e., "other populated areas," that may be affected by an aerosol discharge from the crude oil transit pipelines. Each facility on the North Slope, including personnel camps, has an emergency response plan which describes alarms, evacuation procedures and accountability. Additionally, the field Incident Management Team (IMT) would be mobilized immediately for significant events. The On-Scene Commander makes an initial evaluation of the magnitude of the incident and notifies potentially impacted facilities through the IMT. Should a personnel camp be a potentially impacted facility, they would monitor the incident and activate the facility emergency response plan as necessary.

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**U.S. BUREAU OF SAFETY AND ENVIRONMENTAL ENFORCEMENT**



**NORTHSTAR OPERATIONS  
OIL DISCHARGE PREVENTION AND CONTINGENCY PLAN**

**CROSS REFERENCE TO  
U.S. BUREAU OF SAFETY AND ENVIRONMENTAL ENFORCEMENT  
RESPONSE PLAN REQUIREMENTS  
[30 CFR 254, Subpart D]]**

REGULATION SECTION (30 CFR)	SECTION TITLE	PLAN SECTION
<b>254.53</b>	<b>Submitting a Response Plan Developed Under State Requirements</b>	Contents are in Volume 1 (Response Action Plan), unless otherwise specified
(a) (1)	Be consistent with the requirements of the National Contingency Plan and appropriate Area Contingency Plan(s).	Management Approval and Resource Commitment Statement, page i
(a) (2)	Identify a qualified individual and require immediate communication between that person and appropriate Federal officials and response personnel if there is a spill.	Sections 1.1, 1.2.4 and 3.3; Table 1-3
(a) (3)	Identify any private personnel and equipment necessary to remove, to the maximum extent practicable, a worst-case discharge as defined in §254.47. The plan must provide proof of contractual services or other evidence of a contractual agreement with any OSROs or spill management team members who are not employees of the owner or operator.	Introduction – Alaska Clean Seas Statement of Contractual Terms, Sections 1.2, 3.6 and 3.8, Facility Response Plan (OPA 90) Addendum
(a) (4)	Describe the training, equipment, testing, periodic unannounced drills and response actions of personnel at the facility to ensure both the safety of the facility and the mitigation or prevention of a discharge or the substantial threat of a discharge.	Section 3.9
(a) (5)	Describe the procedures to periodically update and resubmit the plan for approval of each significant change.	Introduction
(b) (1)	A list of facilities and leases the plan covers and a map showing their location.	Volume 2 (Prevention Plan), Section 3.1, Appendix B Figures
(b) (2)	A list of the types of oils handled, stored, or transported at the facility.	Volume 2 (Prevention Plan) Section 3.1, Table 3-1, Appendix A
(b) (3)	Name and address of the State agency to which the plan was submitted.	Introduction – ADEC approval letter
(b) (4)	The date the plan was submitted to the State.	Introduction – ADEC approval letter
(b) (5)	If the plan received formal approval, the name of the approving organization, the date of approval, and a copy of the State agency's approval letter, if issued.	Introduction – ADEC approval letter
(b) (6)	Identification of any regulation or standards used in preparing the plan.	Introduction

**NORTHSTAR OPERATIONS  
OIL DISCHARGE PREVENTION AND CONTINGENCY PLAN**

**CROSS REFERENCE (cont'd)  
U.S. BUREAU OF SAFETY AND ENVIRONMENTAL ENFORCEMENT  
RESPONSE PLAN REQUIREMENTS  
[30 CFR 254, Subpart D]]**

<b>254.54</b>	<b>Spill Prevention for Facilities Located in State Waters Seaward of the Coast Line</b>	
	<p>In addition to your response plan, you must submit to the Regional Supervisor a description of the steps you are taking to prevent spills of oil or mitigate a substantial threat of such a discharge. You must identify all State or Federal safety or pollution prevention requirements that apply to the prevention of oil spills from your facility, and demonstrate your compliance with these requirements. You also should include a description of industry safety and pollution prevention standards your facility meets. The Regional Supervisor may prescribe additional equipment or procedures for spill prevention if it is determined that your efforts to prevent spills do not reflect good industry practices.</p>	Volume 2, Prevention Plan

## Worst-Case Discharge Volume

SOURCE	CAPACITY (BBL)	REFERENCE
Sum of Capacity of Oil Storage Tanks	4,300	The total capacity of the oil storage tanks is the sum of permanent oil storage containers on Northstar Production Island. See Table 3-1 and Appendix A in Volume 2 for capacities of individual storage tanks.
Capacity of Flow Lines	510	Flow line capacity specific to Northstar is calculated by the BP Exploration (Alaska), Inc. engineers. Northstar flow line capacity represents the sum of volumes from the headers and production well lines.
Crude Oil Transmission Pipeline Break	4,724	Catastrophic release volume from the sales oil pipeline is the sum of: 1) oil volume in the sales pipeline from Northstar Production Island to the mainland landfall (31,840 feet x 0.089 bb/LF = 2,834 bbl); and 2) an estimate of additional oil volume that would enter the pipeline from the production facility in the period before the break is detected and the valves shut (2,520 boph * 45 minute detection and shutdown time = 1,890 bbls).
Daily Production Volume of Highest Capacity Well	2,762	The simulated blowout rate is based on the reservoir characteristics (as defined by BSEE).
<b>Total</b>	<b>12,296</b>	

## Worst Case Discharge Response Scenario

The following scenario discusses a simulated response to a worst case discharge (WCD), including adverse weather conditions. The following WCD scenario is developed in accordance with 30 CFR 254.26. Table 1 summarizes how the scenario meets the BSEE regulatory requirement. The table also provides references to documents that support the assumptions. The scenario is based upon assumptions about environmental conditions, oil distribution and response capabilities. The assumptions are supported by a number of publicly available technical documents.

The scenario describes equipment, personnel, and strategies that could be used to respond to an oil spill. The scenario is for illustration only. It is not a performance standard or a guarantee of performance. The scenario assumes conditions of the spill and responses only for the purpose of describing general procedures, strategies, and selected operational capacities.

Some details are examples. Although some equipment is named, it may be replaced by functionally similar equipment. The response timelines are for illustration only. They do not limit the discretion of the persons in charge of the spill response to select any sequence or take whatever time they deem necessary for an effective response without jeopardizing safety.

Actual responses are determined by the Unified Command, and depend on safety considerations, weather, and other environmental conditions, agency permits, response priorities, and other factors. In any incident, consideration for personnel safety is the highest priority. The scenario assumes the agency on-scene coordinators and other agency officials immediately grant permits.

Larger responses than illustrated in the scenario can be mounted with additional in-region resources and with the mobilization of out-of-region resources.

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**WORST CASE DISCHARGE SCENARIO**

**WELL BLOWOUT DURING  
TYPICAL SPRING CONDITIONS**

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**TABLE 1: SUMMARY OF HOW THE SCENARIO COMPLIES WITH BSEE REGULATION**

BSEE REGULATION	SUMMARY	REFERENCE
<p>30 CFR 254.26(a) and 254.47(a) Worst Case Discharge Volume for Production Facility</p>	<p>The WCD volume is 12,296 barrels. The volume is the sum of the following volumes: 4,300 barrels, capacities of the oil storage tanks; 510 barrels, capacities of the flow lines; 4,724 barrels, from the sales oil pipeline; and approximately 2,762 barrels daily, as determined by reservoir modeling.</p> <p>The following response scenario details a 30-day blowout from a production well on Northstar. The blowout is assumed to occur during typical spring conditions.</p>	<p>See the Oil Pollution Act of 1990 (OPA 90) BSEE cross reference section in Appendix A of the <i>Northstar Operations Oil Discharge Prevention and Contingency Plan</i> for descriptions of the basis of the WCD estimate. The estimates follow 30 CFR 254.47 regarding WCDs for production facilities.</p> <p>The total capacity of the oil storage tanks is the sum of permanent oil storage containers on Northstar Island.</p> <p>Flow line capacity specific to Northstar is calculated by the BPXA drilling development engineer. Northstar flow line capacity represents the sum of volumes from the production header, test header, sixteen production well lines, and the section of the sales oil line leading from the process facility to the island perimeter.</p> <p>Catastrophic release volume from the subsea portion of the sales oil pipeline is the sum of: 1) oil volume in the sales pipeline from Seal Island to the mainland landfall at Point Storkersen; and 2) an estimate of additional oil volume that would enter the pipeline from the production facility in the period before the break is detected and the valves shut. Calculation is consistent with 18 AAC 75.436, which takes into account length, flow capacity, leak detection and shutdown time, and the effects of hydraulic characteristics due to the terrain profile and gravity.</p> <p>The simulated blowout rate is based on the reservoir characteristics (as defined by BSEE).</p>
<p>30 CFR 254.26(b) Oil Trajectory</p>	<p>The simulation of the aerial oil plume is based on gas flow rate, orifice area, oil combustion, and wind direction. The frequency distribution of the oil droplet size assumed in Tactic T-6 is assumed to remain unaffected by combustion or impingement.</p> <p>The simulation of 90 percent consumption of the oil during combustion of the aerial plume is based on the percentage burn efficiency as a function of the oil's flow rate, the gas-to-oil ratio, and the orifice diameter that is illustrated in SL Ross and Energetex (1986: Figure 11).</p>	<p>The oil's aerial plume trajectory is determined from ACS <i>Technical Manual</i>, Tactic T-6, a model developed by S. L. Ross Environmental Research, Ltd. (1997), and incorporated into the scenario by reference. The ACS <i>Technical Manual</i> parts that are cited in the scenario are thereby incorporated by reference.</p> <p>For a discussion of the expected proportion of oil consumed by combustion, see SL Ross Environmental Research Ltd. and Energetex Engineering (1986).</p>

**TABLE 1 (CONTINUED): SUMMARY OF HOW THE SCENARIO COMPLIES WITH BSEE REGULATION**

<b>BSEE REGULATION</b>	<b>SUMMARY</b>	<b>REFERENCE</b>
<p>30 CFR 254.26(b) Oil Trajectory</p> <p>(Continued)</p>	<p>The scenario assumes that oil droplets and gas affected by the well fire still form an aerial plume as large as predicted by the Tactic T-6 model for an un-ignited plume. The assumptions are made because no alternative model is available that accounts for reduction of the oil footprint by combustion of the aerial oil plume.</p> <p>The scenario assumes that the oil blows out to the atmosphere from a production well. In such a blowout, oil impingement on the well blowout preventer is expected to reduce the oil's aerial plume and reduce its footprint beyond the well. However, available models do not account for the affect of impingement on the oil footprint dimensions. Consequently, the scenario calculates oil footprints by the Tactic T-6 model for an un-obstructed plume.</p>	<p>The oil's trajectory on the sea is based on the following:</p> <ol style="list-style-type: none"> <li>1. Historical water and ice movements in July are incorporated from Appendix H in SL Ross Environmental Research, Ltd., D.F. Dickens and Associates, Ltd. and Vaudrey and Associates, Inc. (1998).</li> <li>2. Wind direction is simulated as prescribed by 18 AAC 75.425(e)(1). The wind data were retrieved from the Nearshore Beaufort Sea Meteorological Monitoring and Data Synthesis (Veltkamp, B. and Wilcox, 2007). The weather data presented were collected during the summers of 2000 through 2006.</li> </ol>
<p>30 CFR 254.26(c) Important Resources</p>	<p>Resources of special economic or environmental importance that potentially could be impacted are all the marine bird and mammal populations that occupy the sea between the pack ice and the shoreline and the shorelines of the barrier islands that lie in the oil trajectory. The trajectory is described in the body of the scenario. The resources are described more fully in the references.</p>	<p>Resources of special economic or environmental importance that potentially could be impacted in the areas in the trajectory are described in the ARRT's "North Slope Subarea Plan," Areas of Concern, which is also printed in the ACS <i>Technical Manual</i>, Volume 2, Map Atlas.</p>
<p>30 CFR 254.26(d)(1) Response Equipment</p>	<p>The scenario identifies the types, numbers and usage of the equipment capable of containing and removing the oil.</p>	<p>The equipment's types, locations, owners, inventory quantity and capabilities are described in ACS <i>Technical Manual</i>, Volume 1, Tactics L-4 and L-6.</p>
<p>30 CFR 254.44(a) Effective Daily Recovery Capacities</p>	<p>The recovery rate for this scenario is assumed to be 20% of the pump's throughput rate. Based on the pump's throughput capacity of 1,181 boph, the de-rated recovery rate for this skimmer is 236 boph (20% x 1,191 boph = 236 boph).</p>	
<p>30 CFR 254.44(b) Other Efficiency Factors</p>	<p>The effective recovery capacity of the Foxtail rope mop skimmer is 75 barrels per hour, as determined by tests.</p>	<p>The recovery capacity for the Foxtail skimmer is 30 percent of the manufacturer's nameplate pump capacity (Canadian Association of Petroleum Producers Technical Report 92-01, 1992).</p>
<p>30 CFR 254.45(b) Other Efficiency Factors</p>	<p>The Crucial fiber-coated disc skimmer has been tested in conditions simulating its use in a break-up or freeze-up situation in Arctic conditions. The presence of ice in the test slick did not affect the performance of the skimmer, except to block the flow oil to the discs, lessening the overall recovery rate.</p>	<p>Section 1.6.2 of this plan and SL Ross test report (2010).</p>

**TABLE 1 (CONTINUED): SUMMARY OF HOW THE SCENARIO COMPLIES WITH BSEE REGULATION**

<b>BSEE REGULATION</b>	<b>SUMMARY</b>	<b>REFERENCE</b>
30 CFR 254.26(d)(2) Deployment and Operation	The quantities and types of field personnel, materials and support vessels to deploy and operate the response oil removal and storage equipment are described in the "Discussion of Equipment, Personnel and Times" section of the scenario.	The locations and owners of the equipment are described in ACS <i>Technical Manual</i> , Volume 1, Tactics L-4 and L-6.
30 CFR 254.26(d)(3) Oil Storage, Transfer and Disposal	The oil storage, transfer and disposal equipment, including barges and oil processing facilities, is described in the scenario.	The types, locations, owner, quantity and capacity of the scenario's equipment are described in ACS <i>Technical Manual</i> , Volume 1, Tactics L-4 and L-6, Section 1.6.3, Temporary Storage and Disposal.
30 CFR 254.26(d)(4)(i) Time for Procurement of Oil Containment, Recovery and Storage Equipment	Mobilization (i.e., procurement) and transit time is reflected in the scenario.	Mobilization time for equipment is specified in equipment tables in the ACS <i>Technical Manual tactics</i> that the scenario incorporates by reference. In addition, BPXA has the capability to mobilize out-of-region resources, if needed. See Tactics L-8, L-9 and L-10.
30 CFR 254.26(d)(4)(ii) Time for Procurement of Transportation Vessels	Mobilization (i.e., procurement) and transit time is reflected in the scenario.	Mobilization time for vessels is specified in the ACS <i>Technical Manual tactics</i> that the scenario incorporates by reference.
30 CFR 254.26(d)(4)(iii) Time for Procurement of Personnel	Mobilization (i.e., procurement) and transit time is reflected in the scenario.	Mobilization time for staff operating vessels and other equipment is specified in the ACS <i>Technical Manual tactics</i> equipment tables that list equipment mobilization times. Equipment operators and crews mobilize with their equipment from North Slope origins through ACS contracts and mutual aid agreements; See Tactics L-8, L-9 and L-10 for mutual aid agreements, master agreements and other agreements for accessing equipment.
30 CFR 254.26(d)(4)(iv) Equipment Loadout Time	The times to transfer equipment to the transportation vessels are reflected in the scenario. The times are included in the mobilization times listed in the ACS <i>Technical Manual tactics'</i> equipment tables that the scenario incorporates by reference.	Equipment loadout time is included in the mobilization times specified for equipment and vessels listed in the ACS <i>Technical Manual tactics</i> that the scenario incorporates by reference.
30 CFR 254.26(d)(4)(v) Travel Time	Times to travel to the deployment site, including from equipment storage are described in the narrative of the scenario.	ACS <i>Technical Manual</i> , Tactic L-3 lists travel rates.
30 CFR 254.26(d)(4)(vi) Deployment Time	Times to deploy equipment are described in the scenario narrative and incorporated by reference to particular ACS <i>Technical Manual tactics</i> that list deployment times.	Deployment times for most equipment are specified in the ACS <i>Technical Manual tactics</i> equipment tables that list equipment deployment times.

**TABLE 1 (CONTINUED): SUMMARY OF HOW THE SCENARIO COMPLIES WITH BSEE REGULATION**

<b>BSEE REGULATION</b>	<b>SUMMARY</b>	<b>REFERENCE</b>
<p>30 CFR 254.26(e)(1) Equipment and Strategies are Suitable for Conditions</p>	<p>Response equipment illustrated in the scenario is suitable, within the limits of current technology, for the range of environmental conditions anticipated at the facility. The equipment available on the North Slope and selected for the simulated deployments is the “best available technology” for responding to oil well blowouts in the nearshore Beaufort Sea. For example, the barges, vessels, boom, skimmers, and oil-burning equipment in the scenario have been tested and selected as the most suitable for mechanical oil recovery and in situ burning in the fast ice, broken ice and open water conditions associated with the facility.</p> <p>Response strategies illustrated in the scenario are also suitable, within the limits of current technology, for the range of environmental conditions anticipated at the facility. The strategies of burning and mechanical recovery illustrated in the scenario reflect “best available technology” for the conditions. The strategies have been tested, exercised and selected as most suitable for the conditions.</p>	<p>See the following analyses and reports that indicate that the scenario’s equipment and strategies are the most suitable:</p> <ol style="list-style-type: none"> <li>1. Blowout response plans in Section 1.9 of this plan;</li> <li>2. Results of field tests of vessels, boom, skimmers and barges in broken ice near Northstar (Bronson, M., 2000);</li> <li>3. Mechanical recovery and in situ burning strategy analyses (S. L. Ross Environmental Research, Ltd. D.F. Dickins and Associates, Ltd., and Vaudrey and Associates, 1998);</li> <li>4. Response strategies and ice considerations in Northstar area (D.F. Dickins Associates Ltd., Vaudrey and Associates Inc. and SL Ross Environmental Research Limited, 2000);</li> <li>5. Access capabilities on rotting ice around Northstar (Coastal Frontiers Corporation, 2001).</li> </ol>
<p>30 CFR 254.26(e)(2) Standard Terms for Conditions and Equipment Capabilities</p>	<p>The scenario employs standardized, defined terms to define environmental conditions and response equipment. The terms in the scenarios are consistent with terms used in spill response planning in general and for North Slope responses in particular.</p>	<p>FOR DEFINITIONS OF TERMS SEE THE FOLLOWING DOCUMENTS:</p> <ol style="list-style-type: none"> <li>1. D.F. Dickins Associates, Ltd., Vaudrey and Associates, Inc. and SL Ross Environmental Research Limited. 2000. <i>Oil Spills in Ice Discussion Paper: A Review of Spill Response, Ice Conditions, Oil Behavior, and Monitoring</i>. Prepared for Alaska Clean Seas.</li> <li>2. Alaska Clean Seas, 2010. <i>Technical Manual</i>, Volumes 1, 2 and 3.</li> </ol>

## **SIMULATED WEATHER AND SEA CONDITIONS AT SPILL SCENE**

The scenario reflects historical ice and weather conditions that are described in references cited in the last column of Table 1. The weather is typical of the season. Air temperatures average 35 degrees F and range from 20 to 40 degrees F. The wind is variable, but blows predominantly from the E and NE, averaging 10 knots.

Ice floe maximum diameters are 500 to 1,000 feet in the first two days of break-up. They diminish to 30 to 40 feet within three weeks. The wind pushes ice of 7 tenths to 9 tenths coverage at 1 to 2 percent of wind speed, concentrations of 4 tenths to 6 tenths at 2 to 3 percent of wind speed, and 3 tenths and less at 3 to 4.5 percent of wind speed. Ice moves 30 degrees to the right of the wind direction.

Table 2 illustrates sea and ice conditions.

**TABLE 2: SIMULATED ICE CONDITIONS DURING BREAK-UP**

<b>DATES</b>	<b>WIND DIRECTION</b>	<b>WIND SPEED</b>	<b>SIMULATED CONDITIONS IN THE VICINITY OF NORTHSTAR PRODUCTION ISLAND</b>
June 7	ENE	Averages 11 knots	The Kuparuk River overflow reaches within one mile of Northstar Island. Floodwaters drain through the ice within the overflow area (shore to the seaward boundary of the flood waters), leaving a relatively dry surface with scattered meltwater pools (Condition 6).
June 12	ENE	Averages 11 knots	The simulated blowout begins. Solid ice still surrounds Northstar Production Island. The ice is 4 feet thick. The surface is melting, with a soft surface and meltwater pools having 25 percent coverage (Condition 6).
June 15	ENE	Averages 11 knots	Gwydyr Bay ice melts in place and the lagoon becomes ice free. Offshore of the barrier islands, the overflow drains through the ice. June 15 is the last day that conventional wheeled vehicles travel the ice road between West Dock and the Northstar Production Island.
July 4	ENE	Averages 11 knots	Deteriorated fast ice (4-5 ft. thick) starts to shift and fracture. Most of the energy generated by the wind is spent fracturing the deteriorated ice sheet into large floes. Ice concentrations remain 9/10 <sup>th</sup> all day and large floes (over 1,000 ft.) start to shift locally around the island (hundreds of feet). (Condition 7)
July 5	ENE	Averages 11 knots	Ice starts to open around the island with large floes moving past. Ice concentrations are 7-9/10 <sup>th</sup> . Openings are small (less than a few hundred feet) and transient in time (tens of minutes). Dominant floe sizes range from 500 to 1000 ft.
July 6	ENE	Averages 11 knots	Ice concentrations in the 6-8/10 <sup>th</sup> range, with floes moving past the island at about 0.3 knot (scattered openings in the cover up to 500 ft across and lasting for up to several hours). Dominant floe sizes in the range of 250 to 700 ft. During days 2 and 3 the ice moves approximately 10 nautical miles to W based on a drift rate of 2 percent of the wind and 30° to the right of the wind. A shoreline rubble pile forms against the east side of Northstar Island. (Condition 8)
July 7-9	ENE	Averages 11 knots	Ice concentrations of 4-6/10 <sup>th</sup> wallow around the island. Ice distribution becoming patchy with a series of openings with less than 1/10 <sup>th</sup> ice separated by more concentrated areas of ice (up to 7/10 <sup>th</sup> ). Spatial extent of the openings and the ice patches about equal. Dominant floe sizes range from 250-700 ft.
July 10-14	W	Averages 11 knots	Very patchy ice concentrations of 2-5/10 <sup>th</sup> . Large areas (1-200 ft) of close to open water are interspersed with belts and patches of ice up to 6/10 <sup>th</sup> . Floe size is in the range of 100-500 ft.
July 15	W	Averages 11 knots	Ice concentration of 3-5/10 <sup>th</sup> . Slightly less patchy than previous five day period. Open areas are smaller (less than 1000 ft. across and more frequent). Floe size is in the range of 70-250 ft.
July 16-18	W	Averages 11 knots	Ice concentrations of 1-3/10 <sup>th</sup> move sporadically in patches past the island. Stretches of open water for up to ½ mile separated by bands of patches of 6-7/10 <sup>th</sup> ice several hundred feet across. Dominant floe sizes in the range of 50-150 ft.
July 19-22	W	Averages 11 knots	Trace to 1/10 <sup>th</sup> distributed as strips and irregular patches of 6-7/10 <sup>th</sup> ice up to hundred feet across, separated by areas of open water up to ¾ mile in extent. Dominant floe sizes in the 30-40 ft range. (Condition 9)

**Note:**

1. Per convention, the wind states the direction of wind origin (i.e., where the wind is coming from). The predominant wind directions during the simulated blowout were determined from the 16 cardinal compass directions that blow over 10 percent of the time. The wind data were retrieved from the Nearshore Beaufort Sea Meteorological Monitoring and Data Synthesis (Veltkamp and Wilcox, 2007). The data represented above was collected from 2004 through 2010.
2. Ice conditions are summarized from Dickins, D.F., K. Vaudrey, and SL Ross (2000).



## October

Freeze-up begins October 10 and ice around the Northstar Production Island becomes completely fast (i.e., stable with movements less than 100 feet) for the season on November 15. Between October 10 and October 25, complete break-up of the young ice cover is possible in response to fall storms. From October 25 to November 15 large-scale break-up of the sheet is unlikely but movements up to thousands of feet can occur with strong winds. Air temperatures range from 5 to 15 degrees F. Daylight is 9 to 10 hours per day. Broken new ice at freeze-up moves at 4 to 4.5 percent of the wind speed and 30 degrees to the right of the wind direction.

### **CHARACTERISTICS OF THE DISCHARGED OIL [30 CFR 254.26(a)]**

Oil from the Kuparuk Formation reaches the surface from a Northstar production well several hours after a kick is detected. Oil flows at the rate of approximately 2,762 bopd. The simulated blowout discharges a total of approximately 82,860 barrels of crude oil over 30 days, although only the unburned portion falls out to surfaces. See the vicinity map in Figure 1.

The scenario assumes that the blowout oil ignites at the well house floor on Day 1. Sub-surface safety valves prevent nearby production well blowouts in the case of collateral fire damage of the well trees. The effect of the ignition is to (1) increase safety by removal of toxic and flammable gases, (2) decrease pollution of the sea surface, and (3) increase the effort necessary to access the wellhead for well capping. Over the course of 30 days, a new capping stack is installed. The oil from the well burns without interruption until it is diverted with the capping stack as part of the kill step.

Ninety percent of the oil is lost to combustion when the aerial oil plume ignites (SL Ross Environmental Research Ltd., 1986). Oil from the ignited well impacts surfaces on the production island and the surrounding area at the rate of 249 bopd [2,762 bopd x 10 percent un-burned = 277 bopd x 90 percent in droplets large enough to settle = 249 bopd.] Over 30 days of the blowout, approximately 7,470 barrels fall to the surface of the production island and surrounding area.

Where the oil falls to water, it forms little or no emulsion (SL Ross Environmental Research Ltd., 2001).

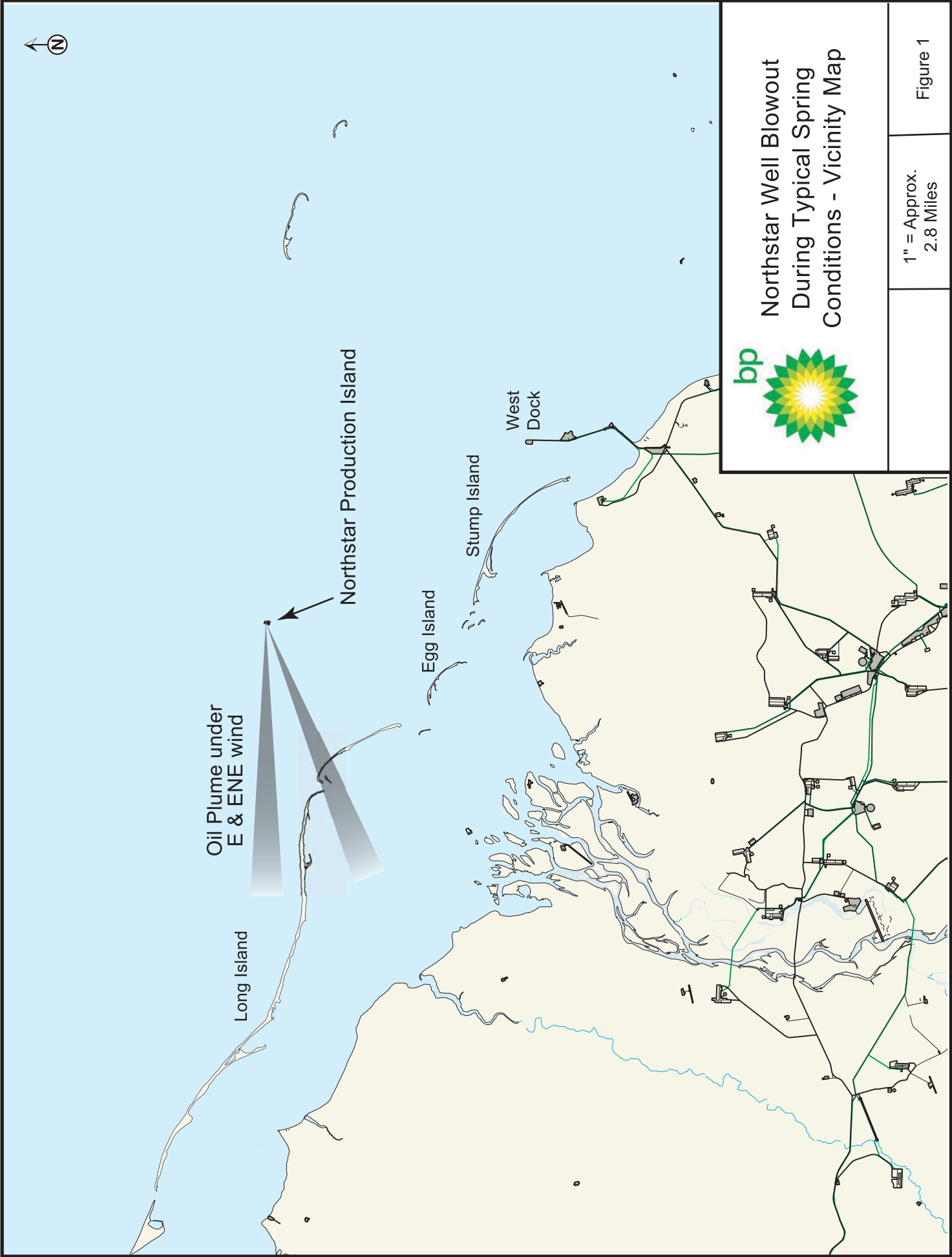
The aerial oil follows trajectories dictated by wind direction and as predicted by the SL Ross plume dispersion model published in *ACS Technical Manual*, Tactic T-6. Adoption of the Tactic T-6 trajectories assumes that the length and width of the simulated aerial oil droplets plume remain unaffected by the loss of airborne oil to evaporation and combustion and the loss of gas by combustion. The aerial oil plume extends approximately 4.9 miles from the well. Each triangular footprint of oil settlement is 1,230 acres [(4.9 miles long x 0.67 miles wide X 0.5) x (640 acres per square mile) = 1,051 acres].

Approximately 13 percent of the falling oil (32 bopd) contacts the Northstar Production Island. Over 30 days, 960 barrels falls to the Northstar Island surface. The remainder of the discharged oil contacts ice and/or water surrounding the Northstar Production Island surface at a rate of 217 bopd [249 bopd falling oil x 87 percent falling to ice and/or water surrounding Northstar Production Island surface = 217 bopd]. Over 30 days, 6,510 barrels falls to surfaces beyond the island. See Figure 1.

### **OIL SPILL TRAJECTORY [30 CFR 254.26(b)]**

Through Day 22, before break-up north of the barrier islands, movement of surface oil deposits is very limited. From June 12 to July 3, the oil falls out to the sea ice. See Figure 1 for examples of deposition zones.

From July 4 to 6, during aggressive break-up of the sea ice around Northstar, the oil falls out to large pieces of moving broken ice and to some water. By the end of July 6 (Day 25), the ice that had been fast to the island over the winter has moved 10 nautical miles WNW. Oil deposited to the sea ice and leads during the 3 days is carried with the ice [249 bopd x 3 days = 747 bb].



Northstar Well Blowout  
During Typical Spring  
Conditions - Vicinity Map

1" = Approx.  
2.8 Miles

Figure 1

From July 7 to the end of the blowout on July 11, the broken ice moves northward 5 to 7 miles as it becomes patchier and decreases in area coverage. Under the light southern winds, the oil moves in the same direction, but as far as 10 miles northward. A zone containing scattered oil becomes centered NW of the island. The area contains as much as 1,992 barrels [249 bopd x 8 days = 1,992 bb] that was deposited between July 4 and July 11.

For several days immediately after the blowout stops, winds from the N move oil and ice southward to nearshore waters from Prudhoe Bay to Spy Island and Harrison Bay. The oil on water takes the form of windrows. Most of the remaining oil strands on scattered sections of shorelines, primarily on the barrier islands.

During the remaining 10 days of the broken ice period, to July 20, the remaining oil on ice and on water generally moves westward as scattered patches in a water corridor between the Beaufort Sea coast and the Arctic ice pack. Oil on the water is mainly windrows and sheen. The clockwise deflection of water and oil under the east wind tending to carry the oil offshore and the presence of barrier islands act together to minimize the potential for oil to enter the lagoons.

The floating oil that remains is no longer significantly affected by broken ice from late July until freeze-up in October. During the open water period, floating oil as windrows and sheen moves under the influence of currents with a net westward movement typical of the area. Some oil strands on shorelines and becomes entrapped in the Arctic ice pack.

The oil decreases in quantity and becomes distributed along shorelines and on water and ice in a pattern similar to that described in a 1,000-barrel summer spill scenario by the U.S. Army Corps of Engineers' Final Environmental Impact Statement for Northstar (1999), Table 3 and Figures 8-4b and 8-5b. Most simulated shoreline impact is on the outer shoreline of the barrier islands from Prudhoe Bay to Long Island. Most oil on the water and on sea ice extends from Prudhoe Bay to eastern Harrison Bay. Very little oil is found west of Spy Island.

Little floating oil remains when the nearshore Beaufort Sea begins to freeze into shorefast ice on October 10 and entraps the oil. The area experiences several cycles of fast ice formation under calm conditions and new-ice shattering under stronger, shifting winds.

#### **RESOURCES OF IMPORTANCE [30 CFR 254.26(c)]**

Resources of special economic or environmental importance could be impacted by the spilled oil. Marine and coastal bird and mammal populations and shoreline cultural resources occupying the path of the spilled oil described in the Trajectory section potentially could be affected by oiling.

Many of the birds and mammals are important both ecologically and economically. The ACS *Technical Manual*, Volume 2, lists the marine mammal groups and marine bird groups potentially exposed to the scenario's oil, and describes their seasonal distribution in the spill vicinity. Threatened and endangered species protection notes are also provided in the *Technical Manual's* map descriptions. In addition, the types of coastal habitats exposed to the oil are listed by level of concern and depicted on maps of the spill area. Catalogued cultural resource sites are listed on the maps that cover their vicinity in the spill area as

well. The *Technical Manual* lists are adapted from the Alaska Regional Response Team's (ARRT's) "North Slope Subarea Plan."

The first strategy to protect resources of importance is to remove oil quickly and where it still lies in thick layers close to the spill source. Targeting that area can most effectively reduce the quantity of oil available to move into sensitive areas later.

A further strategy is to deploy exclusion and deflection boom at selected shoreline sites. The sites are selected partly on their suitability for maintaining boom conformance and anchors in the face of wind, waves and current. See the priority protection sites marked in the *ACS Technical Manual*, Volume 2. Simulated oil trajectories are shown in Figure 2. *ACS Technical Manual* Map Atlas maps 30 to 34, 56, 58 to 60, 62, 65, 66, 92, and 93 show the shorelines near the simulated trajectories. Where pre-staged equipment has been placed on marine shorelines, the maps indicate its location and list the contents of the containers.

To protect shoreline sites from oncoming oil that escapes the offshore oil removal task forces, strike teams of workboats tow delta and harbor boom from West Dock and anchor it in shallow water. Exclusion booming and deflection booming tactics, including equipment lists, personnel numbers, procedures, and mobilization and deployment times, are described in *ACS Technical Manual* Tactics C-13, C-14, and C-15. The numbers and features of the vessels and boom are outlined in Tactic L-6.

To protect birds and mammals, the main strategy is removing oil from the environment. The primary strategy for direct wildlife protection is hazing and collection of oiled carcasses. In the early hours of the spill response, hazing is carried out with ACS equipment and trained personnel under the direction and permits of the ADFG and the USFWS. Oiled carcasses are collected to remove them as sources of injury to predators. Oiled animals are captured, stabilized and treated by specialists using ACS equipment, including the wildlife stabilization facility at Prudhoe Bay. Animals requiring further treatment are transported to the Alaska Wildlife Rehabilitation Center in Anchorage. See *ACS Technical Manual* Tactics W-1 to W-6 for decision-making and field procedures.

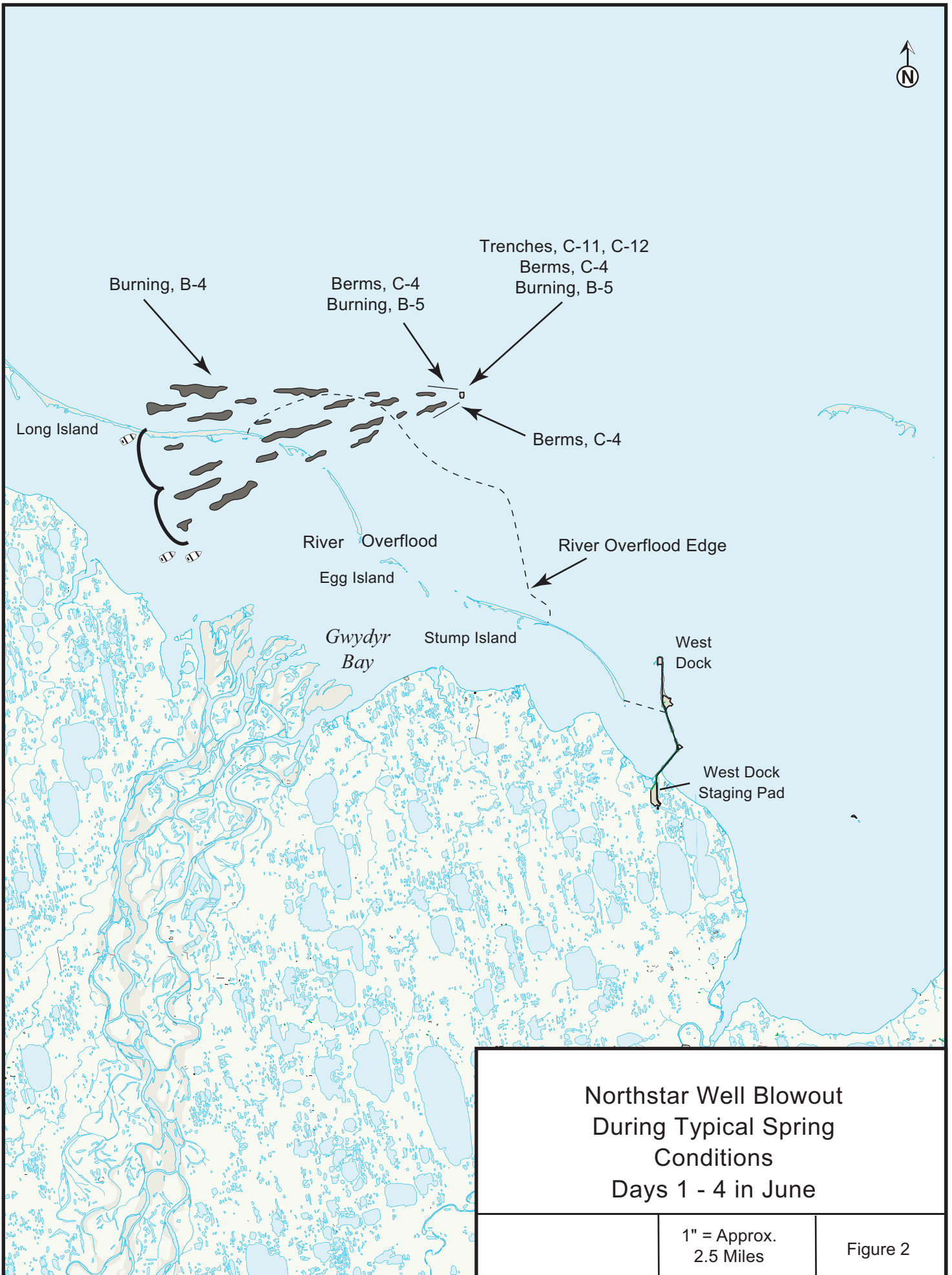
On the fast sea ice, seal breathing holes are identified and avoided by response operators under advisories from specialists in the Wildlife Unit.

#### **DISCUSSION OF EQUIPMENT, PERSONNEL AND TIMES [30 CFR 254.26(d)(1) THROUGH (4)]**

The following discussion illustrates a response to a WCD scenario in adverse weather conditions. The adverse weather conditions involve low temperatures, high winds, periods of fog, short-period waves up to 3 feet and ice concentrations. Descriptions of conditions are provided in the Simulated Conditions section of the scenario and in *ACS Technical Manual*, Tactic L-7, Realistic Maximum Response Operating Limitations, for mechanical response equipment. In addition, skimmer capacities are de-rated to reflect the effects of adverse weather among other factors.

The locations, owner and capacities of response equipment, personnel, materials, support vessels, oil storage, transfer, and disposal equipment in the scenario are listed in the *ACS Technical Manual* tactics cited in the narrative. The cited *ACS Technical Manual* tactics are incorporated into the scenario by reference.

Mobilization (procurement) and deployment times of the scenario's containment and recovery, storage equipment, equipment transportation vessels, and personnel to load and operate the equipment are listed in the *ACS Technical Manual* tactics' equipment tables. Equipment loadout times to transfer equipment to vessels are incorporated into the mobilization times. The tables are incorporated into the scenario by reference.



Northstar Well Blowout  
During Typical Spring  
Conditions  
Days 1 - 4 in June

1" = Approx.  
2.5 Miles

Figure 2

In situ burning and oil recovery operations are conducted on two 12-hour shifts per day. The equipment operates for 10 hours in each 12-hour shift. The remaining 2 hours represent down-time when equipment is out of conformance or conditions are beyond the equipment's operating limitations.

## **June**

Mobilization of oil containment and removal equipment begins on June 12, Day 1 of the simulated spill. The equipment is deployed at the spill scene and staged on the island in the first few days to avoid the surface transportation barrier posed by the loss of the ice road on June 15, Day 4 of the spill. Amphibious and tracked vehicles and airboats mobilized from North Slope sources provide stable work platforms and access to the ice. A staging area is set up at West Dock staging area on Days 1 and 2. See Tactics L-2 to L-6 and L-8 to L-10.

Equipment operations and workers on foot follow safety guidelines for vehicle load, ice thickness and ice condition and for walking on deteriorating ice that are found in Sandwell Engineering, Inc.'s (2001) Ice Access Guidelines for Spill Responders, prepared for ACS. ACS and SRT oil containment and removal crews work in safety zones determined by the Site Safety Officer, following OSHA standards. Containment and recovery operations are allowed without respiratory protection where safety criteria are met through real-time monitoring.

Some spill response workers operate closer to the blowout where oil particulate matter is expected to exceed the OSHA 8-hour PEL. The workers wear full-face air purifying respirator and organic vapor cartridges, chemically protective outwear over FRC, and nitrile gloves. The workers recover oil 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<sub>2</sub>S air concentration is less than 10 ppm
- Benzene air concentration is less than 10 ppm
- No visible mist or fog of oil present

## **ISLAND**

On Day 1, earth-moving equipment excavates a trench on the island bench to divert oil draining from the pad. A Challenger mobilizes from Prudhoe Bay to the island across the sea ice. Tracked Tucker trucks with blades also mobilize and travel on the same schedule.

Decontamination facilities are set up at West Dock during the initial hours of the response. A mobile decon site is mobilized from Prudhoe Bay and set up on the island bench on Days 2 and 3 during the last days of the ice road. On Day 4, a safe access work plan is implemented (Tactics S-1 to S-6).



## SEA ICE

Oil spill response technicians and equipment operators mobilize on Day 1 with their equipment for work on the sea ice.

On Day 1, 500 feet of fireboom is mobilized from storage at West Dock, hauled by Rolligon, and deployed on the ice adjacent to the island to contain oil draining from the island (Tactics C-11 and B-4).

A trencher machine cuts shallow trenches in the sea ice near the island beginning on Day 1. The objective is to divert and concentrate oil into depressions.

On Day 1, the Unified Command determines that ice conditions exceed the operating limit of mechanical oil transfer equipment. The option of hauling oil to shore with wheeled dump trucks and tankers once the oil is collected in pits and snow mounds is precluded by the seasonal loss of the ice road. Consequently, the contained oil and oil mixed with ice is burned in situ.

On Day 2, the Challenger moves oiled snow several hundred feet from the island to create fire breaks. On the sea ice, the Challenger and tracked Tucker trucks with blades begin moving windrowed snow and excavated material into berms on Day 2 (Tactics C-4 and C-12). The berms divert oil into depressions and away from un-oiled areas.

From June 13 to June 30, oil is burned on the ice and on the water perched on the ice by surface crews. See Figure 3.

The burning teams each comprise two vehicles: a tracked vehicle with a blade to make mounds and berms, and an airboat to shuttle burn residue from the spill scene. During this period, assuming a mix of 70 percent of the oil in thick films with 95 percent burn efficiency, and 30 percent of the oil in thin films with a 70 percent burn efficiency, the overall percentage remaining as residue is estimated as 13 percent  $(1 - (0.95 \times 0.70) + (0.70 \times 0.30) = 13)$ . The teams engage in the following tactics:

**Mounds.** Bladed vehicles move oiled snow into mounds for burning at a rate of 2 acres per day per vehicle (Tactic B-5). See the report by Coastal Frontiers Corp. 2001. Spring Break-Up Equipment Access Test Program, June 2001, for measured rates on deteriorating sea ice.

**Depressions.** The tracked Tucker truck vehicles also move snow into berms to divert and contain oil released from melting snow into thicker concentrations on meltwater pools for the purposes of burning and to exclude oil from un-oiled areas. See Tactics C-4, C-11, C-12, B-5, and B-6.

**Fireboom.** Oil pooled in trenches and behind fire booms near the island is ignited when the accumulation becomes thick, and the wind is away from the island and nearby on-ice operations (Tactic B-4).

**Aerial Ignition.** Oil on the ice naturally migrates to melt pools and accumulates against downwind ice edges. A helicopter drops gelled gasoline on more isolated pools of oil (Tactic B-3).

Residue is collected with hand tools and becomes available for transfer and storage at the average rate of 6.7 cubic yards per day  $[(249 \text{ bopd} \times 13 \text{ percent residue}) = 32.4 \text{ bopd}; (5.6 \text{ cubic feet per bbl} / 27 \text{ cubic feet per cubic yard}) \times (32.4 \text{ bopd}) = 6.7 \text{ cubic yards per day}]$  (Tactic B-6). Residue is transferred by an

airboat with shuttling capacity exceeding the rate that residue becomes available. Volumes are measured in the containers and logged on manifests.



## MELT PONDS

Beginning Day 2, a task force of airboats burns oil in the apices of fire boom on ponds of perched melt water and overflow water with handheld igniters (Tactic B-5). Fire booms are deployed and anchored in the ice. Airboats deploy boom and anchors and set up the configurations. A series of fire booms spans the oil plume. Each U-shaped fire boom has a sweep of approximately 300 feet and contains oil where it is burned in the boom apex. See Figure 4.

Figure 4 shows simulated response tactics Days 22 to 30 in early July. Table 3 and Table 4 list the major equipment and staff for oil removal before break-up.

### July 1 to 4

On July 1, Unified Command halts the on-ice operations in anticipation of break up. Ice tracking beacons and buoys are deployed with the objective of tracking potentially remaining oil as the ice breaks up (Tactic T-4A). A helicopter with a heli-torch is dispatched daily to burn oil patches on ice and water (Tactic B-3).

**TABLE 3: MAJOR OIL CONTAINMENT AND RECOVERY EQUIPMENT EQUIVALENTS NEEDED BEFORE BREAK-UP**

TACTIC	EQUIPMENT	NO. ITEMS
<b>On Island, Day 1</b>		
C-4, Berms on Island	Backhoe	1
<b>On Sea Ice, Day 1</b>		
B-4, Fire Containment Boom	Fire Boom	500 feet
	Airboat	1
	Rolligon	1
C-11, Trenching on Ice	Ditch Witch	1
<b>On Sea Ice, Day 2</b>		
C-4, Berms on Sea Ice	Challenger	1
	Tracked Vehicle with Blade, e.g., Tucker Sno-Cat	1
C-11, C-12, Trenching on Ice	Ditch Witch Trencher, e.g., R-100	1
B-5 and B-6, Burning on Sea Ice	Challenger	1
	Tracked Vehicle with Blade, e.g., Tucker Sno-Cat	4
	Airboat to Tend Burning	4
	Airboat for Shuttling	1
	Rolligon with Auger	1
	Fire Boom	1,000 feet
B-3, Ignition on Ice	Helicopter	1
	Heli-torch	2
B-4 (3), Burning on Overflow Ponds	Airboat to Tend Burning	6
	Fire Boom, 500 feet each	1,500 feet
	Airboat for Towing and Shuttling	3



Northstar Well Blowout  
During Typical Spring  
Conditions  
Days 22 - 30 in Early July

1" = Approx.  
2.5 Miles

Figure 4

**TABLE 4: PERSONNEL TO OPERATE OIL CONTAINMENT AND REMOVAL EQUIPMENT  
BEFORE BREAK-UP**

<b>LABOR CATEGORY</b>	<b>TACTIC</b>	<b>NO. STAFF PER TACTICAL UNIT</b>	<b>NO. TACTICAL UNITS</b>	<b>NO. STAFF PER SHIFT, DAYS 2 TO 6</b>	<b>NO. STAFF PER SHIFT, DAYS 6 TO 21</b>
<b>Team Leader</b>	C-4	1	1	1	1
	B-5, B-6 on ice	1	5	5	5
	C-11, C-12	1	1	1	0
	B-3	1	1	1	1
	B-4, B-6 in overflow ponds	1	2	0	0
<b>Vessel Operator &gt;30 ft</b>	B-4, B-6 in overflow ponds	1	2	2	0
<b>Vessel Operator &lt;30 ft</b>	B-5, B-6 on ice	1	5	5	5
	B-4, B-6 in overflow ponds	1	8	8	0
<b>Skilled Technician</b>	B-5 on ice	1	4	4	4
	B-3	5	1	5	5
	B-4 on overflow ponds	2	8	16	0
<b>General Technician</b>	B-5	2	4	4	4
<b>Equipment Operator</b>	C-4	2	1	2	2
	B-5 on ice	2	4	4	4
	C-11, C-12	1.5	2	3	0
<b>Total Operators and Technicians</b>	-	-	-	53	26

\* Vessel Operators are Team Leaders

## July 4 to 20

Following break-up, teams target the 2,998 barrels that fall to sea ice pieces and water from July 1 to July 11 [249 bopd x 12 days = 2,988 bbl].

Vessels and mini-barges for recovery configurations mobilize at West Dock, travel to the spill scene and deploy on the same schedule.

Vessel configurations, each with a Crucial C Disc 13/30 skimmer, free skim in the drift ice (R-31B). Other teams also target oil outside the barrier islands where they encounter <1 tenths ice. Oil and water are stored immediately in mini-barges.

In situ burning continues as the broken ice coverage decreases (Tactic B-3 and B-4). A heli-torch ignites isolated pockets of oil on the water, oil in fireboom and oil on ice pieces. Pairs of workboats tow fireboom in U configurations between ice pieces. Two workboats collect burn residue with hand tools (B-6) and off-load it to lined dump trucks at West Dock. The residue quantity is estimated by volume measurements at West Dock.

Daily aerial surveillance continues until fast ice forms in October.

Table 5 and Table 6 list equipment and staff that remove oil in the broken ice period. Table 7 lists skimmer capacities.

**TABLE 5: MAJOR OIL CONTAINMENT AND REMOVAL EQUIPMENT EQUIVALENTS NEEDED IN BROKEN ICE CONDITIONS**

<b>EQUIPMENT</b>	<b>EQUIPMENT PER TACTICAL UNITS</b>	<b>TOTAL QUANTITY</b>
Workboat Type E (2) and Type D (1)		3
Crucial C Disc 13/30 Skimmer		3
Workboat Type D, shuttle	3 ea. R-31B	3
Mini-barge		6
Helicopter with heli-torch	1 ea. B-3	1
Workboat, Type B and C		4
Fireboom, 500 LF ea per day for 16 days	2 ea. B-4	16,000 LF
Workboat, Type C	2 ea. B-6	2

**TABLE 6: PERSONNEL TO OPERATE OIL CONTAINMENT AND REMOVAL EQUIPMENT IN BROKEN ICE CONDITIONS**

LABOR CATEGORY	TACTIC	NO. STAFF PER TACTICAL UNIT	NO. TACTICAL UNITS	NO. STAFF PER SHIFT TO JULY 11	NO. STAFF PER SHIFT, JULY 12 TO 22
Team Leader	R-31B (3), B-4 (2)	1	9	9	9
	B-6				
Large Vessel Operator, >30 ft	R-31B	2	3	6	6
Small Vessel Operator, <30 ft	B-6	1	2	2	2
	B-4	1	2	2	2
Skilled Technicians	R-31B	5	3	15	15
	B-6	2	2	4	4
	B-4	2	2	4	4
Total Operators and Technicians	-	-	-	33	33

Total is sum of vessel operators and technicians; team leaders are vessel operators.

**TABLE 7: SKIMMER CAPACITIES DURING BROKEN ICE PERIOD**

A	B	C	D	E	F	G
SKIMMER AND ICE CONDITION	NO.	DE-RATED OIL RECOVERY RATE (boph)	DAILY EFFECTIVE OIL RECOVERY RATE (bopd) C X 20 HOURS	SUM OF DAILY EFFECTIVE OIL RECOVERY RATES (bopd) B X D	NO. DAYS	TOTAL SKIMMER CAPACITY (bb1) E X F
RB-10 drum/brush, ice <1/10	2	28	554	1,108	27	29,916
Crucial C Disc 13/30 Skimmer R-31B, >5/10s	3	236	4,720	14,160	16	226,560

A Liquid Transfer Task Force assembles at West Dock. The stored liquids are offloaded from the storage barges to vacuum trucks (Tactic R-22). The volumes of stored oil and free water are gauged with ullage tape in the barge tanks.



The Environmental Unit includes a three-person Waste Management Team to (1) fill out and sign manifests; (2) measure liquid and other waste; and (3) submit a plan to ADEC for waste management. Burn residue and non-liquid oily wastes are transported to GPB for handling and ultimate disposal. Liquid and non-liquid oily wastes are processed as described in Tactics D-1 and D-2.

Shoreline cleanup teams recover oil on marine shorelines using methods recommended by the Shoreline Cleanup Assessment Teams, reflected in a shoreline cleanup plan and approved by the Unified Command (Tactics SH-1 to SH-12).

### **July 20 to October 9**

In the ice-free season, in situ burning and mechanical oil recovery efforts continue. The heli-torch (B-3), fireboom (B-4), and detached J containment and skimming teams that operated in the broken ice earlier in July continue their efforts daily on day and night shifts in the ice-free conditions from late July to October. Their objective is to remove oil on the water that may remain after the earlier removal efforts. The B-4 rows in Table 5 and Table 6 list the equipment and staff of those on-water oil removal teams.

### **After October 9**

As the nearshore Beaufort Sea freezes, oil removal operations are reduced and then suspended for the winter. The on-water teams continue to target oil for removal in the ice-free water areas. However, the teams avoid taking paths through areas where grease, slush and new ice are forming. See Tactic L-7.

During the freeze-up period, aerial monitoring continues. Patches of scattered oil are reported and mapped until the area supports fast ice.



## United States Department of the Interior

MINERALS MANAGEMENT SERVICE  
Alaska Outer Continental Shelf Region  
3801 Centerpoint Drive, Suite 500  
Anchorage, Alaska 99503-5823



Mike Bronson  
BP Exploration (Alaska) Inc.  
P.O. Box 196612  
Anchorage, Alaska 99519-6612

JUL 31 2007

Dear Dr. Bronson:

The Minerals Management Service (MMS) has received and reviewed the BP Exploration (Alaska) Inc. (BPXA) Northstar Oil Discharge Prevention and Contingency Plan (ODPCP) dated June 2007. The ODPCP was prepared in accordance with the State of Alaska Oil and Hazardous Substances Pollution Control Regulations and submitted to satisfy the MMS regulations 30 CFR 254, for compliance with the Federal Oil Pollution Act of 1990. The MMS' review of the plan is limited to sections that directly pertain to offshore oil and gas exploration and production activities and offshore pipeline transportation of produced oil, including distillates or condensate associated with produced natural gas. This plan was submitted to meet ODPCP renewal requirements for both Alaska Department of Environmental Conservation (ADEC) and MMS.

The MMS has completed its review of the document and determined that the ODPCP adequately addresses MMS oil spill response requirements for offshore activities. Therefore the Northstar ODPCP is hereby approved. Review and renewal of this plan will be based on the State of Alaska's 5-year schedule with renewal required on or before June 27, 2012.

Since BPXA is submitting a State of Alaska ODPCP to satisfy the MMS requirements, BPXA will provide notifications of non-readiness and proposed modifications and amendments to the ODPCP, as required in 18 AAC 75, to the MMS at the same time they are presented to the State of Alaska.

If you have any questions, please contact me at (907) 334-5309 or by email at [christy.bohl@mms.gov](mailto:christy.bohl@mms.gov).

Sincerely

Christy Bohl  
Oil Spill Program Administrator

cc: Gary Evans, ADEC



LOG: 1709 8/2/07

**U.S. COAST GUARD**



**NORTHSTAR OPERATIONS  
OIL DISCHARGE PREVENTION AND CONTINGENCY PLAN  
CROSS REFERENCE TO  
U.S. COAST GUARD RESPONSE PLAN REQUIREMENTS  
[33 CFR 154.1035]**

REGULATION SECTION (33 CFR 154.1035)	SECTION TITLE	PLAN SECTION
<b>(a)</b>	<b>Introduction and Plan Content</b>	Contents are in Volume 1 (Response Action Plan) unless otherwise indicated
(a)(1)	Facility name, address, telephone number, and mailing address	Page i
(a)(2)	Facility's geographic location	Introduction
(a)(3)	24-hour procedure for contacting facility owner or operation	Sections 1.1, 1.2 and Table 1-3
(a)(4)	Table of contents	Table of Contents
(a)(5)	Cross-index	This Section
(a)(6)	Record of changes	ROR-1
<b>(b)</b>	<b>Emergency Response Action Plan</b>	
(b)(1)(i)	Prioritized list identifying person(s) to be notified of a discharge or substantial threat of a discharge of oil	Sections 1.1, 1.2 and Tables 1-1, 1-2 and 1-3
(b)(1)(i)(A)	Facility response personnel, the spill management team, OSRO, and the qualified individual(s) and the designated alternate(s)	Sections 1.1, 1.2, 3.8, Table 1-1, 1-2 and 1-3
(b)(1)(i)(B)	Government agencies	Section 1.2 and Table 1-4
(b)(1)(ii)	Notification form	Section 1.2, Figure 1-3
(b)(2)(i)(A)	Average most probable discharge	This Section
(b)(2)(i)(B)	Maximum most probable discharge	This Section
(b)(2)(i)(C)	Worst-case discharge	This Section
(b)(2)(i)(D)	Worst-case discharge from non-MTR portion of facility	Section 1.6.4
(b)(2)(ii)	Mitigation or prevention procedures for discharges or threat of discharge	Section 1.6.4, Table 1-1; Volume 2, Sections 2.1.5 through 2.1.10, 2.5 and 3.1.3, Table 2-5
(b)(2)(ii)(A)	Failure of manifold, loading arm, hoses, other transfer equipment	Section 1.6.4
(b)(2)(ii)(B)	Tank overfill	Volume 2, Sections 2.1.5, 2.1.8 and 2.5.5
(b)(2)(ii)(C)	Tank failure	Section 1.6.4; Volume 2, Section 2.5.5
(b)(2)(ii)(D)	Piping rupture	Section 1.6.4; Volume 2, Sections 2.5.2 through 2.5.4, 2.5.6, and 2.5.7

**CROSS REFERENCE (cont'd)**  
**U.S. COAST GUARD RESPONSE PLAN REQUIREMENTS**  
**[33 CFR 154.1035]**

REGULATION SECTION (33 CFR 154.1035)	SECTION TITLE	PLAN SECTION
(b)(2)(ii)(E)	Piping leak, both under pressure and not under pressure, if applicable	Section 1.6.4; Volume 2, Sections 2.5.2 through 2.5.4, 2.5.6, and 2.5.7
(b)(2)(ii)(F)	Explosion or fire	Section 1.6.4
(b)(2)(ii)(G)	Equipment failure	Sections 1.6.4 and 2.5
(b)(3)(i)	Facility personnel's responsibilities to initiate and supervise response pending arrival of QI	Section 1.1 and Table 1-1
(b)(3)(ii)	Qualified Individual's responsibility and authorities	Section 1.2.4
(b)(3)(iii)(A – H)	Organizational structure to manage response actions	Sections 1.1, 3.3, Tables 1-1, 1-2 and Figure 1-2
(b)(3)(iv)(A)(1)	Provide equipment and supplies to meet the requirements of §§154.1045 and 154.1047 as appropriate	Section 3.6
(b)(3)(iv)(A)(2)	Trained personnel for 7 days	Sections 3.5 and 3.9
(b)(3)(iv)(B)	Job descriptions for each spill management team member within the organization structure	Sections 1.1 and 3.9 and Table 1-1
(b)(4)(i)	Identification of environmentally sensitive areas potentially impacted by a worst-case discharge	Sections 1.6.4 and 3.10
(b)(4)(ii)(A)	List of sensitive areas potentially impacted by a worst-case discharge	Sections 1.6.4 and 3.10
(b)(4)(ii)(B)	Procedures to protect sensitive areas	Sections 1.6.4 and 3.10
(b)(4)(ii)(C)	Depict response actions on map	Section 1.6.4
(b)(4)(iii)(A) and (B)(iv)	Personnel and equipment to protect sensitive areas for distance and days per Table 2, Appendix C, 33 CFR 154; For non-persistent oil discharged into tidal waters, 5 miles from the facility down current during ebb tide and to the point of max. tidal influence or 5 miles, whichever is less, during flood tide.	Five mile circumference from barge mooring location; Sections 1.6.4, 3.5, 3.6, 3.8 and 3.9
(b)(4)(iii)(B)(2)	Trajectory model [substitute for distance calculation required by (b)(4)(iii)(B)(1)]	Not applicable
(b)(4)(iii)(B)(3)	U.S. EPA Planning Distances	Not applicable
(b)(5)	Disposal plan	Sections 1.6.3 and 1.6.4
<b>(c)</b>	<b>Training and Exercises</b>	
(c)(1)	Training procedures and programs to meet §154.1050	Section 3.9; Volume 2, Section 2.1.1
(c)(2)	Exercise procedures to meet §154.1055	Section 3.9
<b>(d)</b>	<b>Plan review and update procedures</b>	<b>Introduction</b>
<b>(e)</b>	<b>Appendices</b>	
(e)(1)(i)	Physical description of facility	Section 1.8; Volume 2, Section 3.1
(e)(1)(ii)	Identify the sizes, types, and number of vessels that the facility can transfer oil to and from simultaneously	Not applicable

**CROSS REFERENCE (Cont'd)**  
**U.S. COAST GUARD RESPONSE PLAN REQUIREMENTS**  
**[33 CFR 154.1035]**

REGULATION SECTION (33 CFR 154.1035)	SECTION TITLE	PLAN SECTION
(e)(1)(iii)	Identify first valve(s) on facility piping separating the transportation-related portion of the facility from the non-transportation-related portion of the facility.	Valves are at the bulk storage tank and are located within secondary containment.
(e)(1)(iv)(A – E)	Information on oil handled, stored, or transported at the facility in bulk	Material Data Safety Sheets are available in the Fuel Transfer Operations Manual (33 CFR 154.300), maintained at the Northstar facility.
(e)(2)	List of contacts	Sections 1.1 and 1.2, Table 1-1 through 1-4
(e)(2)(i)	24-hour contact for Qualified Individual and alternate	Section 1.1, Table 1-3
(e)(2)(ii)	24-hour contact for oil spill response organization(s)	Section 1.1, Tables 1-1 and 1-3
(e)(2)(iii)	24-hour contact for agencies	Section 1.2, Table 1-4
(e)(3)(i)	Equipment and Personnel for Response of Average Most Probable Discharge	Sections 1.1, 1.6.4, 3.3, 3.5, 3.6, and 3.8
(e)(3)(ii)	Equipment list belonging to OSRO to respond to a most probable or worst-case discharge	Section 3.6 and ACS <i>Technical Manual</i> , Volume 1, Tactic L-6
(e)(3)(iii)	USCG OSRO Classification	Section 3.6
(e)(4)	Communications Plan	Section 1.4
(e)(5)	Site-Specific Health and Safety Plan	Emergency Action Plan for Northstar maintained on BPXA's intranet website. Available upon request.
(e)(6)	List of Acronyms and Definitions	Table of Contents

### **Average Most Probable Discharge**

The average most probable discharge is calculated as approximately 0.5 bbl of diesel fuel, based on the definition contained in 33 CFR 154.1020 (the lesser of 50 bbl or 1 percent of the volume of the worst-case discharge).

### **Maximum Most Probable Discharge**

The maximum most probable discharge is 4.5 bbl of diesel fuel, based on the definition contained in 33 CFR 154.1020 (the lesser of 1,200 bbl or 10 percent of the volume of the worst-case discharge).

### **Worst-Case Discharge**

The worst-case discharge is calculated as approximately 45 bbl of diesel fuel, based on the formula provided in 33 CFR 154.1029(b)(2), using the following values:

- *Maximum Time to Discover Release:* 2 minutes (The transfer hose will be kept in sight at all times during a transfer from the barge to the diesel storage tank).
- *Maximum Time to Shutdown Pumping:* 0.5 minutes
- *Maximum Flow Rate:* 10.5 bbl per minute
- *Total Line Drainage Volume:* 19 bbl (based on 1,200 ft of 4-inch-diameter hose)



U.S. Department of  
Homeland Security

United States  
Coast Guard



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510 L Street, Suite 100  
Anchorage, AK 99501-1946  
Staff Symbol: Prevention  
Phone: (907) 271-6700  
FAX: (907) 271-6751

16230

BP Exploration (Alaska) Inc.  
Attn: Mike Bronson, Crisis Management Coordinator  
900 E Benson Boulevard  
P.O. Box 196612  
Anchorage, AK 99519-6612

AUG 27 2007

Dear Mr. Bronson:

We have completed the review of Northstar Facility Response Plan. Your plan is hereby approved. Your Facility Response Plan (FRP) expires and is due for a complete review, in five years from the date of this letter. However, an annual review of the FRP shall be conducted in accordance with 33 C.F.R §154.1065, and any revisions shall be submitted to the Captain of the Port (COTP). If no revisions are required, the facility owner or operator shall indicate the completion of the annual review on the record of changes page.

Changes to the FRP that come before the annual review must be submitted to the COTP within thirty days of the change. A list of changes that shall be submitted are listed in 33 C.F.R. §154.1065(b).

Questions or comments concerning your FRP shall be directed to Sector Anchorage, Facilities Department at (907) 271-6700 / (6918) / (6721). Submit revisions to the above address.

Sincerely,

A handwritten signature in cursive script, appearing to read "S. E. Durden".

S. E. DURDEN  
Chief Petty Officer  
U.S. Coast Guard  
By Direction of  
Captain of the Port Western Alaska