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# EXPLORATION PLAN

REGIONAL SUPERVISOR  
FIELD OPERATION  
MINERALS MANAGEMENT SERVICE

**OCS LEASE SALE 87 AREA  
DIAPIR FIELD  
BEAUFORT SEA, ALASKA**

**UNION OIL COMPANY OF CALIFORNIA**

EXPLORATION PLAN  
FOR  
HAMMERHEAD PROSPECT  
OCS SALE 87 AREA  
BEAUFORT SEA, ALASKA

UNION OIL COMPANY OF CALIFORNIA

MARCH 1985

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## 1.0 Introduction

Union Oil Company of California (UNOCAL), as operator for themselves, Shell Western Exploration and Production Inc., (SWEPI), and Amoco Production Company (AMOCO) (hereinafter "parties"), hereby submits this Exploration Plan for the drilling of exploratory wells on the Hammerhead Prospect involving Federal leases in the eastern part of the Beaufort Sea OCS Sale No. 87. Beginning in the summer season of 1985, UNOCAL proposes to begin evaluation of this prospect from an arctic-designed drillship.

## 2.0 Location of Area of Interest

The Hammerhead Prospect is located within the Area of Interest as drafted by the parties. The Area of Interest is depicted in Figure No. 1 and includes blocks in which the parties have individually or jointly acquired exploratory rights.

The parties have conducted or participated in geophysical surveys and geological studies in this Area of Interest. Available geologic information from other wells drilled in the geographical area has also been considered. The interpretation of these data encourages the parties that significant accumulations of hydrocarbons may exist under the acquired leases. As shown in Figure No. 1 & 2, the Area of Interest is located north of Camden Bay. These prospects are located at the eastern, central and western part of the Area of Interest. The water depth of the prospects ranges from approximately 100 to 120 ft. The location of UNOCAL's proposed drilling activity is within

the Hammerhead Prospect in the western part of the Area of Interest. SWEPI and AMOCO will be submitting their Exploratory Plans to cover the proposed operations on their prospects in the near future.

Operatorship of a portion of these blocks within the Area of Interest has been assigned by prospect area to the three different companies as follows:

<u>COMPANY</u>	<u>PROSPECT NAME</u>	<u>CENTRAL BLOCK NO.</u>
UNOCAL	Hammerhead	624
SWEPI	Corona	678
AMOCO	Eric	705

(Please refer to Figure No. 2)

The order in which the various wells of each prospect will be evaluated depends upon the drilling and testing results of the first and subsequent wells.

### 3.0 Supporting Documents

The Exploration Plan is composed of several documents. The main body of the plan is contained in this report. In addition, two stand-alone appendices have also been submitted. Appendix 1 contains proprietary and confidential geologic information. Appendix 2 is the Oil Spill Contingency Plan for part of the Sale 87 Area. The Environmental Report is also submitted as a separate document in support of this Exploration Plan. Because of the similarity of conditions, the Oil Spill Contingency Plan and the Environmental Report have been prepared to address the Area of Interest as defined by the parties.

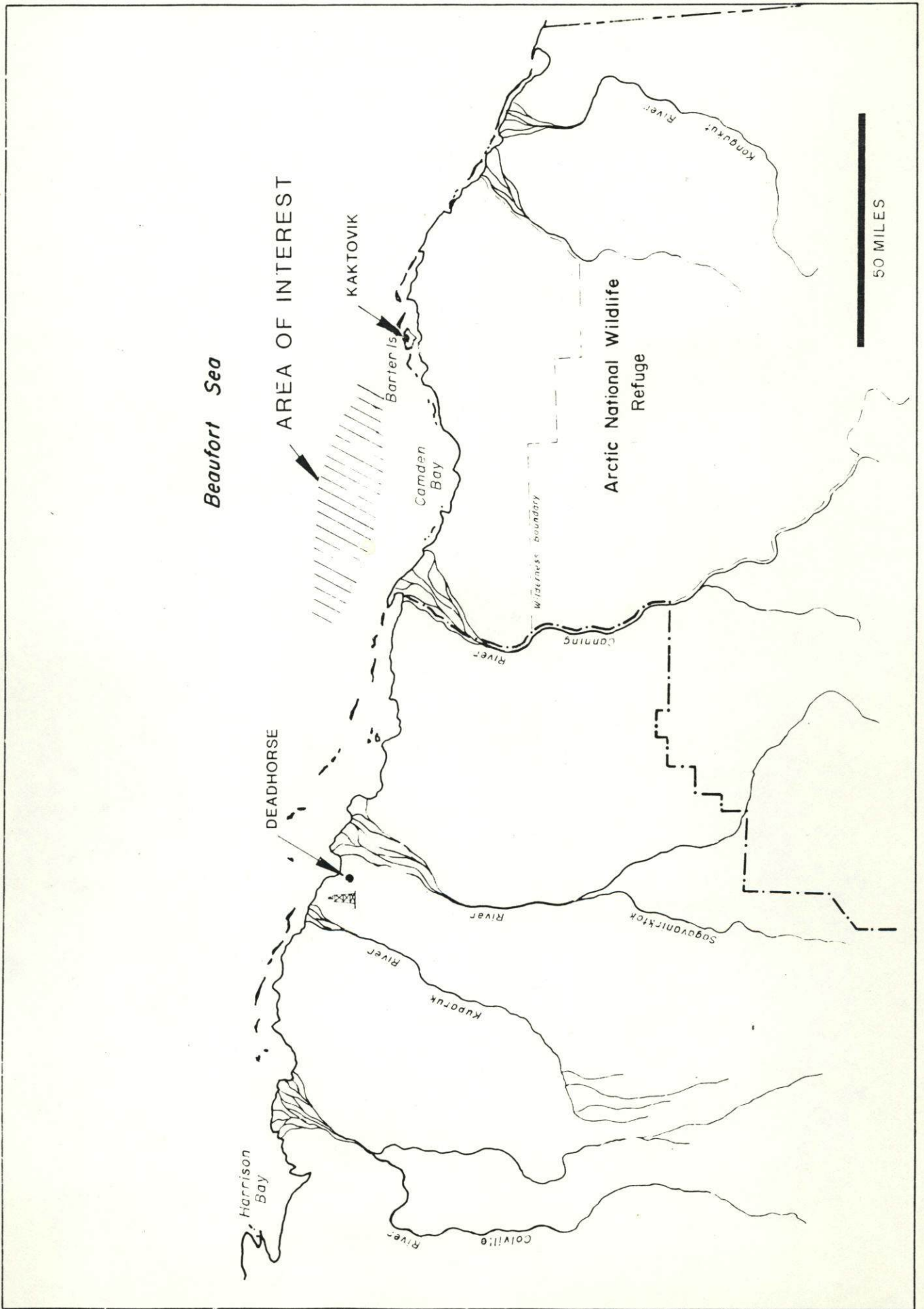
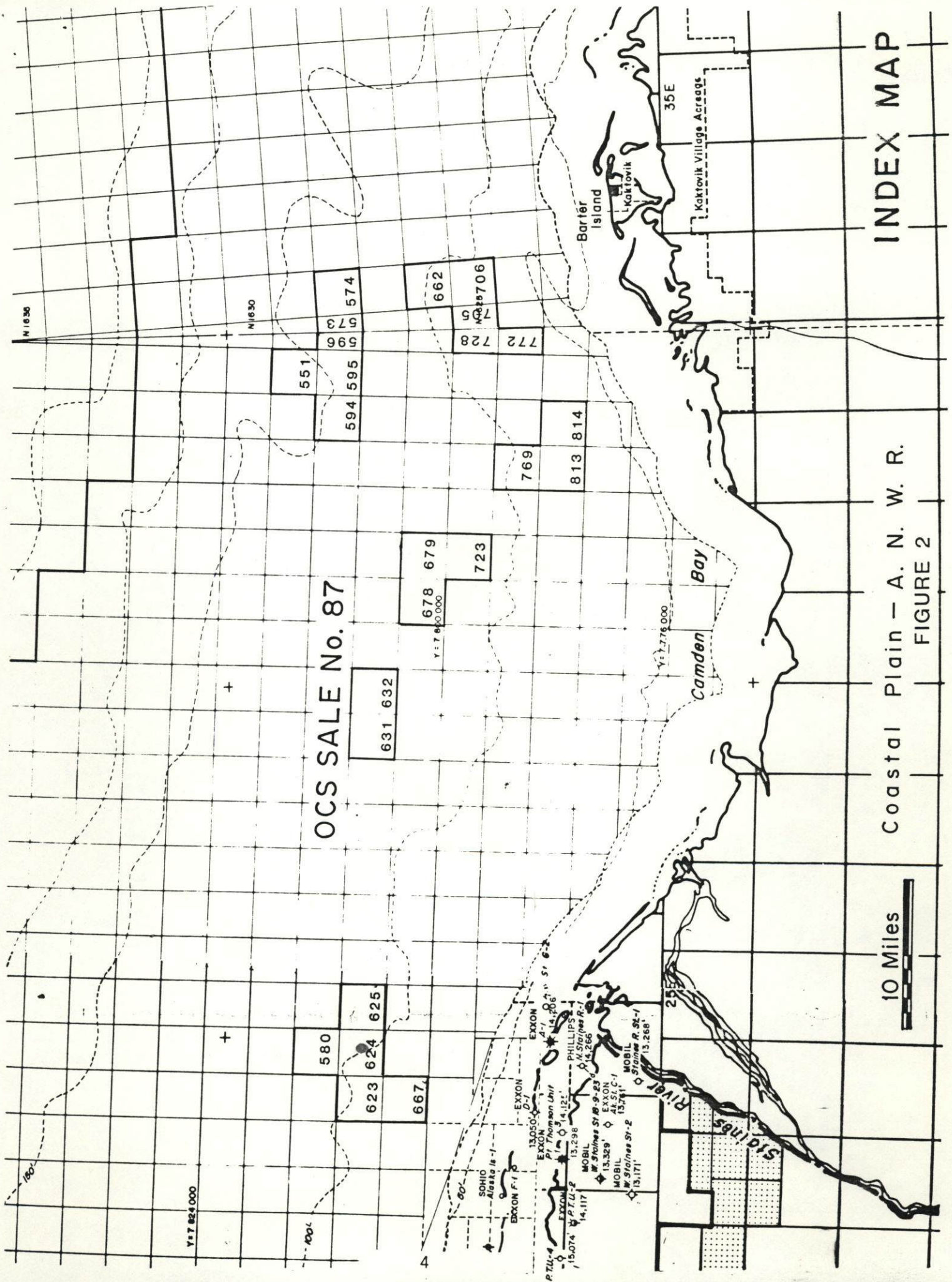


FIGURE 1





Shallow geohazard surveys have been conducted to assess the drill site conditions at anticipated well locations and the results will be submitted with or prior to the Application for Permit to Drill (APD) in compliance with MMS guidelines.

#### 4.0 Proprietary Data

All proprietary data of the Exploration Plan for the Hammerhead Prospect has been placed in Appendix 1, which is included as a separate volume. This data is provided for the exclusive use of MMS. Included in Appendix 1 is a structure contour map, and a schematic cross-section of the prospect.

#### 5.0 Description and Schedule of Proposed Activity

As operator of the Hammerhead Prospect, UNOCAL proposes to drill, evaluate and test one or more of the exploratory wells shown in Table 1. The approximate locations are shown in Figure 3. The locations as shown, if all are drilled, would test and define this prospect. The drilling sequence will begin with location No. 1. The remaining wells listed are subject to change as results from previously completed wells are taken into consideration. Depending upon ice conditions, drilling could begin in mid-July of 1985.

Drilling and testing time for a 8,000 well is expected to take 45 days.

Drilling depth and weather will have an effect on this time-frame.

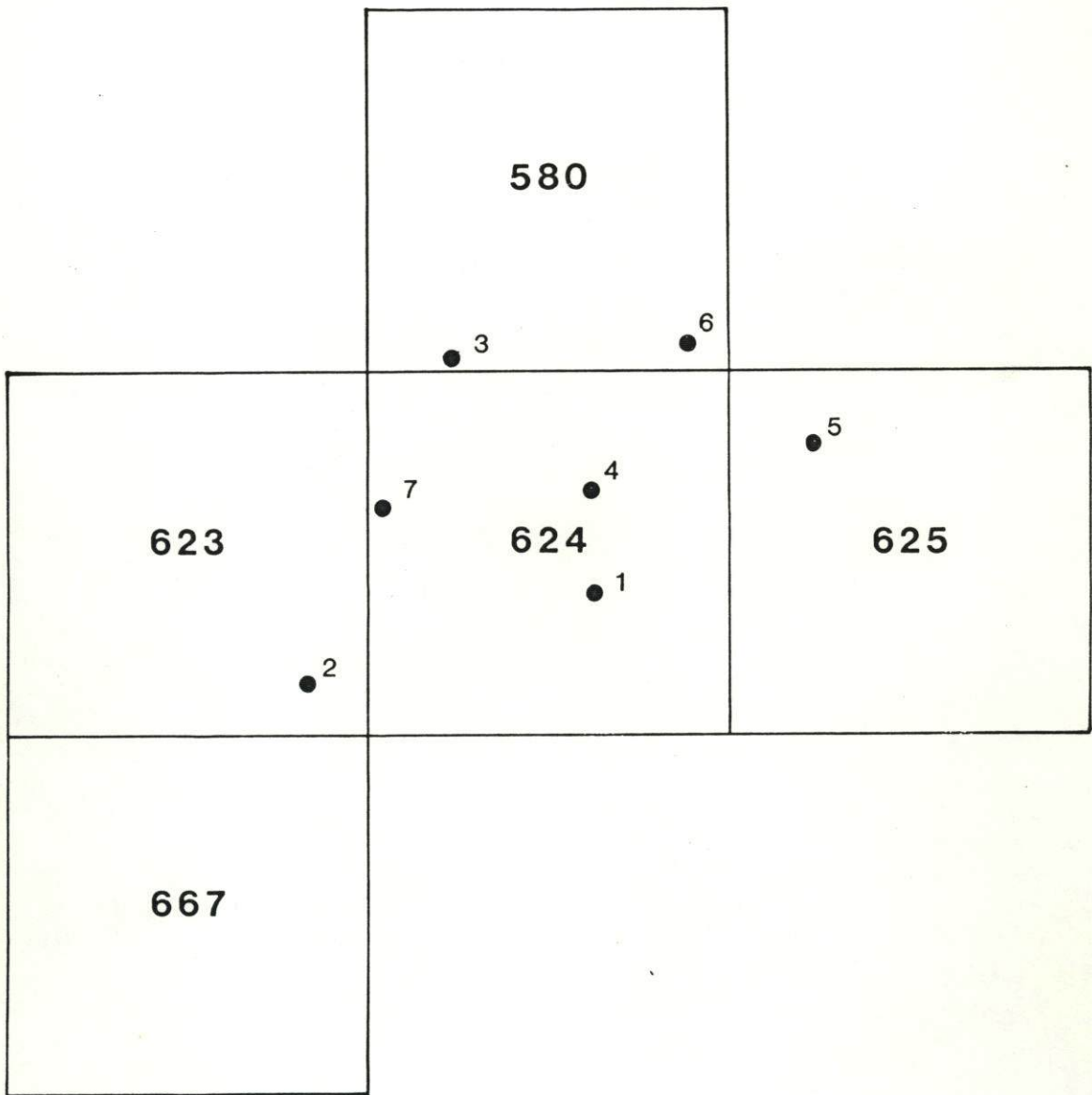
PROPOSED EXPLORATORY WELL LOCATIONS  
FOR  
HAMMERHEAD PROSPECT  
OCS SALE 87  
BEAUFORT SEA, ALASKA

<u>Well Site No.</u>	<u>NR 6-4 Block No.</u>	<u>Lease OCS-Y</u>	<u>Water Depth (ft)</u>	<u>Lat Long Co-od</u>	<u>UTM Zone 6 Co-od (M)</u>
1	624	849	100 Approx.	70.3646°N 146.0243°W	X=536,591 Y=7,806,655
2	623	848	100 "	70.3547°N 146.0754°W	X=532,792 Y=7,809,718
3	580	843	100 "	70.3924°N 146.0754°W	X=534,631 Y=7,809,718
4	624	849	100 "	70.3770°N 146.0270°W	X=536,470 Y=7,808,028
5	625	850	100 "	70.3820°N 145.9454°W	X=539,517 Y=7,808,645
6	580	843	100 "	70.3943°N 145.9892°W	X=537,851 Y=7,809,996
7	624	849	100 "	70.3748°N 146.0988°W	X=533,782 Y=7,807,744

NOTE:

- 1.) The well sites number does not designate drilling sequence.
- 2.) The wells are proposed as vertical.
- 3.) The anticipated depths are listed in the confidential section to the MMS as Appendix 1.

Table 1



# HAMMERHEAD PROSPECT AREA

SCALE: 1"=2400 METERS

FIGURE 3

# PROPOSED EXPLORATION PROGRAM SCHEDULE

DRILL WELL #1

POSSIBLE WHALE CLOSURE PERIOD

DRILL WELL #2



FIGURE 64e

Moves between wells should require about 2 to 3 days. A tentative time schedule of each drilling season is shown in Figure 4. A delay in starting would result in a shift of the entire schedule. Because of timing, drilling results, and uncertainties due to contingencies related to ice conditions, an extended schedule is not available.

#### 6.0 Drillship and Drillrig Description

A moored ice class drillship, the CANMAR Explorer II, will be utilized in the proposed drilling program. The CANMAR Explorer II will be supported by three ice class vessels. The support vessels will be used for anchor handling and ice management. The Robert Lemeur is a 9600 HP, Class 3, icebreaking supply vessel which will be used to open the route to the drillsite. It will be used for ice management, supply transport and picket duty in support of the Explorer II. The Supplier I and Supplier VII are smaller ice-class supply vessels which will share picket duty, ice management, anchor handling and supply transport duties with the Robert Lemeur. At least two of these three vessels will be on picket duty with the drillship at all times.

In the event that encroaching ice becomes detrimental to the drilling operation, the supply vessels will break up the ice around the drillship. Large floes will be broken, towed, or pushed so that their drift trajectories miss the drillship. In heavy ice, the supply vessels will continuously steam around the drillship to keep the ice sufficiently broken up so that it will produce minimal lateral forces on the drillship hull and easily flow around it. Vessel design specifications and drilling equipment are outlined in this section. An outboard profile of the drillship is shown in Figure 5.

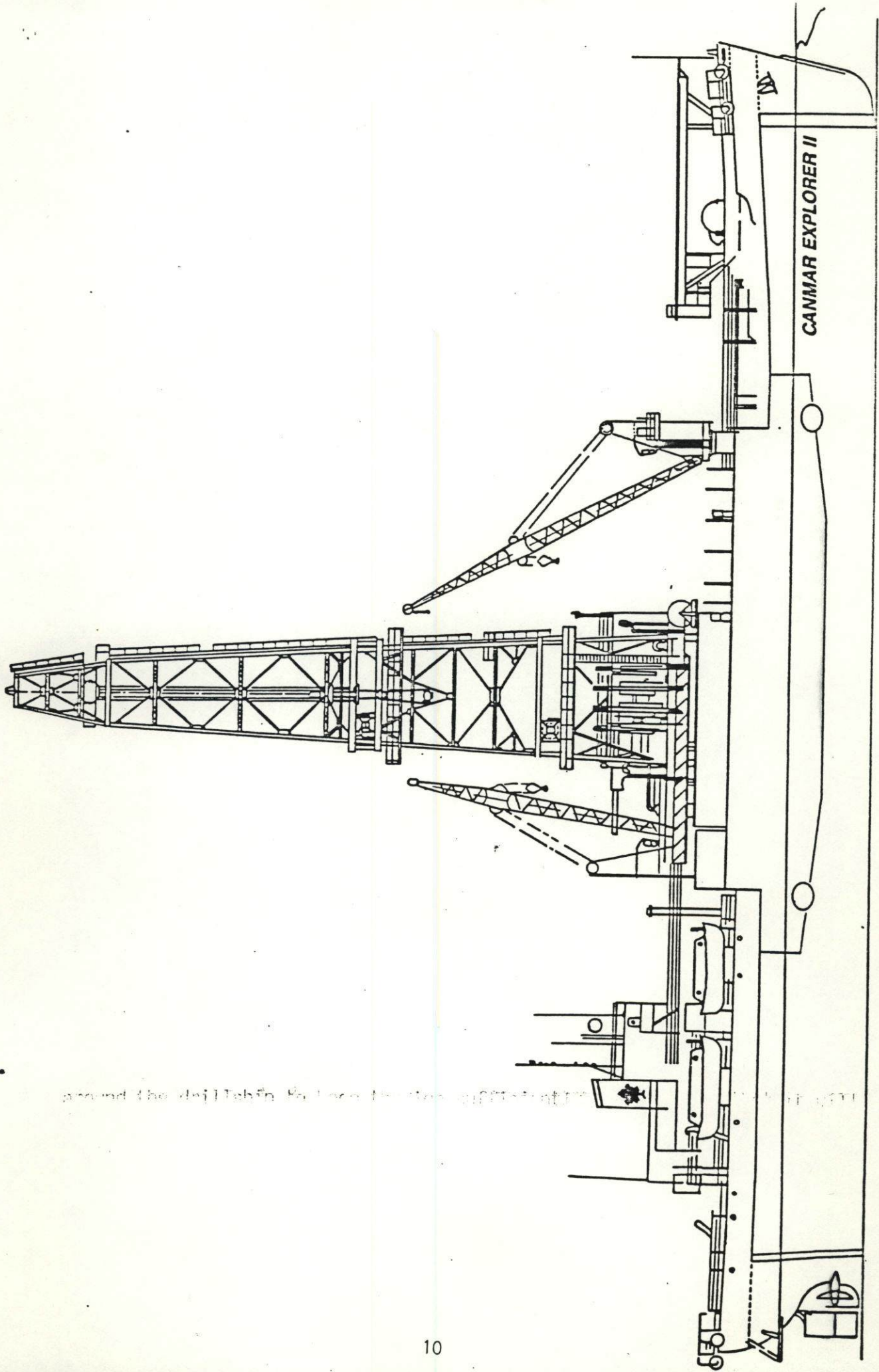


Figure 5 Outboard Profile of CANMAR Explorer II

6.1 Environmental Capability

- 6.1.1 Drilling Operations Capability - concurrent 17.5 foot waves and winds at 65 knots in 85 foot water depth.
- 6.1.2 Cold Weather Capability - enclosed drillrig (no cold weather restrictions.)
- 6.1.3 Water Depth Capability - 600' maximum depth capability.

6.2 Drilling Capability

- 6.2.1 Depth rating - 20,000'
- 6.2.2 Major Drilling Equipment -
  - Derrick - 160' with 1,330,000 lb capacity, designed to withstand 86 knot winds.
  - Drawworks - IDECO Model 2100 with Baylor Elmagco Model 6032 auxiliary brake, driven by two GE Model 752R motors.
  - Rotary Table - IDECO Model LR-375 (37 1/2").
  - Maximum support load of 700 tons.
  - Mud Pumps - Two National 12P-160 triplex pumps each driven by two GE 752R DC motors.

6.3 Subsea Equipment

- 6.3.1 Blowout Preventers - 18 3/4", 10,000 psi WP system,
  - One - triple ram,
  - One - single ram,
  - One - unitized double spherical (5,000 psi WP)

6.3.2 Marine Riser - 22" riser with 10,000 psi kill/choke/booster lines.

6.3.3 All accessory and control equipment necessary to complement the primary subsea equipment represents state-of-the-art design.

#### 6.4 Mooring System

The CANMAR EXPLORER II utilizes an eight point system with acoustic quick release modules on all eight lines. Four Skagit model DMW-250 double drum winches with collapsible pawls and 2 3/4" wires. Eight Bruce 6.5 ton moorfast anchors are employed.

#### 6.5 Power Plant

6.5.1 Main engines - Seven Caterpillar D-399Ta, (1125 BHP each)

6.5.2 AC Generators - Four GE 1162.5 KVA-600VAC - three Tamper 1250 KVA - 600 VAC

6.5.3 DC Conversion - Seven GE SCR's 1000 AMP @ 750VDC, two Marine & Industrial SCR's, 700 AMP @ 750VDC

6.5.4 Emergency Power - One caterpillar D-343, 250 kw (360 BHP)

#### 6.6 Cranes

One Liebherr Model BOS 35/360 (100' boom, 35 ton)

One Liebherr Model BOS 80/1800 (95' boom, 80 ton)

One Skagit (35 tons)



6.7 Heliport

Capable of handling Sikorsky S-61, Puma, and all smaller helicopters - complete fuel system, aircraft fire fighting system, and flight navigation system (DME type), SWRS (Certified) weather station onboard to meet FAA rules for IFR aircraft operations.

6.8 Survival Equipment

6.8.1 Personnel Safety - all USCG, SOLAS, ABS, and OSHA required equipment.

6.8.2 Fire Safety - All firefighting equipment and sensors as required by the USCG.

6.8.3 Evacuation - covered power lift boats as required by the USCG

6.8.4 H<sub>2</sub>S safety - Equipment for detection and personnel safety as required by the H<sub>2</sub>S contingency plan.

6.9 Storage Capacities

6.9.1 Drilling Water - 2,000 bbls

6.9.2 Potable Water - 16,800 gallons (onboard water maker capable of producing 9,600 gal. per day)

6.9.3 Diesel Fuel - 294,000 gallons

6.9.4 Helicopter Fuel - 1,200 gallons

6.9.5 Liquid Drilling Mud - 3,800 bbls

6.9.6 Bulk Cement - 9,600 cu. ft.

6.9.7 Bulk Mud - 9,600 cu. ft.

6.9.8 Sacked Material - 313 tons

The drillship will provide self-contained facilities for housing about 100 persons. The drillship contains necessary utilities, a potable water supply and a sewage treatment plant.

Storage tanks are provided for fuel and contaminated fluids produced during production testing. Small quantities of produced hydrocarbons will be incinerated in the drillship's boiler system while larger quantities will be flared outboard.

Additional details specific to the rig will be submitted with the APD, as required by the MMS. Discussions of the drillrig safety, monitoring and support systems are included in the Environmental Report.

#### 7.0 Pollution Prevention and Control Equipment and Procedures

Pollution prevention is assigned a high priority, exceeded only by the protection and safety of personnel. Proper equipment is provided on the drillship and on the supply vessels in order to minimize the potential for environmental harm. Good housekeeping practices are emphasized. The equipment and procedures for responding to a potential oil spill in Beaufort Sea waters are detailed in the Oil Spill Contingency Plan (see Appendix 2, separate volume).

#### 8.0 Fresh Water Source, Treatment of Sewage and Other Discharges

Fresh water for the drillrig's use will be provided by a desalinization plant located on the drillship. A sewage plant on the drillship will process sewage

before discharge. All discharges will comply with the conditions of the Environmental Protection Agency (EPA) National Pollutant Discharge Elimination System (NPDES) general permit for the Beaufort Sea. An estimated volume of discharge while drilling is shown as Table 2. An application will be filed to operate under the general NPDES permit for the Beaufort Sea. All drillship equipment and procedures for discharges will comply with applicable lease stipulations and permits.

## 9.0 Training and Drills

- 9.1 Well Control Training - As required by OCS Order 2, company and contractor personnel involved directly in drilling operations (including rotary helpers and derrickmen) will be trained in well control methods and detection of abnormal pressures. Such training will be completed in approved company or industry schools before drilling is commenced. A list of personnel and their completed training will be maintained on the drillship and will be available on request. Blowout prevention drills will be conducted as outlined in MMSS-OCS-T1.
- 9.2 Fire Drills - Procedures for emergencies, such as fires are spelled out in a Station Bill and together with the specific emergency responsibilities for crew members, are posted at appropriate conspicuous places on the drillship.

TABLE 2. Estimated Discharges for one (1) exploratory well.

Discharge	ESTIMATE VOLUME
Drill mud (daily dump)	11,500 GPD
+ Excess mud	42,000 gals 3 times
Drill cuttings and wash water	3,500,000 GPD
Deck Drainage	1,000 GPD
Sanitary & domestic waste discharge	3,500 GPD
Desalinization unit discharge	3,700 GPD
Blowout prevention (BOPO) fluid discharge	50 GPD
Non-contact cooling water	3,500,000 GPD
Uncontaminated ballast water	18,000 GPD
Excess cement	7,500 GPD
Oil/water separator	1,400 GPD

Fire drills will be conducted on a regular basis for all crew members.

- 9.3 Safety Measures - Safety meetings will be conducted periodically to make crews aware of safety procedures and to review potential sources of accidents, and the means of preventing them. Accident causes and corrective measures to be taken to prevent recurrence will be discussed in the event of accidents.

#### 10.0 Environmental Training

An Environmental Training Program (ETP) is being prepared jointly by successful bidders for operations in the Sale 87 area. The program is designed to comply with OCS Sale 87 stipulations and will be presented to all personnel directly involved in the exploratory activities covered by this plan. The purpose of the program is to provide managers, supervisors and employees, together with their agents, contractors and subcontractors, an awareness of the Beaufort Sea Sale 87 area environmental, cultural and sociological systems. A presentation will be made by a qualified instructor to all personnel who will be working on, or visiting the operations. The Environmental Training Program, when completed, will be submitted to the MMS for review and approval before drilling activities in the Sale 87 area are initiated.

## 11.0 Coastal Zone Management Consistency

The activities proposed in the Exploration Plan are consistent with Alaska's Coastal Zone Management Program and will be conducted in a manner consistent with the purposes of that program. A copy of the Certification of Consistency is contained in the Environmental Report for the Sale 87 area which accompanies this document.

## 12.0 Emergency Situation Provisions

Plans for dealing with emergency situations involving oil spills are presented in Appendix 2, Sale 87 Beaufort Sea Oil Spill Contingency Plan. A contingency plan for hydrogen sulfide hazards will be included with the APD's filed for each well. Other emergency situations are discussed in the following sections.

### 12.1 Critical Operations and Curtailment Plan

The factors that could result in the curtailment of drilling operations on location in the Beaufort Sea Sale 87 area would be wind, waves, and ice and the presence of migratory bowhead whales. This section addresses wind, waves, and whales; ice conditions are addressed in Section 12.5

Critical operations include drilling, coring, running and cementing casing or riser, cutting and recovering casing, logging or other wireline operations, and drill stem testing.

#### 12.1.1 Wind and Wave Factors

Any critical operation will be curtailed when the wind and waves either singly or in combination with each other exceeds a significant wave height of 17.5 feet and/or the wind velocity exceeds 65 knots. Specific curtailment limits for each of these critical operations with the design characteristics of the actual drillship to be used will be included with a more detailed curtailment plan to be submitted with each APD.

#### 12.1.2 Other Conditions

No drilling operations will commence or be conducted when any of the following conditions exist:

1. When there is an insufficient supply of drilling fluid materials on board to control the well.
2. When there are not enough vessels in the area to deploy the necessary booms or skimmers.
3. When sufficient emergency containment and cleanup equipment is not on location or is not maintained in good working order.
4. When the manpower required to safely conduct the drilling operations is not available.
5. When any critical machinery needed to assure a normally safe operation is not operative.

6. When shutdown is directed by MMS in response to bowhead whales migrating through the area.

IMPORTANT: The above list is only a guideline. The decision as to what action to take during a given emergency, no matter what the cause, must be based on the judgement of the operator's Drilling Supervisor, and the drillship's Captain.

## 12.2 Loss or Disablement of the Drillship

If the drillship becomes partially or totally disabled while under contract to the parties in Alaskan waters, the priorities for action in all cases will be:

1. Personnel safety and evacuation, if required.
2. Prevention of pollution from well in progress.
3. Minimize property and drillship damage.
4. Regulatory agency and operator management notification.

All contingency plans are developed with these priority objectives in mind. If the drillship is damaged to the point where it cannot be repaired on location, after evacuation of personnel (if necessary) and securing or plugging the well in progress, the drillship would be towed to the nearest suitable harbor (or dry dock) facility for repairs. If the drillship is damaged beyond repair, a similar drillship will be brought in as soon as possible to continue drilling or plug and abandon the well. Debris will be removed from the seafloor in accordance with Coast Guard regulations and other agency requirements.



Relief well plans are included in the accompanying Oil Spill Contingency Plans.

#### 12.4 Loss or Damage to Support Craft

The same priorities for emergency response in the event of a supply vessel or helicopter accident will be followed as for a drillship mishap. Since there will be at least three vessels and one helicopter dedicated to our operations at all times, there will be strong back-up capability to provide assistance in the event any one of these support craft requires help. Additional assistance for search and rescue operations would come from the Prudhoe Bay operators and equipment available at Deadhorse. If any support craft is lost from service to the operations, a suitable replacement for that support craft will be acquired before proceeding with any segment of the operation which depends on it's safety in that support craft.

#### 12.5 Environmental Hazards Unique to the Site of the Drilling Operations

The environmental hazards in the Beaufort Sea include sea ice and superstructure icing (potentially a problem for both rig and support craft).

Sea ice could be present during the proposed program, depending on wind and temperature conditions. If the support vessels cannot

prevent drifting ice from moving the anchored drillship, critical operations will be curtailed and, in the extreme, down hole equipment and anchors will be pulled, allowing the drillship to retreat from the drillsite until ice conditions become manageable. Helicopter observation, ship-mounted radar and Side-Looking Airborne Radar (SLAR) observations will be performed to monitor ice floe positions, size and movement. These data will be used to direct the ice management vessels and determine the need for early curtailment of operations.

A careful estimate of the time required to curtail ongoing operations and move the drillship off location will be maintained and updated every four hours while the drillship is on location.

Meteorological data for the area indicate that moderate to heavy superstructure icing could occasionally occur during the months of September and October. The unlikely occurrence of icing conditions is dependent upon air temperature, surface water temperature and wind speed. The drillship will be instrumented with meteorological and oceanographic monitoring systems that will accurately monitor wind speed, air temperature and water temperature. The onsite meteorological and oceanographic data will be utilized on a routine basis in Tuktoyuktuk to project weather forecast. These will be relayed by microwave or radio to the drillship. Conditions at the drill site will be monitored, recorded, and information disseminated to supervisory personnel on a routine basis. Also, routine reports will be disseminated to the supply vessels. By utilization of weather data and forecasts, impending superstructure icing conditions

can be predicted and proper mitigating measures can be employed.

Operations on the drillship should not be affected unless a storm of significant magnitude and duration occurring simultaneously with low surface water temperature develops. Such a forecast might result in securing the well until the storm subsides.

APPENDIX 1  
GEOLOGICAL DATA  
(Proprietary and confidential)

Appendix 1 contains a structure contour map; a schematic cross-section; and Table 1.

APPENDIX 2  
OIL SPILL CONTINGENCY PLAN  
(Separate, stand-alone volume)