OCS Study
BOEM 2024-035

Alaska OCS Oil and Gas Activities: Historical Data Compilation and Synthesis

U.S. Department of the Interior
Bureau of Ocean Energy Management
Alaska OCS Region, Anchorage, AK

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DISCLAIMER

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List of Abbreviations and Acronyms

2D	two-dimensional
3D	three-dimensional
AECOM	AECOM Technical Services, Inc.
API	American Petroleum Institute
ARCO	Atlantic Richfield Company
ARLIS	Alaska Resources Library & Information Services
ASRC	Arctic Slope Regional Corporation
Bbbl	billion barrels
bbl	barrel(s)
Bcf	billion cubic feet
BF	Beaufort Sea
BLM	U.S. Department of the Interior, Bureau of Land Management
BOEM	U.S. Department of the Interior, Bureau of Ocean Energy Management
BPXA	BP Exploration (Alaska) Inc.
BSEE	Bureau of Safety and Environmental Enforcement
CFR	Code of Federal Regulations
CI	Cook Inlet
CIDS	concrete island drilling system
cf	cubic feet
cy	cubic yards
COST	continental offshore stratigraphic test
DST	deep stratigraphic test
DWT	deadweight
E&D scenario	Exploration and Development scenario
EIS	environmental impact statement
ESP	Environmental Studies Program
G&G	geological and geophysical
GCA	Geophysical Corporation of Alaska
GOA	Gulf of Alaska
GSI	Geophysical Service, Inc.
km	kilometer(s)
km^2	square kilometers
LNG	liquified natural gas

m^3	cubic meters
M/V	motor vessel
Mbbl	thousand barrels
MMbbl	million barrels
Mcf	thousand cubic feet
MMcf	million cubic feet
MMS	U.S. Department of the Interior, Minerals Management Service
MODU	Mobile Offshore Drilling Unit
N/A	not applicable
NEPA	National Environmental Policy Act
nm	nautical miles
OBC	ocean bottom cable
OBS	ocean-bottom seismometer
OCS	Outer Continental Shelf
R/V	research vessel
ROV	Remotely Operated Underwater Vehicle
S65	Special Case: U.S. v. Alaska
SSC	sound source characterization
SSDC	single steel drilling caisson
TAPS	Trans-Alaska Pipeline System
Tcf	trillion cubic feet
U.S.	United States
USGS	United States Geological Survey

1 Introduction

The Outer Continental Shelf Lands Act (1953), as amended, established a policy for the management of energy and mineral resources on the Outer Continental Shelf (OCS) and for the protection of the marine and coastal environments. The U.S. Department of the Interior, Bureau of Ocean Energy Management (BOEM), uses information on historical Alaska OCS activities and their associated impact-producing factors to evaluate potential impacts that may be associated with Alaska OCS oil and gas exploration, development, and production activities as estimated in Exploration and Development scenarios (E&D scenarios) in final environmental impact statements (EISs) for lease sales. Prior to this study, the Retrospective Synthesis of Historical Alaska OCS Oil and Gas Activities, historical Alaska OCS lease sales, and their resulting activities were not compiled and synthesized in a readily available format.

This study fulfilled a need for consolidating publicly documented activities into a geographic information system (GIS) database for informing BOEM of the magnitude, location, and available information of historical OCS activities. For this study, we conducted an existing data and information summary and acquisition, compiled a bibliography, and developed a GIS database. This synthesis report is the study's conclusion and it reports and compares compiled data from the previous steps in the study against Exploration and Development (E&D) scenarios in a detailed synthesis.

Sections 1 and 2 of this document provide information on the types of data used in this study, how they were acquired, and the methodology used to synthesize them. Section 3 provides an overview of the synthesis results, while Sections 4–6 provide detailed study results for each lease sale, organized by subregion and OCS planning area. Section 7 provides a summary of conclusions as a result of this study and recommendations for future data collection, and Section 8 is the bibliography compiled for the study.

1.1 Project Area

According to 33 Code of Federal Regulations (CFR) § 140.10, the term OCS is defined as all submerged lands lying seaward and outside of the area of lands beneath navigable waters (as defined in the Submerged Lands Act) where the subsoil and seabed are within the exclusive economic zone of the United States. The OCS is subject to the jurisdiction of the United States. For most coastal states, the extent of their state jurisdiction is 3 nautical miles (nm) from the coastline. In some few exceptions, the jurisdiction extends 9 nm from shore. Federal jurisdiction is defined under accepted rules of international law. Specifically, under international law, the continental shelf extends to the outer edge of the continental margin, or to 200 nm from the baseline, whichever is greater. Where the outer edge of the continental margin extends beyond 200 nm from the baseline, the outer limits of the continental shelf are established by the U.S. Extended Continental Shelf Project, led by the Department of State, the Department of the Interior, and the National Oceanic and Atmospheric Administration. The limits are in accordance with Article 76 of the 1982 United Nations Convention on the Law of the Sea, although the treaty has not been ratified by the U.S.

The Alaska OCS encompasses approximately 1,047 million acres off the shore of Alaska and its islands and includes the Beaufort and Chukchi Seas, the Bering Sea, Cook Inlet, and the Gulf of Alaska. BOEM's Alaska OCS Region includes 15 OCS planning areas, which were consolidated into three unofficial subregions for this study: Arctic, Bering Sea, and Gulf of Alaska. The Alaska OCS planning areas and unofficial subregions are shown in Figure 1-1.

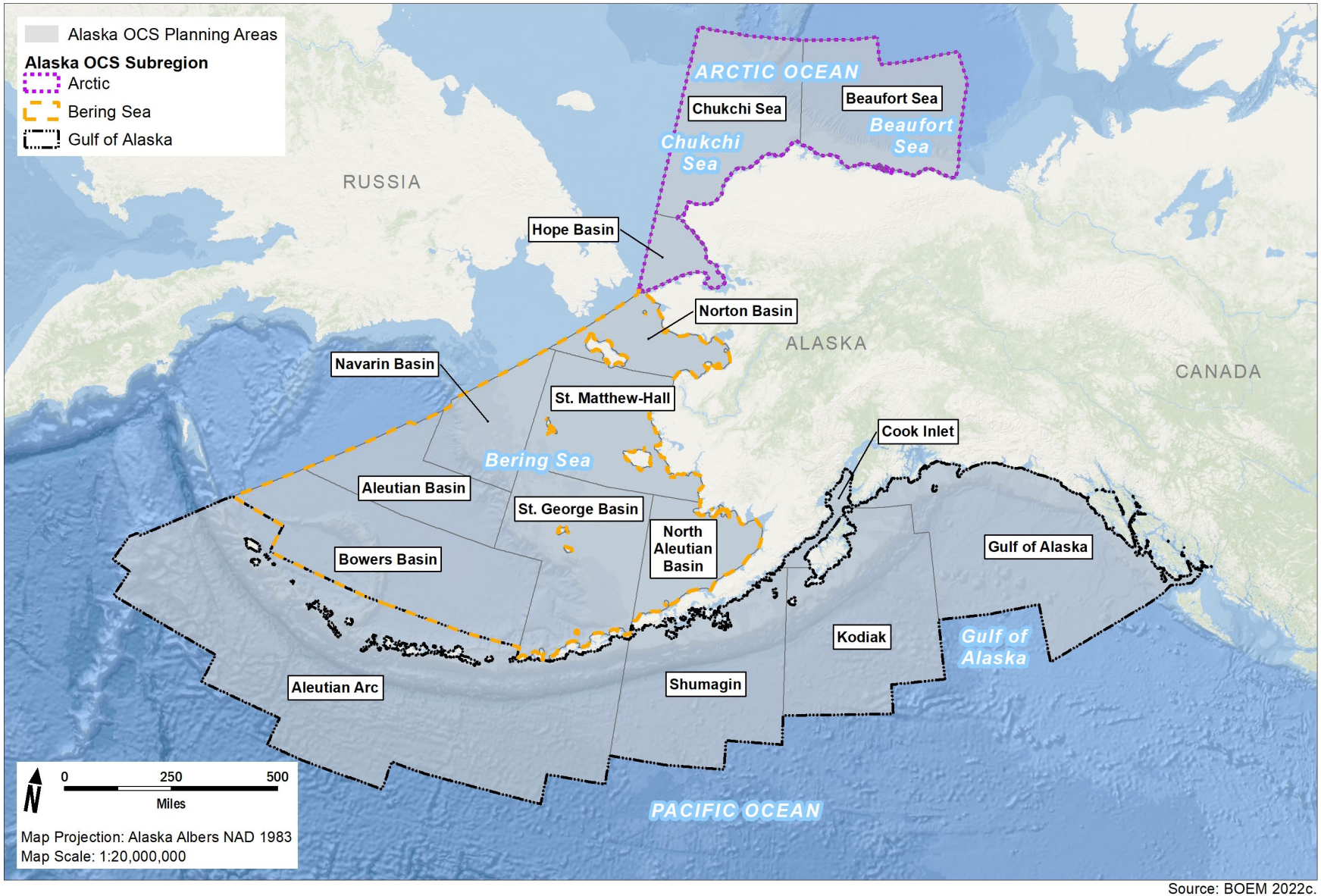


Figure 1-1. Alaska OCS planning areas and unofficial subregions

1.2 Purpose

Prior to this Retrospective Synthesis of Historical Alaska OCS Oil and Gas Activities study, information on historical Alaska OCS lease sales and their resulting activities was not compiled and synthesized in a readily available format. It was difficult to quickly find and synthesize information in a timely manner to answer questions related to historical Alaska OCS leasing and related activities. The purpose of this study was to obtain and collate sufficient public information to provide an accurate description of the activities associated with oil and gas on the Alaska OCS. This includes continental offshore stratigraphic test (COST) and deep stratigraphic test (DST) wells, leasing, and subsequent exploration, development and production, and transportation activities to date, including information regarding events, equipment, shorebases, travel routes, and timing of these activities. This report is the final phase of the study—a synthesis report that describes the methodologies used, and results obtained, from the previous phases of the study (existing data and information summary and acquisitions, bibliography, and GIS database) and reports the findings of historical oil and gas activities in the Alaska OCS. Additionally, this synthesis report evaluates the magnitude of historical activities for each lease sale and compares them against the E&D scenario for that lease sale. This report also assesses whether future data gathering efforts could be modified to better meet BOEM information needs.

1.3 Public Data Availability and Summary

1.3.1 Historical Alaska Oil and Gas Activities

As stated above, historical Alaska OCS lease sales and their resulting activities were not compiled and synthesized in a readily available format. To date, one similar compilation was a GIS database compiled by LGL Limited in 1998 (Wainwright 2002) for oil and gas activities and other human activities in the Beaufort Sea. However, LGL Limited's GIS database had a different purpose, which was to complete a quantitative description of human activities to support analysis of potential effects on ecology and biota as well as the fall bowhead whale migration. Wainwright (2002) noted that the database was proprietary; regulations 30 CFR § 551.14(b)(1) and § 550.197 provide the release times (10–50 years) of proprietary geological and geophysical (G&G) data and information. Therefore, historical data from the resulting database was not utilized for this project, as this study focuses only on public information.

In order to begin compiling data for this study, BOEM directed us to a variety of public resources. The project scope was limited to public documentation, but other activities may have occurred that were not documented or not available to the public. Types of data that were available included:

- GIS data for wells (BOEM 2022b, BOEM 2023c, BOEM 2023d) and for leases (BOEM 2022d), seismic survey tracklines, OCS platforms, and pipelines (BOEM 2023b, USGS 2023, BSEE 2022, and AK Pipelines, respectively);
- Four Environmental Studies Program (ESP) monitoring study reports (Burden et al. 1985, Dames & Moore 1978, Kevin Waring Associates 1985, Northern Resource Management 1980);
- Data availability announcements for multi-channel seismic reflection data (such as Banet 2001a);
- Annual G&G data acquisition reports (such as BOEM 2023a);
- An evaluation of sub-sea physical environmental data for the Beaufort Sea OCS, which provided summaries of oil-and-gas-related surveys in the Beaufort Sea Planning Area from 1981 to 1998, as well as the accompanying geohazards database for survey areas (Horowitz 2002a, Horowitz 2002b);
- Tables and charts of well and lease sale information (BOEM 2005a, BOEM 2005b, BOEM 2005c, BOEM 2005d, BOEM 2016a, BOEM 2016b, BOEM 2016c, BOEM 2019a, BOEM 2019b, BOEM 2020, BSEE 2021, and BOEM 2023g);

- 90-day industry reports containing summaries of oil and gas activities for given seasons or years (such as Kim et al. 2020b);
- Alaska G&G permit applications where the permitted activity was completed (excluding geologic prospecting) spanning from 1997 to 2021 (such as Veritas DGC 2005); and
- Permit approval letters which occasionally contained additional details about permitted activities not contained in G&G permit applications (such as Carr 2018 and Carr 2019).

Information from G&G permit applications did not always indicate the actuality of events performed but were at times the only information available in the public domain with an oil-and-gas-related activity. Additionally, the areas in which G&G permit applications designated a given activity were often larger than the area where the activity was performed.

The timeframes of the documents and files reviewed spanned from January 1966 through January 2023; however, the project scope focused on 1975 through the present. While some limited information on G&G surveys is available prior to 1975, the project scope focused on 1975 because a sufficient amount of detailed information was available for compilation beginning in 1975 in the four ESP monitoring study reports and other documents and datasets.

The bibliography in Section 8 includes the exhaustive list of the 143 sources compiled for this study. Refer to section 1.4.1 for a description of how these sources were retrieved and compiled.

1.3.2 Exploration and Development Scenarios

EISs were used for locating E&D scenarios for each lease sale summarized in this report. E&D scenarios are conceptual views of the future and represent reasonably possible, though not necessarily probable, sets of activities in the event of a lease sale. The E&D scenario for a proposed action is a fundamental first step for an analysis of the potential environmental effects from oil and gas activities that could result from leasing, to include exploration, development, production, and decommissioning activities. An E&D scenario is based upon BOEM's professional judgment of the interpreted geologic features within the area offered for lease coupled with an analysis of current exploration and production activities. It represents only one possible view of how the potential resources could be developed if they are found. An E&D scenario is not a permitting document for any OCS activity. It simply provides a reasonable set of activities to frame an environmental analysis and to inform decision-makers of potential environmental effects of offering certain areas for leasing.

An E&D scenario is provided in the EIS for each lease sale. Each lease sale that resulted in successful leasing had an EIS retrieved for this study (with the exceptions of RS-2 and 191 which did not result in leases sold, S65 which was the result of a court case, and RS-1 and 55 used the same E&D). Final EISs were obtained from BOEM or found online; documents that were not available digitally and existed only in hard copy format were retrieved from the Alaska Resources Library & Information Services (ARLIS). Table 1.3-1 lists the E&D scenarios in final EISs or on websites that were examined against documented activities in this report. The table does not list available E&D scenarios by section within the EIS and lists one E&D scenario that is only available on a BOEM website.

Table 1.3-1. Environmental impact statements with E&D scenarios

Lease Sale	Planning Area	Date	EIS Name
39	Gulf of Alaska	1976	Outer Continental Shelf proposed oil and gas leasing in the Northern Gulf of Alaska, final environmental impact statement (BLM 1976b)
CI	Cook Inlet	1977	Final environmental statement: proposed 1976 Outer Continental Shelf oil and gas lease sale, Lower Cook Inlet (BLM 1976a)

Lease Sale	Planning Area	Date	EIS Name
BF	Beaufort Sea	1979	Final environmental impact statement: proposed Federal/State oil and gas lease sale: Beaufort Sea (BLM 1979)
55	Gulf of Alaska	1980	Eastern Gulf of Alaska, sale no. 55, final environmental impact statement, Alaska Outer Continental Shelf Office oil & gas lease sale (BLM 1980)
RS-1	Gulf of Alaska	1980	Eastern Gulf of Alaska, sale no. 55, final environmental impact statement, Alaska Outer Continental Shelf Office oil & gas lease sale (BLM 1980)
60	Cook Inlet	1981	Final environmental impact statement, Lower Cook Inlet-Shelikof Strait, proposed oil and gas lease sale 60 (BLM 1981)
71	Beaufort Sea	1982	Diapir Field, final environmental impact statement, proposed oil & gas lease sale 71 (BLM 1982a)
57	Norton Basin	1983	Norton Sound, final environmental impact statement, OCS proposed oil & gas lease sale 57 (BLM 1982b)
70	St. George Basin	1983	St. George Basin, final environmental impact statement, proposed oil & gas lease sale 70 (MMS 1982)
83	Navarin Basin	1984	Navarin Basin lease offering, final environmental impact statement (MMS 1984b)
87	Beaufort Sea	1984	Diapir Field lease offering, final environmental impact statement (MMS 1984a)
97	Beaufort Sea	1988	Beaufort Sea sale 97, final environmental impact statement (MMS 1987a)
109	Chukchi Sea	1988	Chukchi Sea oil & gas lease sale 109, final environmental impact statement (MMS 1987b)
92	North Aleutian Basin	1988	North Aleutian lease sale 92, final environmental impact statement (MMS 1985)
124	Beaufort Sea	1991	Beaufort Sea Planning Area oil and gas lease sale 124, final environmental impact statement (MMS 1990)
126	Chukchi Sea	1991	Chukchi Sea Planning Area oil and gas lease sale 126, final environmental impact statement (MMS 1991)
144	Beaufort Sea	1996	Beaufort Sea Planning Area oil and gas lease sale 144, final environmental impact statement (MMS 1996a)
149	Cook Inlet	1997	Cook Inlet Planning Area oil and gas lease sale 149, final environmental impact statement (MMS 1996b)
170	Beaufort Sea	1998	Beaufort Sea Planning Area oil and gas lease sale 170, final environmental impact statement (MMS 1998)
U.S. v. AK (S65)[1]	N/A	2000	N/A
186	Beaufort Sea	2003	Beaufort Sea Planning Area oil and gas lease sales 186, 195, and 202, final environmental impact statement (MMS 2003)
195	Beaufort Sea	2005	Beaufort Sea Planning Area oil and gas lease sales 186, 195, and 202, final environmental impact statement (MMS 2003)
202	Beaufort Sea	2007	Beaufort Sea Planning Area oil and gas lease sales 186, 195, and 202, final environmental impact statement (MMS 2003)
193	Chukchi Sea	2008	Chukchi Sea Planning Area oil and gas lease sale 193 in the Chukchi Sea, Alaska, final second supplemental environmental impact statement (BOEM 2015)
244	Cook Inlet	2017	Cook Inlet Planning Area oil and gas lease sale 244, final environmental impact statement (BOEM 2016d)
258	Cook Inlet	2022	Revised exploration and development (E&D) scenario for environmental impact statement lease sale 258, Cook Inlet, Alaska (BOEM 2021b)

Notes: (Lease Sale) BF = Beaufort Sea; (Lease Sale) CI = Cook Inlet; E&D = Exploration and Development; EIS = environmental impact statement; N/A = not applicable
[1]Does not count as a sale. The United States was determined to be the landowner of these submerged lands by the U.S. Supreme Court's final judicial determination on June 29, 2000, in United States v. Alaska (No. 84 Original).

1.4 Data Acquisition Methodology

1.4.1 Existing Data and Information

This study included a task to summarize existing data and information, identify any gaps in data availability, research additional information for identified data gaps, and compile attributes relevant to the study for inclusion in a GIS geodatabase. The completion of this summary of existing data and information acquisition, performed September 27, 2022, through December 16, 2022, allowed for clarifying the study scope based on data or lack of data discovered.

Prior to this task, BOEM had provided references where data deemed relevant to this study could be downloaded and delivered an external hard drive with additional documents and files, notably a sizeable collection of industry 90-day monitoring reports. We reviewed the resources provided, downloaded additional files from BOEM and Bureau of Safety and Environmental Enforcement (BSEE) referenced websites, and organized them into a repository. A total of 370 documents and files were reviewed and then refined for a total of 143 documents to be included in the bibliography of this study, with the exception of three that were later deemed irrelevant to the study as mentioned in Section 1.5.2. Section 1.4.2 describes how the 370 documents and data files initially identified were refined to 143. We documented attributes about each document or file to help determine which were relevant to the study, which OCS planning area and subregion they were attributed to, and to develop a high-level summary of relevant activities, if any, for quick reference for inclusion in a geodatabase and synthesis report. Section 1.5.1 describes of the results of the existing data and information acquisition summary.

The first documents reviewed were five final lease sale EISs. These were reviewed in an effort to determine the type of information available in a typical E&D scenario. The initial five that were selected (BOEM 2015, BOEM 2016d, MMS 1987a, MMS 1991, MMS 2003) were chosen because they were readily available in digital format and spanned a wide timeframe, in order to provide an example of how E&D scenarios have been approached over time (the EISs were published in 1987, 1991, 2003, 2015, and 2016). These E&D scenarios typically included a summary table documenting the estimated values of parameters that the scenarios examined, which was helpful in determining, at a glance, the type of information needed to be obtained from historical documents in order to do a meaningful comparison of estimated versus actual oil and gas activities.

The next set of documents reviewed included the four ESP monitoring study reports (Burden et al. 1985, Dames & Moore 1978, Kevin Waring Associates 1985, Northern Resource Management 1980). These documents gave context for the early history of the Alaska OCS and helped inform us on how to review other sources for information relevant to the study.

In addition to the EISs and ESP monitoring study reports, types of documents reviewed included environmental assessments, environmental reports, biological assessments, G&G permit applications, monitoring reports, G&G data acquisition reports, and plans of operation. Digital data types such as shapefiles or feature classes, spreadsheets, and database tables were reviewed for existing attribution and data available for collation into a GIS database.

After reviewing all of the documents and files received from BOEM, we performed an online desktop search and searched ARLIS for additional documentation on two leases (Y01697 and Y01698 under Special Case: U.S. v. Alaska [S65], a court case), two lease sales (149 and RS-1), and three wells (OCS

Y-1597 WILD WEASEL 1, OCS Y-1663 WARTHOG 1, and OCS Y-1650 LIBERTY 1) because these leases, lease sales, and wells had known limited information or data. Lease sales 149, RS-1, and Special Case: U.S. v. Alaska (S65) contained very limited information and turned up records only in GIS data that contain high-level summary information such as the lease name and the geographic location. Wells OCS Y-1597 WILD WEASEL 1, OCS Y-1650 LIBERTY 1, and OCS Y-1663 WARTHOG 1 were given an additional search for information as these wells were drilled in the mid-1990s, a period with less publicly available data. This search resulted in retrieving documents and GIS data for Horowitz (2002a) and Horowitz (2002b); other documents retrieved were not retained for the study due to a later determination of irrelevance.

We used a list of 39 data elements (Table 1.4-1) to identify E&D scenarios for examples of use and potential terminology to analyze in ESP monitoring study reports and other references. This list was provided to us from BOEM, along with the names of Alaska OCS subregions, Alaska OCS planning areas, and other attributions not listed in the referenced Table 1.4-1, to refine relevant parameters for this study in the project statement of work. These included date/time of activity, location or coordinates, lease sale number/ID, well name/ID, water depth, results/attribution of wells drilled, discharges, facility types, shorebases, aircraft/vessels/vehicles utilized, well cellar depth, transportation route, dates of travel, operator name, frequency of transportation trips, and drill rig name. Additional attributes that were initially considered for the study, but were unable to be retrieved in public documents, included volumes for exploration, production, and service well mud, and exploration, production, and service well cuttings.

For the organization of this report, the data elements of OCS subregion, OCS planning area, and lease sale were required to be assigned for each activity documented in this study. In most cases, assigning an OCS subregion or OCS planning area was straightforward, and when an exception occurred, it was documented in this report in Sections 4 through 6. In contrast, an activity's association with a lease sale was sometimes not determinable from the source document or file of the activity and required additional research.

When an activity's associated lease sale number (or documented lack of association) could not be clearly identified from the source, the activity was cross-examined with available geospatial data for wells and/or leases from BOEM (2023b), to make a reasonable conclusion about an associated lease sale, based on the following criteria:

- Facilities and transportation sites and routes were often traced to a specific well activity with explicit mention from the source documentation or inferred using available information such as travel dates and vessel names.
- When this information was unavailable, the facility or transportation site or route was reported as not being associated with a lease sale, due to lack of public information to make this connection. If the facility or transportation site or route was associated with a COST/DST well, which by their design are not associated with any lease sale, it was also reported as not associated with a lease sale.
- Facilities and transportation sites and routes were sometimes associated with a specific survey activity. In these cases, these were defined as the lease sale, if applicable or defined, for the survey activity.
- Surveys were linked to lease sales in the following way from details in the source documentation: If the source documentation did not explicitly state an associated lease sale, then we cross-checked dates, operator names, vessel names, and lease numbers, where available, with available geospatial data for verification. If a reasonable match could be made with this information, the lease sale was assigned the same lease sale as the successfully cross-checked activity. If not, the activity was binned as not associated with a lease sale. This is further discussed in Section 2.1.1 and Section 2.2.

Table 1.4-1. OCS planning area, lease sale number, leases, and typical data elements in an E&D scenario

Data Elements	Data Elements
OCS planning area	Total development wells in operation
COST/DST Wells	Exploration rig
Lease sale number	Production platform
Leases[1]	Production platform installation/construction
2D marine seismic program	Production platform removal
Line miles 2D seismic program[2]	Total onshore oil pipelines installed
3D marine seismic program	Total offshore gas pipelines installed
Blocks 3D seismic program[3]	Total offshore oil pipelines abandoned[5]
Geohazard survey	Total offshore gas pipelines abandoned[5]
Line miles geohazard survey[2]	Offshore facilities for oil processing[5]
Geotechnical survey	Offshore facilities for gas processing[5]
Exploration wells	Onshore shorebase complex
Production oil wells[4]	Total oil and condensate production (sales)
Production gas wells[4]	Exploration well mud[5]
Service wells	Production or service well mud[5]
Total development wells drilled	Exploration well cuttings[5]
Total development wells decommissioned	Production service well cuttings[5]

Notes: 2D = two-dimensional; 3D = three-dimensional; E&D = Exploration and Development; OCS = Outer Continental Shelf
[1]Lease GIS data (AK_Leases.shp; BOEM 2023b) was not imported into the geodatabase because the data and schema were not altered, and it is routinely updated by BOEM.
[2]We did not include GIS-based measurements for miles or acreages as these may be misleading, and where available included original source descriptions of measurements instead.
[3]Where available, blocks were used to digitize survey areas and were captured in attribution.
[4]Production oil and gas wells were referred to as “development wells” (Alaska_OCS_Wells.shp; BOEM 2022b).
[5]This information was not recovered from documents gathered in the survey and collate phase of the project.

1.4.2 Bibliography

A bibliography was compiled during February 15, 2023, through October 25, 2023. Key relevant sources of information were identified from the existing data and information summary and acquisition (Section 1.4.1) to be included in the bibliography. Two meetings were held: one on March 14, 2023, to ensure that the data and information search provided the necessary information and to reach mutual agreement regarding the analysis approach, and one on September 21, 2023, to finalize the datasets to be retained in the bibliography. No additional documents were added to the study after October 25, 2023.

Bibliographic citations (Section 8) were compiled and entered into the Clarivate brand of software Endnote (version 21) as a citation database, in the BOEM EndNote citation style (based on the Council of Science Editors 8th Edition Name-Year). PDF documents for each information source were attached to the citation in the EndNote database. This allows users to open the PDF of the complete document directly from EndNote, if needed.

1.4.3 GIS Database

Prior to the development of the GIS database, or geodatabase, a survey occurred to identify, retrieve, and collate publicly available data and examine available information for use as possible attributes within a GIS. Surveyed information included a focus on the Alaska OCS historical activities for the period of 1975–present in the Arctic Ocean, the Bering Sea, and the Gulf of Alaska subregions, OCS planning areas, and lease sales within those areas. The survey also examined the extent to which existing BOEM data sources could be supplemented with additional readily available data attributes to provide insights regarding the timing, scale, magnitude, and locations of historical OCS activities relevant to E&D scenarios.

Categories for organizing GIS data geographically had been predetermined by BOEM by introducing three unofficial subregions, the Gulf of Alaska, Bering Sea, and Arctic, inclusive of each of the Alaska OCS Region's 15 OCS planning areas. Additionally, data identified as applicable for this study from both the existing data and information summary and acquisition and bibliography were reviewed for inclusion into a geodatabase, an Esri proprietary format for a GIS database.

Attributes that were identified for inclusion from the existing data and information summary and acquisition were organized into a GIS schema, or database structure. An initial structure of the geodatabase was developed using the Cook Inlet Planning Area (part of the Gulf of Alaska subregion) as a test for both the GIS and an early draft chapter in this report. When the early draft chapter had been refined, chapters for the Bering Sea subregion, the remainder of the Gulf of Alaska subregion, and the Arctic subregion were developed. It became apparent that a need for simplifying the retrieval of activities to be able to quickly map them was a necessity for the geodatabase, and this consideration, as well as the types of data available for each subregion and OCS planning area, further refined the geodatabase schema for improved organization and usability. We resolved this need by creating a standalone table that could be related to feature classes and other standalone tables. This table, TB_Activity, served as the major infrastructure of the geodatabase, as well as the source of most information utilized in this synthesis report in Sections 4–6.

As source documents from the bibliography were reviewed in detail for data extraction, we digitized a geographic representation of the activity, as one of 12 types of features in a feature class (see Section 1.5.3). This may have been from a georeferenced image from a document, from text-based descriptions, or other information such as latitude/longitudes or existing GIS data. In addition to the geographic representation, a record for the activity was documented in the TB_Activity table, complete with dates of occurrence, a narrative describing the activity, the OCS planning area, subregion, and if applicable or determinable, the lease sale associated with the activity, as well as other details. An activity identifier was assigned to both the TB_Activity and the geographic representation, which linked these two records together with a table relate in the form of a relationship class. Additionally, some activities were determined to be sub-activities, which were associated with a main activity that was the reason for the sub-activity's occurrence. An example of this would be a main activity of well drilling for a specific well, and a sub-activity could be transportation activities associated with the well drilling. The sub-activity would not have occurred without the instance of the main activity.

We methodically analyzed the 143 bibliographic references, sorted by subregion, OCS planning area, and lease sale (or lack of lease sale) to compile the geodatabase, develop maps, and assist in the development of Sections 4–6 by extracting joined tables of activities (TB_Activity joined to each of the feature classes, or other standalone tables, using established key identifiers). Section 2.1.2 describes this process further.

Instances where data were not retrieved for OCS planning areas or lease sales, as was the case for G&G surveys and supporting oil and gas activities, do not necessarily indicate a lack of activities occurring. Instead, those instances indicate that no activities were retrieved from the 143 public documents and files

compiled in this study. Sections 4–6 use language where applicable to denote that activities were not documented, rather than did not occur, where an absence of retrieved information resulted. The exception is for well drilling, which is definitively documented.

1.5 Data Acquisition Results

1.5.1 Existing Data and Information

The total number of individual documents and files reviewed during the existing data and information summary and acquisition was 370, which included five final lease sale EISs containing E&D scenarios during that phase of the study. During the development and finalization of the bibliography, the total increased to 384, not including the additional lease sale EISs which were reviewed afterward.

The 384 files were condensed into 143 bibliographic references (Section 1.5.2). Some documents contained duplicative information, and in these instances only the most comprehensive document was included in the bibliography. Some documents contained multiple files, as was the case for many of the lease sale EISs, and a single EIS could include multiple PDFs. G&G permit applications also included more than one file in some cases, such as an image representing the permitted area for the activity.

Section 1.3.1 above summarized the resulting types of information that were ultimately selected for this study.

1.5.2 Bibliography

All documents and data sources were compiled into a final bibliography, provided in Section 8. After the bibliography was compiled, a detailed review of each document occurred for the GIS database. As a result, three citations in Section 8 were later discovered to not contain relevant information to the study; Hauser and Holst (2009) contained a two-dimensional (2D) seismic survey later deemed to not be related to oil and gas, and HDR Alaska (2013) and Lomac-MacNair and Smultea (2014) were georeferenced using GIS software after the bibliography was compiled and were subsequently discovered to not be located within the Alaska OCS, but in state waters instead.

1.5.3 GIS Database

The project geodatabase developed for this study resulted in 12 feature classes, 9 standalone tables including TB_Activity, and 38 georeferenced rasters. It contained multiple relationship classes to support relates between different tables and feature classes. Table 1.5.3-1 summarizes the geodatabase file structure, excluding relationship classes. We developed documentation to accompany the geodatabase for a detailed account of its development, schema, domains, and how to use it for GIS users.

Table 1.5.3-1. Geodatabase schema summary

File Name	Description	Data Type
TB_Activity	Alaska OCS historical oil and gas activity table	Standalone table
Facility	Shorebases and/or facilities	Feature class
Pipeline	Pipelines	Feature class
Planning_Area	Alaska OCS planning area	Feature class
Platform	Platforms/artificial islands	Feature class
Subregion	Alaska OCS subregion	Feature class

File Name	Description	Data Type
Survey_LN	Survey line	Feature class
Survey_PT	Survey point	Feature class
Survey_PY	Survey polygon	Feature class
Transportation_LN	Transportation line	Feature class
Transportation_PT	Transportation point	Feature class
Transportation_PY	Transportation polygon	Feature class
Well	Wells including COST/DST wells	Feature class
TB_BFT_NS_Production	Beaufort Sea Northstar production (2001 through January 31, 2023)	Standalone table
TB_BFT_NS_Yearly_Trips	Beaufort Sea Northstar yearly trips	Standalone table
TB_Bibliography	Reference table for citations and bibliography references.	Standalone table
TB_G_G_2D_Inventory	Geological and geophysical 2D survey inventory	Standalone table
TB_G_G_Data_Inventory	Geological and geophysical data inventory	Standalone table
TB_G_G_Survey_1975_1977	Geological and geophysical surveys during 1975–1977 (CI and GOA)	Standalone table
TB_G_G_Survey_1980_1984	Geological and geophysical surveys during 1980–1984 (Bering Sea)	Standalone table
TB_Historical_Lease_Sales	Historical lease sales summary table	Standalone table
RR_BER_Supply_Routes_1980_1984	Major supply routes in the Bering Sea from 1980–1984	Georeferenced raster image
RR_BFT_Activities_2008	Location of the Eni Spy Island drillsite and Oliktok Dock, 2008, in the Beaufort Sea Planning Area	Georeferenced raster image
RR_BFT_Activities_2012	Location of the Shell drill vessel SSC survey, during the drilling of the Sivulliq-N top-hole, 2012, in the Beaufort Sea Planning Area	Georeferenced raster image
RR_BFT_CHU_Survey_2012	Vessel tracklines during ION Geophysical's seismic survey in the Beaufort Sea Planning Area and Chukchi Sea Planning Area, 2012	Georeferenced raster image
RR_BFT_Helicopter_Route_2000_2004	Route flown by helicopters among Deadhorse airport, the West Dock base of operations, and the Northstar Development at Seal Island	Georeferenced raster image
RR_BFT_Ice_Roads_1998_1999	Ice roads constructed by BP Exploration (Alaska) Inc. in January–April 1999 in support of the planned re-construction of Seal Island	Georeferenced raster image
RR_BFT_Ice_Roads_1999_2000	Northstar Island (formerly Seal Island) construction area northwest of Prudhoe Bay, Alaska, depicting ice roads established during the winter of 1999–2000	Georeferenced raster image
RR_BFT_Ice_Roads_2000_2001	Northstar Island construction area northwest of Prudhoe Bay, Alaska, depicting ice roads established during the winter of 2000–2001.	Georeferenced raster image

File Name	Description	Data Type
RR_BFT_Survey_1993	Location of a high-resolution seismic survey area at Kuvlum #2 in the Beaufort Sea Planning Area	Georeferenced raster image
RR_BFT_Survey_1996	Movement of vessels involved in the Northstar 3D OBC survey, 1996, in the Beaufort Sea Planning Area (excluding the source vessel Point Barrow)	Georeferenced raster image
RR_BFT_Survey_1998_A	Location of the Western Geophysical 3D OBC seismic survey patches in the Beaufort Sea Planning Area, 1998	Georeferenced raster image
RR_BFT_Survey_1998_B	Proposed locations of the 3D marine seismic survey by ARCO Alaska, Inc., and Western Geophysical Company in the Beaufort Sea Planning Area, 1997/1998	Georeferenced raster image
RR_BFT_Survey_1999	Location of the Western Geophysical 3D OBC seismic survey in the Beaufort Sea Planning Area, 1999	Georeferenced raster image
RR_BFT_Survey_2000	Proposed location of the ARCO Alaska, Inc., Fiord 3D Survey in the Beaufort Sea Planning Area, 2000	Georeferenced raster image
RR_BFT_Survey_2007_A	Location of the Shell Offshore Inc. lease holdings in 2007, which is a generalized location of where deep seismic survey activities occurred in the Beaufort Sea Planning Area	Georeferenced raster image
RR_BFT_Survey_2007_B	Location of the permitted on-ice survey program area for Shell Offshore Inc. in the Beaufort Sea Planning Area, 2007	Georeferenced raster image
RR_BFT_Survey_2008_A	Deep seismic and shallow hazards surveys in the Beaufort Sea Planning Area by Shell Offshore Inc., 2008	Georeferenced raster image
RR_BFT_Survey_2008_B	Location of the Liberty seismic survey area in the Beaufort Sea Planning Area by BP Exploration (Alaska) Inc., 2008	Georeferenced raster image
RR_BFT_Survey_2014	Location and boundaries of Phase 1 and Phase 2 components of the Liberty 2014 survey in the Beaufort Sea Planning Area	Georeferenced raster image
RR_BFT_Survey_2015	Project area boundary and vessel activity for the Hilcorp Shallow Geohazard Survey in the Beaufort Sea Planning Area, 2015	Georeferenced raster image
RR_BFT_Transport_2003_2004	Transportation corridors to Northstar in late 2003 and early 2004, showing hovercraft trail used during freeze-up and the ice road that was established	Georeferenced raster image
RR_CHU_Activities_2012	Location of the Shell drill vessel SSC survey during the drilling of the Burger-A top-hole in the Chukchi Sea Planning Area, 2012	Georeferenced raster image
RR_CHU_Activities_2015_A	Vessel movement for ice management at Burger J (Burger V is shown but was not drilled) in 2015 in the Chukchi Sea Planning Area	Georeferenced raster image

File Name	Description	Data Type
RR_CHU_Activities_2015_B	Aerial transportation areas supporting the drilling of Burger J (Burger V is shown but was not drilled) in 2015 in the Chukchi Sea Planning Area	Georeferenced raster image
RR_CHU_Activities_2015_C	Location of an SSC survey at Burger J (Burger V is shown but was not drilled) in 2015 in the Chukchi Sea Planning Area	Georeferenced raster image
RR_CHU_Survey_2006	Location of GX Technology's 2D seismic survey in the Chukchi Sea Planning Area, 2006	Georeferenced raster image
RR_CHU_Survey_2007	Location of the proposed MMS Lease Sale 193, where deep seismic survey activities occurred in the Chukchi Sea Planning Area by Shell Offshore, Inc., 2007	Georeferenced raster image
RR_CHU_Survey_2008	Deep seismic and shallow hazards surveys in the Chukchi Sea Planning Area by Shell Offshore Inc., 2008	Georeferenced raster image
RR_CHU_Survey_2009	Location of Shell's shallow hazards surveys in the Chukchi Sea Planning Area, 2009	Georeferenced raster image
RR_CHU_Survey_2010	Location of the Statoil Open Water Seismic Exploration in the Chukchi Sea Planning Area, 2010	Georeferenced raster image
RR_CHU_Survey_2011	Geotechnical and shallow hazard site surveys by Statoil USA E&P Inc. in the Chukchi Sea Planning Area, 2011	Georeferenced raster image
RR_CHU_Survey_2013	Seismic survey tracklines acquired for the TGS 2D seismic survey in the Chukchi Sea Planning Area, 2013	Georeferenced raster image
RR_COK_Supply_Routes_1975_1978	Supply routes for drilling vessels in Lower Cook Inlet (Cook Inlet Planning Area) between April 1975–June 1978	Georeferenced raster image
RR_COK_Survey_2005	Permitted survey area for geophysical exploration for mineral resources (3D seismic survey) in the Cook Inlet Planning Area for Veritas DGC for ConocoPhillips in 2005	Georeferenced raster image
RR_COK_Survey_2018	Permitted survey area for the Lower Cook Inlet Gradiometry 2018 Airborne Gravity and Magnetic Survey for Hilcorp in the Cook Inlet Planning Area, 2018	Georeferenced raster image
RR_COK_Survey_Map_2019	Location for the Hilcorp Lower Cook Inlet Seismic Survey and turn area in the Cook Inlet Planning Area, 2019	Georeferenced raster image
RR_GOA_Drill_Rig_Routes_1975_1978	Drilling vessel movements in the Gulf of Alaska Planning Area between April 1975 and June 1978	Georeferenced raster image
RR_GOA_Supply_Routes_1975_1978	Supply routes for drilling vessels in the Gulf of Alaska Planning Area between April 1975 and June 1978	Georeferenced raster image

Notes: 2D = two-dimensional; 3D = three-dimensional; CI = Cook Inlet; COST = continental offshore stratigraphic test; DST = deep stratigraphic test; GOA = Gulf of Alaska; OBC = ocean bottom cable; OCS = Outer Continental Shelf; SSC = sound source characterization

2 Synthesis Methodology

2.1 Data Collation and Synthesis

In order to prepare this synthesis report, data compiled during the previous phases of the study were reviewed in detail, synthesized into a GIS data schema, and then exported from the GIS in an organized format to develop Sections 4–6 of this report, as well as for use while quantifying and comparing against E&D scenarios.

2.1.1 Data Import

As discussed in Section 1.4.3, a GIS schema was compiled and further refined to best organize geographic and tabular information related to oil and gas activities in the Alaska OCS. The process of importing data from documents and files compiled in the bibliography into GIS was as follows:

1. In the existing data and information summary and acquisition, our preliminary review of the documents and files resulted in documenting key pages, tables, and data which seemed relevant to the study. During this process, we also attempted to link the documents and files to a lease sale if explicitly stated in the document or file, or by cross-referencing dates, operators, lease numbers, or sometimes vessel names with other references. We reviewed these initial summary notes and determined what was applicable to the study. We performed another high-level review of the document for any other details that might have been missed through the initial inventory of the document or file, and attempted to fill in any gaps in information, such as associated lease sale, if determinable or applicable.
2. G&G surveys, particularly 2D seismic surveys, were most frequently the activity that could not be associated with a lease sale. In these instances where no linkage could be made after review and cross-reference of retrieved documents in this study, these were categorized in this report as an activity not associated with a lease sale. 2D seismic surveys that were grouped with a lease sale were done so because of an association made to the lease sale in the source document. Some surveys that are by design associated with a lease sale, such as geohazard surveys, could not always be associated with a lease sale due to lack of retrieved information, and were also categorized in this report as not associated with a lease sale.
3. Any maps or tables with pertinent information on relevant oil and gas activities were extracted from the source material. If this was a document, screen captures or page exports were made.
4. Maps were georeferenced. Data from georeferenced maps were digitized for import into feature classes, depending on the data type, as previously summarized in Table 1.5.3-1.
5. Data from tables were imported into schema for a previously defined dataset or were captured in a new standalone table to preserve the source material, and any additional fields were added as required to help relate or join records to other relevant tables or feature classes.
6. Data that included relevant oil and gas activities, either from a georeferenced map, a data table, or in a written-text format, were summarized in the TB_Activity table with a concise narrative describing who, what, when, where, and why, as available, for each activity. This required another, more detailed review of the portion of the document or file for the applicable activity being summarized in this step for careful data entry.
7. Any related records of data that were compiled across GIS standalone tables and feature classes were linked together using primary keys and relationship classes, which was the final step in the activity digitizing process.
8. The document or file was indicated as being completed for extraction.

Steps 1–7 then repeated until all data flagged for extraction were completed.

2.1.2 Data Export

Data imported into GIS, as outlined in 2.1.1 Data Import, were exported from the platform into spreadsheets for ease of use when developing Sections 4–6.

The method was continually refined and proceeded as follows:

1. The process began with the TB_Activity table. Depending on the section in progress, it was determined which subregion, OCS planning area, or lease sale was to be inspected. This example examined Lease Sale 195, which is associated with the Beaufort Sea Planning Area, in the Arctic subregion.
2. A query was performed in TB_Activity for where the lease sale is 195. The resulting records contained information required to be entered into the report outline for Lease Sale 195 (the exception was historical leases, which were directly queried from BOEM [2023b] and not TB_Activity).
3. The queried results were reviewed in TB_Activity. A field named [Feature_Class] contained a record of which datasets are related to records in Lease Sale 195.
4. A table join was performed using field [Sub_Activity_ID] in both the original table and destination table (feature class Transportation_PT is the exception to this step and did not require a join for exporting data to authors as the necessary details were included in TB_Activity).
5. All records were copied from the resulting table join and pasted into a spreadsheet. Files were appropriately name, and it was specified where the exported information should go in the synthesis report.
6. When it was time for review of the written report section, the extracted spreadsheets proved useful for a detail check for quality control procedures. Additionally, if any errors were noted during the section development, these were communicated to the GIS staff for correction in the GIS database.

2.1.3 E&D Scenarios

For the lease sales in this study each corresponding EIS was collected and the E&D scenarios were summarized in narrative format and in a summary table. In most cases, the EIS text provided a detailed description or summary of the E&D scenario, which was used when developing the narrative. Information that was not deemed relevant to this study was omitted from the narrative. Many EISs included a summary table of activities for the E&D scenario, which became the basis for the summary tables. A row was added to the summary tables for any data in the text summary that were deemed relevant to the study, particularly if there were corresponding data available from recorded activities.

Many older EISs provided a range of E&D scenarios with different cases, such as “high,” “mean,” and “low,” that describe different levels of activity and extraction. In many cases the middle case, (the “mean” or sometimes “base” case) was used to analyze the proposed action in the EIS and was therefore used in this study. For the purposes of this study, the term “mean” was used. If a different case other than the mean analyzed the impacts in the EIS, that case was used and documented in the applicable E&D scenario summary.

The E&D summary narrative and tables provided the research team an apt set of data that was used to compare against the historical activity information collected from documents and source references. Comparisons were made by developing a table with side-by-side information. The E&D summary tables were used as a starting point for the comparison tables, then rows were added for any data available from recorded activities, even in cases where there were no corresponding data for the E&D scenario. An effort was made to make the information presented in comparison tables consistent across all lease sales where possible, with the understanding that the information available was often not the same. As much as

possible, data in the comparison tables are shown as the data were provided, using the units in the E&D scenarios or activity reports.

The language from the E&D scenarios was preserved as much as possible in the E&D scenario summary; definitions of terminology from early E&D scenarios may have different meanings at the time of publication of this study. Placenames were also preserved, as was the case for Barrow, which changed its name to Utqiagvik in 2016.

The narrative and tabular E&D scenario summary and the comparison table for each lease sale are provided in this report in Sections 4–6.

Lease sales that are not included in the E&D scenarios are RS-2 and 191, which did not result in leases sold, and S65 which does not count as a sale.

2.2 Data Limitations and Assumptions

This study encountered several data limitations and assumptions. This section discusses these common encounters, such as limitations of publicly available data, limitations and availability of historical data, inconsistencies with how data are reported, and assumptions made in certain situations, particularly in cases where not enough information was available.

The surveys and activities recorded from the 143 bibliographic references are a compilation of publicly available sources. Other activities may have occurred that were not documented or not available to the public. Regulations at 30 CFR § 551.14(b)(1) and § 550.197 provide the release times (10–50 years) of proprietary G&G data and information, so it is possible that additional activities that occurred had yet to be released. Information that would have been valuable for comparison against an E&D scenario that is often estimated in E&D scenarios were volumes of drill cuttings, which were searched for but not found during the existing data and information summary and acquisition.

Published data for more recent activities were not always available, presumably because they had yet to be published during the data acquisition phase of this study. The latest information available for activities (Crumrine 2023) was Northstar production data from October 2000 to January 31, 2023. A 2022 G&G data inventory report (BOEM 2023a) documented 2D survey miles that were captured in 2022, but the resulting survey tracklines data were not yet available. Additionally, it is assumed that 90-day industry reports have been completed beyond the last year available to this study in 2018 (Kim et al. 2020b).

Another limitation regarding the timeframe of this study was that some information from previous decades were lost to time. The timeframe of this study ranged from 1975 to the present (October 25, 2023). However, for early history in the Alaska OCS (1975–2000), most available information regarding oil and gas activities was summarized in a given time period in four ESP monitoring study reports (Burden et al. 1985, Dames & Moore 1978, Kevin Waring Associates 1985, Northern Resource Management 1980). As these were mostly summarized, and lacked details for activities on an individual basis, most activities from these documents had to be cross-referenced with other verified existing data such as wells and G&G surveys from USGS (2023) and Triezenberg et al. (2016) based on the descriptions, well names, vessel names, and timeframes.

Not all activities could be cross-verified in this manner, however, and had to remain generalized at a high level. This was the case for three instances of surveys that we aggregated into a single record in the Cook Inlet Planning Area, Gulf of Alaska Planning Area, and the Bering Sea (OCS planning areas remain unknown as they were not documented and are lost to time).

Assigning a lease sale was a process that also had limitations; most documents and files did not explicitly associate a lease sale with an activity, except in the case of wells. Activities that could be associated as an activity resulting from the drilling of a well could be reasonably associated with the lease sale of the well. Activities that could be associated with a COST/DST well, which are not associated with a lease sale, could reasonably be categorized as not associated with a lease sale. G&G surveys, and documented transportation activities associated with those surveys, were challenging to assign as they required inference from source documents, linking to other activities, or cross-referencing other documentation. Some activities may not have been associated with lease sales at all by design, but this lack of association was not explicitly documented as it was for COST/DST wells. Some activities, such as geohazard surveys, were associated with a lease sale, but the lease sale was not always retrievable due to lack of available information to make a reasonable conclusion about lease sale association.

Historical data at times reported information inconsistently. This was present even in E&D scenarios, particularly with the way, if estimated, numbers of vessel trips or flights as a result of a lease sale were reported. For these, trip units may have been weekly, assumed to be during peak activity, or a complete number of trips in totality. In historical data that was retrieved, a common inconsistency was operator names. Operator names may have been given in shorthand instead of the full operator name (Shell versus Shell Offshore Inc.) or in an abbreviation instead of the full operator name (ARCO versus Atlantic Richfield Oil Company). Having multiple iterations of parent companies and affiliates (Atlantic Richfield Oil Company versus ARCO Alaska, Inc.) also made documenting these challenging. We used a spreadsheet containing operator names (BOEM 2023e) in an attempt to standardize these entries where possible, where enough information was given to make a judgment on a consistent operator name. Where this could not be done with confidence, the original operator name from the source was retained.

Other specific data limitations and assumptions were as follows:

- In general, georeferenced data were estimated to have low spatial accuracy and should be treated as an approximate location, as georeferencing was based on the visual interpretation of the analyst performing the task, source material maps were historical, and most source maps were small-scale and represented very large areas rather than a detailed data resolution. Topological consistencies were not reviewed as part of this project, as some features were obtained from existing agency data sources.
- Exact locations for G&G surveys, not obtained from USGS (2023) and Triezenberg et al. (2016), were difficult to locate, and some details were unavailable (e.g., vessels used or shorebases utilized). In these instances, G&G permit applications were used to document what was planned for these activities. However, permitted activities did not always occur, or public maps for the G&G permit applications were larger than the area in which the activity actually occurred. In the GIS database, activities utilizing these documents were clearly marked in the data attributes.
- Activities resulting from a G&G permit were not always clearly associated with the permit number. This was the case for the 2D seismic surveys and associated details obtained from the National Archive of Marine Seismic Surveys from USGS (2023) and Triezenberg et al. (2016).
- Survey data summarized in BOEM (2023a) contained 2D seismic survey data, summarized by line miles of collected data for 2D seismic surveys, and an equivalent summary for three-dimensional (3D) seismic surveys by count of lease blocks. In GIS data from USGS (2023), only spatial locations for 2D seismic surveys were available in Alaska, but no spatial data were available for 3D seismic surveys from this source but were available for other OCS regions.
- Some survey types, such as geohazard surveys, are by design associated with a lease sale. In Horowitz (2002a) many geohazard surveys, geophysical surveys, and 3D seismic surveys could not be associated with a lease sale due to lack of available information for a linkage to a lease sale. The 3D seismic surveys from this source may not be associated with a lease sale by survey design, but not enough information was available to confidently make that determination.

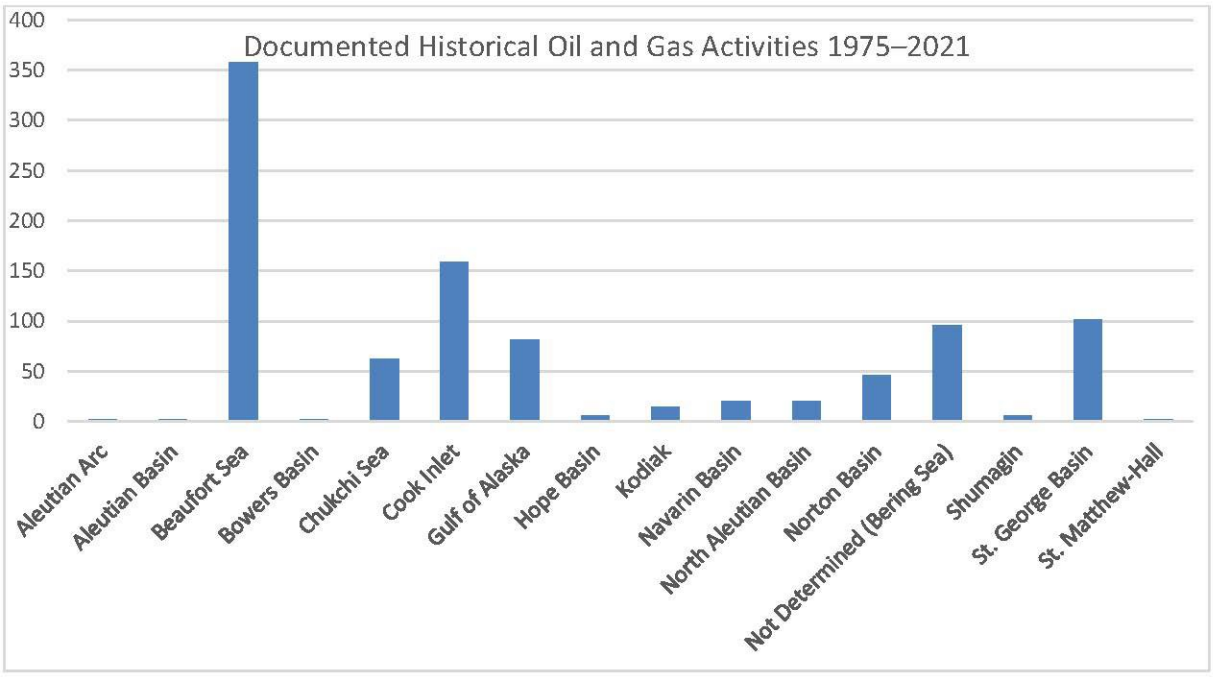
- Exploration surveys, such as 2D seismic surveys and 3D seismic surveys, are often not associated with a lease sale and may occur prior to a lease sale. In Dames & Moore (1978), a large list of early G&G surveys (assumed to be 2D seismic surveys but not explicitly named in the source), were associated with Lease Sale 39 (referred to Northeast Gulf of Alaska in the source) and Lease Sale Cook Inlet (CI) (referred to as Lower Cook Inlet), and this association was preserved in this study.
- There were challenges with linking some activities to a specific lease sale, which is consistent with the fact that a majority of exploration activities (or off-lease activities) do not occur for a specific lease sale and are performed to either prove the existence of a hydrocarbon system (as with the COST/DST wells) or are in advance of any future lease sale. Linking the activity to a lease sale could be successful if the activity recorded contextual evidence such as operation dates, operator names, vessel names, or other data that could be cross-referenced with other references to draw a conclusion about which lease sale the activity was a result of. In cases where these could not be confidently determined because not enough contextual evidence existed, these were designated as an activity not associated with a lease sale.
- Other assumptions were made based on text extrapolation. For example, unique vessel names were used to determine vessel counts if that information was not explicitly stated. Additionally, tug, barge, and aerial overflights were assumed to be round trips depending on the context unless explicitly stated otherwise. When comparisons against E&D scenarios were conducted, it was difficult at times to quantify historical accounts for data elements such as number of flights and number of vessels. If any assumptions were made regarding these or other data elements, these were documented in the footnotes in the E&D scenario comparison table.
- Not all recorded activities had a documented geography, or, in some cases, the information regarding the geography was unknown. In these cases, a description of the generalized location would be given in the narrative for the activity in the GIS database. In the case of the Bering Sea, some activities were documented as occurring in the Bering Sea, as a general geography, and did not have enough context to assign these activities to an OCS planning area within the Bering Sea.

3 Alaska OCS Historical Oil and Gas Activities 1975–Present

This section provides a summary of documented Alaska OCS historical oil and gas activities from 1975 to present. Overall, there were 27 lease sales and 2,446 leases sold, with 21 currently active leases. A total of 12.9 million acres were leased. Survey types included geohazard, geophysical, geotechnical, sonobuoy seismic, pipeline route, sound source, and ice sensor. G&G surveys included 2D seismic, high-resolution data, interpretations, aerogravity and magnetics, 3D seismic, 3D amplitude, and deep stratigraphic tests. A total of 109 wells were drilled. There were 21 facilities/shorebases used under 9 lease sales. There were 42 documented drill rigs/vessels. Activity types included construction and maintenance, facilities, pipelines, platforms, surveys, training activities, transportation routes, transportation sites, and well drilling.

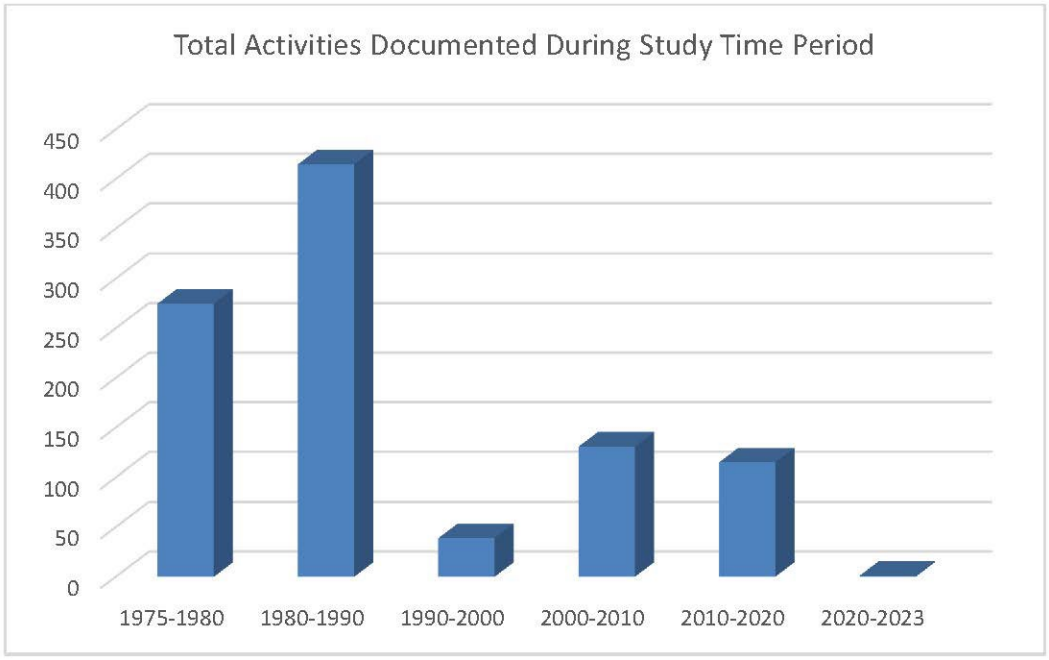
Activities not directly associated with a lease sale included COST/DST well drilling, and G&G surveys, particularly 2D seismic surveys. Subsequently, shorebases/facilities, transportation sites, and transportation routes supporting these activities could not be tied to a lease sale due to the fact these are not associated with a lease sale by activity design. Other activities not associated with a lease sale were due to study limitations, where not enough public information was retrieved to confidently link an activity to a lease sale.

Total documented activities by OCS planning area are shown in Figure 3-1. Total activities by decade are shown in Figure 3-2. The following sections provide more detailed summaries.



Note: Records of aggregated surveys in the Cook Inlet Planning Area (19 surveys), Gulf of Alaska Planning Area (27 surveys), and Bering Sea (89 surveys unable to be assigned to an OCS planning) are expanded and included in this summary. This information is rederived from the TB_Activity table compiled in GIS.

Figure 3-1. Documented historical oil and gas activities from 1975–2021 by OCS planning area



Notes: Records of aggregated surveys for 1970–1980 (46 surveys) and 1980–1990 (89 surveys) are expanded and included in this summary. This information is rederived from the TB_Activity table compiled in GIS.
The cutoff date for data inclusion was October 25, 2023.

Figure 3-2. Total activities documented during from 1975 to present

3.1 Lease Sales

There were 27 lease sales and 2,446 total leases sold, with 21 leases that are active, as shown in Table 3.1-1. A summary of all lease sales in the Alaska OCS are provided in Table 3.1-2.

Table 3.1-1. Lease sales and leases by OCS planning area

Planning Area	Lease Sales	Total Leases	Active Leases
Beaufort Sea (BFT)	10	963	6
Chukchi Sea (CHU)	3	866	0
Cook Inlet (COK)	7	121	15
St. George Basin (GEO)	1	97	0
Gulf of Alaska (GOA)	3	124	0
North Aleutian Basin (NAL)	1	23	0
Navarin Basin (NAV)	1	186	0
Norton Basin (NOR)	1	64	0
Total	27	2,446	21

Sources: BOEM 2023b, 2023g, 2023h

Table 3.1-2. Summary of Alaska OCS lease sales

Subregion	Planning Area	Sale Number	Lease Issued	Tracts Offered	Acres Offered	Acres Leased	Total Bid Sums	High Bid Sums	Active Lease Area (hectares)	Active Leases	Year
Gulf of Alaska	**Gulf of Alaska**	**39**	76	189	1,008,499	409,058	$571,871,587	$559,836,587	0	0	1976
Gulf of Alaska	**Cook Inlet**	**CI**	87	135	768,580	495,307	$400,319,543	$398,471,313	0	0	1977
Arctic	**Beaufort Sea**	**BF**	24	46	173,423	85,776	$491,728,138	$488,691,138	3,032.98	2	1979
Gulf of Alaska	**Gulf of Alaska**	**55**	35	210	1,195,569	199,261	$117,550,113	$109,751,073	0	0	1980
Gulf of Alaska	**Gulf of Alaska**	**RS1**	1	175	996,300	5,693	$3,091,738	$170,496	0	0	1981
Gulf of Alaska	**Cook Inlet**	**60**	13	153	858,247	73,157	$4,405,899	$4,405,899	0	0	1981
Gulf of Alaska	**Cook Inlet**	**RS2**[1]	0	140	785,090	0	0	0	0	0	1982
Arctic	**Beaufort Sea**	**71**	121	338	1,825,770	662,860	$2,067,604,786	$2,055,632,336	0	0	1982
Bering Sea	**Norton Basin**	**57**	59	418	2,379,751	335,898	$325,267,372	$317,873,372	0	0	1983
Bering Sea	**St. George Basin**	**70**	96	479	2,688,787	540,917	$427,343,830	$426,458,830	0	0	1983
Bering Sea	**Navarin Basin**	**83**	163	5,036	28,048,995	927,989	$631,228,331	$516,317,331	0	0	1984
Arctic	**Beaufort Sea**	**87**	227	1,419	7,773,447	1,207,714	$871,131,327	$866,860,327	0	0	1984
Arctic	**Beaufort Sea**	**97**	202	3,344	18,277,806	1,110,764	$115,261,636	$115,261,636	0	0	1988
Arctic	**Chukchi Sea**	**109**	350	4,694	25,631,122	1,976,912	$478,177,948	$478,032,631	0	0	1988
Bering Sea	**North Aleutian Basin**	92	23	990	5,603,586	121,757	$95,439,500	$95,439,500	0	0	1988

Subregion	Planning Area	Sale Number	Lease Issued	Tracts Offered	Acres Offered	Acres Leased	Total Bid Sums	High Bid Sums	Active Lease Area (hectares)	Active Leases	Year
Arctic	**Beaufort Sea**	**124**	57	3,417	18,556,976	277,004	$16,807,025	$16,807,025	2,234.79	1	1991
Arctic	**Chukchi Sea**	**126**	28	3,476	1,8987,976	159,213	$71,17,304	$7,117,304	0	0	1991
Arctic	**Beaufort Sea**	**144**	29	1,364	7,282,795	100,025	$14,572,057	$14,429,363	3,333.58	2	1996
Gulf of Alaska	**Cook Inlet**	**149**	2	101	427,886	9,766	$253,965	$253,965	0	0	1997
Arctic	**Beaufort Sea**	**170**	28	203	920,983	86,371	$623,9015	$5,327,093	0	0	1998
Arctic	**Beaufort Sea**	**U.S. v. AK (S65)[2]**	2	9	10,149	10,149	N/A	N/A	0	0	2000
Arctic	**Beaufort Sea**	**186**	34	1,798	9,459,743	181,810	$10,175,949	$8,903,538	6,000.51	0	2003
Gulf of Alaska	**Cook Inlet**	**191[1]**	0	447	2,219,000	0	0	0	0	0	2004
Arctic	**Beaufort Sea**	**195**	117	1,770	9,301,423	607,285	$46,735,081	$46,735,081	1,749.83	0	2005
Arctic	**Beaufort Sea**	**202**	90	1,654	8,734,194	490,700	$42,339,231	$42,165,195	1.10	1	2007
Arctic	**Chukchi Sea**	**193**	487	5,354	29,389,241	2,758,377	$3,389,919,496	$2,662,059,883	0	0	2008
Gulf of Alaska	**Cook Inlet**	**244**	14	224	1,093,533	76,615	$3,034,815	$3,034,815	31,005.18	14	2017
Gulf of Alaska	**Cook Inlet**	**258**	1	193	958,202	5,693	$63,983	$63,983	2,304.00	1	2022

Note: (Lease Sale) BF = Beaufort Sea; (Lease Sale) CI = Cook Inlet; N/A = not applicable

[1]Lease Sales 191 and RS2 were not included in the study because there were no successful lease sales, and as a result no activities occurred.

[2]Does not count as a sale. The United States was determined to be the landowner of these submerged lands by the U.S. Supreme Court's final judicial determination on June 29, 2000, in United States v. Alaska (No. 84 Original).

Sources: BOEM 2023b, 2023g, 2023h

3.2 Surveys

Documented surveys applicable to this study in the Alaska OCS include several types, which are defined in Table 3.2-1. These do not include other survey activities such as cultural surveys, marine mammal monitoring, and related acoustic surveys as these were outside of the scope of this study. Estimated mileage for surveys conducted between 1968 and 2022 are summarized in Table 3.2-1. A summary of G&G surveys documented in the Alaska OCS between 1968 and 2022 are summarized in Table 3.2-3.

Table 3.2-1. Survey types

Survey Type	Description
Geohazard survey	Geohazards surveys, often shallow hazards surveys, are conducted to verify that the site of interest is clear of hazards. Many geohazard survey methods employ high resolution geophysical sensing (sparkers, sonar, sub-bottom profilers) to remotely image the sea bottom and the shallow sub-sea bed (depth of tens of meters).
Geophysical survey	Geophysical surveys utilize geophysical techniques (e.g., gravity, magnetic, electromagnetic, or seismic) to produce data in support of possible oil and gas exploration and development activities. Surveys include the following: • 2D seismic • 3D seismic • Aerogravity and magnetics
Geotechnical survey	Geotechnical surveys were categorized as such based on the name of the survey from the source material. These generally survey physical characteristics of rock and unconsolidated sediment on the seabed. Surveys include the following: • Bottom sampling and shallow coring • Deep stratigraphic test
Sonobuoy seismic	A sonobuoy seismic is a seismic survey in which a sonobuoy floats in the water and using hydrophones to collect data.
Pipeline route survey	Geohazard and geotechnical data are collected along a potential pipeline route. Ice gouge, strudel scour and bathymetry data were collected over those routes.
Sound source characterization	Underwater sound measurements are used to characterize the sound emitted by proposed activities in order to verify environmental exclusion zones. They are taken for an activity like drilling and required for all seismic surveys with an airgun source.
Ice sensor deployment	Ice profilers are used to monitor ice thickness and understand the dynamics and thermodynamics of sea ice regime.

Notes: 2D = two-dimensional; 3D = three-dimensional
Source: BOEM 2023a

Table 3.2-2. Estimated 2D seismic survey mileage by OCS planning area

Planning Area	Estimated Mileage[1]
Gulf of Alaska	36,000
Cook Inlet	23,000
Kodiak	23,000
Shumagin	10,000
North Aleutian	43,000

Planning Area	Estimated Mileage[1]
St. George Basin	50,000
Aleutian Arc	< 500
Bowers Basin	< 1,000
St. Matthew-Hall	10,000
Norton Basin	25,000
Navarin Basin	55,000
Hope Basin	9,000
Chukchi Sea	141,000
Beaufort Sea	88,000
Total	515,000[2]

Note: 2D = two-dimensional
[1]Mileage is rounded to the nearest 1,000 miles
[2]The total is 515,233 per BOEM 2023a, but this is not available for breakdown by OCS planning area.
Source: BOEM 2023a

Table 3.2-3. Summary of G&G data inventory

Data Type	Number
2-D seismic survey	515,233
High resolution data survey	59,855
Common depth point interpretations	84,683
Aerogravity and magnetics surveys	404,599
3D seismic surveys	1,210
3D Amplitude with offset surveys	81
Deep stratigraphic tests	14

Notes: 2D = two-dimensional; 3D = three-dimensional; G&G = geological and geophysical
Source: BOEM 2023a

3.3 Well Drilling

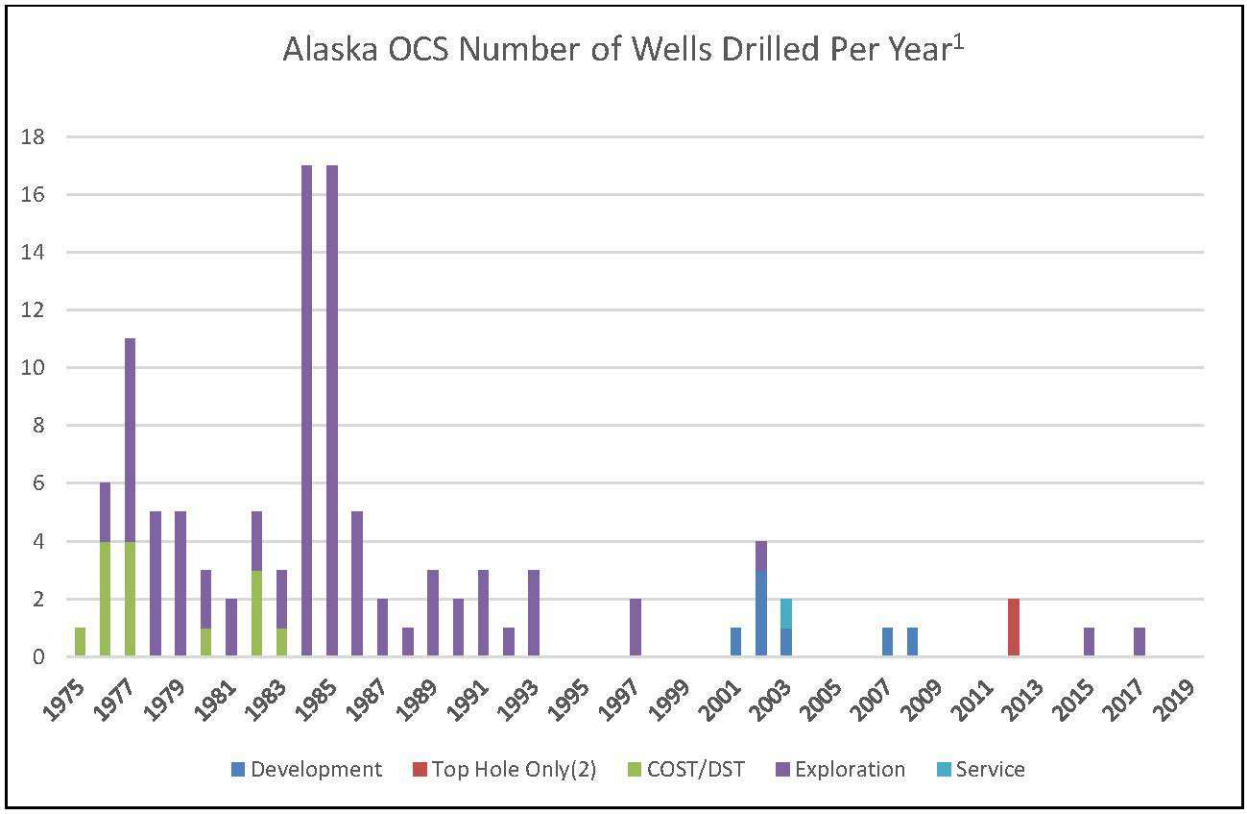
A summary of wells drilled between 1975 and 2019 are provided in Table 3.3-1 and Figure 3-3.

Table 3.3-1. Well drilling by OCS planning area

Planning Area	COST/DST	Development	Exploration	Service	Top Hole	Total
Beaufort Sea (BFT)	--	6	31	1	1	39
Chukchi Sea (CHU)	--	--	6	--	1	7
Cook Inlet (COK)	1	--	13	--	--	14
Gulf of Alaska (GOA)	1	--	12	--	--	13
Kodiak (KOD)	6	--	–	--	--	6

Planning Area	COST/DST	Development	Exploration	Service	Top Hole	Total
Navarin Basin (NAV)	1	--	8	--	--	9
North Aleutian Basin (NAL)	1	--	–	--	--	1
Norton Basin (NOR)	2	--	6	--	--	8
St. George Basin (GEO)	2	--	10	--	--	12
Total	14	6	86	1	2	109

Notes: -- = no data provided; COST = continental offshore stratigraphic test; DST = deep stratigraphic test
Sources: Bisson et al. 2013; BOEM 2005a, 2005b, 2005c, 2005d, 2016a, 2016c, 2019b, 2020, 2022b, 2023c, 2023d; BSEE 2021; Dames & Moore 1978; Ireland and Bisson 2016; Kevin Waring Associates 1985; Northern Resource Management 1980



Notes: [1]For the purpose of total well counts in the Alaska OCS, BOEM and BSEE consider API no. 500292330100 (NS-34) and API no. 500292330101 (NS-34A) to be counted as the same well. For the purpose of documenting activities, NS-34 is included as a development well in this graph.
[2]Permitted top holes only not approved to enter reservoir targets and are not considered to be completed wells.
Sources: BOEM 2019a, 2020

Figure 3-3. Alaska OCS number of wells drilled per year

3.4 Oil-and-Gas-Supporting Activities

Shorebases and facilities located within or near the shorebase were often used to stage operations for well drilling or surveys. Table 3.4-1 summarizes the documented shorebases and facilities by subregion. All shorebases and facilities were onshore, with the exception of facilities at Northstar Island. Onshore

shorebases and facilities required aircraft or support vessels to carry staff to operations at offshore drill rigs or survey research vessels.

Table 3.4-1. Summary of facilities and shorebases

Facility/Shorebase	Subregion	Lease Sale(s)
Barrow shorebase	Arctic	97, 109, 193, 195
Camp near West Dock	Arctic	Not Determined
Deadhorse facilities	Arctic	BF
East Dock Shorebase	Arctic	BF
Housing at Deadhorse	Arctic	Not Determined
Northstar Island permanent living quarters	Arctic	BF
Operations center constructed at Northstar Island	Arctic	BF
West Dock Base of Operations	Arctic	BF
West Dock Shorebase	Arctic	BF
Cold Bay Shorebase	Bering Sea	70
Crowley Maritime Corporation shorebase at Captains Bay	Bering Sea	N/A
Nome Shorebase	Bering Sea	57
Offshore Systems, Inc., shorebase at Captains Bay	Bering Sea	57, 70
Cape Yakataga Shorebase	Gulf of Alaska	39
Homer Airport (helicopter base)	Gulf of Alaska	CI
Homer City Dock	Gulf of Alaska	CI
Homer Shorebase	Gulf of Alaska	N/A
Nikiski Rig Tenders Dock	Gulf of Alaska	CI
Nikiski Shorebase	Gulf of Alaska	N/A
Seward Shorebase	Gulf of Alaska	39
Yakutat Shorebase	Gulf of Alaska	39

Notes: (Lease Sale) BF = Beaufort Sea; (Lease Sale) CI = Cook Inlet; N/A = not applicable
Sources: Aerts et al. 2008b, 2010; Bisson et al. 2013; BOEM 2016c, 2022b, 2023c, 2023d; Brueggeman et al. 1992; Burden et al. 1985; Dames & Moore 1978; Kevin Waring Associates 1985; Kim et al. 2016, 2019; Lomac-MacNair et al. 2015; Northern Resource Management 1980; Richardson 2010a; Richardson 2010b, 2010c, 2011; Richardson and Kim 2012, 2013, 2014, 2015

An offshore drilling rig or platform is a structure on or in water with facilities to aid in exploration or production. Exploration drilling rigs generally are temporary rigs that are mounted on floating platforms or vessels and sail or are towed to the drill site, where they drill boreholes and collect data. Production platforms (or islands) are semi-permanent structures constructed specifically for extraction of the resource. In the Alaska OCS, these are more specifically artificial islands or temporary spray ice islands. They contain all required facilities and pumps for initial processing and pumping the resource onshore. A summary of drilling vessels/rigs by lease sale is provided in Table 3.4-2.

Table 3.4-2. Summary of drilling vessels/rigs by lease sale

Lease Sale	Drill Rig/Vessel Name(s)[1]	OCS Planning Area(s)
BF	Brinkerhoff #84, Tern Gravel Island; Nabors[2]; Nabors 27-E, BF-37 Gravel Island; P.N.J.V. Rig #1, Seal Gravel Island; Pool Arctic #5, Tern Gravel Island	Beaufort Sea
CI	Diamond M. Dragon, Ocean Bounty, Dan Prince	Cook Inlet
39	SEDCO 706, ODECO Ocean Ranger, Alaskan Star, Aleutian Key	Gulf of Alaska
55	*Ocean Odyssey* semi-submersible	Gulf of Alaska
57	Rowan Middletown Jackup, Key Hawaii Jackup	Norton Basin
60	Key Hawaii Jackup, SEDCO 712	Cook Inlet
70	Big Dipper (Doo Sung) semi-submersible, SEDCO 712, SEDCO 708, Ocean Odyssey semi-submersible	St. George Basin
71	Beaufort Sea #1, CIDS; PAA Rig #5, Sandpiper Gravel Island; Spray Ice Island; SSDC/MAT; United Rig #2, Mukluk Gravel Island	Beaufort Sea
83	SEDCO 712, Ocean Odyssey semi-submersible, Big Dipper (Doo Sung) semi-submersible, SEDCO 708	Navarin Basin
87	Beaudril Kulluk, Canmar Explorer II, Canmar Kulluk, Explorer II Drillship, Glomar Beaufort Sea #1, CIDS, SSDC/MAT	Beaufort Sea
97	Canmar Explorer II, Canmar Explorer III	Beaufort Sea, Chukchi Sea
109	Explorer III Drillship, Canmar Explorer III	Chukchi Sea
124	Canmar Kulluk, SSDC/MAT	Beaufort Sea
144	Glomar Beaufort Sea #1, CIDS; PAA Rig #4, Tern Gravel Island/Ice Island	Beaufort Sea
193	M/V Noble Discoverer, Polar Pioneer	Chukchi Sia
195	*Kulluk,* Spy Island drillsite, *Doyon Rig*	Beaufort Sea

Notes: (Lease Sale) BF = Beaufort Sea; (Lease Sale) CI = Cook Inlet; CIDS = concrete island drilling system; SSDC = single steel drilling caisson
[1]Associated artificial islands are named if applicable and available with associated drilling vessel/rig.
[2]Not enough information was retrieved to determine if *Nabors* was the same as *Nabors 27-E*. *Nabors* drilled at Northstar.
Sources: Bisson et al. 2013; BOEM 2005a, 2005b, 2005d, 2016a, 2019b, 2020, 2022b, 2023c, 2023d; BSEE 2021; Dames & Moore 1978; Ireland and Bisson 2016; Kevin Waring Associates 1985; Northern Resource Management 1980

In addition to drill rigs and vessels, a variety of vehicles, aircraft, and vessels were used to support oil and gas activities in the Alaska OCS. Table 3.4-3 illustrates the types of equipment used for various activities. It is not comprehensive but provides examples.

Table 3.4-3. Example vehicles, aircraft, and vessels used to support activities

Activity/Infrastructure	Equipment Examples
Construction and maintenance	Cranes, excavators, loaders, barges, zodiacs
Facilities	Tucker tracked vehicles, standard vehicles, helicopters, work boats, supply barges, tank barges
Pipelines	Backhoes, dump trucks, tractors

Activity/Infrastructure	Equipment Examples
Platforms	Hovercraft, barges, survey boats, ice breakers
Surveys	Support vehicles, vibrators, fixed-wing aircraft, helicopters, source vessels, ice breakers, tugs, support vessels
Training activities	Evacuation vehicles, snowmachines, all-terrain vehicles, landing craft, helicopters, zodiacs, bay-class boats, mini-barges, spill response vessels
Transportation routes	Tucker tracked vehicles, standard vehicles, tractor trailers, helicopters, fixed-wing aircraft, fuel barges, barges, support vessels, supply boats
Transportation sites	Tucker tracked vehicles, standard vehicles, motor carriers, excavators, fuel trucks, loaders, helicopters, fixed-wing aircraft, work boats, crew vessels, tugs, barges, supply barges, source vessels, ice breakers
Well drilling	Trucks, helicopters, support vessels, supply barges, tugs, work boats

Due to the large geography of Alaska, many different locations were used for transporting equipment and materials, fuel, and staff. In many cases, a city was mentioned in source documents, and this was documented as a transportation site. In fewer instances, source documents provided figures with explicit documentation of a transportation route between two locations, and for the purpose of this study these are documented here as transportation routes. Table 3.4-4 summarizes transportation sites. In some situations, one transportation site served oil and gas activities in multiple subregions. This was the case for Dutch Harbor, which served as a transportation site in the Bering Sea and the Arctic subregions. Refer to Sections 4–6 about specific transportation routes or areas.

Table 3.4-4. Summary of supporting activities by lease sale

Lease Sale	Location(s)	Activity Type	OCS Planning Area(s)
BF	Fairbanks, East Dock, Seward, West Dock, Whittier, Deadhorse (airport), Anchorage (Ted Stevens International Airport, formerly Anchorage Airport), Dalton Highway (terminus at Deadhorse), Northstar Island, Endicott	Transportation sites	Beaufort Sea
BF	Deadhorse, Northstar Island, West Dock	Facilities	Beaufort Sea
BF	Northstar Island	Platform	Beaufort Sea
BF	Northstar Island	Construction/maintenance	Beaufort Sea
BF	Northstar Island	Oil production	Beaufort Sea
BF	Northstar Island	Other supporting activity	Beaufort Sea
BF	East Dock, West Dock	Shorebases	Beaufort Sea
BF	Northstar Island	Training activities	Beaufort Sea
CI	Anchorage (Ted Stevens International Airport, formerly Anchorage Airport), Kenai (airport), Seward, Nikiski (Rig Tenders Dock), Seldovia (dock), Anchorage (port), Homer (City Dock), Homer (airport)	Transportation sites	Cook Inlet
39	Seward, Nikiski, Cape Yakataga, Seattle (port), Yakutat, Anchorage (Ted Stevens International Airport, formerly Anchorage Airport)	Transportation routes	Gulf of Alaska

Lease Sale	Location(s)	Activity Type	OCS Planning Area(s)
57	Nome	Transportation site	Norton Basin
70	Cold Bay, Dutch Harbor	Transportation sites	St. George Basin
97	Barrow	Transportation site	Chukchi Sea
97	Barrow shorebase	Facility	Chukchi Sea
109	Barrow, Port Clarence	Transportation sites	Chukchi Sea
109	Barrow shorebase	Facility	Chukchi Sea
144	Anchorage (Ted Stevens International Airport, formerly Anchorage Airport), West Dock, Endicott	Transportation sites	Beaufort Sea
193	Dutch Harbor, Nome, Wainwright, Barrow, Deadhorse	Transportation sites	Chukchi Sea
193	Barrow shorebase	Facility	Chukchi Sea
195	Nome, Dutch Harbor, Oliktok Dock, St. Lawrence Island, Deadhorse, Barrow	Transportation sites	Beaufort Sea
195	Barrow shorebase	Facility	Beaufort Sea
195	Spy Island drillsite	Platform	Beaufort Sea
Not determined	Anchorage (Ted Stevens International Airport, formerly Anchorage Airport), Endicott, Kotzebue, St. Lawrence Island, Dutch Harbor, Nome, Pribilof Islands, Cold Bay, Deadhorse, East Dock	Transportation sites	Norton Basin, Navarin Basin, St. George Basin, Beaufort Sea, Chukchi Sea, not determined (Bering Sea)
Not determined	West Dock, Deadhorse	Facilities	Beaufort Sea

Notes: (Lease Sale) BF = Beaufort Sea; (Lease Sale) CI = Cook Inlet
Sources: Aerts et al. 2008a, 2008b, 2010; Beland et al. 2013; Bisson et al. 2013; Blees et al. 2013; BOEM 2016c, 2022b, 2023c, 2023d; Brueggeman et al. 1992; Burden et al. 1985; BSEE 2022; Cate et al. 2015; Dames & Moore 1978; Funk et al. 2007; Hartin et al. 2011; Ireland et al. 2009; Ireland and Bisson 2016; Kevin Waring Associates 1985; Kim et al. 2016, 2019, 2020a, 2020b; Lomac-MacNair et al. 2015; Reiser et al. 2010; Richardson 2010a, 2010b, 2010c, 2010d, 2011; Richardson and Kim 2012, 2013, 2014, 2015; Smultea et al. 2014

3.5 Activities Not Associated with a Lease Sale

There were situations when available public information was unable to clearly tie an activity to a lease sale. This is to be expected, as many exploration activities (or off-lease activities) do not occur for a specific lease sale. Many are speculative and are done to either prove the existence of a hydrocarbon system (as with COST/DST wells) or are in advance of any future least sale. No sale needs to be announced or scheduled in a particular area for an activity to take place, although, an announcement can spur some activity. Many times, in Alaska, there is not enough time between the announced sale and the actual sale to conduct additional exploration activities. Activities that were not associated with a lease sale, either by program design (such as COST/DST wells and most 2D seismic surveys), or as a result of data limitations, are summarized in Table 3.5-1.

Table 3.5-1. Summary of activities not associated with a lease sale

Activity	Number	Location
Shorebases/facilities	13	Captains Bay, Cold Bay, Deadhorse, Homer, Nikiski, Nome, West Dock, Yakutat
Transportation sites[1]	16	Anchorage (Merrill Field), Anchorage (Ted Stevens International Airport, formerly Anchorage Airport), Cold Bay, Deadhorse, Dutch Harbor, East Dock, Endicott, Homer (Airport), Homer (City Dock), Kotzebue, Nikiski, Nome, Pribilof Islands, Seattle (Port), St. Lawrence Island, Yakutat
Transportation routes[1]	13[2]	Anchorage to Cold Bay, Cold Bay to ST GEORGE 1 DST-2, Lower 48 to Anchorage, Anchorage to Dutch Harbor, Nome to NORTON 1 DST-10, Seattle to Dutch Harbor, Cold to ST GEORGE 2 DST-11, multiple routes in Cook Inlet
COST/DST wells	14	GOA 1 DST-1, ST GEORGE 1 DST-2, KSST KODIAK 1 DST-3, KSST KODIAK 2 DST-4, KSST KODIAK 4 DST-5, KSSD KODIAK 1 DST-6, COOK INLET 1 DST-7, KSSD KODIAK 2 DST-8, KSSD KODIAK 3 DST-9, NORTON 1 DST-10, ST GEORGE 2 DST-11, NORTON 2 DST-12, N ALEUTIAN 1 DST-13, NAVARIN 1 DST-14
G&G surveys	277	• 2D seismic surveys occurring in all OCS planning areas (141)[3] • Surveys generalized as G&G surveys in the Bering Sea with undefinable OCS planning areas (100)[4] • Geological hazard, 3D seismic, and other G&G surveys in the Beaufort Sea Planning Area and Chukchi Sea Planning Area (36)[4]

Notes: COST = continental offshore stratigraphic test; DST = deep stratigraphic test; G&G = geological and geophysical
[1]Transportation routes have a documented beginning and end point, whereas a transportation site is a documented singular location.
[2]Total includes repeated routes used for different purposes or used with different methods of travel, and multiple routes in Cook Inlet recorded as a single route.
[3]This is consistent with the fact that most exploration surveys authorized under the exploration regulations (30 CFR Part 251 for MMS and 30 CFR Part 551 for BOEM) would not be associated with a lease sale.
[4]G&G survey data limitations resulted in the inability to confidently assign these G&G surveys to a lease sale or to determine if a lease sale was not applicable to the activity. The lease sale relation for these G&G surveys are unknown.
Sources: BOEM 2016c, 2022b, 2023c, 2023d; Burden et al. 1985; Dames & Moore 1978

3.6 Northstar Oil and Gas Development and Production

As result of Lease Sale Beaufort Sea (BF), Seal Island (originally built in 1982 in State of Alaska waters) was reconstructed to become Northstar Island (subsequently named Northstar) in the year 2000. Northstar contains a combination of State of Alaska and Federal OCS wells, the latter extending into the Beaufort Sea Planning Area with horizontal drilling. Northstar is the only location in the Alaska OCS that has federal development wells that actively produce oil and gas condensate and associated crude oil and gas pipelines. Production began in October 2001 and continues to present as of August 2024 (refer to Section 4.1.1.6 and Section 4.1.1.7) for details). BP Exploration (Alaska) Inc. was the operator of Northstar, until November 18, 2014, when Hilcorp Alaska, LLC took over the Northstar Unit Operatorship. This study focuses on the activities relevant to the Alaska OCS and does not document state wells or activities related to maintaining the state wells.

Just over 160 records of activities were documented for Northstar spanning from 1995 to 2018. Production activities continue beyond 2018, but the latest annual summary report from 2018 (Kim et al. 2020b) was the last document capturing Northstar yearly activities in this study.

A chronological summary of documented development and production activities at Northstar is provided in Table 3.6-1. Refer to Section 4.1.1 for additional information specific to Northstar.

Table 3.6-1. Documented activities at Northstar

Activity Start Year	Activity(ies)[1]	Activity Type(s)[2]
1995	• Northstar Development 1995 Pipeline Route Survey	• Survey
1996	• Northstar Development 1995 Pipeline Route Survey • Northstar 3D OBC Survey, 1996	• Survey • Survey
1997	• Northstar Development 1995 Pipeline Route Survey	• Survey
1998	• Northstar Development 1995 Pipeline Route Survey • Ice road transportation (1998–1999)	• Survey • Transportation route
1999	• Ice road transportation (1999–2000)	• Transportation route
2000	• Construction to rebuild Seal Island as a platform for Northstar oil production operations • Installation of Northstar Oil and Northstar Gas Pipelines • Aerial transportation to and from Northstar Island • Marine transportation to and from Northstar Island • Transportation support (air, marine, ice road) from West Dock • Construction of permanent living quarters • Ice road transportation (2000–2001) • ARKTOS training	• Platform • Pipeline • Transportation route • Transportation site • Facility • Training activities
2001	• Aerial transportation to and from Northstar Island • Marine transportation to and from Northstar Island • Ice road transportation • Crude oil production • Drilling of development well API no. 500292305200 (NS-09) • ARKTOS training	• Transportation route • Transportation site • Oil production • Well drilling • Training activities
2002	• Aerial transportation to and from Northstar Island • Marine transportation to and from Northstar Island • Ice road transportation • Drilling of development well API no. 500292308800 (NS-06) • Drilling of development well API no. 500292309100 (NS-12) • Drilling of development well API no. 500292312800 (NS-22) • Spill response training	• Transportation route • Transportation site • Well drilling • Training activities

Activity Start Year	Activity(ies)[1]	Activity Type(s)[2]
2003	• Marine transportation to and from Northstar Island • Aerial transportation to and from Northstar Island • Aerial travel for oil spill inspections • Drilling of water disposal well API no. 500292317900 (NS-32) • Bathymetric survey • Thermosiphon and thermistor installation • Berm reconstruction • Hovercraft landing area modification • Miscellaneous gravel placement inside island sheetpile wall • Well cellar retrofit project • Island slope protection and ARKTOS ramp repair • Spill response training	• Transportation route • Well drilling • Construction/ maintenance • Training activities
2004	• Marine transportation to and from Northstar Island • Aerial transportation to and from Northstar Island • Aerial travel for oil spill inspections • Air support from Deadhorse Airport to Endicott • Ice road transportation • Concrete slope-protection repair • General maintenance activities • West Dock Base of Operations supporting activities • Spill response training • ARKTOS training	• Transportation route • Transportation site • Construction/ maintenance • Facility • Training activities
2005	• Marine transportation to and from Northstar Island • Aerial transportation to and from Northstar Island • Aerial travel for oil spill inspections • Ice road transportation • Spill response training • ARKTOS training	• Transportation route • Transportation site • Training activities
2006	• Marine transportation to and from Northstar Island • Aerial transportation to and from Northstar Island • Aerial travel for oil spill inspections • Ice road transportation • Drilling of development well API no. 500292329300 (NS-30) • Drilling of development well API no. 500292330100 (NS-34) • General maintenance activities • Spill response training • ARKTOS training	• Transportation route • Transportation site • Well drilling • Construction/ maintenance • Training activities
2007	• Marine transportation to and from Northstar Island • Aerial transportation to and from Northstar Island • Aerial travel for oil spill inspections • Ice road transportation • General maintenance activities • Spill response training • ARKTOS training	• Transportation route • Transportation site • Construction/ maintenance • Training activities

Activity Start Year	Activity(ies)[1]	Activity Type(s)[2]
2008	• Marine transportation to and from Northstar Island • Aerial transportation to and from Northstar Island • Aerial travel for oil spill inspections • Ice road transportation • Drilling of development well API no. 500292330101 (NS-34A) • General maintenance activities • Deployment of ice sensors near • Spill response training • ARKTOS training	• Transportation route • Transportation site • Well drilling • Construction/ maintenance • Survey • Training activities
2009	• Marine transportation to and from Northstar Island • Aerial transportation to and from Northstar Island • Aerial travel for oil spill inspections • Ice road transportation • Bench block repair • Below-water repairs • Deployment of ice sensors near Northstar Island • Spill response training	• Transportation route • Transportation site • Construction/ maintenance • Survey • Training activities
2010	• Marine transportation to and from Northstar Island • Aerial transportation to and from Northstar Island • Aerial travel for oil spill inspections • Ice road transportation • Demobilization of the Nabors drill rig • Spill response training • ARKTOS training	• Transportation route • Transportation site • Other supporting activity • Training activities
2011	• Marine transportation to and from Northstar Island • Aerial transportation to and from Northstar Island • Aerial travel for oil spill inspections • Construction of operations center • General construction activity • Spill response training • ARKTOS training	• Transportation route • Transportation site • Facility • Construction/ maintenance • Training activities
2012	• Marine transportation to and from Northstar Island • Aerial transportation to and from Northstar Island • Aerial travel for oil spill inspections • Ice road transportation • Construction of the ARKTOS evacuation ramp • Reconstruction of southeast corner of Northstar Island • Planned maintenance • Bench protection installation • Hovercraft ramp replacement • Spill response training • ARKTOS training	• Transportation route • Transportation site • Construction/ maintenance • Training activities
2013	• Marine transportation to and from Northstar Island • Aerial transportation to and from Northstar Island • Aerial travel for oil spill inspections • Ice road transportation • Spill response training • ARKTOS training	• Transportation route • Transportation site • Training activities

Activity Start Year	Activity(ies)[1]	Activity Type(s)[2]
2014	• Marine transportation to and from Northstar Island • Aerial transportation to and from Northstar Island • Aerial travel for oil spill inspections • Transportation support (air and marine) from Endicott • Spill response training	• Transportation route • Transportation site • Training activities
2015	• Marine transportation to and from Northstar Island • Aerial transportation to and from Northstar Island • Aerial travel for oil spill inspections • Ice road transportation • Well repair • Bathymetric survey • Spill response training	• Transportation route • Transportation site • Construction/ maintenance • Survey • Training activities
2016	• Marine transportation to and from Northstar Island • Aerial transportation to and from Northstar Island • Aerial travel for oil spill inspections • Ice road transportation • Spill response training	• Transportation route • Transportation site • Training activities
2017	• Marine transportation to and from Northstar Island • Aerial transportation to and from Northstar Island • Aerial travel for oil spill inspections • Ice road transportation • Terrestrial transportation to and from Northstar Island • Spill response training	• Transportation route • Transportation site • Training activities

Notes: API = American Petroleum Institute
[1]Major milestones are shown in **bold**.
[2]Transportation routes have a documented beginning and end point, whereas a transportation site is a documented singular location.
Sources: Aerts et al. 2008b, 2010; AK Pipelines; BOEM 2022b, 2023c, 2023d; BSEE 2022; Horowitz 2002a, 2002b; Kim et al. 2016, 2019, 2020a, 2020b; Richardson 1997, 2010a, 2010b, 2010c, 2010d, 2011; Richardson and Kim 2012, 2013, 2014, 2015

4 Arctic Subregion

The Arctic subregion encompasses the Chukchi and Beaufort seas from the tip of the Seward Peninsula to the eastern border of the U.S. with Canada. There are three OCS planning areas in this subregion: Beaufort Sea, Chukchi Sea, and Hope Basin, shown in Figure 4-1. Information on the lease sales in these OCS planning areas is provided in this section.

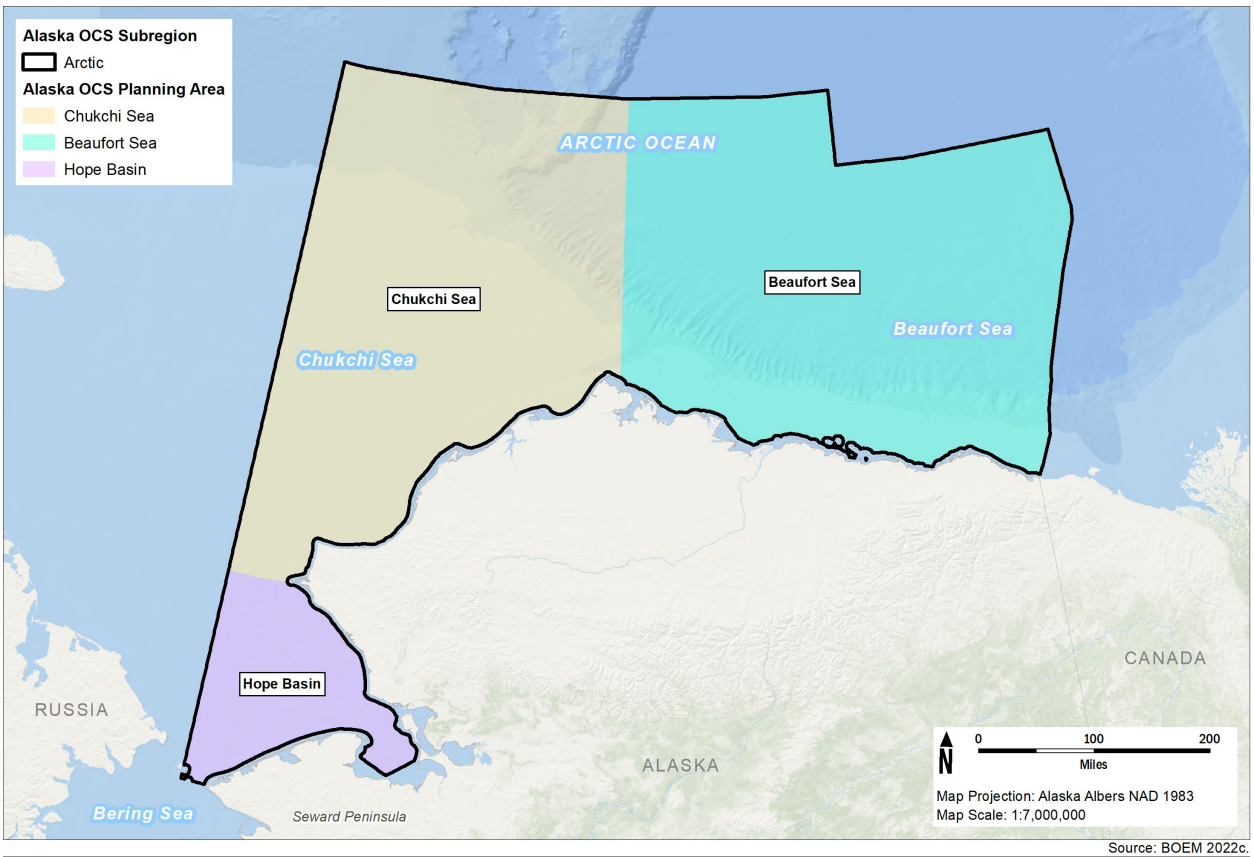


Figure 4-1. Arctic subregion Alaska OCS planning areas

4.1 Beaufort Sea Planning Area

The Beaufort Sea Planning Area extends from a point just east of Point Barrow to the U.S.-Canadian border to the east. Between 1979 and 2007, there were 10 lease sales and 1 special case in the Beaufort Sea Planning Area: Lease Sales BF, 71, 87, 97, 124, 144, 170, 186, 195, 202, and S65. There are six active leases in this OCS planning area. A summary of the leases in the Beaufort Sea Planning Area is shown in Table 4.1-1. Information on these leases is provided in the sections below.

In the Beaufort Sea Planning Area between 1968 and 2022, there were an estimated 88,000 miles of 2D marine seismic surveys conducted (BOEM 2023a).

Table 4.1-1. Summary of leases in the Beaufort Sea Planning Area

	Lease Sale BF	Lease Sale 71	Lease Sale 87	Lease Sale 97	Lease Sale 124	Lease Sale 144	Lease Sale 170	Lease Sale 186	Lease Sale 195	Lease Sale 202	S65[1]
Year	1979	1982	1984	1988	1991	1996	1998	2003	2005	2007	1997
Tracts offered	46	338	1,419	3,344	3,417	1,364	203	1,798	1,770	1,654	9
Acres offered	173,423	1,825,770	7,773,447	18,277,806	18,556,976	7,282,795	920,983	9,459,743	9,301,423	8,734,194	10,149
Leases issued	24	121	227	202	57	29	28	34	117	90	2
Acres leased	85,776	662,860	1,207,714	1,110,764	277,004	100,025	86,371	181,810	607,285	490,700	10,149
Active leases	2	0	0	0	1	2	0	0	0	1	0
Active lease area (hectares)	3,032.98	0	0	0	2,234.79	3,333.58	0	0	0	1.10	0

Notes: BF = Beaufort Sea; S65 = Special Case: U.S. v. AK
[1]Does not count as a sale. The United States was determined to be the landowner of these submerged lands by the U.S. Supreme Court's final judicial determination on June 29, 2000, in United States v. Alaska (No. 84 Original).
Sources: BOEM 2023b, 2023g, 2023h

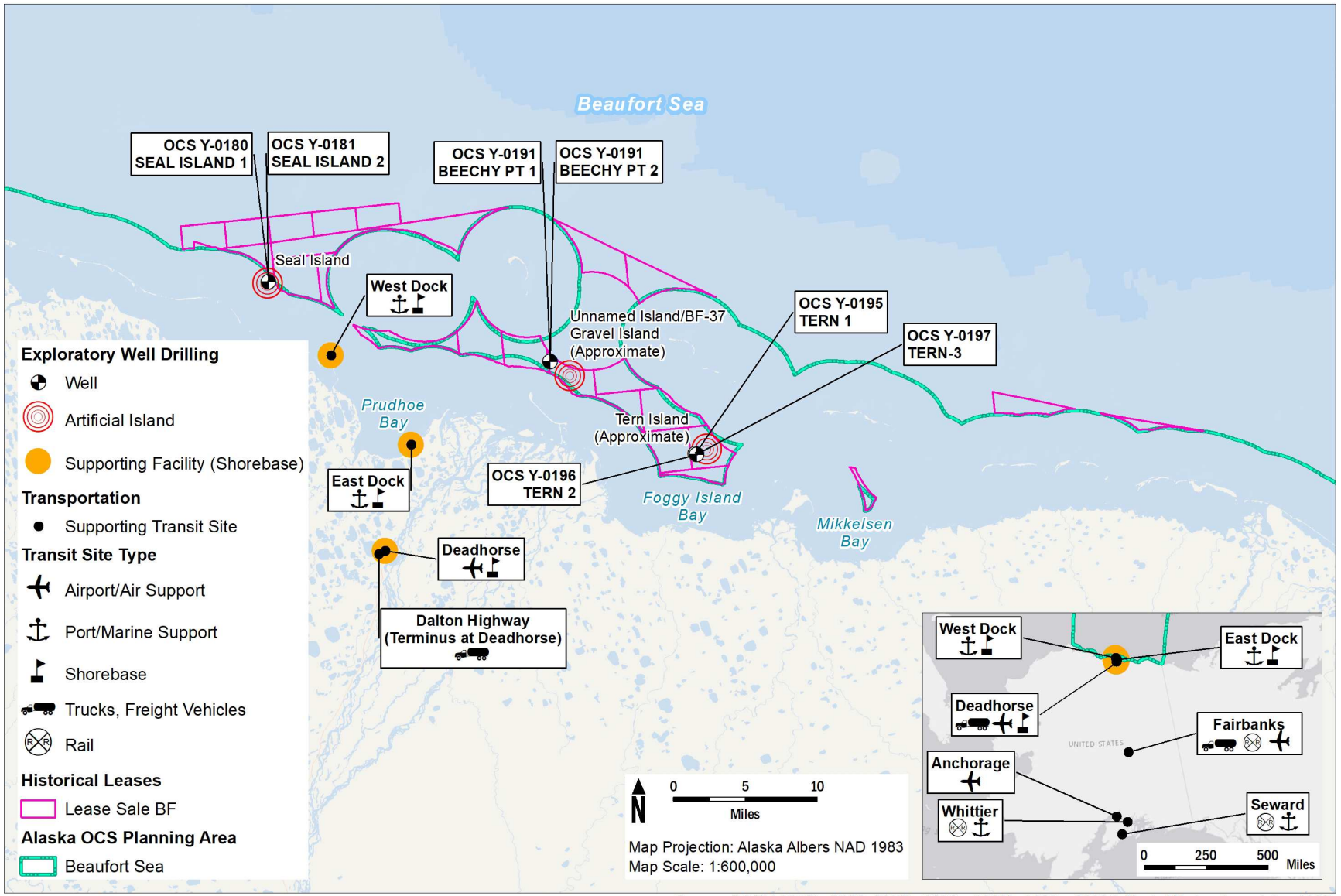
4.1.1 Lease Sale BF (1979)

The only location in Alaska where there has been or is oil and/or gas production in federal waters is Northstar. Since this area has a high level of activity, it is presented separately in the sections below; the Lease Sale BF information presented excludes Northstar, and the Northstar-only information directly follows.

Lease Sale BF was a joint lease sale of the federal and state governments. The identified activities associated with Lease Sale BF (excluding Northstar) are shown in Figure 4-2, such as the locations of exploration wells, shorebases, artificial islands, and transportation facilities. The identified activities associated with Northstar are shown in Figure 4-3, such as the locations of development wells, artificial islands, transportation facilities, and G&G survey areas.

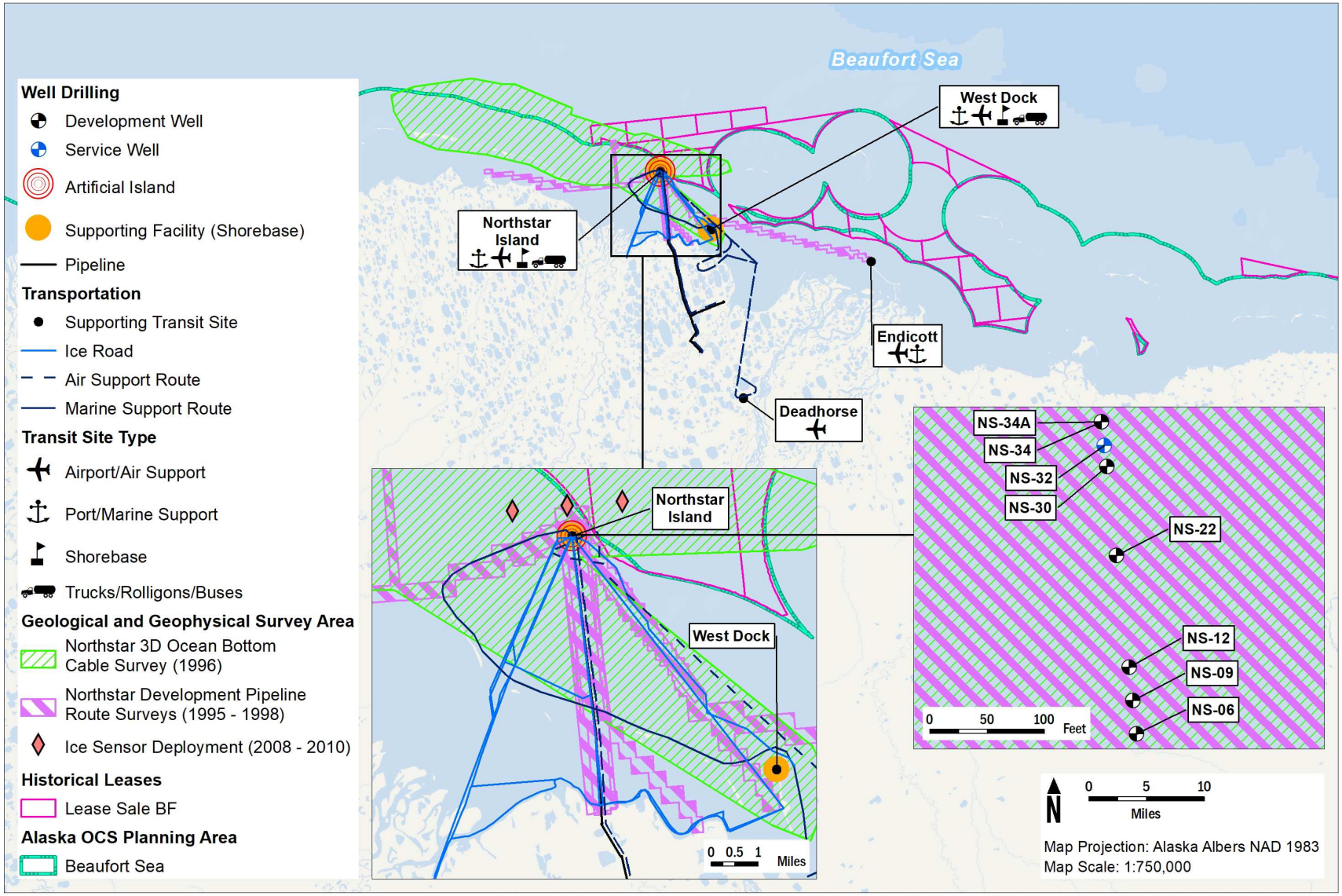
4.1.1.1 Leasing

As shown in Table 4.1-1, Figure 4-2, and Figure 4-3, as a result of Lease Sale BF, there were 46 tracts offered and 24 leases issued. There were 173,423 acres offered and 85,776 acres leased. There are two active leases from Lease Sale BF with an active lease area of 3,032.98 hectares. Table 4.1.1-1 summarizes documented information associated with the leasing as a result of Lease Sale BF. Leasing information includes Northstar.



Source: BOEM 2019b, 2020, 2022b, 2022c, 2023b, 2023c, 2023d; Kevin Waring Associates 1985.

Figure 4-2. Historical oil and gas activities associated with Lease Sale BF excluding Northstar, 1979



Source: Aerts et al. 2008b, 2010; AK Pipelines; Kim et al. 2016, 2019, 2020a, 2020b; BOEM 2022b, 2022c, 2023b, 2023c, 2023d; BSEE 2022; Horowitz 2002a, 2002b; Richardson 1997, 2010a, 2010b, 2010c, 2010d, 2011; Richardson and Kim 2012, 2013, 2014, 2015.

Figure 4-3. Historical oil and gas activities associated with Lease Sale BF at Northstar, 1979

Table 4.1.1-1. Lease information as a result of Lease Sale BF

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y00176	Exxon	7/1/1980	Relinquished	12/14/1989	Beechey Point	08F003	472
Y00189	Exxon	7/1/1980	Relinquished	12/26/1985	Beechey Point	08F035	564
Y00190	Exxon	7/1/1980	Relinquished	12/23/1988	Beechey Point	08F036	609
Y00191	Exxon	7/1/1980	Relinquished	12/23/1988	Beechey Point	08F037	610
Y00192	Exxon	7/1/1980	Relinquished	12/14/1989	Beechey Point	08F038	655
Y00193	Exxon	7/1/1980	Relinquished	12/21/1989	Beechey Point	08F039	699
Y00197	ARCO	7/1/1980	Relinquished	6/8/1990	Beechey Point	08F043	788
Y00175	Amoco	8/1/1980	Expired	7/31/1990	Beechey Point	08F002	471
Y00177	ARCO	8/1/1980	Relinquished	7/28/1989	Beechey Point	08F004	473
Y00178	Shell	8/1/1980	Relinquished	7/28/1989	Beechey Point	08F005	474
Y00179	Hilcorp	8/1/1980	Production	None	Beechey Point	08F023	470
Y00180	Amoco	8/1/1980	Relinquished	2/13/1989	Beechey Point	08F024	472
Y00181	Hilcorp	8/1/1980	Production	None	Beechey Point	08F025	516
Y00182	Chevron	8/1/1980	Expired	7/31/1990	Beechey Point	08F026	517
Y00183	ARCO	8/1/1980	Expired	7/31/1990	Beechey Point	08F027	474
Y00184	Hamilton	8/1/1980	Expired	7/31/1990	Beechey Point	08F028	478
Y00185	ARCO	8/1/1980	Relinquished	7/31/1986	Beechey Point	08F029	524
Y00186	BPXA	8/1/1980	Relinquished	6/29/1989	Flaxman Island	08F032	664
Y00187	BPXA	8/1/1980	Relinquished	6/29/1989	Flaxman Island	08F033	710
Y00188	Gulf Oil	8/1/1980	Expired	7/31/1990	Beechey Point	08F034	561
Y00194	ARCO	8/1/1980	Relinquished	7/31/1989	Beechey Point	08F040	700
Y00195	ARCO	8/1/1980	Relinquished	7/19/1990	Beechey Point	08F041	744
Y00196	Shell	8/1/1980	Relinquished	7/19/1990	Beechey Point	08F042	745
Y00198	ARCO	8/1/1980	Expired	7/31/1990	Beechey Point	08F044	792
Y00174	ARCO	None	Rejected	None	Beechey Point	08F001	470

Notes: ARCO = Atlantic Richfield Company; BPXA = BP Exploration (Alaska) Inc.
Source: BOEM 2023b

4.1.1.2 Surveys

As of October 25, 2023, no surveys have been documented as a result of Lease Sale BF that are not associated with Northstar. This may change in the future as there are two active leases. At Northstar, between 1995 and 1998, there were four pipeline route surveys and one 3D seismic survey documented, and ice sensors were deployed in between 2008 and 2010, as shown in Table 4.1.3-2.

Table 4.1.1-2. Survey activity summary (Northstar)

Activity Start Date	Activity End Date	Year	Activity Name	Description	Transportation	Operator and Contractor
8/7/1995	8/12/1995	1995	Pipeline route survey	The survey included a preliminary review of four candidate pipeline routes. Ice gouge, strudel scour, and bathymetry data were collected over those routes. Sub-bottom profiler data was collected for this survey, not part of the report provided to MMS.	Unspecified	BP Exploration (Alaska) Inc.
6/4/1996	8/4/1996	1996	Pipeline route survey	The survey focused on the Point Storkersen pipeline route. Survey activities included helicopter overflights to collect strudel hole data and mapping the seaward limit of the Kuparuk River. The survey collected data on ice gouge, strudel scour, and water depth. A magnetometer was used.	Helicopters	BP Exploration (Alaska) Inc.
7/24/1996	9/19/1996	1996	3D marine seismic program	A 3D ocean bottom cable seismic survey using an airgun array as the energy source. A total of about 1,137 square miles of production seismic survey was shot as a result of Permit 96-03.	Point Barrow, R/V Arctic Endeavor, Barge 215, Barge 216, Sag River, Toolik River, Peregrine Falcon, La Brisa, Faraday, Hippo	BP Exploration (Alaska) Inc.
5/31/1997	8/16/1997	1997	Pipeline route survey	The survey focused on the Point Storkersen pipeline route. The aerial survey used helicopter-based reconnaissance of strudel holes and mapped the overflood area for the Kuparuk River. A vessel-based survey was conducted to map strudel scours, ice gouge, and to collect water depth data.	Helicopters, vessel names unspecified	BP Exploration (Alaska) Inc.

Activity Start Date	Activity End Date	Year	Activity Name	Description	Transportation	Operator and Contractor
6/1/1998	8/31/1998	1998	Pipeline route survey	A helicopter-based survey was conducted to map strudel holes and map the extent of the Kuparuk River overflood. A vessel-based survey mapped the extent of the strudel scours and ice gouges along the Point Storkersen pipeline route.	Helicopters, vessel names unspecified	BP Exploration (Alaska) Inc.
8/9/2008	8/9/2010	2010	Ice sensor deployment	Ice profilers were deployed at three locations ~1 mile offshore from Northstar Island. Data were recorded year-round and retrieval and re-installation of the equipment was planned to occur at least once a year for 3 to 5 years.	Unspecified	BP Exploration (Alaska) Inc.

Notes: 3D = three-dimensional; MMS = U.S. Department of the Interior, Minerals Management Service
Sources: Aerts et al. 2010; Horowitz 2002a, 2002b; Richardson 1997, 2010d

4.1.1.3 Well Drilling

Seven exploration wells were drilled as a result of Lease Sale BF that are not associated with Northstar, as summarized in Table 4.1.1-3. At Northstar, seven development wells and one service well were drilled, as summarized in Table 4.1.1-4.

Table 4.1.1-3. Well drilling summary (excluding Northstar)

Activity Start Date	Activity End Date	Well Name (includes API no. and bottom hole lease number)	Well Type	Well Depth (feet)	Drill Rig Name
1/11/1981	3/31/1982	API no. 552010000100 (BEECHY PT 1) on OCS Y-0191	Exploration	11,637	*Nabors 27-E,* BF-37 Gravel Island
12/27/1981	3/31/1982	API no. 552010000200 (BEECHY PT 2) on OCS Y-0191	Exploration	11,132	*Nabors 27-E,* BF-37 Gravel Island
5/29/1982	6/12/1989	API no. 552010000300 (TERN 1) on OCS Y-0195	Exploration	11,725	Brinkerhoff #84, Tern Gravel Island
10/16/1982	1/31/1983	API no. 552010000400 (TERN 2) on OCS Y-0196	Exploration	11,917	Brinkerhoff #84, Tern Gravel Island
2/4/1984	4/14/1984	API no. 500292107470 (SEAL ISLAND 2) on OCS Y-0181	Exploration	12,498	P.N.J.V. Rig #1, Seal Gravel Island
2/22/1985	4/10/1985	API no. 500292123670 (SEAL ISLAND 1) on OCS Y-0180	Exploration	9,249	P.N.J.V. Rig #1, Seal Gravel Island
2/10/1987	6/12/1989	API no. 552010000401 (TERN-3) on OCS Y-0197	Exploration	12,182	*Pool Arctic #5,* Tern Gravel Island

Notes: API = American Petroleum Institute; OCS = Outer Continental Shelf
Sources: BOEM 2019b, 2020, 2022b, 2023c, 2023d; Kevin Waring Associates 1985

Table 4.1.1-4. Well drilling summary (Northstar)

Activity Start Date	Activity End Date	Well Name (includes API no. and bottom hole lease number)	Well Type	Well Depth (feet)	Drill Rig Name
12/4/2001	1/16/2002	API no. 500292305200 (NS-09)	Development	11,228	*Nabors,* Northstar Island
5/19/2002	2/22/2003	API no. 500292308800 (NS-06)	Development	11,210	*Nabors,* Northstar Island
6/8/2002	5/18/2003	API no. 500292309100 (NS-12)	Development	11,150	*Nabors,* Northstar Island
11/21/2002	2/3/2003	API no. 500292312800 (NS-22)	Development	11,142	*Nabors,* Northstar Island
11/15/2003	5/2/2004	API no. 500292317900 (NS-32)	Service	6,684	*Nabors,* Northstar Island
2/5/2006	4/14/2006	API no. 500292329300 (NS-30)	Development	11,244	*Nabors,* Northstar Island
3/24/2006	3/31/2008	API no. 500292330100 (NS-34)[1]	Development	10,790	*Nabors,* Northstar Island
3/31/2008	5/15/2008	API no. 500292330101 (NS-34A)[1]	Development	11,359	*Nabors,* Northstar Island

Notes: API = American Petroleum Institute
[1]For the purpose of total well counts in the Alaska OCS, BOEM and BSEE consider API no. 500292330100 (NS-34) and API no. 500292330101 (NS-34A) to be counted as the same well.
Sources: BOEM 2022b, 2023c, 2023d

4.1.1.4 Pipelines

There are no pipelines documented as a result of Lease Sale BF that are not associated with Northstar. There are two pipelines documented that are associated with Northstar, one oil and one gas, as summarized in Table 4.1.1-5.

Table 4.1.1-5. Pipeline summary (Northstar)

Activity Start Date	Name	Description	Length (miles)[1]	Operator
3/14/2000	Northstar Gas Pipeline	10-inch diameter pipeline transports natural gas to the island for field injection and use in power generation	16.5	Hilcorp Alaska, LLC
3/14/2000	Northstar Oil Pipeline	10-inch diameter pipeline that transports crude oil to shore	16.9	Hilcorp Alaska, LLC

Note:
[1]Pipeline length was derived from the source geometry for the GIS pipeline data.
Sources: AK Pipelines; Richardson 2010a

4.1.1.5 Platforms

There are three platforms documented resulting from Lease Sale BF that are not associated with Northstar, as summarized in Table 4.1.1-6. There is one platform associated with Northstar, as summarized in Table 4.1.1-7.

Table 4.1.1-6. Platform summary (excluding Northstar)

Activity Start Date	Name	Description	Operator
1/1/1981	Unnamed Island/BF-37 Gravel Island	Construction of Unnamed Island/BF-37 Gravel Island supporting the drilling of exploration well API no. 552010000100 (OCS Y-0191 BEECHY PT 1)	Exxon Corporation
1/1/1982	Tern Island	Construction of Tern Island supporting the drilling of exploration well API no. 552010000300 (OCS Y-0195 TERN 1)	Shell Oil Company
1/1/1982	Seal Island	Construction of Seal Island supporting the drilling of exploration well API no. 500292107470 (OCS Y-0181-SEAL ISLAND 2)	Shell Oil Company

Notes: API = American Petroleum Institute; OCS = Outer Continental Shelf
Sources: BOEM 2023b, 2023d; BSEE 2022; Kevin Waring Associates 1985

Table 4.1.1-7. Platform summary (Northstar)

Activity Start Date	Name	Description	Operator
6/1/2000	Northstar Island	Construction to rebuild Seal Island as a platform for Northstar oil production operations	Hilcorp Alaska, LLC

Notes: API = American Petroleum Institute; OCS = Outer Continental Shelf
Sources: BSEE 2022; Richardson 2010a

4.1.1.6 Oil-and-Gas-Supporting Activities

Identified oil-and-gas-supporting activities as a result of Lease Sale BF not associated with Northstar included facility support and transportation from facilities and shorebases to relevant activity sites (if documented), as summarized in Table 4.1.1-8 and Table 4.1.1-10. Identified oil-and-gas-supporting activities associated with Northstar included facility support and transportation from facilities to relevant activity sites (if documented), as summarized in Table 4.1.1-9 and Table 4.1.1-11. In addition to the activities summarized below, spill response training and ARKTOS training occurred at the Northstar site on a regular basis, and regular construction and maintenance activities occurred as needed.

Table 4.1.1-8. Facility support summary (excluding Northstar)

Facility Name	Facility Type	Description	Supported Activity
Deadhorse facilities	Onshore shorebase complex	Facilities included a state-owned and -operated airport, contractor facilities, oil field service companies, supplies, and other support firms for the oil and gas industry. Deadhorse is also the northern terminus of the Dalton Highway which connects the Prudhoe Bay area and Fairbanks. These facilities within the Prudhoe Bay area are linked together by many access roads.	Drilling wells: OCS Y-0191 BEECHY PT 1, OCS Y-0191 BEECHY PT 2, OCS Y-0196 TERN 2, OCS Y-0195 TERN 1

Facility Name	Facility Type	Description	Supported Activity
East Dock shorebase	Onshore shorebase complex	The East Dock was located in the southeast portion of Prudhoe Bay at the end of a gravel causeway. In summer lighterage barges were grounded to provide a wharf. The primary use of the dock during summer was to load gravel into shallow-draft barges for use in construction of artificial islands. In the winter, the East Dock was used as the take-off point for hauling gravel via ice roads to build artificial islands. The East Dock was also used for stockpiling gravel and other commodities to be transported to offshore operation in the Beaufort Sea.	Drilling wells: OCS Y-0191 BEECHY PT 1, OCS Y-0191 BEECHY PT 2
West Dock shorebase	Onshore shorebase complex	In 1982 the Prudhoe Bay West Dock was lengthened. A mile-long breached gravel causeway was added and an island built. The existing causeway was widened to accommodate a water intake facility for the waterflood project. The West Dock handled the unloading of barges and modules in the annual sea lift and was also used for marine operations in support of Beaufort Sea activities.	Drilling wells: OCS Y-0191 BEECHY PT 1, OCS Y-0191 BEECHY PT 2

Source: Kevin Waring Associates 1985

Table 4.1.1-9. Facility support summary (Northstar)

Facility Name	Facility Type	Description	Supported Activity
Northstar Island Permanent Living Quarters	Offshore facilities for oil and gas production	Permanent living quarters were installed; capacity is unknown.	Undocumented
West Dock Base of Operations	Onshore shorebase complex	West Dock Base of Operations supported activities at Northstar Island.	Undocumented
Operations center constructed at Northstar Island	Offshore facilities for oil and gas production	Operations center was constructed at Northstar Island.	Undocumented

Sources: Aerts et al. 2008b, 2010; Kim et al. 2016, 2019; Richardson 2010a, 2010b, 2010c, 2011; Richardson and Kim 2012, 2013, 2014, 2015

Table 4.1.1-10. Summary of transportation activity (excluding Northstar)

Facility Name	Facility Type	Supported Activity	No. Aircraft	No. Vessels	Vessel Names	No. Vehicles
Deadhorse Airport	Airport	Drilling wells: OCS Y-0191 BEECHY PT 1, OCS Y-0191 BEECHY PT 2, OCS Y-0195 TERN 1, OCS Y-0196 TERN 2	Bell 212 IFR (count unknown)	N/A	N/A	N/A

Facility Name	Facility Type	Supported Activity	No. Aircraft	No. Vessels	Vessel Names	No. Vehicles
Fairbanks Airport	Airport	Drilling wells: OCS Y-0191 BEECHY PT 1, OCS Y-0191 BEECHY PT 2, OCS Y-0195 TERN 1, OCS Y-0196 TERN 2	7 per day from Deadhorse to Anchorage, with some stops in Fairbanks	N/A	N/A	N/A
Anchorage Airport	Airport	Drilling wells: OCS Y-0191 BEECHY PT 1, OCS Y-0191 BEECHY PT 2, OCS Y-0195 TERN 1, OCS Y-0196 TERN 2	7 per day from Deadhorse to Anchorage, with some stops in Fairbanks	N/A	N/A	N/A
Prudhoe Bay East Dock	Port	Drilling wells: OCS Y-0191 BEECHY PT 1, OCS Y-0191 BEECHY PT 2, OCS Y-0195 TERN 1, OCS Y-0196 TERN 2	N/A	--	Ocean-going tug and barge combinations, flat deck barges, fuel barges, camp barges (counts and names unknown)	N/A
Prudhoe Bay West Dock	Port	Drilling wells: OCS Y-0191 BEECHY PT 1, OCS Y-0191 BEECHY PT 2, OCS Y-0195 TERN 1, OCS Y-0196 TERN 2	N/A	--	Ocean-going tug and barge combinations, flat deck barges, fuel barges, camp barges (counts and names unknown)	N/A
Port of Whittier	Port	Drilling wells: OCS Y-0191 BEECHY PT 1, OCS Y-0191 BEECHY PT 2, OCS Y-0195 TERN 1, OCS Y-0196 TERN 2	N/A	--	Barges, ships (counts and names unknown)	N/A
Port of Seward	Port	Drilling wells: OCS Y-0191 BEECHY PT 1, OCS Y-0191 BEECHY PT 2, OCS Y-0195 TERN 1, OCS Y-0196 TERN 2	N/A	--	Barges, ships (counts and names unknown)	N/A
Dalton Highway	Road	Drilling wells: OCS Y-0191 BEECHY PT 1, OCS Y-0191 BEECHY PT 2, OCS Y-0195 TERN 1, OCS Y-0196 TERN 2	N/A	N/A	N/A	Buses, trucks, motor carriers (counts unknown)
Seward Railroad Station	Railroad	Drilling wells: OCS Y-0191 BEECHY PT 1, OCS Y-0191 BEECHY PT 2, OCS Y-0195 TERN 1, OCS Y-0196 TERN 2	N/A	N/A	N/A	N/A

Facility Name	Facility Type	Supported Activity	No. Aircraft	No. Vessels	Vessel Names	No. Vehicles
Whittier Railroad Station	Railroad	Drilling wells: OCS Y-0191 BEECHY PT 1, OCS Y-0191 BEECHY PT 2, OCS Y-0195 TERN 1, OCS Y-0196 TERN 2	N/A	N/A	N/A	N/A

Notes: -- = no data provided; N/A = not applicable
Source: Kevin Waring Associates 1985

Table 4.1.1-11. Summary of transportation activity (Northstar)

Facility Name	Facility Type	Documented Timeframe	Supported Activity[2,3]	No. Aircraft	No. Vessels	Vessel Names	No. Vehicles
Deadhorse Airport[1]	Airport	November 2004 – October 2018	Round-trip helicopter flights took place to transport crew and materials to and from Northstar Island.	2	N/A	N/A	N/A
Deadhorse Airport[1]	Airport	November 2003 – October 2004	During the 2004 open-water period, 3 surveys were completed in June, 8 in July, 5 in August, 8 in September, and 6 in October for a total of 22 surveys with a Twin Otter fixed-wing aircraft.	1	N/A	N/A	N/A
Deadhorse Airport[1]	Airport	November 2004 – October 2006	Each month, six to seven aerial surveys were conducted to inspect the pipeline for leaks or spills. These surveys were done from a twin engine fixed-wing aircraft, either a Twin Otter (DHC-6) or a CASA 212 backup aircraft.	1	N/A	N/A	N/A
Deadhorse Airport[1]	Airport	November 2006 – October 2007	Each month, four to seven aerial surveys were conducted to inspect the pipeline for leaks or spills. These surveys were done from a twin engine fixed-wing aircraft, either a Twin Otter (DHC-6) or a CASA 212 backup aircraft.	2	N/A	N/A	N/A
Deadhorse Airport[1]	Airport	November 2007 – October 2018	Aerial overflights were conducted weekly with a twin-engine fixed-wing aircraft (Twin Otter DHC-6) to inspect the Northstar pipeline for leaks or spills.	1	N/A	N/A	N/A

Facility Name	Facility Type	Documented Timeframe	Supported Activity[2,3]	No. Aircraft	No. Vessels	Vessel Names	No. Vehicles
Prudhoe Bay West Dock	Port	July 2000 – October 2018	A Griffon 2000 TD hovercraft and a crew vessel were used to transport personnel to and from Northstar. Barges were used to transport materials (including fuel) to Northstar.	--	3	Arctic Express (crew vessel)	--
Ice Road Network	Road	December 1998 – May 2017	Offshore ice roads were constructed annually to transport personnel, equipment, materials, and supplies between the Prudhoe Bay facilities and Northstar.	N/A	N/A	N/A	1–6 per season

Notes: -- = no data provided; N/A = not applicable
[1]Deadhorse Airport is the assumed origination location of these flights but it is not confirmed.
[2]Helicopter roundtrips to transport crew and materials to and from Northstar Island from 2001 through 2018 were not all documented; however, counts provided are approximately 9,600 trips.
[3]Hovercraft round trips to transport crew to Northstar from 2003 through 2018, were approximately 9,300. The crew vessel round trips were not all documented; however, from 2000 through 2018 counts provided are approximately 4,600. There were approximately 800 round trips from barges from 2001 through 2018.
Source: Aerts et al. 2008b, 2010; Richardson 2010a, 2010b, 2010c, 2010d, 2011; Richardson and Kim 2012, 2013, 2014, 2015; Kim et al. 2016, 2019, 2020a, 2020b

4.1.1.7 Total Oil and Condensate Production

To date, the only production occurring on the federal OCS in Alaska has occurred at the Northstar development as a result of Lease Sale BF. Table 4.1.1-12 shows a summary of crude oil production from October 31, 2001 through January 31, 2023. The table shows both the total oil production and federal-only oil production.

Table 4.1.1-12. Annual calendar year of Northstar production

Calendar Year	Total Oil Production[1] (bbl)	Federal Oil Production[1] (bbl)
2001[2]	1,265,883	217,428
2002	17,902,993	3,075,018
2003	22,970,203	3,945,362
2004	25,078,827	4,307,539
2005	22,421,810	3,851,170
2006	18,877,180	3,242,344
2007	13,877,294	2,383,564
2008	11,440,587	2,917,412
2009	7,981,272	1,823,426
2010	6,133,516	1,337,999
2011	5,248,604	1,057,866
2012	3,030,462	627,108

Calendar Year	Total Oil Production[1] (bbl)	Federal Oil Production[1] (bbl)
2013	3,389,396	669,148
2014	3,475,932	625,303
2015	3,652,140	609,912
2016	3,291,000	548,343
2017	3,521,844	513,420
2018	3,807,383	498,216
2019	3,616,655	479,711
2020	3,222,833	454,067
2021	3,059,024	449,679
2022	2,617,186	397,411
2023[3]	214,632	33,097
Total	190,096,656	34,064,543

Notes: bbl = barrel(s)
[1]Production – Crude oil and natural gas liquids (condensate)
[2]Production began on October 31, 2001
[3]Production through January 31, 2023
Source: Crumrine K. 2023

4.1.1.8 E&D Scenario Summary

A scenario was developed for the Beaufort Sea Final Proposed Oil and Gas Lease Sale BF Final Environmental Impact Statement (BLM 1979) to assess the potential environmental effects of the proposed joint Federal/State lease sale. The total areal extent of the proposed joint Federal/State lease sale was 105 blocks, or 514,192 acres. The mean resource estimate for the proposal was 750 million barrels (MMbbl) of oil and 1.625 trillion cubic feet (Tcf) of gas. Activities associated with the E&D scenario are summarized in Table 4.1.1-13.

Under the scenario, exploratory drilling would begin in 1981. The fields would be discovered and delineated within 4 or 5 years after the sale. Exploration wells would be drilled from onshore and offshore sites in the approximate ratio of 1 to 3. The type of offshore drilling unit used would depend on many factors, but it was assumed offshore exploration wells would be drilled using land-type rigs predominantly from artificial islands. Year-round operation from artificial soil or gravel islands was assumed. It was estimated that during the exploratory phase, a total of 19 to 20 exploration wells and 4 to 5 delineation wells would be drilled (BLM 1979).

Production platform construction would begin in 1985 and continue for 2 to 4 years. It was estimated that three to six production platforms would be required. No onshore production sites were assumed. The type of offshore production platform used would depend on the environmental conditions and water depth at the site. It was assumed that all production platforms would be of artificial soil or gravel island construction. Development drilling would begin in 1986 and would be completed in 8 to 12 years. Each rig was estimated to drill up to six wells per year. Peak oil production would occur 13 years after the sale. The life expectancy of the fields would be 20 to 28 years. Some wells and platforms would be shut in the beginning 2 years before the total end of production (BLM 1979).

No petroleum refineries, petrochemical facilities, or oil terminals were expected to be constructed as a result of the sale. Production treatment facilities were assumed to be a mix of newly constructed and existing facilities (BLM 1979).

Offshore pipelines linking the platforms to onshore production facilities would be fabricated and installed using either the bottom pull or pull barge method. It was estimated that one barge would be required, per construction season, in the installation of offshore pipelines (BLM 1979).

It was assumed that the shipment of oil and gas to a refinery in the contiguous United States would be via the Trans-Alaska Pipeline and the Alaska Natural Gas Transportation System, respectively (BLM 1979).

Table 4.1.1-13. Summary of basic assumptions of Lease Sale BF E&D scenario

Element	Mean Case
Sale acreage offering	514,192 acres
Recoverable oil	750 MMbbl
Recoverable gas	1.625 Tcf
Peak production – oil	151,000 bbl per day; 29 MMbbl per year
Peak production – gas	112 MMcf per day; 22 Bcf per year
Exploration	Exploration
Support and supply facilities – existing	1
Number of wells – exploration	20
Number of wells – delineation	4
Onshore drill sites – remote	4
Onshore drill sites – accessible	1
Artificial islands – ice	2
Artificial islands – shallow water; sandbag retained (summer)	4
Artificial islands – shallow water; sandbag retained (winter)	2
Artificial islands – sacrificial beach	7
Development and Production	Development and Production
Number of wells – production and service	118
Artificial islands – shallow water; sandbag retained (summer); existing	0
Artificial Islands – shallow water; sandbag retained (summer); constructed	2
Sacrificial beach – existing	0
Sacrificial beach – constructed	2
Offshore trunk pipelines	10 miles
Onshore pipelines	10 miles
Support and supply facilities – existing	1
Support and supply facilities – constructed	1

Element	Mean Case
Production processing facilities	1
Direct land requirements – short-term developed area	144 acres
Direct land requirements – long-term developed area (gravel construction)	943 acres
Total onshore development (gravel construction)	563 acres
Total offshore development	523 acres
Total development	1,087 acres
Gravel – from onshore source	2,435 yd^3
Gravel – from offshore source	12,816 yd^3
Total gravel	15,251,000 yd^3
Total drilling muds	792,400 bbl
Total cuttings	99,926 yd^3
Formation waters	375-3,750 MMbbl

Notes: bbl = barrel(s); Bcf = billion cubic feet; cf = cubic feet; E&D = Exploration and Development; MMbbl = million barrels; MMcf = million cubic feet; Tcf = trillion cubic feet; yd^3 = cubic yards
Source: BLM 1979

4.1.1.9 Comparison of E&D Scenario and Historical Activities

A comparison of the E&D scenario and the historical activities are provided in Table 4.1.1-14, using available information. Note that Lease Sale BF was a joint lease sale of the federal and state governments. The E&D scenario presented above accounted for activity at both federal and state jurisdictions, while the actual activity only accounts for activity on federal jurisdictions.

Table 4.1.1-14. Comparison of E&D and historical activities

Activity	E&D Scenario	Actual Activities
Recoverable oil (maximum)	750 MMbbl	34 MMbbl[1]
Recoverable gas (maximum)	1.625 Tcf	--
Sale acreage offering	514,192 acres	173,423 acres offered
Sale	--	85,776 acres leased
Date of exploratory activities (begin)	1981	1981
Number of wells – exploration	20	7
Number of wells – delineation	4	--
Number of wells – production and service	118	8
Average well depth	--	11,010 feet
Number of seismic surveys	--	1
Number of pipeline route surveys	--	4
Artificial islands for exploration (total)	15	3

Activity	E&D Scenario	Actual Activities
Support facility and shorebase locations	--	Deadhorse, Northstar Island, Prudhoe Bay East Dock, Prudhoe Bay West Dock
Average shorebase dockings/flights	--	Approximately 4,000 round trips by helicopter at Northstar
Personnel flights to area	--	7 per day to/from Deadhorse
Other sites used		Anchorage, Fairbanks, Seward, Whittier
Peak production oil	--	4,307,539 bbl (federal)
Peak production gas	--	--
Platforms	--	4
Pipelines	20 miles (10 onshore, 10 offshore)	33.4 miles (16.5 gas, 16.9 oil)
Support / supply facilities	2 (1 existing, 1 constructed)	3
Production treatment facilities	1	--
Total direct land requirements	1,087 acres	--
Supply and support boats	--	Ocean-going tug and barge combinations, flat deck barges, fuel barges, camp barges, ships (counts of each unknown)
Annual crude shipped by tanker	--	--

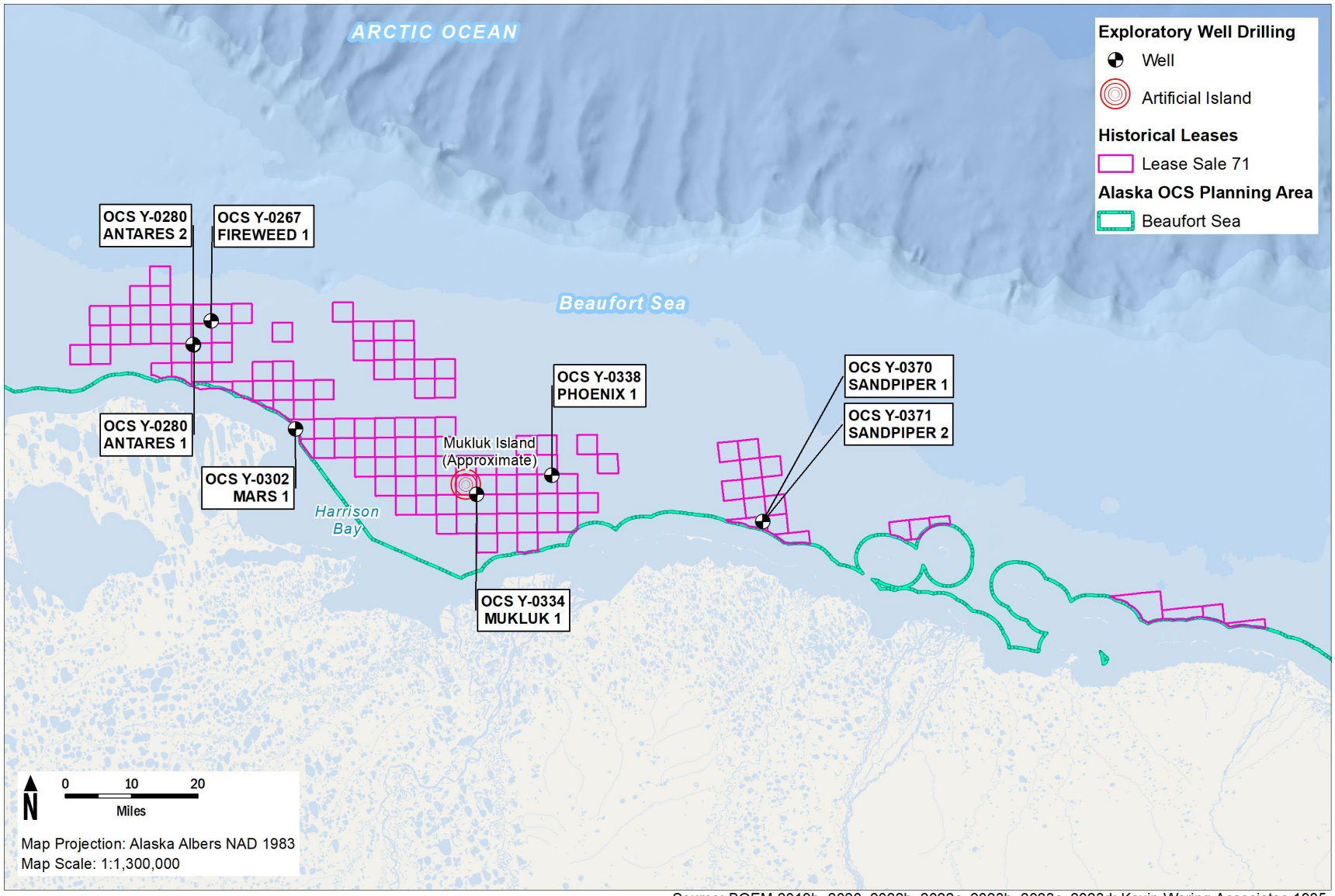
Notes: -- = no data provided; bbl = barrel(s); E&D = Exploration and Development; MMbbl = million barrels; Tcf = trillion cubic feet
[1]Federal production

4.1.2 Lease Sale 71 (1982)

The identified activities associated with Lease Sale 71 are shown in Figure 4-4, such as wells and artificial islands.

4.1.2.1 Leasing

As shown in Table 4.1-1 and Figure 4-4, as a result of Lease Sale 71, there were 338 tracts offered and 121 leases issued. There were 1,825,770 acres offered and 662,860 acres leased. There are no active leases from Lease Sale 71. Table 4.1.2-1 summarizes documented information associated with the leasing as a result of Lease Sale 71.



Source: BOEM 2019b, 2020, 2022b, 2022c, 2023b, 2023c, 2023d; Kevin Waring Associates 1985.

Figure 4-4. Historical oil and gas activities associated with Lease Sale 71, 1982

Table 4.1.2-1. Lease information as a result of Lease Sale 71

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y00254	Amoco	12/1/1982	Relinquished	11/26/1991	Dease Inlet	71004	880
Y00255	Elf Aquitane Inc	12/1/1982	Relinquished	10/24/1991	Dease Inlet	71006	922
Y00256	Penzoil Oil & Gas	12/1/1982	Relinquished	11/4/1991	Dease Inlet	71007	923
Y00257	Elf Aquitane Inc	12/1/1982	Relinquished	11/4/1991	Dease Inlet	71008	924
Y00258	Gulf Oil Corporation	12/1/1982	Relinquished	10/24/1991	Dease Inlet	71010	966
Y00259	Gulf Oil Corporation	12/1/1982	Relinquished	11/4/1991	Dease Inlet	71011	967
Y00260	Elf Aquitane Inc	12/1/1982	Relinquished	11/4/1991	Dease Inlet	71012	968
Y00261	Exxon	12/1/1982	Relinquished	10/24/1991	Dease Inlet	71013	1009
Y00262	Exxon	12/1/1982	Relinquished	9/26/1991	Dease Inlet	71014	1010
Y00263	Amoco	12/1/1982	Relinquished	11/6/1991	Harrison Bay North	70108	793
Y00264	Amoco	12/1/1982	Relinquished	11/6/1991	Harrison Bay North	70109	837
Y00265	Penzoil Oil & Gas	12/1/1982	Relinquished	11/4/1991	Harrison Bay North	71020	881
Y00266	ARCO	12/1/1982	Relinquished	11/4/1991	Harrison Bay North	71021	882
Y00267	Amoco	12/1/1982	Expired	11/30/1992	Harrison Bay North	71022	883
Y00268	Shell	12/1/1982	Relinquished	11/6/1991	Harrison Bay North	71023	884
Y00269	ARCO	12/1/1982	Relinquished	10/25/1991	Harrison Bay North	71024	885
Y00270	Sohio	12/1/1982	Relinquished	11/14/1991	Harrison Bay North	71029	890
Y00271	Gulf Oil Corporation	12/1/1982	Relinquished	11/4/1991	Harrison Bay North	71037	925
Y00272	Exxon	12/1/1982	Relinquished	10/21/1991	Harrison Bay North	71038	926
Y00273	Gulf Oil Corporation	12/1/1982	Relinquished	10/24/1991	Harrison Bay North	71039	927
Y00274	Exxon	12/1/1982	Relinquished	10/21/1991	Harrison Bay North	71040	928
Y00275	ARCO	12/1/1982	Relinquished	11/4/1991	Harrison Bay North	71043	931
Y00276	Sohio	12/1/1982	Relinquished	11/14/1991	Harrison Bay North	71047	935
Y00277	Sohio	12/1/1982	Relinquished	11/14/1991	Harrison Bay North	71048	936
Y00278	Sohio	12/1/1982	Relinquished	11/14/1991	Harrison Bay North	71049	937
Y00279	Exxon	12/1/1982	Relinquished	12/24/1987	Harrison Bay North	71057	970
Y00280	Exxon	12/1/1982	Relinquished	12/24/1987	Harrison Bay North	71058	971
Y00281	Sohio	12/1/1982	Relinquished	11/4/1987	Harrison Bay North	71059	972
Y00282	Penzoil Oil & Gas	12/1/1982	Relinquished	11/4/1991	Harrison Bay North	71066	979
Y00283	Elf Aquitane Inc	12/1/1982	Relinquished	11/4/1991	Harrison Bay North	71067	980
Y00284	Elf Aquitane Inc	12/1/1982	Relinquished	11/4/1991	Harrison Bay North	71068	981

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y00285	Mobil	12/1/1982	Relinquished	11/12/1991	Harrison Bay	71080	3
Y00286	Getty Oil Company	12/1/1982	Relinquished	11/29/1988	Harrison Bay	71083	6
Y00287	Chevron	12/1/1982	Relinquished	11/29/1988	Harrison Bay	71084	7
Y00288	Penzoil Oil & Gas	12/1/1982	Relinquished	11/4/1991	Harrison Bay	71089	12
Y00289	Elf Aquitane Inc	12/1/1982	Relinquished	11/4/1991	Harrison Bay	71090	13
Y00290	ARCO	12/1/1982	Relinquished	11/4/1991	Harrison Bay	71091	14
Y00291	ARCO	12/1/1982	Relinquished	11/4/1991	Harrison Bay	71092	15
Y00292	Amoco	12/1/1982	Relinquished	12/22/1986	Harrison Bay	71101	49
Y00293	Amoco	12/1/1982	Relinquished	12/22/1986	Harrison Bay	71102	50
Y00294	Chevron	12/1/1982	Relinquished	11/29/1988	Harrison Bay	71103	51
Y00295	Chevron	12/1/1982	Relinquished	11/29/1988	Harrison Bay	71104	32
Y00296	Exxon	12/1/1982	Relinquished	11/24/1986	Harrison Bay	71105	53
Y00297	ARCO	12/1/1982	Relinquished	10/25/1991	Harrison Bay	71110	58
Y00298	Gulf Oil Corporation	12/1/1982	Relinquished	11/4/1991	Harrison Bay	71111	59
Y00299	Shell	12/1/1982	Relinquished	11/18/1988	Harrison Bay	71120	93
Y00300	Shell	12/1/1982	Relinquished	11/18/1988	Harrison Bay	71121	95
Y00301	Amoco	12/1/1982	Relinquished	12/22/1986	Harrison Bay	71122	96
Y00302	Union	12/1/1982	Relinquished	11/22/1988	Harrison Bay	71138	139
Y00303	Amoco	12/1/1982	Relinquished	11/22/1988	Harrison Bay	71139	141
Y00304	Shell	12/1/1982	Relinquished	11/22/1988	Harrison Bay	71140	142
Y00305	Union	12/1/1982	Relinquished	11/17/1988	Harrison Bay	71141	143
Y00306	Union	12/1/1982	Relinquished	11/17/1988	Harrison Bay	71142	144
Y00307	Texaco Inc	12/1/1982	Expired	11/30/1992	Harrison Bay	71143	145
Y00308	Texaco Inc	12/1/1982	Expired	11/30/1992	Harrison Bay	71144	146
Y00309	Union	12/1/1982	Relinquished	11/17/1988	Harrison Bay	71145	147
Y00310	Union	12/1/1982	Relinquished	11/17/1988	Harrison Bay	71154	184
Y00311	Shell	12/1/1982	Relinquished	11/22/1988	Harrison Bay	71155	185
Y00312	Amoco	12/1/1982	Relinquished	11/22/1988	Harrison Bay	71156	186
Y00313	Amoco	12/1/1982	Relinquished	11/17/1988	Harrison Bay	71157	187
Y00314	Amoco	12/1/1982	Relinquished	11/17/1988	Harrison Bay	71158	188
Y00315	Tenneco	12/1/1982	Relinquished	10/3/1991	Harrison Bay	71159	189
Y00316	Texaco Inc	12/1/1982	Expired	11/30/1992	Harrison Bay	71160	190
Y00317	Texaco Inc	12/1/1982	Expired	11/30/1992	Harrison Bay	71165	193

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y00318	Texaco Inc	12/1/1982	Expired	11/30/1992	Harrison Bay	71166	196
Y00319	Shell	12/1/1982	Relinquished	10/22/1991	Harrison Bay	71168	198
Y00320	Shell	12/1/1982	Relinquished	11/17/1988	Harrison Bay	71172	231
Y00322	Amoco	12/1/1982	Relinquished	11/27/1987	Harrison Bay	71174	233
Y00323	Amoco	12/1/1982	Relinquished	11/27/1987	Harrison Bay	71175	234
Y00324	Amoco	12/1/1982	Relinquished	12/22/1986	Harrison Bay	71176	235
Y00325	Sohio	12/1/1982	Relinquished	11/24/1987	Harrison Bay	71177	236
Y00326	Sohio	12/1/1982	Relinquished	12/23/1986	Harrison Bay	71178	237
Y00327	Texaco Inc	12/1/1982	Expired	11/30/1992	Harrison Bay	71180	239
Y00328	Texaco Inc	12/1/1982	Expired	11/30/1992	Harrison Bay	71181	240
Y00329	Amoco	12/1/1982	Relinquished	10/22/1991	Harrison Bay	71184	243
Y00331	Sohio	12/1/1982	Relinquished	11/24/1987	Harrison Bay	71188	277
Y00332	Sohio	12/1/1982	Relinquished	10/3/1991	Harrison Bay	71189	278
Y00333	Sohio	12/1/1982	Relinquished	11/24/1987	Harrison Bay	71190	279
Y00334	Sohio	12/1/1982	Relinquished	11/24/1987	Harrison Bay	71191	280
Y00335	Shell	12/1/1982	Relinquished	11/27/1987	Harrison Bay	71192	281
Y00336	Sohio	12/1/1982	Relinquished	11/29/1989	Harrison Bay	71193	282
Y00337	Shell	12/1/1982	Relinquished	11/20/1989	Harrison Bay	71194	283
Y00338	Tenneco	12/1/1982	Expired	11/30/1992	Harrison Bay	71195	284
Y00339	Mobil	12/1/1982	Expired	11/30/1992	Harrison Bay	71196	285
Y00340	Sohio	12/1/1982	Relinquished	11/24/1987	Harrison Bay	71202	321
Y00341	Texaco Inc	12/1/1982	Expired	11/30/1992	Harrison Bay	71203	322
Y00342	Texaco Inc	12/1/1982	Expired	11/30/1992	Harrison Bay	71204	323
Y00343	Sohio	12/1/1982	Relinquished	12/27/1988	Harrison Bay	71205	324
Y00344	Texaco Inc	12/1/1982	Expired	11/30/1992	Harrison Bay	71206	325
Y00345	BPXA	12/1/1982	Relinquished	11/29/1989	Harrison Bay	71207	326
Y00346	Amoco	12/1/1982	Relinquished	11/14/1989	Harrison Bay	71208	327
Y00347	Union	12/1/1982	Relinquished	11/20/1989	Harrison Bay	71209	328
Y00348	Mobil	12/1/1982	Relinquished	11/14/1991	Harrison Bay	71210	329
Y00349	Tenneco	12/1/1982	Expired	11/30/1992	Harrison Bay	71211	330
Y00351	Chevron	12/1/1982	Relinquished	1/21/1987	Harrison Bay	71218	368
Y00352	Chevron	12/1/1982	Relinquished	1/21/1987	Harrison Bay	71219	369
Y00353	Texaco Inc	12/1/1982	Expired	11/30/1992	Harrison Bay	71220	370

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y00354	BPXA	12/1/1982	Relinquished	11/29/1991	Harrison Bay	71221	371
Y00355	Mobil	12/1/1982	Relinquished	11/14/1991	Harrison Bay	71222	372
Y00356	Diamond Shamrock	12/1/1982	Expired	11/30/1992	Harrison Bay	71227	413
Y00357	ARCO	12/1/1982	Relinquished	10/24/1986	Harrison Bay	71229	415
Y00358	Amoco	12/1/1982	Relinquished	12/22/1986	Harrison Bay	71233	1
Y00359	Sohio	12/1/1982	Relinquished	11/12/1991	Harrison Bay	71234	2
Y00360	Amoco	12/1/1982	Relinquished	11/18/1988	Harrison Bay	71235	47
Y00361	Mobil	12/1/1982	Relinquished	11/14/1991	Harrison Bay	71236	373
Y00362	Shell	12/1/1982	Relinquished	11/7/1991	Beechey Point	71289	247
Y00363	Shell	12/1/1982	Relinquished	11/7/1991	Beechey Point	71290	248
Y00364	Shell	12/1/1982	Relinquished	11/7/1991	Beechey Point	71297	292
Y00365	Shell	12/1/1982	Relinquished	11/7/1991	Beechey Point	71298	293
Y00366	Murphy Oil	12/1/1982	Expired	11/30/1992	Beechey Point	71306	335
Y00367	Murphy Oil	12/1/1982	Expired	11/30/1992	Beechey Point	71307	336
Y00368	Murphy Oil	12/1/1982	Expired	4/1/2001	Beechey Point	71311	380
Y00369	Murphy Oil	12/1/1982	Expired	4/1/2001	Beechey Point	71312	381
Y00370	Amoco	12/1/1982	Expired	4/1/2001	Beechey Point	71322	423
Y00371	Amoco	12/1/1982	Expired	4/1/2001	Beechey Point	71323	425
Y00373	Texaco Inc	12/1/1982	Expired	11/30/1992	Beechey Point	71325	475
Y00374	Texaco Inc	12/1/1982	Expired	11/30/1992	Beechey Point	71326	476
Y00375	Sohio	12/1/1982	Relinquished	12/19/1986	Beechey Point	71346	708
Y00376	Sohio	12/1/1982	Relinquished	12/19/1986	Beechey Point	71347	710
Y00377	Sohio	12/1/1982	Relinquished	12/19/1986	Beechey Point	71349	755
Y00378	Sohio	12/1/1982	Relinquished	12/19/1986	Beechey Point	71351	661
Y00321	Sohio	None	Rejected	None	Harrison Bay	71173	232
Y00330	Amoco	None	Rejected	None	Harrison Bay	71187	276
Y00350	Chevron	None	Rejected	None	Harrison Bay	71217	367
Y00372	Amoco	None	Rejected	None	Beechey Point	71324	469

Notes: ARCO = Atlantic Richfield Company; BPXA = BP Exploration (Alaska) Inc.
Source: BOEM 2023b

4.1.2.2 Surveys

No surveys were documented as a result of Lease Sale 71.

4.1.2.3 Well Drilling

Eight exploration wells were drilled as a result of Lease Sale 71, as summarized in Table 4.1.2-2.

Table 4.1.2-2. Well drilling summary

Activity Start Date	Activity End Date	Well Name (includes API no. and bottom hole lease number)	Well Type	Well Depth (feet)	Drill Rig Name
11/1/1983	1/24/1984	API no. 552310000100 (MUKLUK 1) on OCS Y-0334	Exploration	9,857	*United Rig #2,* Mukluk Gravel Island
11/1/1984	1/18/1985	API no. 552320000100 (ANTARES 1) on OCS Y-0280	Exploration	8,448	Beaufort Sea #1, CIDS
1/19/1985	4/12/1985	API no. 552320000200 (ANTARES 2) on OCS Y-0280	Exploration	8,187	Beaufort Sea #1, CIDS
9/12/1985	1/26/1986	API no. 552010000700 (SANDPIPER 1) on OCS Y-0370	Exploration	11,925	*PAA Rig #5,* Sandpiper Gravel Island
3/12/1986	4/19/1986	API no. 552310000400 (MARS 1) on OCS Y-0302	Exploration	7,971	Spray Ice Island
5/19/1986	7/12/1986	API no. 552010000800 (SANDPIPER 2) on OCS Y-0371	Exploration	11,829	*PAA Rig #5,* Sandpiper Gravel Island
9/23/1986	12/29/1986	API no. 552310000500 (PHOENIX 1) on OCS Y-0338	Exploration	9,865	SSDC/MAT
10/19/1990	12/25/1990	API no. 552320000300 (FIREWEED 1) on OCS Y-0267	Exploration	9,650	SSDC/MAT

Notes: API = American Petroleum Institute; CIDS = concrete island drilling system; OCS = Outer Continental Shelf; SSDC = single steel drilling caisson
Sources: BOEM 2019b, 2020, 2022b, 2023c, 2023d

4.1.2.4 Platforms

There is one platform documented resulting from Lease Sale 71, as summarized in Table 4.1.2-3. The Spray Ice Island and Sandpiper Gravel Island were documented under well data, but no additional information on these platforms was found.

Table 4.1.2-3. Platform summary

Activity Start Date	Name	Description	Operator
1/1/1983	Mukluk Island	Construction of Mukluk Island supporting the drilling of exploration well API no. 552310000100 (OCS Y-0334 MUKLUK 1)	Sohio Alaska Petroleum Company

Notes: API = American Petroleum Institute; OCS = Outer Continental Shelf
Sources: BOEM 2023b, 2023d

4.1.2.5 Oil-and-Gas-Supporting Activities

There were no oil-and-gas-supporting activities identified as a result of Lease Sale 71.

4.1.2.6 E&D Scenario Summary

A scenario was developed for the Diapir Field Final Proposed Oil and Gas Lease Sale 71 Final Environmental Impact Statement (BLM 1982) to assess the potential environmental effects of the lease sale. The total areal extent of the proposed lease sale was 372 blocks, or 1,837,999 acres. The blocks were located 3 to 37 miles offshore in water depths that ranged from 16 to 131 feet. The mean resource estimate for the proposal was 2,380 MMbbl of oil and 1.78 Tcf (BLM 1982). A summary of activities is provided in Table 4.1.2-4.

The exploratory period would begin in 1983 and end by 1988. Peak exploratory drilling would occur in 1987 with 10 wells completed by three drilling rigs. It was estimated approximately 32 wells may be completed. The average depth of the wells would be 12,500 feet. Approximately 775 tons of wet drilling mud would be required to drill each 12,500-foot exploration well. The volume of cuttings would be 248 cubic meters per well (BLM 1982).

The developmental period would begin as early as 1990 with the placement of three ice-resistant platforms and could end by 1996. During development, it was estimated that 12 production platforms could drill as many as 462 production and service wells. Average depth of the wells was estimated to be about 9,000–13,000 feet, with 495 tons of wet drilling mud for a 9,000-foot well and 800 tons for a 13,000-foot well. The volume of drill cuttings expected was 191 cubic meters per 9,000-foot well and 260 cubic meters per 13,000-foot well (BLM 1982).

Pipeline construction would be expected to begin in 1990 and end in 1991. A total of 164 miles of pipe may be laid. Oil production would be expected to begin in 1992, reaching peak production of 424 MMbbl in 1994. Gas production would also begin in 1992, reaching a maximum output of 317 billion cubic feet (Bcf) (BLM 1982).

A summary of activities is provided in Table 4.1.2-4.

Table 4.1.2-4. Summary of basic assumptions of Lease Sale 71 E&D scenario

Element	Mean Case
Sale acreage offering	1,837,999 acres
Recoverable oil	2,380 MMbbl
Recoverable gas	1.78 Tcf
Peak production – oil	424 MMbbl per year
Peak production – gas	317 Bcf per year
Exploration	Exploration
Number of wells – exploration and delineation	32
Drill rigs	11
Drilling mud – per well	775 tons (wet)
Drilling cuttings – per well	248 m^3
Average well depth	9,000–13,000 feet

Element	Mean Case
Development and Production	Development and Production
Platforms – development and production	12
Number of wells – production and service	462
Total drilling muds – development and production	449–726 metric tons (wet)
Total cuttings – development and production	191–260 m^3 (wet)
Transportation	Transportation
Trunk pipeline – total	164 miles
Onshore terminals	2

Notes: Bcf = billion cubic feet; E&D = Exploration and Development; m^3 = cubic meters; MMbbl = million barrels; Tcf = trillion cubic feet
Source: BLM 1982

4.1.2.7 Comparison of E&D Scenario and Historical Activities

A comparison of the E&D scenario and the historical activities are provided in Table 4.1.2-5, using available information.

Table 4.1.2-5. Comparison of E&D and historical activities

Activity	E&D Scenario	Actual Activities
Recoverable oil (maximum)	2,380 MMbbl	--
Recoverable gas (maximum)	1.78 Tcf	--
Sale acreage offering	1,837,999 acres	1,825,770 acres offered
Sale	--	662,860 acres leased
Date of exploratory activities (begin)	1983	1983
Number of wells – exploration and delineation	32	8
Number of wells – production and service	462	0
Average well depth	9,000–13,000 feet	9,717 feet
Drilling mud – per well (exploration)	775 tons (wet)	--
Drilling cuttings – per well (exploration)	248 m^3	--
Total drilling muds – per well (development and production)	449–726 metric tons (wet)	0
Total cuttings – per well (development and production)	191–260 cubic meters (wet)	0
Number of seismic or G&G surveys	--	0
Drill rigs	11	2
Support facility and shorebase locations	2 onshore terminals	0
Average shorebase dockings/flights	--	0
Personnel flights to area	--	0

Activity	E&D Scenario	Actual Activities
Other sites used	--	0
Peak production oil	424 MMbbl per year	--
Peak production gas	317 Bcf per year	--
Platforms	12	3
Pipelines	164 miles	0
Support / supply facilities	--	0
Production treatment facilities	--	0
Total direct land requirements	--	0
Supply and support boats	--	--
Annual crude shipped by tanker	--	0

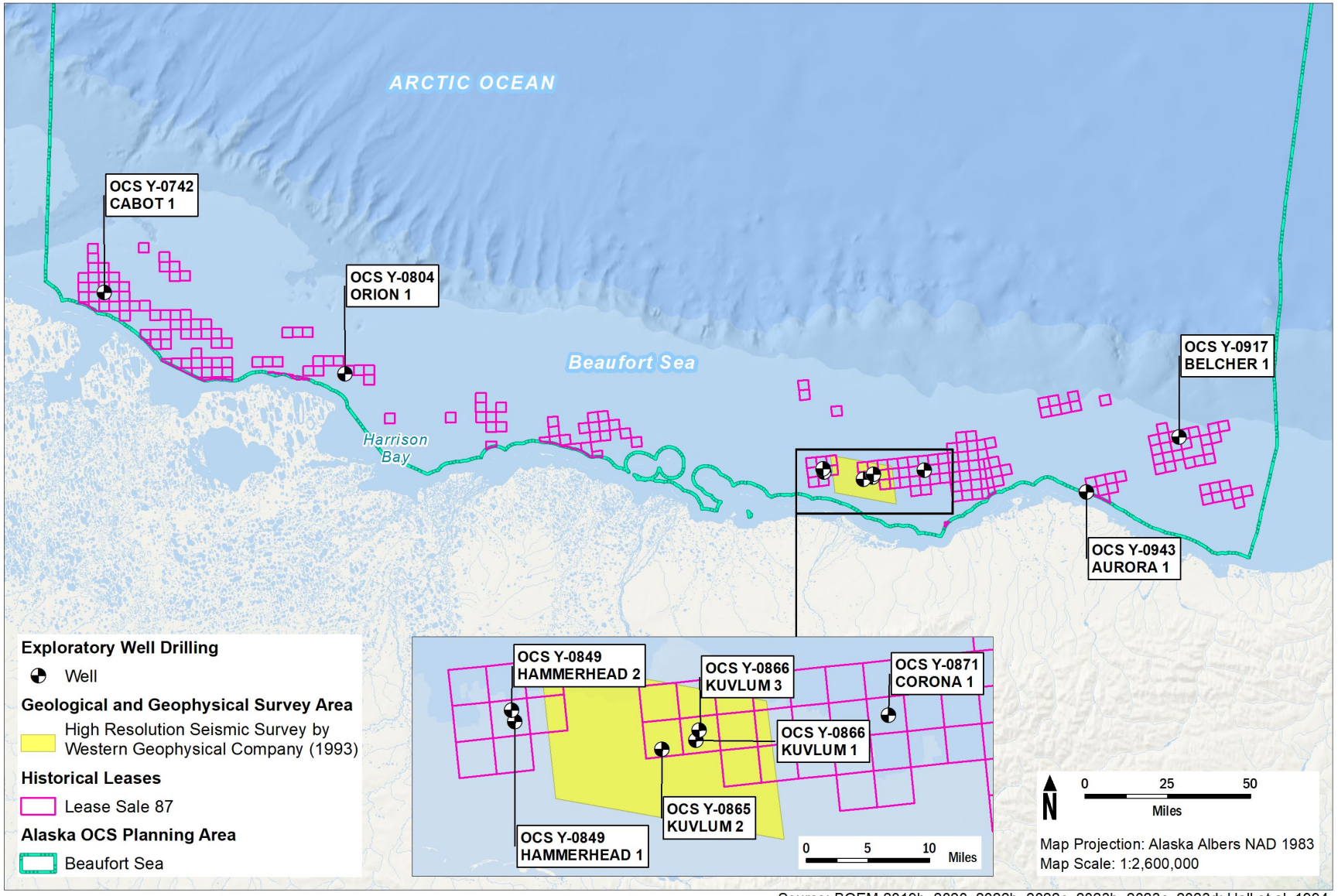
Notes: -- = no data provided; Bcf = billion cubic feet; E&D = Exploration and Development; G&G = geological and geophysical; m^3 = cubic meters; MMbbl = million barrels; Tcf = trillion cubic feet

4.1.3 Lease Sale 87 (1984)

The identified activities associated with Lease Sale 87 are shown in Figure 4-5, such as the locations of exploration wells, and G&G survey areas.

4.1.3.1 Leasing

As shown in Table 4.1-1 and Figure 4-5, as a result of Lease Sale 87, there were 1,419 tracts offered and 227 leases issued. There were 7,773,447 acres offered and 1,207,714 acres leased. There are no active leases from Lease Sale 87. Table 4.1.3-1 summarizes documented information associated with the leasing as a result of Lease Sale 87.



Source: BOEM 2019b, 2020, 2022b, 2022c, 2023b, 2023c, 2023d; Hall et al. 1994.

Figure 4-5. Historical oil and gas activities associated with Lease Sale 87, 1984

Table 4.1.3-1. Lease information as a result of Lease Sale 87

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y00734	Exxon	10/1/1984	Relinquished	9/30/1992	Dease Inlet	734	598
Y00745	Exxon	10/1/1984	Relinquished	9/28/1992	Dease Inlet	745	686
Y00750	Exxon	10/1/1984	Relinquished	9/28/1992	Dease Inlet	750	730
Y00786	Exxon	10/1/1984	Relinquished	9/26/1991	Dease Inlet	786	1011
Y00787	Exxon	10/1/1984	Relinquished	9/26/1991	Dease Inlet	787	1012
Y00791	Exxon	10/1/1984	Relinquished	9/26/1991	Harrison Bay North	791	969
Y00800	Exxon	10/1/1984	Relinquished	7/31/1989	Teshekpuk	800	44D
Y00802	Exxon	10/1/1984	Relinquished	9/26/1991	Harrison Bay	802	4
Y00803	Exxon	10/1/1984	Relinquished	9/26/1991	Harrison Bay	803	5
Y00804	Exxon	10/1/1984	Relinquished	12/22/1986	Harrison Bay	804	8
Y00805	Exxon	10/1/1984	Relinquished	12/22/1986	Harrison Bay	805	9
Y00806	Exxon	10/1/1984	Relinquished	9/29/1989	Harrison Bay	806	10
Y00818	Exxon	10/1/1984	Relinquished	7/31/1989	Harrison Bay	818	2 DE
Y00842	Exxon	10/1/1984	Expired	9/30/1994	Flaxman Island	842	579
Y00844	Exxon	10/1/1984	Relinquished	9/30/1992	Flaxman Island	844	581
Y00849	Union	10/1/1984	Relinquished	12/30/1998	Flaxman Island	849	624
Y00852	Exxon	10/1/1984	Relinquished	9/30/1992	Flaxman Island	852	629
Y00853	Exxon	10/1/1984	Relinquished	9/30/1992	Flaxman Island	853	630
Y00864	Exxon	10/1/1984	Relinquished	9/30/1992	Flaxman Island	864	668
Y00868	Exxon	10/1/1984	Expired	9/30/1994	Flaxman Island	868	675
Y00869	Exxon	10/1/1984	Expired	9/30/1994	Flaxman Island	869	676
Y00871	Amoco	10/1/1984	Relinquished	12/20/1993	Flaxman Island	871	678
Y00872	Union	10/1/1984	Relinquished	12/20/1993	Flaxman Island	872	679
Y00879	Exxon	10/1/1984	Relinquished	9/30/1994	Flaxman Island	879	720
Y00880	Exxon	10/1/1984	Expired	9/30/1994	Flaxman Island	880	721
Y00881	Exxon	10/1/1984	Expired	9/30/1994	Flaxman Island	881	722
Y00887	Exxon	10/1/1984	Expired	9/30/1994	Flaxman Island	887	765
Y00888	Exxon	10/1/1984	Relinquished	9/30/1992	Flaxman Island	888	766
Y00899	Exxon	10/1/1984	Relinquished	9/26/1991	Flaxman Island	899	640
Y00921	Exxon	10/1/1984	Relinquished	9/30/1993	Barter Island	921	749
Y00726	Placid	11/1/1984	Expired	10/31/1994	Dease Inlet	726	467

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y00727	Chevron	11/1/1984	Relinquished	10/28/1993	Dease Inlet	727	472
Y00728	Placid	11/1/1984	Expired	10/31/1994	Dease Inlet	728	511
Y00729	Placid	11/1/1984	Relinquished	10/28/1993	Dease Inlet	729	518
Y00730	Chevron	11/1/1984	Expired	10/31/1994	Dease Inlet	730	555
Y00731	Placid	11/1/1984	Expired	10/31/1994	Dease Inlet	731	556
Y00732	ARCO	11/1/1984	Relinquished	10/28/1993	Dease Inlet	732	562
Y00733	ARCO	11/1/1984	Relinquished	10/28/1993	Dease Inlet	733	563
Y00735	Placid	11/1/1984	Expired	10/31/1994	Dease Inlet	735	599
Y00736	Sohio	11/1/1984	Relinquished	10/28/1993	Dease Inlet	736	600
Y00737	Sohio	11/1/1984	Expired	10/28/1993	Dease Inlet	737	601
Y00738	ARCO	11/1/1984	Expired	10/24/1986	Dease Inlet	738	607
Y00739	ARCO	11/1/1984	Expired	10/24/1986	Dease Inlet	739	608
Y00740	Mobil	11/1/1984	Expired	10/28/1992	Dease Inlet	740	642
Y00741	Sohio	11/1/1984	Expired	10/28/1992	Dease Inlet	741	643
Y00742	Sohio	11/1/1984	Relinquished	10/31/1994	Dease Inlet	742	644
Y00743	Sohio	11/1/1984	Relinquished	10/31/1994	Dease Inlet	743	645
Y00744	Sohio	11/1/1984	Expired	10/28/1993	Dease Inlet	744	646
Y00746	BPXA	11/1/1984	Relinquished	10/28/1992	Dease Inlet	746	687
Y00747	Mobil	11/1/1984	Expired	10/31/1994	Dease Inlet	747	688
Y00748	Sohio	11/1/1984	Expired	10/31/1994	Dease Inlet	748	689
Y00749	Sohio	11/1/1984	Expired	10/31/1994	Dease Inlet	749	690
Y00751	Sohio	11/1/1984	Relinquished	10/28/1992	Dease Inlet	751	731
Y00752	Sohio	11/1/1984	Relinquished	10/28/1992	Dease Inlet	752	732
Y00753	Sohio	11/1/1984	Relinquished	10/28/1992	Dease Inlet	753	733
Y00754	Sohio	11/1/1984	Relinquished	10/14/1992	Dease Inlet	754	734
Y00755	Sohio	11/1/1984	Relinquished	10/28/1992	Dease Inlet	755	735
Y00756	Sohio	11/1/1984	Relinquished	10/28/1992	Dease Inlet	756	736
Y00757	Sohio	11/1/1984	Relinquished	10/28/1992	Dease Inlet	757	778
Y00758	Texaco	11/1/1984	Relinquished	10/29/1992	Dease Inlet	758	781
Y00759	Sohio	11/1/1984	Relinquished	10/4/1993	Dease Inlet	759	782
Y00760	Sohio	11/1/1984	Expired	10/31/1994	Dease Inlet	760	783
Y00761	Sohio	11/1/1984	Expired	10/31/1994	Dease Inlet	761	784
Y00762	Texaco	11/1/1984	Relinquished	9/14/1992	Dease Inlet	762	827

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y00763	Sohio	11/1/1984	Expired	10/31/1994	Dease Inlet	763	828
Y00764	Sohio	11/1/1984	Expired	10/31/1994	Dease Inlet	764	829
Y00765	Sohio	11/1/1984	Relinquished	10/28/1993	Dease Inlet	765	830
Y00766	Amoco	11/1/1984	Relinquished	4/1/1993	Dease Inlet	766	868
Y00767	Amoco	11/1/1984	Relinquished	4/1/1993	Dease Inlet	767	869
Y00768	Amoco	11/1/1984	Relinquished	4/1/1993	Dease Inlet	768	870
Y00769	Sohio	11/1/1984	Expired	10/31/1994	Dease Inlet	769	872
Y00770	Sohio	11/1/1984	Expired	10/31/1994	Dease Inlet	770	873
Y00771	Sohio	11/1/1984	Relinquished	10/28/1993	Dease Inlet	771	874
Y00772	BPXA	11/1/1984	Relinquished	10/31/1986	Dease Inlet	772	875
Y00773	Amoco	11/1/1984	Relinquished	4/1/1993	Dease Inlet	773	912
Y00774	Amoco	11/1/1984	Relinquished	4/1/1993	Dease Inlet	774	913
Y00775	Amoco	11/1/1984	Relinquished	4/1/1993	Dease Inlet	775	914
Y00776	BPXA	11/1/1984	Relinquished	10/31/1986	Dease Inlet	776	919
Y00777	Sohio	11/1/1984	Relinquished	10/31/1986	Dease Inlet	777	920
Y00778	Chevron	11/1/1984	Relinquished	10/22/1993	Dease Inlet	778	961
Y00779	Amoco	11/1/1984	Relinquished	4/1/1993	Dease Inlet	779	1002
Y00780	Amoco	11/1/1984	Relinquished	4/1/1993	Dease Inlet	780	1003
Y00781	Chevron	11/1/1984	Relinquished	10/22/1993	Dease Inlet	781	1004
Y00782	Sohio	11/1/1984	Relinquished	10/28/1991	Dease Inlet	782	1005
Y00783	Sohio	11/1/1984	Expired	10/31/1994	Dease Inlet	783	1006
Y00784	Sohio	11/1/1984	Expired	10/31/1994	Dease Inlet	784	1007
Y00785	Sohio	11/1/1984	Relinquished	10/22/1987	Dease Inlet	785	1008
Y00788	Amoco	11/1/1984	Relinquished	9/8/1992	Harrison Bay North	788	838
Y00789	Amoco	11/1/1984	Relinquished	9/8/1992	Harrison Bay North	789	839
Y00790	Amoco	11/1/1984	Relinquished	9/8/1992	Harrison Bay North	790	840
Y00792	Sohio	11/1/1984	Relinquished	10/28/1991	Harrison Bay North	792	973
Y00793	Sohio	11/1/1984	Relinquished	10/16/1989	Harrison Bay North	793	974
Y00794	Sohio	11/1/1984	Relinquished	10/30/1986	Harrison Bay North	794	975
Y00795	Sohio	11/1/1984	Relinquished	10/22/1987	Teshekpuk	795	37
Y00796	Sohio	11/1/1984	Expired	10/31/1994	Teshekpuk	796	38
Y00797	Sohio	11/1/1984	Expired	10/31/1994	Teshekpuk	797	39
Y00798	Sohio	11/1/1984	Relinquished	10/28/1991	Teshekpuk	798	40

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y00799	Amoco	11/1/1984	Relinquished	4/1/1993	Teshekpuk	799	35
Y00801	Sohio	11/1/1984	Expired	10/31/1994	Teshekpuk	801	81
Y00807	Sohio	11/1/1984	Expired	10/31/1994	Harrison Bay	807	54
Y00808	Amoco	11/1/1984	Relinquished	10/22/1991	Harrison Bay	808	153
Y00809	Placid	11/1/1984	Relinquished	10/25/1991	Harrison Bay	809	197
Y00810	Amoco	11/1/1984	Relinquished	10/22/1991	Harrison Bay	810	199
Y00811	Tenneco	11/1/1984	Relinquished	10/3/1991	Harrison Bay	811	232
Y00812	Tenneco	11/1/1984	Relinquished	10/28/1993	Harrison Bay	812	238
Y00813	Tenneco	11/1/1984	Relinquished	10/28/1993	Harrison Bay	813	241
Y00814	Tenneco	11/1/1984	Relinquished	10/28/1993	Harrison Bay	814	242
Y00815	Tenneco	11/1/1984	Relinquished	10/28/1993	Harrison Bay	815	286
Y00816	Tenneco	11/1/1984	Relinquished	10/28/1993	Harrison Bay	816	287
Y00817	Tenneco	11/1/1984	Expired	10/31/1994	Harrison Bay	817	374
Y00819	Murphy	11/1/1984	Relinquished	10/18/1993	Beechey Point	819	290
Y00820	Texaco	11/1/1984	Relinquished	9/14/1992	Beechey Point	820	294
Y00821	Texaco	11/1/1984	Relinquished	10/29/1992	Beechey Point	821	295
Y00822	Murphy	11/1/1984	Relinquished	10/18/1993	Beechey Point	822	334
Y00823	Conoco	11/1/1984	Relinquished	10/8/1991	Beechey Point	823	337
Y00824	Conoco	11/1/1984	Relinquished	10/8/1991	Beechey Point	824	338
Y00825	Texaco	11/1/1984	Relinquished	10/29/1992	Beechey Point	825	340
Y00826	Placid	11/1/1984	Expired	10/31/1994	Beechey Point	826	377
Y00827	Placid	11/1/1984	Expired	10/31/1994	Beechey Point	827	378
Y00828	Amoco	11/1/1984	Relinquished	8/27/2002	Beechey Point	828	379
Y00829	Conoco	11/1/1984	Relinquished	10/8/1991	Beechey Point	829	382
Y00830	Conoco	11/1/1984	Relinquished	10/16/1991	Beechey Point	830	383
Y00831	Diamond	11/1/1984	Relinquished	10/29/1992	Beechey Point	831	385
Y00832	Texaco	11/1/1984	Relinquished	9/14/1992	Beechey Point	832	430
Y00833	Placid	11/1/1984	Relinquished	10/31/1994	Beechey Point	833	376 DE
Y00834	Amoco	11/1/1984	Expired	10/31/1994	Beechey Point	834	378 D
Y00835	Amerada Hess	11/1/1984	Expired	10/31/1994	Beechey Point	835	424 DE
Y00837	Amoco	11/1/1984	Relinquished	4/1/1993	Flaxman Island	837	227
Y00838	Amoco	11/1/1984	Relinquished	4/1/1993	Flaxman Island	838	271
Y00839	Amoco	11/1/1984	Relinquished	4/1/1993	Flaxman Island	839	362

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y00840	Amoco	11/1/1984	Relinquished	7/20/1994	Flaxman Island	840	550
Y00841	Amoco	11/1/1984	Relinquished	7/20/1994	Flaxman Island	841	551
Y00843	Shell	11/1/1984	Relinquished	12/30/1998	Flaxman Island	843	580
Y00845	ARCO	11/1/1984	Relinquished	10/28/1993	Flaxman Island	845	593
Y00846	Amoco	11/1/1984	Relinquished	7/20/1994	Flaxman Island	846	594
Y00847	Amoco	11/1/1984	Relinquished	7/20/1994	Flaxman Island	847	595
Y00848	Amoco	11/1/1984	Relinquished	12/30/1998	Flaxman Island	848	623
Y00850	Shell	11/1/1984	Relinquished	12/30/1998	Flaxman Island	850	625
Y00851	BPXA	11/1/1984	Relinquished	12/30/1998	Flaxman Island	851	628
Y00854	Union	11/1/1984	Relinquished	12/20/1993	Flaxman Island	854	631
Y00855	Union	11/1/1984	Relinquished	12/20/1993	Flaxman Island	855	632
Y00856	Chevron	11/1/1984	Expired	10/31/1994	Flaxman Island	856	633
Y00857	Chevron	11/1/1984	Expired	10/31/1994	Flaxman Island	857	634
Y00858	Chevron	11/1/1984	Relinquished	10/29/1991	Flaxman Island	858	635
Y00859	ARCO	11/1/1984	Relinquished	10/28/1992	Flaxman Island	859	636
Y00860	ARCO	11/1/1984	Relinquished	10/28/1992	Flaxman Island	860	637
Y00861	ARCO	11/1/1984	Relinquished	10/28/1993	Flaxman Island	861	638
Y00862	ARCO	11/1/1984	Relinquished	10/28/1993	Flaxman Island	862	639
Y00863	Union	11/1/1984	Expired	10/31/1994	Flaxman Island	863	667
Y00865	BPXA	11/1/1984	Relinquished	12/30/1998	Flaxman Island	865	672
Y00866	Conoco	11/1/1984	Relinquished	12/30/1998	Flaxman Island	866	673
Y00867	Conoco	11/1/1984	Relinquished	10/30/1996	Flaxman Island	867	674
Y00870	Chevron	11/1/1984	Relinquished	10/15/1991	Flaxman Island	870	677
Y00873	ARCO	11/1/1984	Relinquished	10/28/1992	Flaxman Island	873	680
Y00874	ARCO	11/1/1984	Relinquished	10/28/1992	Flaxman Island	874	681
Y00875	ARCO	11/1/1984	Relinquished	10/28/1993	Flaxman Island	875	683
Y00876	ARCO	11/1/1984	Relinquished	10/28/1993	Flaxman Island	876	684
Y00877	Conoco	11/1/1984	Relinquished	12/30/1998	Flaxman Island	877	718
Y00878	Mobil	11/1/1984	Relinquished	10/30/1996	Flaxman Island	878	719
Y00882	Union	11/1/1984	Relinquished	10/26/1989	Flaxman Island	882	723
Y00883	ARCO	11/1/1984	Relinquished	10/28/1992	Flaxman Island	883	724
Y00884	ARCO	11/1/1984	Relinquished	10/28/1992	Flaxman Island	884	726
Y00885	Union	11/1/1984	Expired	10/31/1994	Flaxman Island	885	727

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y00886	Amoco	11/1/1984	Expired	10/31/1994	Flaxman Island	886	728
Y00889	ARCO	11/1/1984	Relinquished	7/20/1994	Flaxman Island	889	769
Y00890	ARCO	11/1/1984	Relinquished	10/28/1992	Flaxman Island	890	770
Y00891	Placid	11/1/1984	Expired	10/31/1994	Flaxman Island	891	771
Y00892	Amoco	11/1/1984	Expired	10/31/1994	Flaxman Island	892	772
Y00893	Amoco	11/1/1984	Relinquished	7/20/1994	Flaxman Island	893	813
Y00894	Amoco	11/1/1984	Relinquished	7/20/1994	Flaxman Island	894	814
Y00895	ARCO	11/1/1984	Relinquished	10/28/1992	Flaxman Island	895	815
Y00896	ARCO	11/1/1984	Relinquished	10/28/1992	Flaxman Island	896	816
Y00897	ARCO	11/1/1984	Relinquished	10/24/1986	Flaxman Island	897	944
Y00898	Amoco	11/1/1984	Relinquished	7/20/1994	Flaxman Island	898	596
Y00900	Amoco	11/1/1984	Relinquished	6/4/1990	Barter Island	900	448
Y00901	Amoco	11/1/1984	Relinquished	6/4/1990	Barter Island	901	449
Y00902	Amoco	11/1/1984	Relinquished	6/4/1990	Barter Island	902	451
Y00903	Amoco	11/1/1984	Relinquished	6/4/1990	Barter Island	903	492
Y00904	Amoco	11/1/1984	Relinquished	6/4/1990	Barter Island	904	493
Y00905	Amoco	11/1/1984	Relinquished	6/4/1990	Barter Island	905	494
Y00906	Amoco	11/1/1984	Relinquished	6/4/1990	Barter Island	906	495
Y00907	Amoco	11/1/1984	Relinquished	6/4/1990	Barter Island	907	498
Y00908	Amoco	11/1/1984	Relinquished	7/20/1994	Barter Island	908	574
Y00909	ARCO	11/1/1984	Relinquished	10/28/1993	Barter Island	909	661
Y00910	Union	11/1/1984	Expired	10/31/1994	Barter Island	910	662
Y00911	Placid	11/1/1984	Relinquished	10/29/1990	Barter Island	911	679
Y00912	Amoco	11/1/1984	Expired	10/31/1994	Barter Island	912	705
Y00913	Amoco	11/1/1984	Expired	10/31/1994	Barter Island	913	706
Y00914	ARCO	11/1/1984	Relinquished	10/28/1993	Barter Island	914	707
Y00915	Placid	11/1/1984	Relinquished	10/29/1990	Barter Island	915	722
Y00916	Placid	11/1/1984	Relinquished	10/29/1990	Barter Island	916	723
Y00917	Amoco	11/1/1984	Relinquished	9/24/1990	Barter Island	917	724
Y00918	Amoco	11/1/1984	Relinquished	9/24/1990	Barter Island	918	725
Y00919	ARCO	11/1/1984	Relinquished	10/28/1991	Barter Island	919	726
Y00920	Union	11/1/1984	Relinquished	4/26/1993	Barter Island	920	728
Y00922	ARCO	11/1/1984	Relinquished	10/28/1992	Barter Island	922	750

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y00923	Placid	11/1/1984	Relinquished	10/29/1990	Barter Island	923	766
Y00924	Chevron	11/1/1984	Relinquished	10/29/1991	Barter Island	924	767
Y00925	Placid	11/1/1984	Relinquished	10/29/1990	Barter Island	925	768
Y00926	Shell	11/1/1984	Relinquished	10/4/1990	Barter Island	926	769
Y00927	Shell	11/1/1984	Relinquished	4/26/1993	Barter Island	927	771
Y00928	Amoco	11/1/1984	Relinquished	4/26/1993	Barter Island	928	772
Y00929	ARCO	11/1/1984	Relinquished	10/28/1992	Barter Island	929	793
Y00930	Placid	11/1/1984	Relinquished	10/29/1990	Barter Island	930	810
Y00931	ARCO	11/1/1984	Relinquished	10/3/1991	Barter Island	931	811
Y00932	ARCO	11/1/1984	Relinquished	10/3/1991	Barter Island	932	812
Y00933	Union	11/1/1984	Relinquished	4/26/1993	Barter Island	933	815
Y00934	Chevron	11/1/1984	Relinquished	10/29/1991	Barter Island	934	847
Y00935	Chevron	11/1/1984	Relinquished	10/29/1991	Barter Island	935	848
Y00936	Conoco	11/1/1984	Relinquished	10/29/1991	Barter Island	936	849
Y00937	Conoco	11/1/1984	Expired	10/31/1994	Barter Island	937	850
Y00938	Placid	11/1/1984	Relinquished	10/29/1990	Barter Island	938	854
Y00939	Placid	11/1/1984	Relinquished	10/29/1990	Barter Island	939	855
Y00940	ARCO	11/1/1984	Relinquished	10/29/1991	Barter Island	940	857
Y00941	ARCO	11/1/1984	Relinquished	10/29/1991	Barter Island	941	858
Y00942	ARCO	11/1/1984	Relinquished	10/29/1991	Barter Island	942	859
Y00943	ARCO	11/1/1984	Relinquished	10/25/1991	Barter Island	943	890
Y00944	Conoco	11/1/1984	Expired	10/31/1994	Barter Island	944	891
Y00945	Placid	11/1/1984	Relinquished	10/31/1994	Barter Island	945	892
Y00946	Chevron	11/1/1984	Expired	10/31/1994	Barter Island	946	893
Y00947	Shell	11/1/1984	Relinquished	4/28/1993	Barter Island	947	990
Y00948	Shell	11/1/1984	Relinquished	4/28/1993	Barter Island	948	991
Y00949	Shell	11/1/1984	Relinquished	4/28/1993	Barter Island	949	992
Y00950	ARCO	11/1/1984	Relinquished	10/25/1991	Barter Island	950	935
Y00952	Shell	11/1/1984	Relinquished	4/28/1993	Demarcation Point	952	23
Y00953	Shell	11/1/1984	Relinquished	4/26/1993	Demarcation Point	953	24
Y00954	Shell	11/1/1984	Relinquished	4/26/1993	Demarcation Point	954	25
Y00836	Amerada Hess	None	Rejected	None	Beechey Point	836	469

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y00951	Union	None	Unexecuted	None	Mackenzie Canyon North	951	705
Y00955	Union	None	Unexecuted	None	Mackenzie Canyon	955	1
Y00956	Union	None	Unexecuted	None	Mackenzie Canyon	956	2
Y00957	Union	None	Unexecuted	None	Mackenzie Canyon	957	45

Notes: ARCO = Atlantic Richfield Company; BPXA = BP Exploration (Alaska) Inc.
Source: BOEM 2023b

4.1.3.2 Surveys

In 1993, there was one 2D seismic survey documented as a result of Lease Sale 87, as shown in Table 4.1.3-2.

Table 4.1.3-2. Survey activity summary

Activity Start Date	Activity End Date	Year	Activity Name	Description	Vessel Name	Operator and Contractor
7/16/1993	8/31/1993	1993	2D high resolution seismic survey	The seismic vessels utilized arrays of airguns as the energy source.	Western Aleutian, Arctic Star	Western Geophysical Company

Note: 2D = two-dimensional
Source: Hall et al. 1994

4.1.3.3 Well Drilling

Ten exploration wells were drilled as a result of Lease Sale 87, as summarized in Table 4.1.3-3.

Table 4.1.3-3. Well drilling summary

Activity Start Date	Activity End Date	Well Name (includes API no. and bottom hole lease number)	Well Type	Well Depth (feet)	Drill Rig Name
8/10/1985	10/21/1987	API no. 551710000100 (HAMMERHEAD 1) on OCS Y-0849	Exploration	8,034	Canmar Explorer II
11/10/1985	12/15/1985	API no. 552310000300 (ORION 1) on OCS Y-0804	Exploration	7,298	Glomar Beaufort Sea #1, CIDS
7/28/1986	10/21/1987	API no. 551710000200 (CORONA 1) on OCS Y-0871	Exploration	9,997	Canmar Explorer II
9/27/1986	10/21/1987	API no. 551710000600 (HAMMERHEAD 2) on OCS Y-0849	Exploration	6,460	Explorer II Drillship
6/22/1988	9/7/1988	API no. 551410000400 (AURORA 1) on OCS Y-0943	Exploration	18,303	SSDC/MAT
9/10/1988	9/25/1989	API no. 551410000500 (BELCHER 1) on OCS Y-0917	Exploration	13,108	Beaudril Kulluk
11/1/1991	2/26/1992	API no. 552620000100 (CABOT 1) on OCS Y-0742	Exploration	10,471	SSDC/MAT
8/22/1992	10/24/1992	API no. 551710000800 (KUVLUM 1) on OCS Y-0866	Exploration	8,500	Beaudril Kulluk
7/28/1993	8/28/1993	API no. 551710000900 (KUVLUM 2) on OCS Y-0865	Exploration	11,123	Beaudril Kulluk
9/9/1993	7/30/1993	API no. 551710001000 (KUVLUM 3) on OCS Y-0866	Exploration	8,000	Canmar Kulluk

Notes: API = American Petroleum Institute; CIDS = concrete island drilling system; OCS = Outer Continental Shelf; single steel drilling caisson
Sources: BOEM 2019b, 2020, 2022b, 2023c, 2023d

4.1.3.4 Oil-and-Gas-Supporting Activities

There were no oil-and-gas-supporting activities identified as a result of Lease Sale 87.

4.1.3.5 E&D Scenario Summary

A scenario was developed for the Diapir Field Lease Offering Final Environmental Impact Statement (MMS 1984a) to assess the potential environmental impacts of the lease sale. The sale consisted of a total of 3,193 blocks, 17.2 million acres, located in the Beaufort and Chukchi Seas 5 to 257 kilometers offshore. The mean resource estimate used was 3.0 billion barrels (Bbbl) of oil and 7.75 Tcf of gas. Activities associated with the E&D scenario (MMS 1984a) are summarized in Table 4.1.3-4.

Exploration was expected to begin in 1986 and continue through 1993. Delineation wells would be drilled between 1989 and 1994. During those years, 30 exploration wells, 9 oil delineation wells, and 3 gas delineation wells were expected to be drilled (MMS 1984a).

During exploratory drilling, the scenario assumed that half of the wells in the Diapir Field Lease Offering may be drilled year-round from artificial gravel islands, caisson-type structures, or semi-submersible drilling units. Gravel islands would be built in waters shallower than 15 to 20 meters. The scenario considered that caisson-type structures and semi-submersible units had been built on submerge berms in waters from 13 to 31 meters deep and could be constructed in shallower or deeper waves. During drilling, it was assumed that there would be 15 gravel islands. It was assumed five oil delineation wells would be drilled from gravel or caisson-retained islands, two wells would require new island construction, and the remaining four delineation wells for oil would be from mobile units. During gas exploration, it was estimated three delineation wells would be drilled, two from island units (one of which was used during exploration) and one from a mobile unit (MMS 1984a).

Under the scenario, approximately 1,000 tons of mud solids would be used for each exploration well and 1,850 tons of cuttings per well will be produced. Given the assumption that 39 wells would be drilled for exploration and oil field delineation, approximately 39,000 tons of mud and 72,150 tons of cuttings would be disposed of (MMS 1984a).

The primary forward support base for exploration activity would be in Deadhorse. Because of the geographic extent of this proposed lease offering, some type of temporary support base probably would be in proximity to the offshore operations. Another support base option during exploration would be the use of a barge. Support barges could either be used independently or in conjunction with an onshore facility (MMS 1984a).

Developmental drilling was expected to begin in 1995 following 9 years of exploration drilling and field delineation. Drilling platforms would begin to be constructed on-site in 1994, 6 years after the initial discovery. It was assumed that development drilling would continue through 2001. During that time, 125 oil production wells and 30 service wells are assumed to be drilled. Six rigs would be operating in 1995 and 1996: the peak years for drilling. This development is assumed to occur on five platforms, each with 25 production wells and six service wells. Each platform would have two drilling rigs. Pipeline construction was assumed to begin in 1994 and continue for approximately 6 years. Of the five production platforms, approximately half would be gravel or caisson-retained islands. Production islands would be larger, approximately 600 to 1,000 feet in diameter with a freeboard of 15 feet above sea level and an 8-foot protective berm (MMS 1984a).

The development scenario assumed that pipelines would be the preferred method for transporting hydrocarbons from the lease offering area. Three trunk lines would be connected to the Trans-Alaska Pipeline System (TAPS). Support operations and logistics for the development phase would be similar to

the exploration phase. Three additional support bases would likely be established if commercial fields were developed (MMS 1984a).

Activities associated with production would begin in the 13th year after the lease offering (1997) and would terminate in 2023. Peak oil production would occur early in the producing life of the field. In the seventh year, annual oil delivered would peak at 222 MMbbl. Gas would peak at 310 Bcf and remain at that level for 21 years, from 2001 to 2024 (MMS 1984a).

The average production well for oil would use about 500 tons of mud solids, most of which would be recycled to other production wells. The average well depth would be 2,275 meters (7,464 feet). Approximately 1,250 tons of drill cuttings per oil well would be produced. A total of 193,750 tons would be disposed of. The average production well for gas would use approximately 450 tons of mud solids, most of which would be recycled to other production wells. Each gas well would also produce an average of 1,225 tons of drill cuttings. The depth of 75 percent of the gas wells was assumed to be approximately 1,200 meters; the approximate depth of the other 25 percent was assumed to be 4,545 meters. A total of 41,650 tons would be dumped on site (MMS 1984a).

Table 4.1.3-4. Summary of basic assumptions of Lease Sale 87 E&D scenario

Element	Mean Case
Sale acreage offering	17.2 million acres
Recoverable oil	3.0 Bbbl
Recoverable gas	7.75 Tcf
Peak production – oil	222 MMbbl
Peak production – gas	310 Bcf
Exploration	Exploration
Number of wells – exploration	30
Delineation wells – oil	9
Delineation wells – gas	3
Drilling units – exploration and delineation	38
Total drilling muds – exploration	39,000 tons
Total cuttings – exploration	72,150 tons
Development and Production	Development and Production
Platforms – oil	5
Platforms – gas	3
Number of wells – oil production	155
Number of wells – gas production	34
Drilling rigs	6
Helicopter flights – during development	5,400 trips
Helicopter flights – after development	3,744 trips
Total drilling muds – development and production	193,750 tons
Total cuttings – development and production	41,650 tons

Element	Mean Case
Transportation	Transportation
Trunk pipeline miles – oil	400
Trunk pipeline miles – gas	200
Shorebases	3

Notes: Bbbl = billion barrels; Bcf = billion cubic feet; E&D = Exploration and Development; MMbbl = million barrels; Tcf = trillion cubic feet
Source: MMS 1984a

4.1.3.6 Comparison of E&D Scenario and Historical Activities

A comparison of the E&D scenario and the historical activities are provided in Table 4.1.3-5, using available information.

Table 4.1.3-5. Comparison of E&D and historical activities

Activity	E&D Scenario	Actual Activities
Recoverable oil (maximum)	3.0 Bbbl	--
Recoverable gas (maximum)	7.75 Tcf	--
Sale acreage offering	17.2 million acres	7,773,447 acres offered
Sale	--	1,207,714 acres leased
Date of exploratory activities (begin)	1986	1985
Number of wells – exploration	30	10
Number of wells – delineation	12 (9 oil, 3 gas)	0
Number of wells – production and service	189 (155 oil 34 gas)	0
Drilling units – exploration and delineation	38	0
Drill rigs	6	6
Average well depth	7,464 feet	10,129 feet
Drilling mud – per well (exploration)	--	--
Drilling cuttings – per well (exploration)	--	--
Total drilling muds – development and production	193,750 tons	0
Total cuttings – development and production	41,650 tons	0
Number of seismic surveys	--	1
Support facility and shorebase locations	3 Deadhorse	0
Helicopter flights – during development	5,400 trips	--[1]
Helicopter flights – after development	3,744 trips	0
Peak production oil	222 MMbbl	0
Peak production gas	310 Bcf	0

Activity	E&D Scenario	Actual Activities
Platforms	8 (5 oil, 3 gas)	0
Pipelines	600 miles (400 oil, 200 gas)	0
Support / supply facilities	--	0
Production treatment facilities	--	0
Total direct land requirements	--	0
Supply and support boats	--	4[2]
Annual crude shipped by tanker	--	0

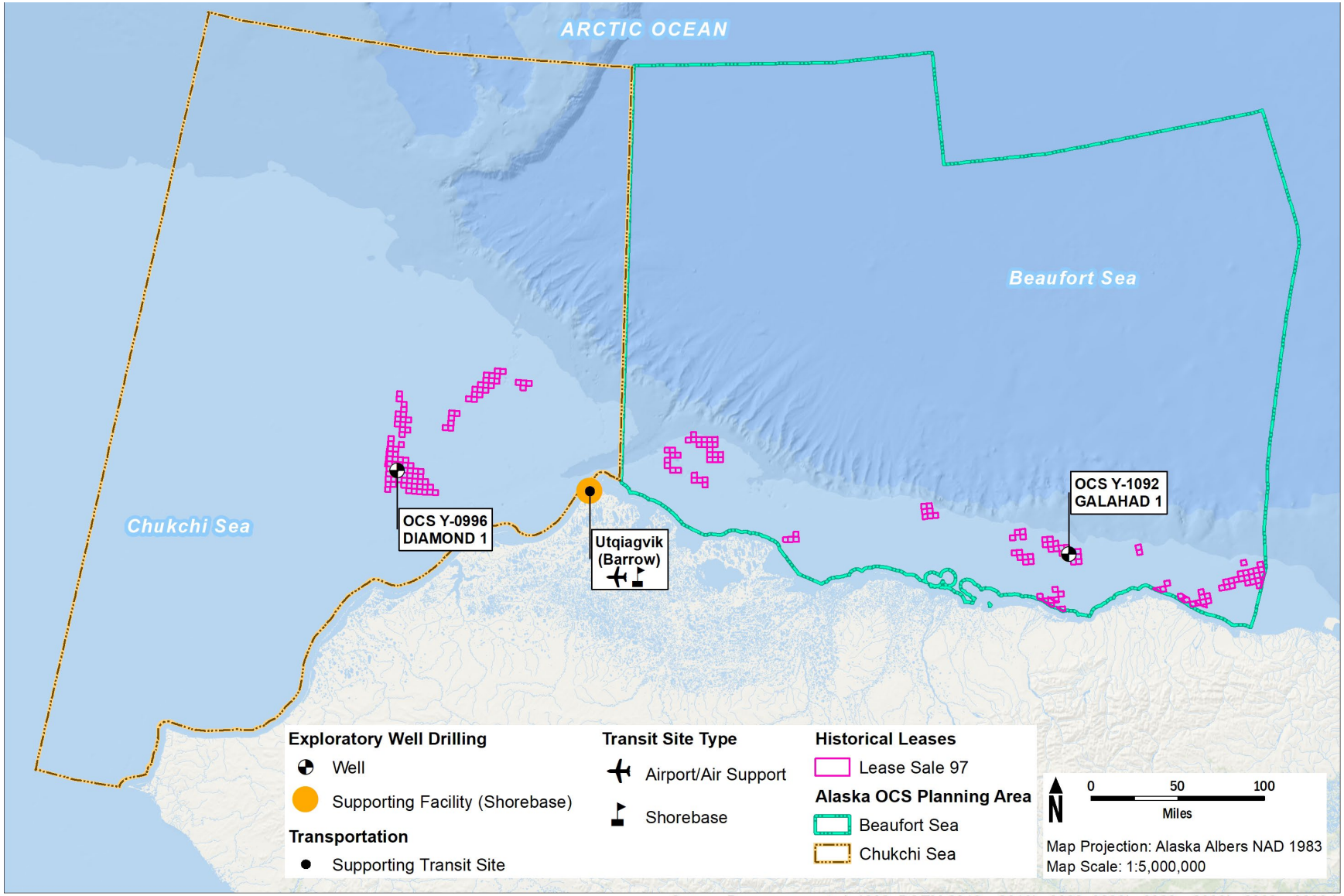
Notes: -- = no data provided; Bbbl = billion barrels; Bcf = billion cubic feet; E&D = Exploration and Development; MMbbl = million barrels; Tcf = trillion cubic feet
[1]No trip information available, but use of a Bell 214 helicopter and Aerospace Super Puma helicopter were documented to support drilling.
[2]Supplier II was documented as a support vessel, and *Kalvik*, *Ikaluk*, and *Kigoriak* were documented as ice management vessels supporting well drilling.

4.1.4 Lease Sale 97 (1988)

The identified activities associated with Lease Sale 97 are shown in Figure 4-6, such as the locations of exploration wells and transportation facilities.

4.1.4.1 Leasing

As shown in Table 4.1-1 and Figure 4-6, as a result of Lease Sale 97, there were 3,344 tracts offered and 202 leases issued. There were 18,277,806 acres offered and 1,110,764 acres leased. This lease sale is considered a Beaufort Sea Planning Area lease sale, although there were leases sold in the Chukchi Sea. There are no active leases from Lease Sale 97. Table 4.1.4-1 summarizes documented information associated with the leasing as a result of Lease Sale 97.



Source: Brueggeman et al. 1992; BOEM 2016a, 2019b, 2020, 2022b, 2022c, 2023b, 2023c, 2023d.

Figure 4-6. Historical oil and gas activities associated with Lease Sale 97, 1988

Table 4.1.4-1. Lease information as a result of Lease Sale 97

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y00958	ARCO	5/1/1988	Relinquished	4/1/1992	Hanna Shoal	958	3
Y00959	ARCO	5/1/1988	Relinquished	4/1/1992	Hanna Shoal	959	48
Y00960	Amoco	5/1/1988	Relinquished	4/1/1993	Hanna Shoal	960	92
Y00961	Texaco	5/1/1988	Relinquished	4/9/1992	Hanna Shoal	961	101
Y00962	Texaco	5/1/1988	Relinquished	4/9/1992	Hanna Shoal	962	102
Y00963	ARCO	5/1/1988	Relinquished	4/1/1992	Hanna Shoal	963	135
Y00964	Amoco	5/1/1988	Relinquished	4/1/1993	Hanna Shoal	964	136
Y00965	Texaco	5/1/1988	Relinquished	4/9/1992	Hanna Shoal	965	145
Y00966	ARCO	5/1/1988	Relinquished	4/1/1992	Hanna Shoal	966	179
Y00967	Amoco	5/1/1988	Relinquished	4/1/1993	Hanna Shoal	967	180
Y00968	Amoco	5/1/1988	Relinquished	4/1/1993	Hanna Shoal	968	181
Y00969	Texaco	5/1/1988	Relinquished	4/9/1992	Hanna Shoal	969	189
Y00970	Amoco	5/1/1988	Relinquished	4/1/1993	Hanna Shoal	970	223
Y00971	Amoco	5/1/1988	Relinquished	4/1/1993	Hanna Shoal	971	224
Y00972	Texaco	5/1/1988	Relinquished	4/9/1992	Hanna Shoal	972	232
Y00973	Texaco	5/1/1988	Relinquished	4/9/1992	Hanna Shoal	973	233
Y00974	Amoco	5/1/1988	Relinquished	4/1/1993	Hanna Shoal	974	268
Y00975	Amoco	5/1/1988	Relinquished	4/1/1993	Hanna Shoal	975	269
Y00976	Amoco	5/1/1988	Relinquished	4/1/1993	Hanna Shoal	976	312
Y00977	ARCO	5/1/1988	Relinquished	4/16/1992	Hanna Shoal	977	352
Y00978	ARCO	5/1/1988	Relinquished	4/16/1992	Hanna Shoal	978	354
Y00979	ARCO	5/1/1988	Relinquished	4/16/1992	Hanna Shoal	979	398
Y00980	Texaco	5/1/1988	Relinquished	4/17/1992	Hanna Shoal	980	400
Y00981	ARCO	5/1/1988	Relinquished	4/16/1992	Hanna Shoal	981	442
Y00982	ARCO	5/1/1988	Relinquished	4/16/1992	Hanna Shoal	982	443
Y00983	ARCO	5/1/1988	Relinquished	4/16/1992	Hanna Shoal	983	486
Y00984	ARCO	5/1/1988	Relinquished	4/16/1992	Hanna Shoal	984	487
Y00985	ARCO	5/1/1988	Relinquished	4/16/1992	Hanna Shoal	985	530
Y00986	ARCO	5/1/1988	Relinquished	4/16/1992	Hanna Shoal	986	531
Y00987	ARCO	5/1/1988	Relinquished	4/16/1992	Hanna Shoal	987	532

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y00988	Shell Western E&P Inc	5/1/1988	Relinquished	4/25/1994	Hanna Shoal	988	533
Y00989	ARCO	5/1/1988	Relinquished	4/16/1992	Hanna Shoal	989	574
Y00990	ARCO	5/1/1988	Relinquished	4/16/1992	Hanna Shoal	990	575
Y00991	ARCO	5/1/1988	Relinquished	4/16/1992	Hanna Shoal	991	576
Y00992	Shell	5/1/1988	Relinquished	4/25/1994	Hanna Shoal	992	577
Y00993	Shell	5/1/1988	Relinquished	4/25/1994	Hanna Shoal	993	578
Y00994	ARCO	5/1/1988	Relinquished	4/16/1992	Hanna Shoal	994	618
Y00995	Texaco	5/1/1988	Relinquished	4/17/1992	Hanna Shoal	995	619
Y00996	ARCO	5/1/1988	Relinquished	4/16/1992	Hanna Shoal	996	620
Y00997	ARCO	5/1/1988	Relinquished	4/16/1992	Hanna Shoal	997	621
Y00998	ARCO	5/1/1988	Relinquished	4/16/1992	Hanna Shoal	998	622
Y00999	Shell	5/1/1988	Relinquished	4/25/1994	Hanna Shoal	999	623
Y01000	Shell	5/1/1988	Relinquished	4/25/1994	Hanna Shoal	1000	624
Y01001	ARCO	5/1/1988	Relinquished	4/1/1992	Hanna Shoal	1001	662
Y01002	Texaco	5/1/1988	Relinquished	4/17/1992	Hanna Shoal	1002	663
Y01003	ARCO	5/1/1988	Relinquished	4/16/1992	Hanna Shoal	1003	664
Y01004	ARCO	5/1/1988	Relinquished	4/16/1992	Hanna Shoal	1004	665
Y01005	ARCO	5/1/1988	Relinquished	4/16/1992	Hanna Shoal	1005	666
Y01006	ARCO	5/1/1988	Relinquished	4/16/1992	Hanna Shoal	1006	667
Y01007	ARCO	5/1/1988	Relinquished	4/15/1992	Hanna Shoal	1007	668
Y01008	ARCO	5/1/1988	Relinquished	4/1/1992	Hanna Shoal	1008	706
Y01009	ARCO	5/1/1988	Relinquished	4/16/1992	Hanna Shoal	1009	707
Y01010	ARCO	5/1/1988	Relinquished	4/16/1992	Hanna Shoal	1010	708
Y01011	ARCO	5/1/1988	Relinquished	4/16/1992	Hanna Shoal	1011	709
Y01012	ARCO	5/1/1988	Relinquished	4/16/1992	Hanna Shoal	1012	710
Y01013	ARCO	5/1/1988	Relinquished	4/16/1992	Hanna Shoal	1013	711
Y01014	ARCO	5/1/1988	Relinquished	4/16/1992	Hanna Shoal	1014	712
Y01015	ARCO	5/1/1988	Relinquished	4/16/1992	Hanna Shoal	1015	713
Y01016	ARCO	5/1/1988	Relinquished	4/1/1992	Hanna Shoal	1016	750
Y01017	ARCO	5/1/1988	Relinquished	4/1/1992	Hanna Shoal	1017	751
Y01018	ARCO	5/1/1988	Relinquished	4/16/1992	Hanna Shoal	1018	753

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y01019	ARCO	5/1/1988	Relinquished	4/16/1992	Hanna Shoal	1019	754
Y01020	ARCO	5/1/1988	Relinquished	4/16/1992	Hanna Shoal	1020	755
Y01021	ARCO	5/1/1988	Relinquished	4/16/1992	Hanna Shoal	1021	756
Y01022	ARCO	5/1/1988	Relinquished	4/16/1992	Hanna Shoal	1022	757
Y01023	ARCO	5/1/1988	Relinquished	4/16/1992	Hanna Shoal	1023	758
Y01024	ARCO	5/1/1988	Relinquished	4/1/1992	Hanna Shoal	1024	794
Y01025	ARCO	5/1/1988	Relinquished	4/15/1992	Hanna Shoal	1025	798
Y01026	ARCO	5/1/1988	Relinquished	4/16/1992	Hanna Shoal	1026	799
Y01027	ARCO	5/1/1988	Relinquished	4/16/1992	Hanna Shoal	1027	800
Y01028	ARCO	5/1/1988	Relinquished	4/16/1992	Hanna Shoal	1028	801
Y01029	ARCO	5/1/1988	Relinquished	4/16/1992	Hanna Shoal	1029	802
Y01030	ARCO	5/1/1988	Relinquished	4/16/1992	Hanna Shoal	1030	803
Y01031	Shell	5/1/1988	Relinquished	4/1/1993	Dease Inlet	1031	212
Y01032	Exxon	5/1/1988	Relinquished	4/30/1992	Dease Inlet	1032	255
Y01033	Exxon	5/1/1988	Relinquished	3/27/1995	Dease Inlet	1033	256
Y01034	Amoco	5/1/1988	Relinquished	4/1/1993	Dease Inlet	1034	257
Y01035	Amoco	5/1/1988	Relinquished	4/1/1993	Dease Inlet	1035	258
Y01036	Amoco	5/1/1988	Relinquished	4/1/1993	Dease Inlet	1036	259
Y01037	Amoco	5/1/1988	Relinquished	4/1/1993	Dease Inlet	1037	260
Y01038	Exxon	5/1/1988	Relinquished	4/30/1992	Dease Inlet	1038	301
Y01039	Exxon	5/1/1988	Relinquished	3/27/1995	Dease Inlet	1039	302
Y01040	Amoco	5/1/1988	Relinquished	4/1/1993	Dease Inlet	1040	303
Y01041	Amoco	5/1/1988	Relinquished	4/1/1993	Dease Inlet	1041	304
Y01042	Amoco	5/1/1988	Relinquished	4/1/1993	Dease Inlet	1042	339
Y01043	Amoco	5/1/1988	Relinquished	4/1/1993	Dease Inlet	1043	340
Y01044	Exxon	5/1/1988	Relinquished	4/30/1992	Dease Inlet	1044	347
Y01045	Amoco	5/1/1988	Relinquished	4/1/1993	Dease Inlet	1045	384
Y01046	Amoco	5/1/1988	Relinquished	4/1/1993	Dease Inlet	1046	385
Y01047	Amoco	5/1/1988	Relinquished	4/1/1993	Dease Inlet	1047	391
Y01048	Amoco	5/1/1988	Relinquished	4/1/1993	Dease Inlet	1048	392
Y01049	Amoco	5/1/1988	Relinquished	4/1/1993	Dease Inlet	1049	393
Y01050	Exxon	5/1/1988	Relinquished	4/20/1994	Dease Inlet	1050	427
Y01051	Amoco	5/1/1988	Relinquished	4/1/1993	Dease Inlet	1051	435

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y01052	Amoco	5/1/1988	Relinquished	4/1/1993	Dease Inlet	1052	436
Y01053	Amoco	5/1/1988	Relinquished	4/1/1993	Dease Inlet	1053	437
Y01054	Exxon	5/1/1988	Relinquished	4/20/1994	Dease Inlet	1054	471
Y01055	Exxon	5/1/1988	Relinquished	3/27/1995	Dease Inlet	1055	516
Y01056	ARCO	5/1/1988	Relinquished	4/28/1994	Dease Inlet	1056	517
Y01057	ARCO	5/1/1988	Relinquished	4/28/1994	Dease Inlet	1057	564
Y01058	ARCO	5/1/1988	Relinquished	4/28/1994	Dease Inlet	1058	608
Y01059	Shell	5/1/1988	Relinquished	4/28/1992	Dease Inlet	1059	609
Y01060	Shell	5/1/1988	Relinquished	4/28/1992	Dease Inlet	1060	610
Y01061	Shell	5/1/1988	Relinquished	4/28/1992	Dease Inlet	1061	654
Y01062	Amerada	5/1/1988	Relinquished	3/27/1996	Harrison Bay	1062	55
Y01063	Amerada	5/1/1988	Relinquished	3/27/1996	Harrison Bay	1063	97
Y01064	Amerada	5/1/1988	Relinquished	3/27/1996	Harrison Bay	1064	98
Y01065	Amerada	5/1/1988	Relinquished	3/27/1996	Harrison Bay	1065	99
Y01066	Amoco	5/1/1988	Relinquished	4/1/1993	Beechey Point North	1066	914
Y01067	Amoco	5/1/1988	Relinquished	4/1/1993	Beechey Point North	1067	915
Y01068	Amoco	5/1/1988	Relinquished	4/1/1993	Beechey Point North	1068	958
Y01069	Amoco	5/1/1988	Relinquished	4/1/1993	Beechey Point North	1069	959
Y01070	Amoco	5/1/1988	Relinquished	4/1/1993	Beechey Point North	1070	1002
Y01071	Amoco	5/1/1988	Relinquished	4/1/1993	Beechey Point North	1071	1003
Y01072	Amoco	5/1/1988	Relinquished	4/1/1993	Beechey Point North	1072	1004
Y01073	Amoco	5/1/1988	Relinquished	4/29/1992	Flaxman Island	1073	183
Y01074	Amoco	5/1/1988	Relinquished	4/29/1992	Flaxman Island	1074	184
Y01075	Amoco	5/1/1988	Relinquished	4/1/1993	Flaxman Island	1075	226
Y01076	Amoco	5/1/1988	Relinquished	4/29/1992	Flaxman Island	1076	228
Y01077	Amoco	5/1/1988	Relinquished	4/29/1992	Flaxman Island	1077	276
Y01078	Amoco	5/1/1988	Relinquished	4/29/1992	Flaxman Island	1078	277
Y01079	Amoco	5/1/1988	Relinquished	4/29/1992	Flaxman Island	1079	320
Y01080	Amoco	5/1/1988	Relinquished	4/29/1992	Flaxman Island	1080	321
Y01081	Amoco	5/1/1988	Relinquished	4/29/1992	Flaxman Island	1081	322
Y01082	Amoco	5/1/1988	Relinquished	4/29/1992	Flaxman Island	1082	358
Y01083	Amoco	5/1/1988	Relinquished	4/29/1992	Flaxman Island	1083	359
Y01084	Amoco	5/1/1988	Relinquished	4/29/1992	Flaxman Island	1084	365

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y01085	Shell	5/1/1988	Relinquished	4/5/1993	Flaxman Island	1085	366
Y01086	Amoco	5/1/1988	Relinquished	4/5/1993	Flaxman Island	1086	367
Y01087	Union	5/1/1988	Relinquished	4/5/1993	Flaxman Island	1087	368
Y01088	Amoco	5/1/1988	Relinquished	4/29/1992	Flaxman Island	1088	403
Y01089	Conoco	5/1/1988	Relinquished	4/20/1994	Flaxman Island	1089	404
Y01090	Conoco	5/1/1988	Relinquished	4/20/1994	Flaxman Island	1090	405
Y01091	Shell	5/1/1988	Relinquished	12/20/1993	Flaxman Island	1091	411
Y01092	Union	5/1/1988	Relinquished	12/20/1993	Flaxman Island	1092	412
Y01093	Amoco	5/1/1988	Relinquished	12/20/1993	Flaxman Island	1093	413
Y01094	Amoco	5/1/1988	Relinquished	4/5/1993	Flaxman Island	1094	414
Y01095	Conoco	5/1/1988	Relinquished	4/20/1994	Flaxman Island	1095	448
Y01096	Conoco	5/1/1988	Relinquished	4/20/1994	Flaxman Island	1096	449
Y01097	Union	5/1/1988	Relinquished	12/20/1993	Flaxman Island	1097	456
Y01098	Shell	5/1/1988	Relinquished	12/20/1993	Flaxman Island	1098	457
Y01099	Amoco	5/1/1988	Relinquished	4/5/1993	Flaxman Island	1099	458
Y01100	Shell	5/1/1988	Relinquished	4/5/1993	Flaxman Island	1100	501
Y01101	Union	5/1/1988	Relinquished	4/5/1993	Flaxman Island	1101	502
Y01102	Phillips	5/1/1988	Relinquished	12/30/1998	Flaxman Island	1102	717
Y01103	Phillips	5/1/1988	Relinquished	4/30/1998	Flaxman Island	1103	7580
Y01104	Phillips	5/1/1988	Relinquished	4/30/1998	Flaxman Island	1104	7600
Y01105	Phillips	5/1/1988	Relinquished	12/30/1998	Flaxman Island	1105	762
Y01106	Phillips	5/1/1988	Relinquished	4/30/1998	Flaxman Island	1106	8020
Y01107	Phillips	5/1/1988	Relinquished	4/30/1998	Flaxman Island	1107	8030
Y01108	Phillips	5/1/1988	Relinquished	4/30/1998	Flaxman Island	1108	804
Y01109	Phillips	5/1/1988	Relinquished	4/30/1998	Flaxman Island	1109	8050
Y01110	Phillips	5/1/1988	Relinquished	7/26/1994	Flaxman Island	1110	805
Y01111	Phillips	5/1/1988	Relinquished	4/30/1998	Flaxman Island	1111	8470
Y01112	Phillips	5/1/1988	Relinquished	4/30/1998	Flaxman Island	1112	8930
Y01113	Texaco	5/1/1988	Relinquished	4/9/1992	Barter Island	1113	447
Y01114	Texaco	5/1/1988	Relinquished	4/9/1992	Barter Island	1114	491
Y01115	ARCO	5/1/1988	Relinquished	3/26/1992	Barter Island	1115	803
Y01116	ARCO	5/1/1988	Relinquished	3/26/1992	Barter Island	1116	8440
Y01117	ARCO	5/1/1988	Relinquished	3/26/1992	Barter Island	1117	8460

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y01118	Conoco	5/1/1988	Relinquished	12/20/1991	Barter Island	1118	902
Y01119	Shell	5/1/1988	Relinquished	4/28/1992	Barter Island	1119	903
Y01120	Shell	5/1/1988	Relinquished	4/28/1992	Barter Island	1120	904
Y01121	Texaco	5/1/1988	Relinquished	3/3/1995	Barter Island	1121	9370
Y01122	Conoco	5/1/1988	Relinquished	4/16/1997	Barter Island	1122	9386
Y01123	Texaco	5/1/1988	Relinquished	4/25/1994	Barter Island	1123	941
Y01124	Conoco	5/1/1988	Relinquished	12/20/1991	Barter Island	1124	945
Y01125	Conoco	5/1/1988	Relinquished	12/20/1991	Barter Island	1125	946
Y01126	Shell	5/1/1988	Relinquished	4/28/1992	Barter Island	1126	947
Y01127	Texaco	5/1/1988	Relinquished	3/3/1995	Barter Island	1127	9810
Y01128	Conoco	5/1/1988	Relinquished	4/16/1997	Barter Island	1128	9820
Y01129	Texaco	5/1/1988	Relinquished	4/25/1994	Barter Island	1129	985
Y01130	Texaco	5/1/1988	Unexecuted	4/25/1994	Barter Island	1130	986
Y01147	Shell	5/1/1988	Relinquished	4/28/1992	Demarcation Point	1147	160
Y01148	Shell	5/1/1988	Relinquished	4/28/1992	Demarcation Point	1148	16
Y01149	Shell	5/1/1988	Relinquished	4/28/1992	Demarcation Point	1149	170
Y01150	Shell	5/1/1988	Relinquished	4/28/1992	Demarcation Point	1150	18
Y01151	Texaco	5/1/1988	Relinquished	4/25/1994	Demarcation Point	1151	19
Y01152	ARCO	5/1/1988	Relinquished	10/28/1992	Demarcation Point	1152	61
Y01153	Mobil	5/1/1988	Relinquished	4/6/1994	(Unnamed)	1153	724
Y01154	Mobil	5/1/1988	Relinquished	4/6/1994	(Unnamed)	1154	725
Y01155	Amoco	5/1/1988	Relinquished	4/6/1994	(Unnamed)	1155	766
Y01156	Amoco	5/1/1988	Relinquished	4/6/1994	(Unnamed)	1156	767
Y01157	Mobil	5/1/1988	Relinquished	4/6/1994	(Unnamed)	1157	768
Y01158	Amoco	5/1/1988	Relinquished	4/6/1994	(Unnamed)	1158	810
Y01159	Amoco	5/1/1988	Relinquished	4/6/1994	(Unnamed)	1159	811
Y01160	Mobil	5/1/1988	Relinquished	4/6/1994	(Unnamed)	1160	812
Y01161	Mobil	5/1/1988	Relinquished	4/6/1994	(Unnamed)	1161	853
Y01162	Mobil	5/1/1988	Relinquished	4/6/1994	(Unnamed)	1162	854
Y01163	Amoco	5/1/1988	Relinquished	4/6/1994	(Unnamed)	1163	855
Y01164	ARCO	5/1/1988	Relinquished	4/27/1992	(Unnamed)	1164	896
Y01165	Amoco	5/1/1988	Relinquished	4/6/1994	(Unnamed)	1165	897
Y01166	Amoco	5/1/1988	Relinquished	4/6/1994	(Unnamed)	1166	898

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y01167	Amoco	5/1/1988	Relinquished	4/6/1994	(Unnamed)	1167	940
Y01168	Amoco	5/1/1988	Relinquished	4/6/1994	(Unnamed)	1168	941
Y01169	ARCO	5/1/1988	Relinquished	4/1/1992	(Unnamed)	1169	970
Y01170	Amoco	5/1/1988	Relinquished	4/6/1994	(Unnamed)	1170	983
Y01171	Amoco	5/1/1988	Relinquished	4/6/1994	(Unnamed)	1171	984
Y01172	Texaco	5/1/1988	Relinquished	4/9/1992	(Unnamed)	1172	794
Y01173	Texaco	5/1/1988	Relinquished	4/9/1992	(Unnamed)	1173	795
Y01174	Texaco	5/1/1988	Relinquished	4/9/1992	(Unnamed)	1174	796
Y01175	Texaco	5/1/1988	Relinquished	4/9/1992	(Unnamed)	1175	839
Y01131	Union	None	Unexecuted	None	Mackenzie Canyon North	1131	750
Y01132	Shell Western E&P Inc	None	Unexecuted	None	Mackenzie Canyon North	1132	797
Y01133	Shell	None	Unexecuted	None	Mackenzie Canyon North	1133	837
Y01134	Shell	None	Unexecuted	None	Mackenzie Canyon North	1134	838
Y01135	Shell	None	Unexecuted	None	Mackenzie Canyon North	1135	839
Y01136	Shell	None	Unexecuted	None	Mackenzie Canyon North	1136	840
Y01137	Shell	None	Unexecuted	None	Mackenzie Canyon North	1137	841
Y01138	Shell	None	Unexecuted	None	Mackenzie Canyon North	1138	881
Y01139	Shell	None	Unexecuted	None	Mackenzie Canyon North	1139	883
Y01140	Shell	None	Unexecuted	None	Mackenzie Canyon North	1140	884
Y01141	Shell	None	Unexecuted	None	Mackenzie Canyon North	1141	885
Y01142	Shell	None	Unexecuted	None	Mackenzie Canyon North	1142	926
Y01143	Shell	None	Unexecuted	None	Mackenzie Canyon North	1143	927
Y01144	Shell	None	Unexecuted	None	Mackenzie Canyon North	1144	928
Y01145	Shell	None	Unexecuted	None	Mackenzie Canyon North	1145	929
Y01146	Shell	None	Unexecuted	None	Mackenzie Canyon North	1146	972

Note: ARCO = Atlantic Richfield Company
Source: BOEM 2023b

4.1.4.2 Surveys

No surveys were documented as a result of Lease Sale 97.

4.1.4.3 Well Drilling

Two exploration wells were drilled as a result of Lease Sale 97, as summarized in Table 4.1.4-2.

Table 4.1.4-2. Well drilling summary

Activity Start Date	Activity End Date	Well Name (includes API no. and bottom hole lease number)	Well Type	Well Depth (feet)	Drill Rig Name
9/11/1991	10/5/1991	API no. 553220000100 (DIAMOND 1) on OCS Y-0996	Exploration	6,742	Canmar Explorer III
9/15/1991	10/13/1991	API no. 551710000700 (GALAHAD 1) on OCS Y-1092	Exploration	9,238	Canmar Explorer II

Notes: API = American Petroleum Institute; OCS = Outer Continental Shelf
Sources: BOEM 2016a, 2020, 2022b, 2023c, 2023d

4.1.4.4 Oil-and-Gas-Supporting Activities

Identified oil-and-gas-supporting activities as a result of Lease Sale 97 included facility support and transportation from facilities and shorebases to relevant activity sites (if documented), as summarized in Table 4.1.4-3 and Table 4.1.4-4.

Table 4.1.4-3. Facility support summary

Facility Name	Facility Type	Description	Supported Activity
Barrow shorebase	Onshore shorebase complex	Helicopters transited between the vessels and Barrow (the base of operations). Activity also occurred in the Chukchi Sea Planning Area.	Drilling well OCS Y-0996 DIAMOND 1

Source: Brueggeman et al. 1992

Table 4.1.4-4. Summary of transportation activity

Facility Name	Facility Type	Supported Activity	No. Aircraft	No. Vessels	Vessel Names	No. Vehicles
Barrow shorebase	Onshore shorebase complex helipad	Air support for drilling well OCS Y-0996 DIAMOND 1. Activity also occurred in the Chukchi Sea Planning Area.	2	N/A	N/A	N/A
Cracker Jack 1 drillsite	Drillsite	Marine support transited from the Crackerjack Prospect (Cracker Jack 1 drillsite) to the Diamond Prospect for drilling well OCS Y-0996 DIAMOND 1. Activity also occurred in the Chukchi Sea Planning Area.	N/A	4	Robert LeMeur, Supplier III, Supplier IV, Kigoriak	N/A

Source: Brueggeman et al. 1992

4.1.4.5 E&D Scenario Summary

A scenario was developed for the Alaska OCS Beaufort Sea 97 Final Environmental Impact Statement (MMS 1987a) to assess the potential environmental impacts of the lease sale. The sale consisted of a total of 3,516 blocks, 19.37 million acres of the Beaufort Sea Planning Area. The blocks were located in waters ranging from 5 to 26 kilometers offshore and from 2 to 1,000 meters deep. The mean resource estimate used was 650 MMbbl of oil. Activities associated with the E&D scenario (MMS 1987a) are summarized in Table 4.1.4-5.

Under the scenario, exploratory drilling was estimated to begin in 1989. The first delineation wells were expected to be drilled in 1990 or during the second drilling season. Approximately 11 exploration and 4 delineation wells would be drilled by 1994 (MMS 1987a).

It was assumed that during exploration, the types of units that may be used would depend on water depth, sea ice conditions, ice resistant capabilities, and the availability of drilling units.

It was assumed one artificial island would be constructed during the open-water period and two additional islands would be constructed during the winter of the previous-lease-sale areas. The three islands would be constructed in waters about 15 meters deep, likely east of Cape Halkett (MMS 1987a).

Approximately 970 tons of dry solids would be used in the drilling muds for each exploration and delineation well drilled in the Sale 97 area and the previously leased areas. Each Sale 97 well was expected to produce approximately 1,550 tons of drill cuttings and each previous-lease-sale well 1,800 tons (MMS 1987a).

Under the scenario, offshore exploration drilling operations in the Sale 97 area would require onshore support facilities. Where possible, existing facilities would be used or upgraded. The onshore facilities would have to provide: (1) a staging area for construction equipment, drilling equipment, and supplies; (2) a transfer point for drilling and construction personnel; (3) a harbor to serve as a base for vessels required to support offshore operations; and (4) an airfield for fixed-wing aircraft and helicopters. Existing systems would be utilized to transport equipment, material, supplies, and personnel (MMS 1987a).

The annual number of helicopter trips flown in support of exploration and delineation well drilling in the Sale 97 area was estimated to range from about 90 in the years when only one well was expected to be drilled to 270 in the years from 1990 through 1993, when three wells could be drilled in each year. These estimates were based on the assumptions that, for each well, there would be one flight for each day of drilling and the time required to drill and test a well was about 90 days. From 1989 to 1994, the total number of helicopter flights supporting drilling operations was estimated to be 1,350 (MMS 1987a).

The initial discovery of previous-sale oil was projected to occur in the second or third year of the lease. The first delineation well was projected to be drilled in 1990, and the first oil discovery in the Sale 97 leased blocks was projected to occur in 1990 (MMS 1987a).

It was assumed that installation of the production platforms in previous-lease-sale tracts would begin in 1993. Construction of a production platform was estimated to begin about 2 or 3 years before installation; fabrication of these platforms would take place outside Alaska. Drilling of the production and service wells was expected to take place from 1992 through 1993. Production of oil from previous-lease-sale tracts was estimated to begin in 1993, peak from 1994 through 1999, and continue through 2011 (MMS 1987a).

Oil would be produced from two platforms installed in 1998. It was estimated that a total of 39 wells would be drilled from the two platforms. Production was estimated to begin in 2000 and peak from 2001 through 2006 and continue through 2018 (MMS 1987a).

Under the scenario, drilling of the production and service wells in both the Sale 97 area and the previous-lease-sale areas would result in a net average disposal of 77 tons of drilling mud for each well. Each well in the Sale 97 area was expected to produce approximately 1,650 tons (dry weight) of drill cuttings and, for the previous-sale areas, 1,850 tons. The amount of time required to drill and complete each production or service well was estimated to average 45 days (MMS 1987a).

For the Sale 97 development and production scenarios, one of the production platforms was assumed to be located about 40 kilometers north of Oliktok Point and the other in the Chukchi Sea about 120 kilometers north of Point Belcher. One of the production platforms in the previously leased sale areas was assumed to be located about 130 kilometers north and east of Bullen Point. The Sale 97 leased tracts in the eastern Beaufort Sea lie between 25 and 235 kilometers north and east of Bullen Point; the mid-distance for this range is about 130 kilometers. The second platform used to produce oil from tracts leased in previous sales was assumed to be located about 70 kilometers west of Cape Halkett (MMS 1987a).

The number of helicopter flights in support of the drilling of production and service wells in the Sale 97 area was estimated to be 540 during 1998 and 1,215 in 1999. These estimates were based on the assumptions that there would be one flight for each day of drilling and that the time required to drill and complete a production and service well was about 45 days. In 1998, 12 wells were estimated to be drilled; in 1999, 27 wells. There would be an estimated 270 flights in the previously leased areas in 1992 and 1,350 in 1993.

Pipelines would be used to transfer the oil from the production platforms to TAPS Pump Stations 1 or 3. The amount of pipeline required was estimated to be about 320 kilometers for the Sale 97 area and 400 kilometers for previous-sale areas. It was assumed that one-half of the pipeline in both the previous-sale areas and the Sale 97 area would lie offshore and the other half onshore. Installation of the pipelines for the Sale 97 leases was expected to begin in 1998 and continue through 1999. Pipelines for previously leased tracts would be installed from 1990 through 1992 (MMS 1987a).

For Sale 97, the pipeline from the platform north of Oliktok Point would be about 40 kilometers long and cross the shore at or near Oliktok Point. The onshore segment of the pipeline would be about 20 kilometers long and connect to the Kuparuk Pipeline; the pipeline could also run parallel to the Kuparuk Pipeline to TAPS Pump Station 1 (MMS 1987a).

The second Sale 97 pipeline was estimated to be in the Chukchi Sea and originate from a platform located about 120 kilometers north of Point Belcher. The pipeline would trend southeast and connect with a pipeline across the southern part of the National Petroleum Reserve-Alaska; the pipeline would connect with TAPS at Pump Station 3. The length of the onshore segment of the Chukchi Pipeline was estimated to be 140 kilometers (MMS 1987a).

Table 4.1.4-5. Summary of basic assumptions of Lease Sale 97 E&D scenario

Element	Mean Case
Sale acreage offering	19.37 million acres
Recoverable oil	650 MMbbl
Peak production oil	55 MMbbl per year
Exploration	Exploration

Element	Mean Case
Number of wells – exploration	1
Exploration wells drilled from artificial islands	1
Exploration wells drilled from bottom-founded mobile	14
Helicopter flights – exploration	1,350 trips
Total drilling muds – exploration	14,500 tons
Total cuttings – exploration	23,250 tons
Development and Production	Development and Production
Number of wells – production and service	39
Helicopter flights – during development	1,755 trips
Total drilling muds – development	3,003 tons
Total cuttings – development	62,400 tons
Transportation	Transportation
Onshore pipeline miles	99
Offshore pipeline miles	99
Road length miles	99
Support facilities	4

Notes: E&D = Exploration and Development; MMbbl = million barrels
Source: MMS 1987a

4.1.4.6 Comparison of E&D Scenario and Historical Activities

A comparison of the E&D scenario and the historical activities are provided in Table 4.1.4-6, using available information.

Table 4.1.4-6. Comparison of E&D and historical activities

Activity	E&D Scenario	Actual Activities
Recoverable oil (maximum)	650 MMbbl	--
Sale acreage offering	19.37 million acres	18,277,806 acres offered
Sale	--	1,110,764 acres leased
Date of exploratory activities (begin)	1989	1991
Number of wells – exploration	11	2
Number of wells – delineation	4	0
Number of wells – production and service	39	0
Average well depth	--	7,790 feet
Number of surveys	--	0
Artificial islands for exploration (total)	3 (Cape Halkett)	0

Activity	E&D Scenario	Actual Activities
Exploration wells drilled from artificial islands	1	0
Exploration wells drilled from bottom-founded mobile	14	0
Support facility and shorebase locations	4	1 (Barrow)
Helicopter flights – exploration	1,350 trips	--
Helicopter flights – during development	1,755 trips	0
Total drilling muds – exploration	14,500 tons	--
Total drilling muds – development	3,003 tons	--
Total cuttings – exploration	23,250 tons	--
Total cuttings – development	62,400 tons	--
Onshore pipeline miles	99	0
Offshore pipeline miles	99	0
Road length miles	99	0
Production treatment facilities	0	0

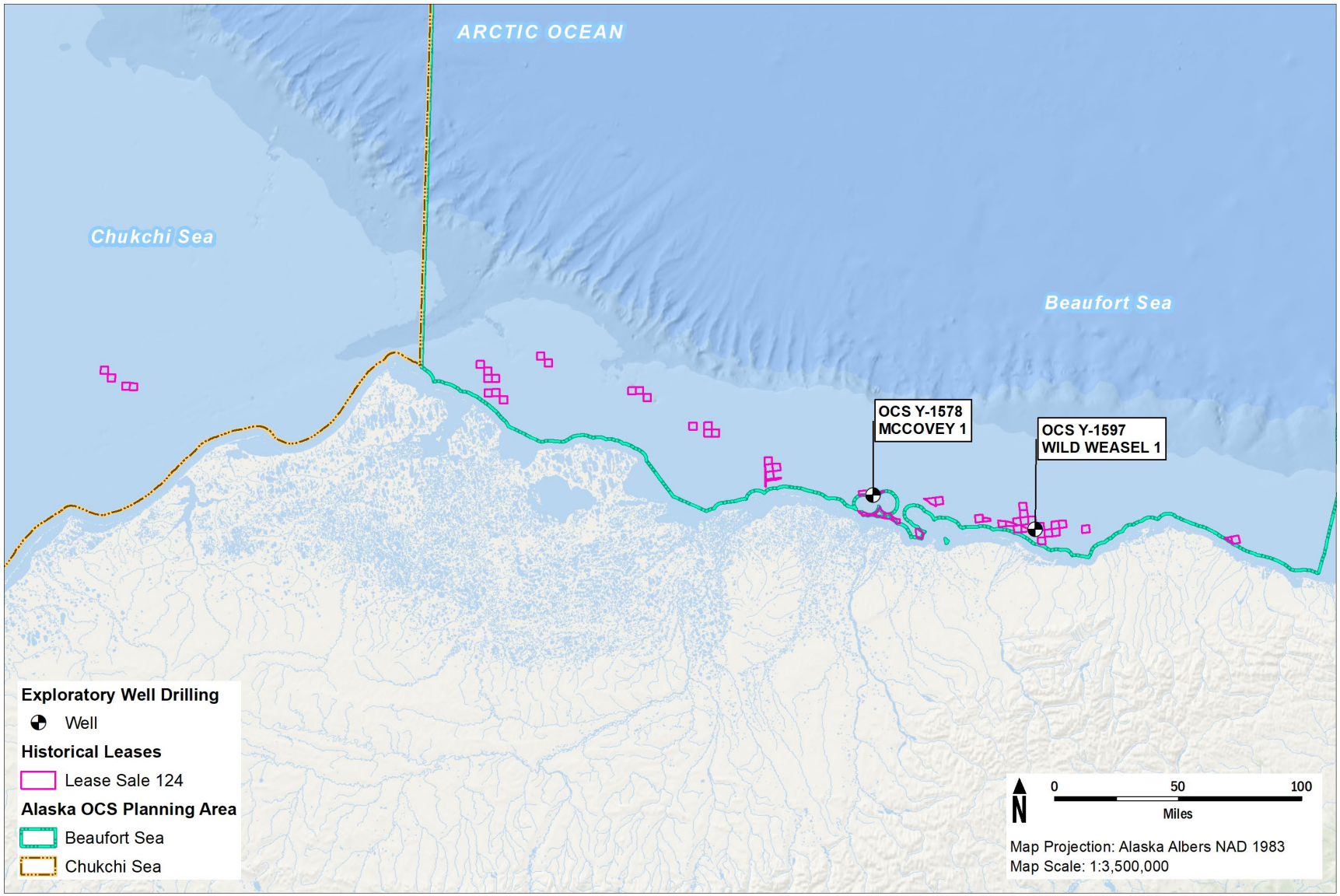
Notes: -- = no data provided; E&D = Exploration and Development; MMbbl = million barrels

4.1.5 Lease Sale 124 (1991)

The identified activities associated with Lease Sale 124 are shown in Figure 4-7, such as the locations of exploration wells.

4.1.5.1 Leasing

As shown in Table 4.1-1 and Figure 4-7, as a result of Lease Sale 124, there were 3,417 tracts offered and 57 leases issued. There were 18,556,976 acres offered and 277,004 acres leased. There is one active lease from Lease Sale 124 with an active lease area of 2,234.79 hectares. This lease sale is considered a Beaufort Sea Planning Area lease sale, although there were leases sold in the Chukchi Sea. Table 4.1.5-1 summarizes documented information associated with the leasing as a result of Lease Sale 124.



Source: BOEM 2019b, 2020, 2022b, 2022c, 2023b, 2023c, 2023d; Hall et al. 1994.

Figure 4-7. Historical oil and gas activities associated with Lease Sale 124, 1991

Table 4.1.5-1. Lease information as a result of Lease Sale 124

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y01550	Chevron	8/1/1991	Relinquished	3/24/1992	Hanna Shoal	1550	752
Y01551	Chevron	8/1/1991	Relinquished	3/24/1992	Hanna Shoal	1551	797
Y01552	Chevron	8/1/1991	Relinquished	4/2/1992	Hanna Shoal	1552	843
Y01553	Chevron	8/1/1991	Relinquished	4/2/1992	Hanna Shoal	1553	844
Y01554	Chevron	8/1/1991	Relinquished	7/14/1992	Dease Inlet	1554	566
Y01555	ARCO	8/1/1991	Relinquished	6/21/1994	Dease Inlet	1555	602
Y01556	Chevron	8/1/1991	Relinquished	7/14/1992	Dease Inlet	1556	611
Y01557	ARCO	8/1/1991	Relinquished	6/21/1994	Dease Inlet	1557	647
Y01558	ARCO	8/1/1991	Relinquished	6/21/1994	Dease Inlet	1558	691
Y01559	ARCO	8/1/1991	Relinquished	6/21/1994	Dease Inlet	1559	692
Y01560	ARCO	8/1/1991	Relinquished	7/26/1993	Dease Inlet	1560	779
Y01561	Texaco	8/1/1991	Relinquished	7/20/1992	Dease Inlet	1561	780
Y01562	Texaco	8/1/1991	Relinquished	7/20/1992	Dease Inlet	1562	825
Y01563	ARCO	8/1/1991	Relinquished	4/28/1994	Harrison Bay North	1563	754
Y01564	ARCO	8/1/1991	Relinquished	4/28/1994	Harrison Bay North	1564	755
Y01565	ARCO	8/1/1991	Relinquished	4/28/1994	Harrison Bay North	1565	800
Y01566	Philips	8/1/1991	Relinquished	7/25/1994	Harrison Bay North	1566	982
Y01567	Philips	8/1/1991	Relinquished	7/25/1994	Harrison Bay North	1567	984
Y01568	Philips	8/1/1991	Relinquished	7/25/1994	Harrison Bay	1568	16
Y01569	Philips	8/1/1991	Relinquished	7/25/1994	Harrison Bay	1569	17
Y01570	Petrofina	8/1/1991	Relinquished	7/18/2000	Harrison Bay	1570	288
Y01571	ARCO	8/1/1991	Relinquished	9/16/1994	Beechey Point	1571	198
Y01572	Petrofina	8/1/1991	Relinquished	7/18/2000	Beechey Point	1572	241
Y01573	ARCO	8/1/1991	Relinquished	9/16/1994	Beechey Point	1573	243
Y01574	Petrofina	8/1/1991	Relinquished	7/18/2000	Beechey Point	1574	286
Y01575	Petrofina	8/1/1991	Relinquished	7/18/2000	Beechey Point	1575	330
Y01576	Chevron	8/1/1991	Relinquished	7/28/2003	Beechey Point	1576	474G
Y01577	Chevron	8/1/1991	Relinquished	7/28/2003	Beechey Point	1577	475GC
Y01578	Chevron	8/1/1991	Relinquished	7/28/2003	Beechey Point	1578	475DB
Y01579	Petrofina	8/1/1991	Relinquished	7/31/2001	Beechey Point	1579	561DS
Y01580	Philips	8/1/1991	Relinquished	7/31/2001	Beechey Point	1580	564D

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y01581	ARCO	8/1/1991	Relinquished	7/31/2001	Beechey Point	1581	570
Y01582	ARCO	8/1/1991	Relinquished	7/31/2001	Beechey Point	1582	572
Y01583	Philips	8/1/1991	Relinquished	7/31/2001	Beechey Point	1583	609D
Y01584	Philips	8/1/1991	Relinquished	7/31/2001	Beechey Point	1584	610D
Y01585	Hilcorp	8/1/1991	Extended	None	Beechey Point	1585	745D
Y01586	Chevron	8/1/1991	Relinquished	12/30/1998	Flaxman Island	1586	627
Y01587	Petrofina	8/1/1991	Relinquished	12/29/2000	Flaxman Island	1587	666G
Y01588	Chevron	8/1/1991	Relinquished	12/30/1998	Flaxman Island	1588	671
Y01589	Petrofina	8/1/1991	Relinquished	12/29/2000	Flaxman Island	1589	710G
Y01590	ARCO	8/1/1991	Relinquished	7/26/1994	Flaxman Island	1590	712G
Y01591	ARCO	8/1/1991	Relinquished	7/26/1994	Flaxman Island	1591	713G
Y01592	ARCO	8/1/1991	Relinquished	7/26/1994	Flaxman Island	1592	714
Y01593	ARCO	8/1/1991	Relinquished	12/30/1998	Flaxman Island	1593	715
Y01594	ARCO	8/1/1991	Relinquished	12/30/1998	Flaxman Island	1594	716
Y01595	ARCO	8/1/1991	Relinquished	7/26/1994	Flaxman Island	1595	758
Y01596	ARCO	8/1/1991	Relinquished	7/31/2001	Flaxman Island	1596	759G
Y01597	ARCO	8/1/1991	Relinquished	7/26/1994	Flaxman Island	1597	760
Y01598	ARCO	8/1/1991	Relinquished	7/26/1994	Flaxman Island	1598	761
Y01599	ARCO	8/1/1991	Relinquished	7/26/1994	Flaxman Island	1599	763
Y01600	ARCO	8/1/1991	Relinquished	7/26/1994	Flaxman Island	1600	764
Y01601	ARCO	8/1/1991	Relinquished	7/26/1994	Flaxman Island	1601	806
Y01602	ARCO	8/1/1991	Relinquished	7/26/1994	Flaxman Island	1602	807
Y01603	Philips	8/1/1991	Relinquished	7/25/1994	Flaxman Island	1603	811
Y01604	Philips	8/1/1991	Relinquished	7/31/2001	Flaxman Island	1604	849G
Y01605	ARCO	8/1/1991	Relinquished	7/24/1996	Demarcation Point	1605	15G
Y01606	ARCO	8/1/1991	Relinquished	7/24/1996	Demarcation Point	1606	60G

Note: ARCO = Atlantic Richfield Company
Source: BOEM 2023b

4.1.5.2 Surveys

As of October 25, 2023, no surveys have been documented as a result of Lease Sale 124. This may change in the future as there is one active lease.

4.1.5.3 Well Drilling

Two exploration wells were drilled as a result of Lease Sale 124, as summarized in Table 4.1.5-2.

Table 4.1.5-2. Well drilling summary

Activity Start Date	Activity End Date	Well Name (includes API no. and bottom hole lease number)	Well Type	Well Depth (feet)	Drill Rig Name
10/13/1993	11/9/1993	API no. 55171000110000 (WILD WEASEL 1) on OCS Y-1597	Exploration	9,310	Canmar Kulluk
12/6/2002	2/8/2003	API no. 552010001000 (MCCOVEY 1) on OCS Y-1578	Exploration	12,121	SSDC/MAT

Notes: API = American Petroleum Institute; OCS = Outer Continental Shelf; SSDC = single steel drilling caisson
Sources: BOEM 2019b, 2020, 2022b, 2023c, 2023d

4.1.5.4 Oil-and-Gas-Supporting Activities

There were no oil-and-gas-supporting activities identified as a result of Lease Sale 124.

4.1.5.5 E&D Scenario Summary

A scenario was developed for the Alaska OCS Beaufort Sea Oil and Gas Lease Sale 124 Final Environmental Impact Statement (MMS 1990) to assess the potential environmental impacts of the lease sale. The sale consisted of a total of 4,095 blocks, 22.1 million acres of the Beaufort Sea Planning Area. The blocks were located in waters ranging from 5 to 260 kilometers offshore and from 2 to 1,000 meters deep. The mean resource estimate used was 900 MMbbl of oil. Activities associated with the E&D scenario (MMS 1990) are summarized in Table 4.1.5-3.

Under the scenario, exploratory drilling was estimated to begin in 1992 and continue through 1996. The first delineation well was expected to be drilled in 1993, during the second year of drilling. Production-platform installation and pipeline laying were estimated to begin in 1997, with production estimated to begin in 2000 and continue through 2018 (MMS 1990).

Under the mean case, 10 exploration and 4 delineation wells were estimated to be drilled. The drilling would begin in 1992 and could be completed by 1996. It was estimated it would take an average of 90 days to drill and test each exploration or delineation well (MMS 1990).

It was assumed that a total of 16 artificial islands would be constructed in the Alaskan Beaufort Sea; 12 in State of Alaska waters and 4 in federal waters. Three ice islands would be used to drill one well in State waters and two in federal waters (MMS 1990).

Based on the water depths of Sale 124 blocks, it was anticipated that 11 of the exploration wells would be drilled from ice strengthened floating vessels, 2 wells would be drilled from bottom-founded mobile units, and 1 well would be drilled from a human-made island (MMS 1990).

Under the scenario, drilling of each exploration well would require the disposal of about 630 tons of drilling mud and approximately 820 tons of drilling cuttings. The total amount estimated to be disposed was about 8,820 tons of drilling muds and 11,480 tons of cuttings (MMS 1990).

It was assumed that offshore exploration drilling operations would require onshore support facilities, as barges transported most heavy and bulky cargo associated with petroleum activities in the North Slope Borough (MMS 1990).

Under the scenario, personnel and routine supplies and materials were expected to be transported to the drilling units from the support base by helicopters. There would be an estimated 1,260 trips during exploration and delineation well drilling from 1992 to 1996. There would be two to four required support vessels for each drilling unit. During the open-water season, it was estimated that there would be one supply boat trip per drilling unit per week. For exploration drilling, it was estimated that there would be between 140 and 170 supply boat trips in total, based on the assumption that it would take 90 days to drill a well (MMS 1990).

It was assumed that work on offshore and onshore production and transportation facilities would not begin until the engineering and economic assessments of the potential reservoirs were completed and the conditions of all the permits had been evaluated. The initial discovery of previous-sale oil was projected to occur in the second or third year of the lease. The first delineation well and oil discovery was projected to occur in 1993 (MMS 1990).

It was estimated that production platforms would be installed on the seafloor between 1997 and 1999. The platforms would be bottom-founded concrete structures to withstand extreme ice conditions. The platforms would be designed so that installation could be accomplished within 45 days (MMS 1990).

It was estimated that a total of 120 production and service wells would be drilled from the four platforms installed from 1997 through 2000. Production of oil was forecasted to begin in 2000, peak from 2001 through 2005, and continue through 2018. During peak years, the yearly production was estimated to be 76 MMbbl (MMS 1990).

Under the scenario, drilling of the production and service wells would use from 150 to 680 tons of drilling mud. Depending on the amount recycled, the amount of drilling mud disposed could range from 150 to 680 tons for each well and from 18,00 to 81,600 tons for all wells drilled. Each well was expected to produce approximately 1,180 tons of drill cuttings, with a total of 141,600 disposed cuttings. The amount of time required to drill and complete each production or service well was estimated to average 45 days (MMS 1990).

Under the scenario, the total number of helicopter flights in support of drilling of production and service wells was estimated to be 5,400 during 1997 through 2000. The number of flights would range from 315 in 1997, when 7 wells were drilled, to 2,250 in 1999, when 50 wells were drilled. From 2001 to 2018, it was estimated the number of helicopter flights to the production platform would average about two per week per platform, or about 3,744 flights (MMS 1990).

Installation of the pipelines was expected to begin in 1997 and continue through 1999. Oil might be transported to TAPS through either an onshore or offshore gathering system. The amount of pipeline needed to connect the production platforms was estimated to be 600 miles; 275 miles offshore (75 miles trenched) and 325 miles onshore. A support base could be located in the vicinity of a pipeline to support offshore development drilling and pipeline trenching and laying that would occupy approximately 60 to 75 acres (MMS 1990).

Table 4.1.5-3. Summary of basic assumptions of Lease Sale 124 E&D scenario

Element	Mean Case
Sale acreage offering	22.1 million acres
Recoverable oil	900 MMbbl
Peak production oil	76 MMbbl
Exploration	Exploration
Number of wells – exploration	14[1] (10 exploration, 4 delineation)
Helicopter flights – exploration	1,260 trips
Supply boat trips – exploration	140–170 trips
Total drilling muds – exploration	2,520 short tons
Total cuttings – exploration	3,280 short tons
Development and Production	Development and Production
Platforms – development and Production	4
Number of wells – development and production	120
Helicopter flights – during development	5,400 trips
Helicopter flights – after development	3,744 trips
Total drilling muds – development and production	18,000–81,600 short tons
Total cuttings – development and production	141,600 short tons
Transportation	Transportation
Onshore pipeline miles	325 miles
Offshore pipeline miles – total	275 miles
Offshore pipeline miles – trenched	75 miles
Offshore pipeline miles – offshore area disturbed	4.60 square miles

Notes: E&D = Exploration and Development; MMbbl = million barrels
[1]11 floating drill units; 2 bottom-founded mobile unit; 1 manmade Island (ice)
Source: MMS 1990

4.1.5.6 Comparison of E&D Scenario and Historical Activities

A comparison of the E&D scenario and the historical activities are provided in Table 4.1.5-4, using available information.

Table 4.1.5-4. Comparison of E&D and historical activities

Activity	E&D Scenario	Actual Activities
Recoverable oil (maximum)	900 MMbbl	--
Recoverable gas (maximum)	0	--
Sale acreage offering	22.1 million acres	18,556,976 acres offered
Sale	--	277,004 acres leased

Activity	E&D Scenario	Actual Activities
Date of exploratory activities (begin)	1992	1993
Number of wells – exploration and delineation	14 (10 exploration, 4 delineation)	2
Number of wells – development and production	120	0
Average well depth	--	10,716 feet
Drilling mud – exploration	2,520 short tons	--
Drilling mud – development and production	18,000–81,600 short tons	0
Drilling cuttings – exploration	3,280 short tons	--
Drilling cuttings – development and production	141,600 short tons	0
Number of seismic or G&G surveys	--	0
Support facility and shorebase locations	North Slope	--
Helicopter flights – exploration	1,260 trips	--[1]
Helicopter flights – during development	5,400 trips	0
Helicopter flights – after development	3,744 trips	0
Supply boat trips – exploration	140-170 trips	--
Peak production oil	76 MMbbl annual	0
Platforms	4 federal	0
Onshore pipeline miles	325 miles	0
Offshore pipeline miles – total	275 miles	0
Offshore pipeline miles – trenched	75 miles	0
Offshore pipeline miles – offshore area disturbed	4.60 square miles	0
Production treatment facilities	--	0
Annual crude shipped by tanker	--	0

Notes: -- = no data provided; E&D = Exploration and Development; G&G = geological and geophysical; MMbbl = million barrels

[1]Number of trips was not documented; however, use of a Bell 214 helicopter and a Aerospatiele Super Puma helicopter was documented to support the WILD WEASEL 1 well.

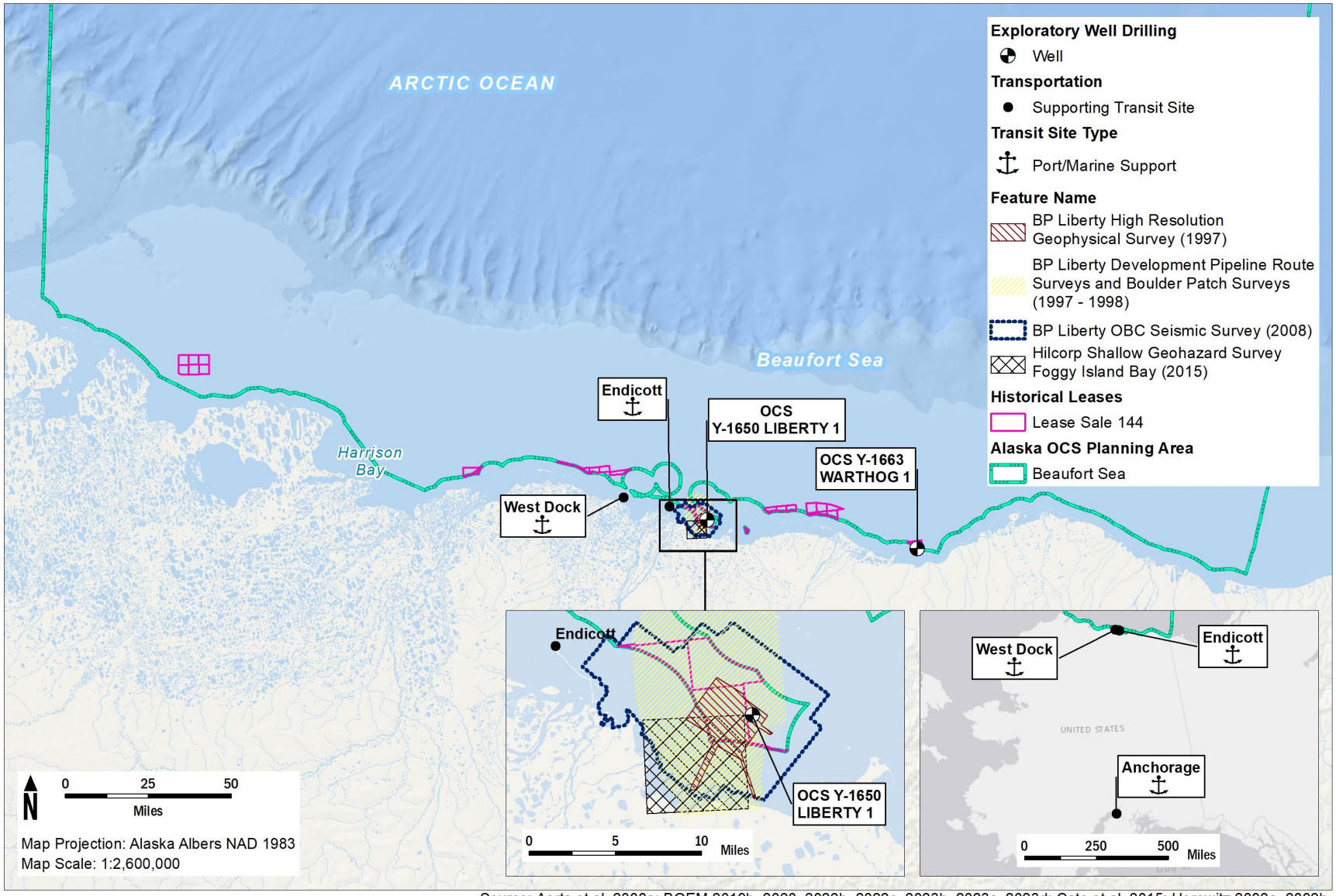
[2]Number of trips was not documented; however, *Supplier II* was documented as a support vessel, as well as *Kalvik*, *Ikaluk*, and *Kigoriak* as ice management vessels for WILD WEASEL 1.

4.1.6 Lease Sale 144 (1996)

The identified activities associated with Lease Sale 144 are shown in Figure 4-8, such as the locations of exploration wells, survey areas, and transportation facilities.

4.1.6.1 Leasing

As shown in Table 4.1-1 and Figure 4-8, as a result of Lease Sale 144, there were 1,364 tracts offered and 29 leases issued. There were 7,282,795 acres offered and 100,025 acres leased. There are two active leases from Lease Sale 144, with an active lease area of 3,333.58 hectares. Table 4.1.6-1 summarizes documented information associated with the leasing as a result of Lease Sale 144.



Source: Aerts et al. 2008a; BOEM 2019b, 2020, 2022b, 2022c, 2023b, 2023c, 2023d; Cate et al. 2015; Horowitz 2002a, 2002b.

Figure 4-8. Historical oil and gas activities associated with Lease Sale 144, 1996

Table 4.1.6-1. Lease information as a result of Lease Sale 144

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y01648	BPXA	10/1/1996	Relinquished	9/15/2003	Beechey Point	1648	6718F
Y01649	BPXA	10/1/1996	Relinquished	9/18/2003	Beechey Point	1649	6770B
Y01650	Hilcorp	10/1/1996	Extended	None	Beechey Point	1650	6819B
Y01651	BPXA	10/1/1996	Expired	9/30/2006	Beechey Point	1651	6871
Y01652	BPXA	10/1/1996	Relinquished	8/6/2003	Beechey Point	1652	6874B
Y01643	Petrofina	11/1/1996	Relinquished	8/27/2002	Beechey Point	1643	6407C
Y01653	Chevron	11/1/1996	Relinquished	10/16/2002	Flaxman Island	1653	6802D
Y01654	Chevron	11/1/1996	Relinquished	10/16/2002	Flaxman Island	1645	6802E
Y01655	Chevron	11/1/1996	Relinquished	10/16/2002	Flaxman Island	1655	6804B
Y01656	Chevron	11/1/1996	Relinquished	10/16/2002	Flaxman Island	1656	6805B
Y01657	Chevron	11/1/1996	Relinquished	10/16/2002	Flaxman Island	1657	6806F
Y01658	Chevron	11/1/1996	Relinquished	10/16/2002	Flaxman Island	1658	6808A
Y01659	Chevron	11/1/1996	Relinquished	10/16/2002	Flaxman Island	1659	6809A
Y01660	Chevron	11/1/1996	Relinquished	10/16/2002	Flaxman Island	1660	6856B
Y01661	ARCO	11/1/1996	Expired	10/31/2006	Flaxman Island	1661	6859B
Y01644	BPXA	12/1/1996	Relinquished	10/23/2001	Beechey Point	1644	6459B
Y01645	Hilcorp	12/1/1996	Production	None	Beechey Point	1645	6510C
Y01646	BP	12/1/1996	Relinquished	9/8/2003	Beechey Point	1646	6511B
Y01647	BPXA	12/1/1996	Relinquished	9/8/2003	Beechey Point	1647	6511I
Y01662	ARCO	12/1/1996	Relinquished	11/30/2000	Flaxman Island	1662	7066B
Y01663	ARCO	12/1/1996	Relinquished	11/30/2000	Flaxman Island	1663	7066E
Y01635	ARCO	1/1/1997	Expired	12/31/2006	Dease Inlet	1635	7015
Y01636	ARCO	1/1/1997	Expired	12/31/2006	Dease Inlet	1636	7016
Y01637	ARCO	1/1/1997	Expired	12/31/2006	Dease Inlet	1637	7017
Y01638	ARCO	1/1/1997	Expired	12/31/2006	Dease Inlet	1638	7065B
Y01639	ARCO	1/1/1997	Expired	12/31/2006	Dease Inlet	1639	7066
Y01640	ARCO	1/1/1997	Expired	12/31/2006	Dease Inlet	1640	7067
Y01641	ARCO	1/1/1997	Expired	12/31/2006	Harrison Bay	1641	6421D
Y01642	ARCO	1/1/1997	Expired	12/31/2006	Harrison Bay	1642	6470B

Notes: ARCO = Atlantic Richfield Company; BPXA = BP Exploration (Alaska) Inc.
Source: BOEM 2023b

4.1.6.2 Surveys

Between 1997 and 2015, there were seven surveys documented as a result of Lease Sale 144, as shown in Table 4.1.6-2.

Table 4.1.6-2. Survey activity summary

Activity Start Date	Activity End Date	Year	Activity Name	Description	Transportation	Operator and Contractor
1/1/1997	12/31/1997	1997	Geophysical survey	The shallow hazards survey was conducted for the Liberty exploration in Foggy Island Bay. Multichannel seismic data and high-resolution sub-bottom profiler, mini-sparker data, digital side scan sonar, and precision fathometer data were collected.	R/V Annika	BP Exploration (Alaska) Inc.
8/11/1997	9/14/1997	1997	Other relevant survey	The survey was located in Foggy Island Bay. Surveys included an extensive side scan and multi-beam sonar survey.	ROV	BP Exploration (Alaska) Inc.
8/17/1997	8/28/1997	1997	Pipeline route survey	Helicopter overflights were conducted within Foggy Island Bay. Data collected include bathymetry and strudel scour and ice gouge data.	Helicopters	BP Exploration (Alaska) Inc.
4/2/1998	4/8/1998	1998	Other relevant survey	The survey was located in Foggy Island Bay.	ROV	BP Exploration (Alaska) Inc.
7/28/1998	8/4/1998	1998	Pipeline route survey	Helicopter overflights were within Foggy Island Bay. Data collected include bathymetry and strudel scour and ice gouge data.	Helicopters	BP Exploration (Alaska) Inc.
7/15/2008	9/1/2008	2008	3D marine seismic program	A 3D ocean bottom cable seismic survey was conducted in the Liberty area. Vessels towed airgun arrays and cabled hydrophones. Approximately 91.8 square miles of data were acquired.	Peregrine, Miss Diane, Canvasback, Cape Fear, Rumple Minze, Sleep Robber, Alaganik, Hook Point, Qayaq Spirit, Mariah B, Arctic Wolf, Gwydyr Bay	BP Exploration (Alaska) Inc.
7/9/2015	7/20/2015	2015	Geohazard survey	A shallow geohazard survey was conducted in Foggy Island Bay to test geotechnical equipment. The total survey distance was 452 miles.	M/V Journey	Hilcorp Alaska, LLC

Notes: 3D = three-dimensional; ROV = Remotely Operated Underwater Vehicle
Sources: Aerts et al. 2008a; Cate et al. 2015; Horowitz 2002a, 2002b

4.1.6.3 Well Drilling

Two exploration wells were drilled as a result of Lease Sale 144, as summarized in Table 4.1.6-3.

Table 4.1.6-3. Well drilling summary

Activity Start Date	Activity End Date	Well Name (includes API no. and bottom hole lease number)	Well Type	Well Depth (feet)	Drill Rig Name
1/11/1997	12/5/1997	API no. 551710001200 (WARTHOG 1) on OCS Y-1663	Exploration	8,603	Glomar Beaufort Sea #1, CIDS
2/7/1997	3/30/1997	API no. 552010000900 (LIBERTY 1) on OCS Y-1650	Exploration	11,088	*PAA Rig #4,* Tern Gravel Island/Ice Island

Notes: API = American Petroleum Institute; OCS = Outer Continental Shelf
Sources: BOEM 2019b, 2020, 2022b, 2023c, 2023d

4.1.6.4 Oil-and-Gas-Supporting Activities

Identified oil-and-gas-supporting activities as a result of Lease Sale 144 included transportation from facilities to survey sites (if documented), as summarized in Table 4.1.6-4.

Table 4.1.6-4. Summary of transportation activity

Facility Name	Facility Type	Supported Activity	No. Aircraft	No. Vessels	Vessel Names	No. Vehicles
Endicott	Port	Shallow geohazard survey in Foggy Island Bay	N/A	1	M/V Journey	N/A
Port of Alaska (Anchorage)	Port	OBC seismic survey in the Beaufort Sea	N/A	1	Arctic Wolf	N/A
Prudhoe Bay West Dock	Port	OBC seismic survey in the Beaufort Sea	N/A	11	Peregrine, Miss Diane, Canvasback, Cape Fear, Rumple Minze, Sleep Robber, Alaganik, Hook Point, Qayaq Spirit, Mariah B, Gwydyr Bay[1]	N/A

Notes: M/V = motor vessel; N/A = not applicable; OBC = ocean bottom cable
[1]Only *Arctic Wolf* originated in Anchorage; other vessels that supported the survey effort were trucked to West Dock.
Sources: Aerts et al. 2008a; Cate et al. 2015

4.1.6.5 E&D Scenario Summary

A scenario was developed for the Alaska OCS Beaufort Sea Oil and Gas Lease Sale 144 Final Environmental Impact Statement (MMS 1996a) to assess the potential environmental impacts of the lease sale. The sale consisted of a total of 1,879 blocks, 9.8 million acres of the Beaufort Sea Planning Area. The blocks were located in waters ranging from 5 to 125 kilometers offshore and from 2 to 1,000 meters deep. The mean resource estimates ranged between 300 MMbbl and 2.1 Bbbl. Activities associated with the E&D scenario (MMS 1996a) are summarized in Table 4.1.6-5.

Under the base scenario, exploratory drilling activities would be expected to occur between 1997 and 2003. During this period, it was estimated that 4 to 11 exploration wells and 2 to 21 delineation wells

would be drilled. The type of units used in exploration drilling would depend on water depths, sea ice conditions, ice resistant capabilities of the units, and availability. Artificial ice islands would likely be employed as drilling platforms in shallow water. Construction and resupply operations for ice-island drilling platforms would be supported by ice roads. Bottom-founded platforms of various designs were most likely to be used to drill prospects farther offshore in water depths of 10 to 25 meters (35 to 80 feet), and because of mobile ice conditions, these operations would be supported by supply boats during the open-water season (MMS 1996a).

It was assumed that activities associated with development and production would begin in 2001 with the installation of a production platform; 2 to 11 platforms would be installed during a 2-to-6-year period between 2001 and 2006. The estimated level of activities associated with crude oil production was based on this range; the low end of the activity range under the base case was associated with the 300 MMbbl estimate and the high end with the 2.1 Bbbl estimate. Between 2001 and 2006, an estimated 54 to 396 production and service wells would be drilled using 4 to 12 drilling rigs. Crude oil production was expected to begin in 2003–2004 and continue from 2023 through 2025; the production life of the Sale 144 field was expected to be 22 years. Peak production was estimated to occur between 2004 and 2009 and range broadly between 25 and 176 MMbbl yearly (MMS 1996a).

Under the scenario, the installation of offshore pipelines between production platforms and onshore facilities would take 1 to 2 years, considering that route surveys, trenching, and pipeline laying would take place in the relatively short open-water season. New onshore pipeline sections would take 2 to 3 years to complete, with construction activities taking place simultaneously with the offshore pipeline activities. Offshore, it was assumed that pipelines would be trenched as a protective measure against damage by ice keels in water depths less than 150 feet. At the landfalls, pipelines would be elevated on linear gravel structures of 90 meters or less to protect them against shoreline-erosion processes. For the base case, it was assumed that landfalls would be made at Oliktok Point (using the Kuparuk field infrastructure), in the Point McIntyre/West Dock area (using the Prudhoe Bay field infrastructure), and at a point about 20 miles east of Bullen Point (MMS 1996a).

It was assumed that if the development schedule could be achieved, it would take at least 5 to 7 years after the first discovery well for production to begin from an offshore field. Based on the possible reservoir characteristics of the offshore oil fields, oil production from individual fields would last from 15 to 25 years (MMS 1996a).

Under the scenario, production wells would average 13,000 feet (drilled or measured depth) because they typically included a mix of near-vertical and horizontally extended wells. It was assumed that 25 percent of the total number of production wells would be employed as service wells, where produced water or gas would be reinjected into the subsurface (MMS 1996a).

Based on the typical well depths, a typical E&D well would use an average of 630 short tons of dry mud and produce approximately 820 short tons of dry rock cuttings. The typical production well would use approximately 150 to 680 short tons of dry mud and produce an average of 1,180 short tons of dry rock cuttings (MMS 1996a).

Table 4.1.6-5. Summary of basic assumptions of Lease Sale 144 E&D scenario

Element	Mean Case
Sale acreage offering	9.8 million acres
Recoverable oil	300 MMbbl to 2.1 Bbbl
Peak production oil	25–176 MMbbl yearly

Element	Mean Case
Exploration	Exploration
Number of wells – exploration	4–11
Number of wells – delineation	2–21
Development and Production	Development and Production
Platforms – development and production	2–11
Number of wells – development and production	54 to 396
Total drilling muds – development and production	150 to 680 short tons
Total cuttings – development and production	1,180 short tons
Transportation	Transportation
Pipeline – total	185 miles
Onshore pipeline	105 miles
Offshore pipeline	80 miles
Onshore pipeline – diameter	16–20 inches
Offshore pipeline – diameter	12–18 inches

Notes: Bbbl = billion barrels; E&D = Exploration and Development; MMbbl = million barrels
Source: MMS 1996a

4.1.6.6 Comparison of E&D Scenario and Historical Activities

A comparison of the E&D scenario and the historical activities are provided in Table 4.1.6-6, using available information.

Table 4.1.6-6. Comparison of E&D and historical activities

Activity	E&D Scenario	Actual Activities
Recoverable oil (maximum)	300 MMbbl to 2.1 Bbbl	--
Sale acreage offering	9.8 million acres	7,282,795 acres offered
Sale	--	100,025 acres leased
Date of exploratory activities (begin)	1997	1997
Number of wells – exploration	4–11	2
Number of wells – delineation	2–21	0
Number of wells – production and service	54 to 396	0
Average well depth	13,000 feet	9,846 feet
Drilling mud – exploration	630 short tons	--
Drilling cuttings – exploration	820 short tons	--
Total drilling muds – development and production	150 to 680 short tons	0
Total cuttings – development and production	1,180 short tons	0

Activity	E&D Scenario	Actual Activities
Number of G&G or other surveys	--	7
Drill rigs	4–12	2
Support facility and shorebase locations	Prudhoe Bay	--
Peak production oil	25–176 MMbbl yearly	0
Platforms	2–11	1
Pipeline – total	185 miles (105 onshore, 80 offshore)	0
Onshore pipeline – diameter	16–20 inches	0
Offshore pipeline – diameter	12–18 inches	0
Production treatment facilities	--	0
Supply and support boats	--	15

Notes: -- = no data provided; E&D = Exploration and Development; G&G = geological and geophysical; MMbbl = million barrels

4.1.7 Lease Sale 170 (1998)

The leases associated with Lease Sale 170 are shown in Figure 4-9.

4.1.7.1 Leasing

As shown in Table 4.1-1 and Figure 4-9, as a result of Lease Sale 170, there were 203 tracts offered and 28 leases issued. There were 920,983 acres offered and 86,371 acres leased. There are no active leases from Lease Sale 170. Table 4.1.7-1 summarizes documented information associated with the leasing as a result of Lease Sale 170.

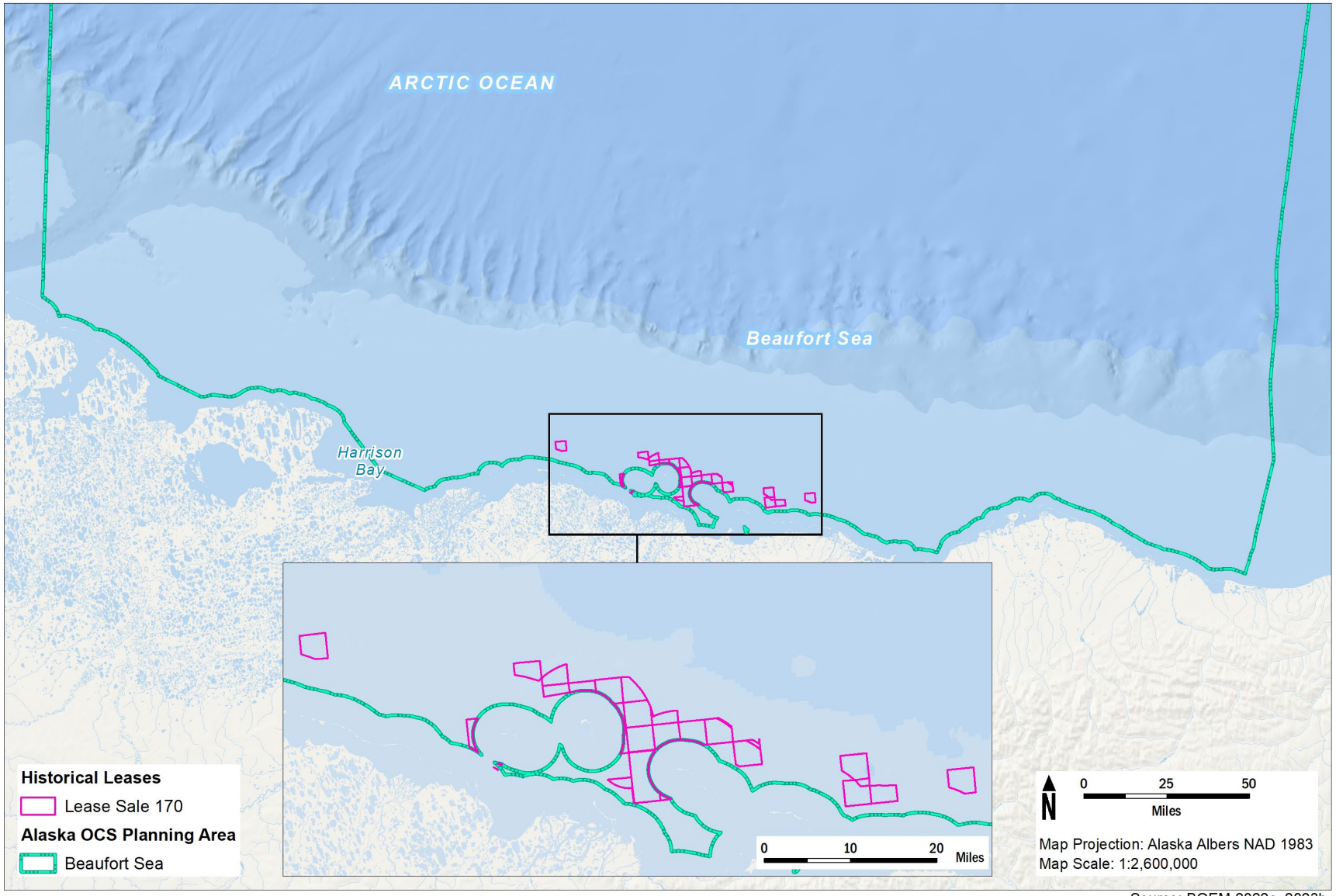


Figure 4-9. Historical oil and gas activities associated with Lease Sale 170, 1998

Table 4.1.7-1. Lease information as a result of Lease Sale 170

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y01677	BP	9/1/1998	Relinquished	8/6/2003	Beechey Point	1677	6613 F
Y01666	Petrofina	11/1/1998	Relinquished	12/29/2000	Beechey Point	1666	6357 B
Y01667	Phillips	11/1/1998	Expired	10/31/2008	Beechey Point	1667	6465 B
Y01668	Phillips	11/1/1998	Expired	10/31/2008	Beechey Point	1668	6466 A
Y01669	Phillips	11/1/1998	Expired	10/31/2008	Beechey Point	1669	6516 B
Y01670	Phillips	11/1/1998	Expired	10/31/2008	Beechey Point	1670	6517 B
Y01671	Phillips	11/1/1998	Expired	10/31/2008	Beechey Point	1671	6518 B
Y01672	Phillips	11/1/1998	Expired	10/31/2008	Beechey Point	1672	6519 A
Y01673	Phillips	11/1/1998	Relinquished	9/8/2003	Beechey Point	1673	6562 E
Y01674	Conoco	11/1/1998	Expired	10/31/2008	Beechey Point	1674	6568
Y01675	Phillips	11/1/1998	Expired	10/31/2008	Beechey Point	1675	6569 A
Y01676	Conoco	11/1/1998	Expired	10/31/2008	Beechey Point	1676	6570
Y01678	Chevron	11/1/1998	Expired	10/31/2008	Beechey Point	1678	6618 B
Y01679	Chevron	11/1/1998	Expired	10/31/2008	Beechey Point	1679	6619 A
Y01680	Phillips	11/1/1998	Expired	10/31/2008	Beechey Point	1680	6620 B
Y01681	Phillips	11/1/1998	Expired	10/31/2008	Beechey Point	1681	6621 B
Y01682	Phillips	11/1/1998	Expired	10/31/2008	Beechey Point	1682	6622 A
Y01683	Phillips	11/1/1998	Expired	10/31/2008	Beechey Point	1683	6622 B
Y01686	Petrofina	11/1/1998	Relinquished	12/29/2000	Beechey Point	1686	6673 A
Y01687	Petrofina	11/1/1998	Relinquished	12/29/2000	Beechey Point	1687	6673 B
Y01688	Phillips	11/1/1998	Relinquished	12/29/2000	Beechey Point	1688	6674 B
Y01690	Petrofina	11/1/1998	Relinquished	12/29/2000	Flaxman Island	1690	6703 B
Y01691	BP	11/1/1998	Relinquished	10/16/2002	Flaxman Island	1691	6753 A
Y01692	Petrofina	11/1/1998	Relinquished	12/29/2000	Flaxman Island	1692	6753 B
Y01693	BP	11/1/1998	Relinquished	10/16/2002	Flaxman Island	1693	6754 A
Y01694	Petrofina	11/1/1998	Relinquished	12/29/2000	Flaxman Island	1694	6757 B
Y01684	BP	12/1/1998	Relinquished	8/6/2003	Beechey Point	1684	6668 E
Y01689	BP	12/1/1998	Relinquished	8/6/2003	Beechey Point	1689	6720 B
Y01685	BP	None	Rejected	None	Beechey Point	1685	6669 D

Source: BOEM 2023b

4.1.7.2 Surveys

No surveys were documented as a result of Lease Sale 170.

4.1.7.3 Well Drilling

No wells were drilled as a result of Lease Sale 170.

4.1.7.4 Oil-and-Gas-Supporting Activities

There were no oil-and-gas-supporting activities identified as a result of Lease Sale 170.

4.1.7.5 E&D Scenario Summary

Two scenarios were developed for the Alaska OCS Beaufort Sea Oil and Gas Lease Sale 170 Final Environmental Impact Statement (MMS 1998) to assess the potential environmental impacts of the lease sale: an exploration scenario where no oil field development or production would occur and an oil development scenario, which assumed a resource estimate of between 350 and 670 MMbbl of oil would be discovered and produced. The sale consisted of a total of 365 blocks, 1.7 million acres of the Beaufort Sea. The blocks were located offshore, extending from a point 12 miles west of the community of Kaktovik to a point approximately 150°W longitude. The mean resource estimates used ranged between 350 and 670 MMbbl of oil produced over the anticipated 21-year life of the field. Activities associated with the E&D scenario are summarized in Table 4.1.7-2.

Under the development scenario, exploratory drilling was expected to begin in 1999 and continue through 2006. During those years, a total of 12 to 16 exploration and delineation wells would be drilled. Between 2004 and 2009, 3 to 5 production platforms were expected to be installed, and pipeline laying was expected to begin in 2005 and conclude in 2010. Production and service well drilling was expected to begin in 2004 and continue through 2010 with a total of 87 to 111 wells drilled. Production was expected to begin in 2006 and continue through 2027 (MMS 1998).

It was assumed that the type of units that would be used in exploration and production drilling would depend on water depth, sea ice conditions, ice resistant capabilities of the units, and availability. Artificial ice islands would likely be employed as drilling platforms in shallow water near shore. Bottom-founded platforms of various designs were most likely to be used in farther offshore water depths. The far offshore operations would be supported by icebreaker-support/supply ships, with support and supply operations staging from Prudhoe Bay and Kuparuk infrastructure (MMS 1998).

Under the development scenario, produced crude oil would be transported via pipeline to intermix with the onshore Prudhoe Bay and Kuparuk pipeline systems. Produced crude would be transported to Valdez via the TAPS and then to the U.S. West Coast and possible Far East via tanker (MMS 1998).

Under the exploration-only scenario, the economic field-sized threshold for active resource exploration and extraction of oil was 350 MMbbl. Activities associated with Lease Sale 170 were considered to be exploration only with no resulting production or development. Exploratory drilling would begin by 1998 and cease in 2006 with four wells drilled by a single rig. All support functions would be staged from Prudhoe Bay facilities (MMS 1998).

It was assumed that the amount of mud and cuttings would depend on the length of the wellbore. Exploration wells would target reservoirs from 5,000 to 15,000 feet in the subsurface, so an average wellbore length would be 10,000 feet. Production and service wells would average about 13,000 feet in length because they would reach outward from a central drilling location (MMS 1998).

An average exploration well would use 630 tons of mud and would produce 820 tons of dry cuttings. An average production well would use 150 to 680 tons of mud (assuming that 20 to 80 percent of the mud is recycled) and would produce 1,180 tons of dry cuttings (MMS 1998).

Table 4.1.7-2. Summary of basic assumptions of Lease Sale 170 E&D scenario

Element	Mean Case
Sale acreage offering	1.7 million acres
Recoverable oil	350 to 670 MMbbl
Peak production oil	76 MMbbl
Exploration	Exploration
Number of wells – exploration	12 to 16
Total drilling muds – exploration	630 tons
Total cuttings – exploration	820 tons
Development and Production	Development and Production
Platforms – development and production	3 to 5
Number of wells – development and production	87 to 111
Total drilling muds – development and production	150 to 680 tons
Total cuttings – development and production	1,180 tons
Transportation	Transportation
Total pipeline miles – 350 MMbbl	80 miles
Total pipeline miles – 670 MMbbl	160 miles
Onshore pipeline miles – 350 MMbbl	40 miles
Onshore pipeline miles – 670 MMbbl	100 miles
Offshore pipeline miles – 350 MMbbl	40 miles
Offshore pipeline miles – 670 MMbbl	60 miles

Notes: E&D = Exploration and Development; MMbbl = million barrels
Source: MMS 1998

4.1.7.6 Comparison of E&D Scenario and Historical Activities

A comparison of the E&D scenario and the historical activities are provided in Table 4.1.7-3, using available information.

Table 4.1.7-3. Comparison of E&D and historical activities

Activity	E&D Scenario	Actual Activities
Recoverable oil (maximum)	350 to 670 MMbbl	--
Sale acreage offering	1.7 million acres	920,983 acres offered
Sale	--	86,371 acres leased
Date of exploratory activities (begin)	1999	--

Activity	E&D Scenario	Actual Activities
Number of wells – exploration	12 to 16	0
Number of wells – development and production	87 to 111	0
Average well depth	10,000 feet (exploration), 13,000 feet (production)	0
Drilling muds – exploration	630 tons	0
Drilling cuttings – exploration	820 tons	0
Total drilling muds – development and production	150 to 680 tons	0
Total cuttings – development and production	1,180 tons	0
Number of G&G or other surveys	--	0
Support facility and shorebase locations	Prudhoe Bay/Kuparuk infrastructure	0
Personnel flights to area	--	0
Peak production oil	76 MMbbl	0
Platforms	3 to 5	0
Total pipeline miles – 350 MMbbl	80 miles (40 onshore, 40 offshore)	0
Total pipeline miles – 670 MMbbl	160 miles (100 onshore, 60 offshore)	0
Production treatment facilities	--	0
Supply and support boats	--	0
Annual crude shipped by tanker	--	0

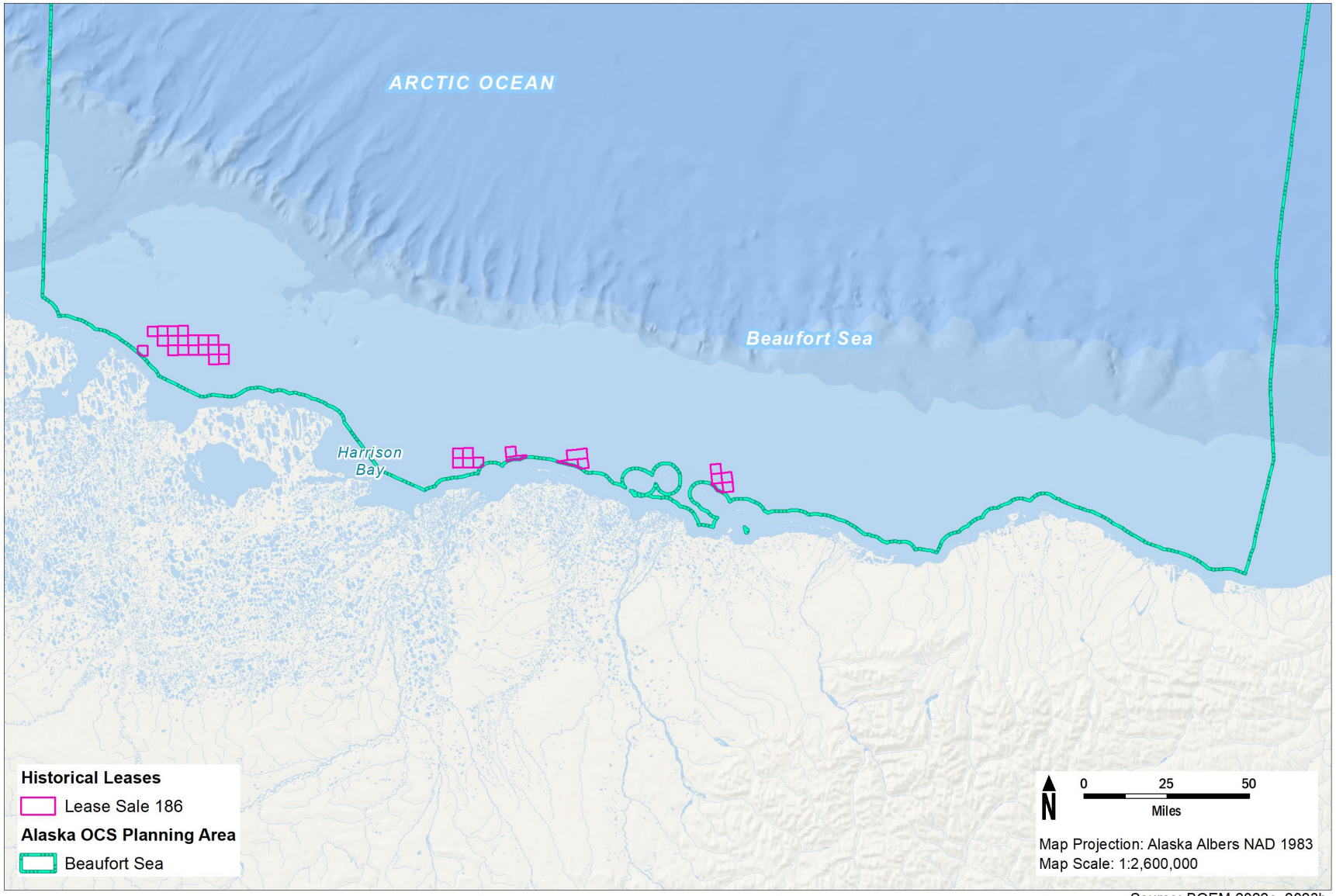
Notes: -- = no data provided; E&D = Exploration and Development; G&G = geological and geophysical; MMbbl = million barrels

4.1.8 Lease Sale 186 (2003)

The leases associated with Lease Sale 186 are shown in Figure 4-10.

4.1.8.1 Leasing

As shown in Table 4.1-1 and Figure 4-10, as a result of Lease Sale 186, there were 1,798 tracts offered and 34 leases issued. There were 9,459,743 acres offered and 181,810 acres leased. There are no active leases from Lease Sale 186. Table 4.1.8-1 summarizes documented information associated with the leasing as a result of Lease Sale 186.



Source: BOEM 2022c, 2023b.

Figure 4-10. Historical oil and gas activities associated with Lease Sale 186, 2003

Table 4.1.8-1. Lease information as a result of Lease Sale 186

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y01699	Armstrong	12/1/2003	Expired	11/30/2013	Harrison Bay	1699	6369
Y01700	Armstrong	12/1/2003	Expired	11/30/2013	Harrison Bay	1700	6370
Y01701	Armstrong	12/1/2003	Expired	11/30/2013	Harrison Bay	1701	6419
Y01702	Armstrong	12/1/2003	Expired	11/30/2013	Harrison Bay	1702	6420
Y01703	Eni	12/1/2003	Expired	4/3/2022	Harrison Bay	1703	6421B
Y01704	Eni	12/1/2003	Expired	4/3/2022	Beechey Point	1704	6352
Y01705	Eni	12/1/2003	Expired	4/3/2022	Beechey Point	1705	6402A
Y01706	Conoco	12/1/2003	Relinquished	11/16/2010	Beechey Point	1706	6408A
Y01707	Conoco	12/1/2003	Relinquished	11/16/2010	Beechey Point	1707	6456A
Y01708	Conoco	12/1/2003	Relinquished	11/16/2010	Beechey Point	1708	6459B
Y01709	Encana	1/1/2004	Relinquished	12/22/2008	Beechey Point	1709	6671A
Y01710	Encana	1/1/2004	Relinquished	12/22/2008	Beechey Point	1710	6637
Y01711	Encana	1/1/2004	Relinquished	12/22/2008	Dease Inlet	1711	6862
Y01712	Encana	1/1/2004	Relinquished	12/22/2008	Dease Inlet	1712	6863
Y01713	Encana	1/1/2004	Relinquished	12/22/2008	Dease Inlet	1713	6864
Y01714	Encana	1/1/2004	Relinquished	12/22/2008	Dease Inlet	1714	6865
Y01715	Encana	1/1/2004	Relinquished	12/22/2008	Dease Inlet	1715	6913
Y01716	Encana	1/1/2004	Relinquished	12/22/2008	Dease Inlet	1716	6914
Y01717	Encana	1/1/2004	Relinquished	12/22/2008	Dease Inlet	1717	6915
Y01718	Encana	1/1/2004	Relinquished	12/22/2008	Dease Inlet	1718	6916
Y01719	Encana	1/1/2004	Relinquished	12/22/2008	Dease Inlet	1719	6917
Y01720	Encana	1/1/2004	Relinquished	12/22/2008	Dease Inlet	1720	6918
Y01721	Encana	1/1/2004	Relinquished	12/22/2008	Dease Inlet	1721	6961B
Y01722	Encana	1/1/2004	Relinquished	12/22/2008	Dease Inlet	1722	6964
Y01723	Encana	1/1/2004	Relinquished	12/22/2008	Dease Inlet	1723	6965
Y01724	Encana	1/1/2004	Relinquished	12/22/2008	Dease Inlet	1724	6966
Y01725	Encana	1/1/2004	Relinquished	12/22/2008	Dease Inlet	1725	6967
Y01726	Encana	1/1/2004	Relinquished	12/22/2008	Dease Inlet	1726	6968
Y01727	Encana	1/1/2004	Relinquished	12/22/2008	Dease Inlet	1727	6969
Y01728	Encana	1/1/2004	Relinquished	12/22/2008	Dease Inlet	1728	7018
Y01729	Encana	1/1/2004	Relinquished	12/22/2008	Dease Inlet	1729	7019

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y01730	Encana	1/1/2004	Relinquished	12/22/2008	Beechey Point	1730	6572
Y01731	Encana	1/1/2004	Relinquished	12/22/2008	Beechey Point	1731	6622C
Y01732	Encana	1/1/2004	Relinquished	12/22/2008	Beechey Point	1732	6623

Source: BOEM 2023b

4.1.8.2 Surveys

No surveys were documented as a result of Lease Sale 186.

4.1.8.3 Well Drilling

No wells were drilled as a result of Lease Sale 186.

4.1.8.4 Oil-and-Gas-Supporting Activities

There were no oil-and-gas-supporting activities identified as a result of Lease Sale 186.

4.1.8.5 E&D Scenario Summary

A scenario was developed for the Alaska OCS Beaufort Sea Oil and Gas Lease Sale 186 Final Environmental Impact Statement (MMS 2003) to assess the potential environmental impacts of the lease sale. The sale consisted of a total of 1,877 blocks, 9.77 million acres of the Beaufort Sea Planning Area. The mean resource estimate used was 460 MMbbl. Activities associated with the E&D scenario (MMS 2003) are summarized in Table 4.1.8-2.

It was assumed that exploration activity would begin the year following Sale 186 and continue at a rate of one exploration well per year for a total of six exploration wells. Following the next discovery, it was assumed delineation wells would employ the same drilling rig and continue over a 2-year period. Under the scenario, two delineation wells could be drilled in a single season. Artificial ice islands grounded on the seabed would likely to be used as drilling platforms in shallow water (less than 10 meters), and nearshore operations would be supported by ice roads over the landfast ice. Bottom-founded platforms (set on the seafloor) could be used to drill prospects in water depths of 10 to 20 meters, and drillships would be used to drill prospects in water deeper than 20 meters. Operations would be supported by icebreakers and supply boats (MMS 2003).

Under the scenario, the first commercial discovery would be made in 2005, 2 years after Sale 186 was held. It was assumed that three new fields ranging in size from 120 to 220 MMbbl of oil would be discovered in alternate years (MMS 2003).

It was assumed that offshore pipelines would be trenched as a protective measure against damage by ice in all water depths less than 50 meters (164 feet). Onshore pipelines would be elevated 5 feet above ground level on vertical support members. New offshore pipeline would use the existing infrastructure wherever possible (MMS 2003).

Table 4.1.8-2. Summary of basic assumptions of Lease Sale 186 E&D scenario

Element	Mean Case
Sale acreage offering	9.77 million acres
Recoverable oil	460 MMbbl
Peak production oil	43.8 MMbbl yearly
Exploration	Exploration
Number of wells – exploration	6
Number of wells – delineation	6
Drill rigs	1–2

Element	Mean Case
Helicopter flights – exploration (annually)	155 trips
Total drilling muds – exploration	1,040 short tons
Total cuttings – exploration	6,300 short tons
Supply boat (annually)	0–14 trips
Helicopter flights – construction (monthly)	300–600
Development and Production	Development and Production
Platforms – development and production	3
Number of wells – production and service	102
Number of fields	3
Helicopter flights – production (monthly)	28–56 trips
Helicopter flights – development (monthly)	12–28 trips
Total drilling muds – development and production	13,300 short tons
Total cuttings – development and production	84,000 short tons
Transportation	Transportation
Offshore pipeline miles	40 miles
Tanker transport – peak year of production	2016
Tanker transport – number of loadings	63

Notes: E&D = Exploration and Development; MMbbl = million barrels
Source: MMS 2003

4.1.8.6 Comparison of E&D Scenario and Historical Activities

A comparison of the E&D scenario and the historical activities are provided in Table 4.1.8-3, using available information.

Table 4.1.8-3. Comparison of E&D and historical activities

Activity	E&D Scenario	Actual Activities
Recoverable oil (maximum)	460 MMbbl	--
Sale acreage offering	9.77 million acres	9,459,743 acres offered
Sale	--	181,810 acres leased
Date of exploratory activities (begin)	2004	--
Number of wells – exploration and delineation	12 (6 exploration, 6 delineation)	0
Number of wells – production and service	102	0
Average well depth	--	0
Drilling muds – exploration	1,040 short tons	0
Drilling muds – development and production	13,300 short tons	0

Activity	E&D Scenario	Actual Activities
Drilling cuttings – exploration	6,300 short tons	0
Drilling cuttings – development and production	84,000 short tons	0
Drill rigs	1–2	0
Number of G&G or other surveys	--	0
Support facility and shorebase locations	Prudhoe Bay	0
Helicopter flights – exploration (annually)	155 trips	0
Helicopter flights – construction (monthly)	300–600	0
Helicopter flights – production (monthly)	28–56 trips	0
Helicopter flights – development (monthly)	12–28 trips	0
Peak production oil	43.8 MMbbl yearly	0
Platforms	3	0
Offshore pipeline miles	40 miles	0
Production treatment facilities	--	0
Supply and support boats	0–14 trips (exploration)	0
Tanker transport – peak year of production	2016	--
Tanker transport – number of loadings	63	0

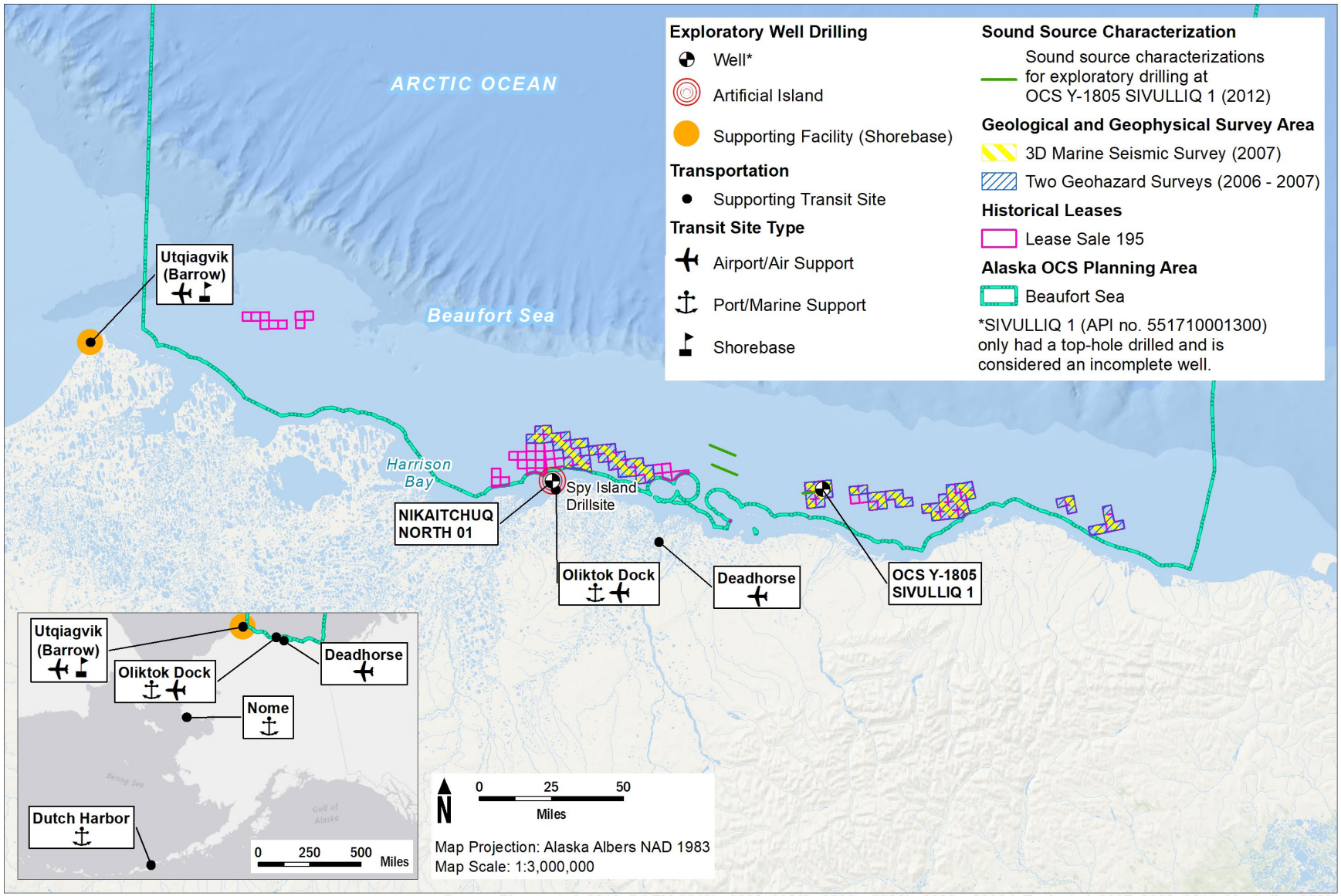
Notes: -- = no data provided; E&D = Exploration and Development; G&G = geological and geophysical; MMbbl = million barrels

4.1.9 Lease Sale 195 (2005)

The identified activities associated with Lease Sale 195 are shown in Figure 4-11, such as the locations of exploration wells, G&G survey areas, sound source characterization, and transportation facilities.

4.1.9.1 Leasing

As shown in Table 4.1-1 and Figure 4-11, as a result of Lease Sale 195, there were 1,770 tracts offered and 117 leases issued. There were 9,301,423 acres offered and 607,285 acres leased. There are no active leases from Lease Sale 195. Table 4.1.9-1 summarizes documented information associated with the leasing as a result of Lease Sale 195.



Source: Bisson et al. 2013; BOEM 2019b, 2020, 2022b, 2022c, 2023b, 2023c, 2023d; Funk et al. 2007, 2008, 2011; Monkelien 2020.

Figure 4-11. Historical oil and gas activities associated with Lease Sale 195, 2005

Table 4.1.9-1. Lease information as a result of Lease Sale 195

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y01798	Conoco	6/1/2005	Relinquished	12/22/2008	Beechey Point	1798	6465
Y01801	Conoco	6/1/2005	Relinquished	12/22/2008	Beechey Point	1801	6515
Y01802	Conoco	6/1/2005	Relinquished	12/22/2008	Beechey Point	1802	6516B
Y01745	Armstrong	7/1/2005	Relinquished	6/23/2016	Harrison Bay	1745	6272
Y01746	Armstrong	7/1/2005	Relinquished	6/23/2016	Harrison Bay	1746	6273
Y01747	Armstrong	7/1/2005	Expired	6/30/2015	Harrison Bay	1747	6320
Y01748	Armstrong	7/1/2005	Expired	6/30/2015	Harrison Bay	1748	6321
Y01749	Armstrong	7/1/2005	Relinquished	6/23/2016	Harrison Bay	1749	6322
Y01750	Armstrong	7/1/2005	Relinquished	6/23/2016	Harrison Bay	1750	6323
Y01751	Eni	7/1/2005	Expired	4/3/2022	Harrison Bay	1751	6371
Y01752	Eni	7/1/2005	Expired	4/3/2022	Harrison Bay	1752	6372
Y01753	Eni	7/1/2005	Expired	4/3/2022	Harrison Bay	1753	6373
Y01754	Eni	7/1/2005	Expired	4/3/2022	Harrison Bay	1754	6347A
Y01755	Armstrong	7/1/2005	Expired	6/30/2015	Harrison Bay	1755	6418
Y01756	Eni	7/1/2005	Expired	4/3/2022	Harrison Bay	1756	6422
Y01757	Eni	7/1/2005	Expired	4/3/2022	Harrison Bay	1757	6423
Y01758	Armstrong	7/1/2005	Expired	6/30/2015	Harrison Bay	1758	6468
Y01759	Armstrong	7/1/2005	Expired	6/30/2015	Harrison Bay	1759	6469
Y01760	Armstrong	7/1/2005	Expired	6/30/2015	Harrison Bay	1760	6518B
Y01765	Armstrong	7/1/2005	Relinquished	6/23/2016	Beechey Point	1765	6251A
Y01766	Armstrong	7/1/2005	Relinquished	6/23/2016	Beechey Point	1766	6252
Y01771	Eni	7/1/2005	Expired	4/3/2022	Beechey Point	1771	6302
Y01779	Eni	7/1/2005	Expired	4/3/2022	Beechey Point	1779	6351A
Y01845	Shell	7/1/2005	Relinquished	6/19/2009	Barter Island	1845	6962
Y01846	Shell	7/1/2005	Relinquished	6/19/2009	Barter Island	1846	6963
Y01847	Shell	7/1/2005	Relinquished	6/19/2009	Barter Island	1847	7013
Y01848	Shell	7/1/2005	Relinquished	6/19/2009	Barter Island	1848	7067
Y01849	Shell	7/1/2005	Relinquished	6/19/2009	Barter Island	1849	7117
Y01850	Shell	7/1/2005	Relinquished	6/19/2009	Demarcation Point	1850	6017
Y01851	Shell	7/1/2005	Relinquished	6/19/2009	Demarcation Point	1851	6018
Y01852	Shell	7/1/2005	Relinquished	6/19/2009	Demarcation Point	1852	6019

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y01853	Shell	7/1/2005	Relinquished	6/19/2009	Demarcation Point	1853	6020
Y01733	Conoco	8/1/2005	Relinquished	1/20/2009	Dease Inlet	1733	6613
Y01734	Conoco	8/1/2005	Relinquished	1/20/2009	Dease Inlet	1734	6614
Y01735	Conoco	8/1/2005	Relinquished	1/20/2009	Dease Inlet	1735	6615
Y01736	Conoco	8/1/2005	Relinquished	1/20/2009	Dease Inlet	1736	6619
Y01737	Conoco	8/1/2005	Relinquished	1/20/2009	Dease Inlet	1737	6620
Y01738	Conoco	8/1/2005	Relinquished	1/20/2009	Dease Inlet	1738	6665
Y01739	Conoco	8/1/2005	Relinquished	1/20/2009	Dease Inlet	1739	6666
Y01740	Conoco	8/1/2005	Relinquished	1/20/2009	Dease Inlet	1740	6667
Y01741	Conoco	8/1/2005	Relinquished	1/20/2009	Dease Inlet	1741	6669
Y01742	Shell	8/1/2005	Relinquished	7/24/2015	Harrison Bay	1742	6173
Y01743	Shell	8/1/2005	Relinquished	6/23/2016	Harrison Bay	1743	6222
Y01744	Shell	8/1/2005	Relinquished	6/23/2016	Harrison Bay	1744	6223
Y01761	Shell	8/1/2005	Relinquished	7/24/2015	Beechey Point	1761	6152
Y01762	Shell	8/1/2005	Relinquished	7/24/2015	Beechey Point	1762	6202
Y01763	Shell	8/1/2005	Relinquished	7/24/2015	Beechey Point	1763	6203
Y01764	Shell	8/1/2005	Relinquished	7/24/2015	Beechey Point	1764	6204
Y01767	Shell	8/1/2005	Relinquished	7/24/2015	Beechey Point	1767	6253
Y01768	Shell	8/1/2005	Relinquished	7/24/2015	Beechey Point	1768	6254
Y01769	Shell	8/1/2005	Relinquished	7/24/2015	Beechey Point	1769	6255
Y01770	Shell	8/1/2005	Relinquished	7/24/2015	Beechey Point	1770	6256
Y01772	Eni	8/1/2005	Expired	4/3/2022	Beechey Point	1772	6303
Y01773	Shell	8/1/2005	Relinquished	7/24/2015	Beechey Point	1773	6304
Y01774	Shell	8/1/2005	Relinquished	7/24/2015	Beechey Point	1774	6305
Y01775	Shell	8/1/2005	Relinquished	7/24/2015	Beechey Point	1775	6306
Y01776	Shell	8/1/2005	Relinquished	7/24/2015	Beechey Point	1776	6307
Y01777	Shell	8/1/2005	Relinquished	7/24/2015	Beechey Point	1777	6308
Y01778	Shell	8/1/2005	Relinquished	7/24/2015	Beechey Point	1778	6309
Y01780	Eni	8/1/2005	Expired	4/3/2022	Beechey Point	1780	6353
Y01781	Shell	8/1/2005	Relinquished	6/23/2016	Beechey Point	1781	6354
Y01782	Shell	8/1/2005	Relinquished	7/24/2015	Beechey Point	1782	6355
Y01783	Shell	8/1/2005	Relinquished	7/24/2015	Beechey Point	1783	6356
Y01784	Shell	8/1/2005	Relinquished	7/24/2015	Beechey Point	1784	6358

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y01785	Shell	8/1/2005	Relinquished	7/24/2015	Beechey Point	1785	6359
Y01786	Shell	8/1/2005	Relinquished	7/24/2015	Beechey Point	1786	6360
Y01787	Shell	8/1/2005	Relinquished	7/24/2015	Beechey Point	1787	6404A
Y01788	Shell	8/1/2005	Relinquished	7/24/2015	Beechey Point	1788	6406
Y01789	Shell	8/1/2005	Relinquished	7/24/2015	Beechey Point	1789	6409
Y01790	Shell	8/1/2005	Relinquished	7/24/2015	Beechey Point	1790	6410
Y01791	Shell	8/1/2005	Relinquished	7/24/2015	Beechey Point	1791	6411
Y01792	Shell	8/1/2005	Relinquished	7/24/2015	Beechey Point	1792	6412
Y01793	Shell	8/1/2005	Relinquished	7/24/2015	Beechey Point	1793	6460
Y01794	Shell	8/1/2005	Relinquished	7/24/2015	Beechey Point	1794	6461
Y01795	Shell	8/1/2005	Relinquished	7/24/2015	Beechey Point	1795	6462
Y01796	Shell	8/1/2005	Relinquished	7/24/2015	Beechey Point	1796	6463
Y01797	Conoco	8/1/2005	Relinquished	12/22/2008	Beechey Point	1797	6464
Y01799	Shell	8/1/2005	Relinquished	7/24/2015	Beechey Point	1799	6512
Y01800	Shell	8/1/2005	Relinquished	7/24/2015	Beechey Point	1800	6513
Y01804	ASRC Exploration	8/1/2005	Relinquished	4/16/2020	Flaxman Island	1804	6657
Y01805	ASRC Exploration	8/1/2005	Relinquished	4/16/2020	Flaxman Island	1805	6658
Y01806	ASRC Exploration	8/1/2005	Relinquished	4/16/2020	Flaxman Island	1806	6659
Y01807	ASRC Exploration	8/1/2005	Relinquished	4/16/2020	Flaxman Island	1807	6707
Y01808	ASRC Exploration	8/1/2005	Relinquished	4/16/2020	Flaxman Island	1808	6708
Y01809	ASRC Exploration	8/1/2005	Relinquished	4/16/2020	Flaxman Island	1809	6709
Y01810	Shell	8/1/2005	Relinquished	6/28/2016	Flaxman Island	1810	6712
Y01811	Shell	8/1/2005	Relinquished	6/28/2016	Flaxman Island	1811	6713
Y01812	ASRC Exploration	8/1/2005	Relinquished	4/16/2020	Flaxman Island	1812	6757
Y01813	ASRC Exploration	8/1/2005	Relinquished	4/16/2020	Flaxman Island	1813	6758
Y01816	Shell	8/1/2005	Relinquished	6/28/2016	Flaxman Island	1816	6764
Y01817	Shell	8/1/2005	Relinquished	7/21/2009	Flaxman Island	1817	6765
Y01818	Shell	8/1/2005	Relinquished	7/21/2009	Flaxman Island	1818	6766
Y01819	Shell	8/1/2005	Relinquished	7/21/2009	Flaxman Island	1819	6767
Y01820	Shell	8/1/2005	Relinquished	7/16/2015	Flaxman Island	1820	6773
Y01821	Shell	8/1/2005	Relinquished	7/16/2015	Flaxman Island	1821	6774
Y01822	Shell	8/1/2005	Relinquished	6/28/2016	Flaxman Island	1822	6814
Y01823	Shell	8/1/2005	Relinquished	6/28/2016	Flaxman Island	1823	6815

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y01824	Shell	8/1/2005	Relinquished	7/21/2009	Flaxman Island	1824	6817
Y01825	Shell	8/1/2005	Relinquished	7/21/2009	Flaxman Island	1825	6818
Y01826	Shell	8/1/2005	Relinquished	7/16/2015	Flaxman Island	1826	6822
Y01827	Shell	8/1/2005	Relinquished	7/16/2015	Flaxman Island	1827	6823
Y01828	Shell	8/1/2005	Relinquished	7/16/2015	Flaxman Island	1828	6824
Y01830	Shell	8/1/2005	Relinquished	7/21/2009	Flaxman Island	1830	6870
Y01831	Shell	8/1/2005	Relinquished	7/21/2009	Flaxman Island	1831	6871
Y01832	Shell	8/1/2005	Relinquished	7/21/2009	Flaxman Island	1832	6872
Y01833	Shell	8/1/2005	Relinquished	7/16/2015	Flaxman Island	1833	6873
Y01834	Shell	8/1/2005	Relinquished	7/16/2015	Flaxman Island	1834	6874
Y01835	Shell	8/1/2005	Relinquished	7/21/2009	Flaxman Island	1835	6921
Y01836	Shell	8/1/2005	Relinquished	7/21/2009	Flaxman Island	1836	6922
Y01837	Shell	8/1/2005	Relinquished	7/21/2009	Flaxman Island	1837	6923
Y01838	Shell	8/1/2005	Relinquished	7/21/2009	Flaxman Island	1838	6924
Y01839	Shell	8/1/2005	Relinquished	7/16/2015	Barter Island	1839	6751
Y01840	Shell	8/1/2005	Relinquished	7/16/2015	Barter Island	1840	6752
Y01841	Shell	8/1/2005	Relinquished	7/16/2015	Barter Island	1841	6801
Y01842	Shell	8/1/2005	Relinquished	7/16/2015	Barter Island	1842	6802
Y01843	Shell	8/1/2005	Relinquished	7/16/2015	Barter Island	1843	6851
Y01844	Shell	8/1/2005	Relinquished	7/21/2009	Barter Island	1844	6901
Y01803	Nacra	None	Unexecuted	None	Beechey Point	1803	6822
Y01814	Shell	None	Rejected	None	Flaxman Island	1814	6762
Y01815	Shell	None	Rejected	None	Flaxman Island	1815	6763
Y01829	Nacra	None	Unexecuted	None	Flaxman Island	1829	5856B

Note: ASRC = Arctic Slope Regional Corporation
Source: BOEM 2023b

4.1.9.2 Surveys

Between 2006 and 2012 there were two geohazard surveys, one 3D seismic survey, and one sound source characterization survey documented as a result of Lease Sale 195, as shown in Table 4.1.9-2.

Table 4.1.9-2. Survey activity summary

Activity Start Date	Activity End Date	Year	Activity Name	Description	Vessel Name	Operator and Contractor
8/1/2006	10/3/2006	2006	Geohazard survey	Shallow hazard and site clearance surveys were conducted using various methods and tools including a small airgun array. Small geophysical survey sources with limited energy output were employed to measure bathymetry, topography, geohazards, and other seabed characteristics.	M/V Henry Christoffersen	Shell Offshore Inc.
8/20/2007	10/2/2007	2007	Geohazard survey	Site clearance, shallow hazard surveys, and geotechnical surveys were conducted. An airgun cluster and a small airgun array were used as well as other acoustic sources and sound source measurements of the airgun array.	M/V Henry Christoffersen, Peregrine, Maxime	Shell Offshore Inc.
8/28/2007	11/4/2007	2007	3D marine seismic program	Deep seismic acquisition was conducted using airgun array and hydrophone streamers. 1,812 miles of deep-seismic data were acquired in the Chukchi Sea and 492 miles in the Beaufort Sea.	M/V Gilavar, Gulf Provider, Norseman II, Jim Kilabuk, Nanuq, American Island, Peregrine, Maxime	Shell Offshore Inc.
9/26/2012	10/22/2012	2012	Sound source characteri-zation	Sound source characterizations were performed. In addition to measurements of vessel sounds, various drilling and support activities were also characterized.	M/V Noble Discoverer (drill rig), Fennica, Nordica, Tor Viking, Aiviq, Harvey Explorer, Harvey Spirit, Harvey Sisuaq, Arctic Seal, Affinity, Nanuq, Guardsman, Pt. Oliktok, Barbara Foss, Lauren Foss, Warrior	Shell Offshore Inc.

Note: 3D = three-dimensional
Sources: BOEM 2023b; Bisson et al. 2013; Funk et al. 2007

4.1.9.3 Well Drilling

One exploration well and one top-hole-only (partially drilled) well were drilled as a result of Lease Sale 195, as summarized in Table 4.1.9-3.

Table 4.1.9-3. Well drilling summary

Activity Start Date	Activity End Date	Well Name (includes API no. and bottom hole lease number)	Well Type	Well Depth (feet)	Drill Rig Name
10/4/2012	10/22/2015	API no. 551710001300 (SIVULLIQ 1) on OCS Y-1805	Top Hole	1,090	Kulluk
12/25/2017	7/27/2018	API no. 506292358300 (NORTH 01) on NIKAITCHUQ	Exploration	5,922	Doyon Rig, Spy Island drillsite

Notes: API = American Petroleum Institute; OCS = Outer Continental Shelf
Sources: Bisson et al. 2013; BOEM 2019b, 2020, 2022b, 2023c, 2023d

4.1.9.4 Platforms

There is one documented platform use resulting from Lease Sale 195, as summarized in Table 4.1.9-4. The platform was initially developed for State of Alaska wells and then used to drill an exploration well resulting from Lease Sale 195.

Table 4.1.9-4. Platform summary

Activity Start Date	Name	Description	Operator
1/1/2008	Spy Island drillsite	Development of Spy Island drillsite to support supported the drilling of exploration well API no. 50629235830000 (NIKAITCHUQ NORTH 01)	Eni US Operating Co. Inc.

Note: API = American Petroleum Institute
Source: Funk et al. 2011

4.1.9.5 Oil-and-Gas-Supporting Activities

Identified oil-and-gas-supporting activities as a result of Lease Sale 195 included facility support and transportation from facilities and shorebases to relevant activity sites (if documented), as summarized in Table 4.1.9-5 and Table 4.1.9-6.

Table 4.1.9-5. Facility support summary

Facility Name	Facility Type	Description	Supported Activity
Barrow shorebase	Onshore shorebase complex	The Barrow shorebase was where the dedicated search-and-rescue S-92 helicopter remained grounded except during training drills, emergencies, and other non-routine events. Activities also occurred in the Chukchi Sea Planning Area.	Drilling well OCS Y-1805 SIVULLIQ 1

Source: Bisson et al. 2013

Table 4.1.9-6. Summary of transportation activity

Facility Name	Facility Type	Supported Activity	No. Aircraft	No. Vessels	Vessel Names	No. Vehicles
Deadhorse Airport	Airport	Helicopter support (S-92) for activities at well OCS Y-1805 SIVULLIQ 1	3	N/A	N/A	N/A
Barrow Airport	Airport	Helicopter support (S-92) for activities at well OCS Y-1805 SIVULLIQ 1	3	N/A	N/A	N/A
Dutch Harbor Port	Port	Deep seismic survey, shallow hazard and site clearance surveys in Chukchi Sea and Beaufort Sea and activities at the Sivulliq N (OCS Y-1805 SIVULLIQ 1) drillsite	N/A	17	M/V Gilavar, M/V Noble Discoverer (drill rig), Fennica, Nordica, Tor Viking, Aiviq, Harvey Explorer, Harvey Spirit, Harvey Sisuaq, Arctic Seal, Affinity, Nanuq, Guardsman, Pt. Oliktok, Barbara Foss, Lauren Foss, Warrior	N/A
Nome Port	Port	Deep seismic survey, shallow hazard and site clearance surveys in Chukchi Sea and Beaufort Sea	N/A	1	M/V Gilavar	N/A
Oliktok Dock	Port	Development of the Spy Island drill site	N/A	2	Hovercraft, Greta Akpik	N/A

Notes: M/V = motor vessel; N/A = not applicable
Sources: Bisson et al. 2013; Funk et al. 2008

4.1.9.6 E&D Scenario Summary

A scenario was developed for the Alaska OCS Beaufort Sea Oil and Gas Lease Sale 186 Final Environmental Impact Statement (MMS 2003) to assess the potential environmental impacts of the lease sale. The sale consisted of a total of 1,877 blocks, 9.77 million acres of the Beaufort Sea Planning Area. The mean resource estimate used was 460 MMbbl. Activities associated with the E&D scenario (MMS 2003) are summarized in Table 4.1.9-7.

It was estimated that Sale 195 exploration and development activities and timeframes likely would vary only slightly from Sale 186. Total exploration and development wells drilled would be the same, and the type of exploration and production platforms used would be the same. Exploration drilling would begin in 2005, 2 years after the sale was held, and peak production was assumed to occur 3 years after the sale. It was assumed two new fields would be discovered, with production potential for each field ranging from 120 to 340 MMbbl of oil. The first production platform would be online in 2012, with production beginning 1 year later. Production from Sale 195 tracts was expected to continue until 2036, 3 years beyond the end of Sale 185 production. Assumed pipeline landfall sites for this sale would be the same as assumed for Sale 186; however, because of the assumed potential for Sale 195 to develop resources in blocks farther from existing infrastructure, a new support facility was forecasted to be constructed near Point Thomson (MMS 2003).

Table 4.1.9-7. Summary of basic assumptions of Lease Sale 195 E&D scenario

Element	Mean Case
Sale acreage offering	9.77 million acres
Recoverable oil	460 MMbbl
Peak production oil	39.4 MMbbl yearly
Exploration	Exploration
Number of wells – exploration	6
Number of wells – delineation	6
Drill rigs	1-2
Helicopter flights – exploration (annually)	155 trips
Total drilling muds – exploration	1,040 short tons
Total cuttings – exploration	6,300 short tons
Supply Boat (annually)	0–14 trips
Helicopter flights – construction (monthly)	300-600
Development and Production	Development and Production
Platforms – development and production	3
Number of wells – production and service	102
Number of fields	2
Helicopter flights – production (monthly)	28–56 trips
Helicopter flights – development (monthly)	12–28 trips
Total drilling muds – development and production	13,300 short tons
Total cuttings – development and production	84,000 short tons
Transportation	Transportation
Offshore pipeline miles	40 miles
Tanker transport – peak year of production	2018
Tanker transport – number of loadings	56

Notes: Exploration and Development; MMbbl = million barrels
Source: MMS 2003

4.1.9.7 Comparison of E&D Scenario and Historical Activities

A comparison of the E&D scenario and the historical activities are provided in Table 4.1.9-8, using available information.

Table 4.1.9-8. Comparison of E&D and historical activities

Activity	E&D Scenario	Actual Activities
Recoverable oil (maximum)	460 MMbbl	--
Sale acreage offering	9.77 million acres	9,301,423 acres offered

Activity	E&D Scenario	Actual Activities
Sale	--	607,285 acres leased
Date of exploratory activities (begin)	2005	2006
Number of wells – exploration and delineation	12 (6 exploration, 6 delineation)	2 (1 exploration, 1 top-hole-only)
Number of wells – production and service	102	0
Average well depth	--	5,922 feet
Drill rigs	1–2	2
Drilling muds – exploration	1,040 short tons	--
Drilling muds – development and production	13,300 short tons	0
Drilling cuttings – exploration	6,300 short tons	--
Drilling cuttings – development and production	84,000 short tons	0
Number of G&G or other surveys	--	4
Support facility and shorebase locations	Prudhoe Bay	Barrow
Helicopter flights – exploration (annually)	155 trips	3 aircraft, frequency undocumented
Helicopter flights – construction (monthly)	300–600	0
Helicopter flights – production (monthly)	28–56 trips	0
Helicopter flights – development (monthly)	12–28 trips	0
Other sites used	Point Thomson	Nome, Dutch Harbor, Oliktok Dock, Deadhorse
Peak production oil	39.4 MMbbl yearly	0
Platforms	3	1
Offshore pipeline miles	40 miles	0
Production treatment facilities	--	0
Supply and support boats (exploration)	0–14 trips annually	Frequency undocumented
Tanker transport – peak year of production	2018	--
Tanker transport – number of loadings	56	0

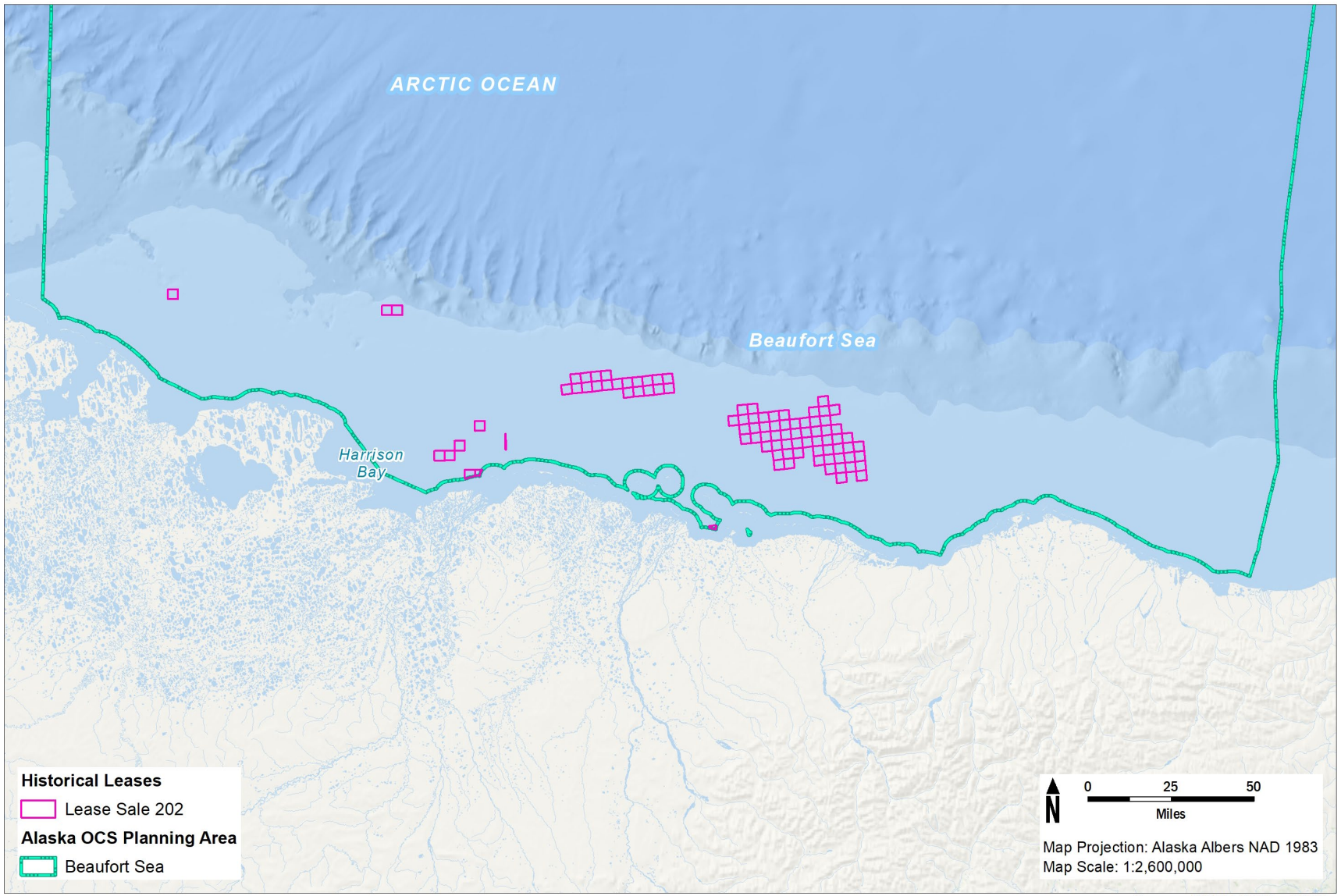
Notes: -- = no data provided; E&D = Exploration and Development; G&G = geological and geophysical; MMbbl = million barrels

4.1.10 Lease Sale 202 (2007)

The leases associated with Lease Sale 202 are shown in Figure 4-12.

4.1.10.1 Leasing

As shown in Table 4.1-1 and Figure 4-12, as a result of Lease Sale 202, there were 1,654 tracts offered and 90 leases issued. There were 8,734,194 acres offered and 490,700 acres leased. There is one active lease from Lease Sale 202 with an active lease area of 1.10 hectares. Table 4.1.10-1 summarizes documented information associated with the leasing as a result of Lease Sale 202.



Source: BOEM 2022c, 2023b.

Figure 4-12. Historical oil and gas activities associated with Lease Sale 202, 2007

Table 4.1.10-1. Lease information as a result of Lease Sale 202

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y01854	Conoco	7/1/2007	Relinquished	1/20/2009	Dease Inlet	1854	6664
Y01886	Hilcorp	7/1/2007	Extended	None	Beechey Point	1886	6871
Y01912	ASRC Exploration	7/1/2007	Relinquished	4/16/2020	Flaxman Island	1912	6406
Y01913	ASRC Exploration	7/1/2007	Relinquished	4/16/2020	Flaxman Island	1913	6407
Y01921	ASRC Exploration	7/1/2007	Relinquished	4/16/2020	Flaxman Island	1921	6457
Y01936	ASRC Exploration	7/1/2007	Relinquished	4/16/2020	Flaxman Island	1936	6559
Y01937	ASRC Exploration	7/1/2007	Relinquished	4/16/2020	Flaxman Island	1937	6560
Y01940	ASRC Exploration	7/1/2007	Relinquished	4/16/2020	Flaxman Island	1940	6609
Y01941	ASRC Exploration	7/1/2007	Relinquished	4/16/2020	Flaxman Island	1941	6610
Y01942	ASRC Exploration	7/1/2007	Relinquished	4/16/2020	Flaxman Island	1942	6611
Y01944	ASRC Exploration	7/1/2007	Relinquished	4/16/2020	Flaxman Island	1944	6660
Y01857	Shell	8/1/2007	Relinquished	6/16/2016	Harrison Bay	1857	6221
Y01858	Eni	8/1/2007	Expired	7/31/2017	Harrison Bay	1858	6274
Y01859	Eni	8/1/2007	Relinquished	6/23/2016	Harrison Bay	1859	6319
Y01860	Eni	8/1/2007	Expired	7/31/2017	Harrison Bay	1860	6324
Y01861	Eni	8/1/2007	Relinquished	6/23/2016	Harrison Bay	1861	6367
Y01862	Eni	8/1/2007	Relinquished	6/23/2016	Harrison Bay	1862	6368
Y01863	Eni	8/1/2007	Relinquished	6/23/2016	Harrison Bay	1863	6470
Y01864	Eni	8/1/2007	Relinquished	6/23/2016	Harrison Bay	1864	6471
Y01865	Shell	8/1/2007	Relinquished	7/16/2015	Beechey Point	1865	6009
Y01866	Shell	8/1/2007	Relinquished	7/16/2015	Beechey Point	1866	6010
Y01867	Shell	8/1/2007	Relinquished	7/16/2015	Beechey Point	1867	6011
Y01868	Shell	8/1/2007	Relinquished	7/16/2015	Beechey Point	1868	6012
Y01869	Shell	8/1/2007	Relinquished	7/16/2015	Beechey Point	1869	6058
Y01870	Shell	8/1/2007	Relinquished	7/16/2015	Beechey Point	1870	6059
Y01871	Shell	8/1/2007	Relinquished	7/16/2015	Beechey Point	1871	6060
Y01872	Shell	8/1/2007	Relinquished	7/16/2015	Beechey Point	1872	6061
Y01873	Shell	8/1/2007	Relinquished	7/16/2015	Beechey Point	1873	6062
Y01874	Shell	8/1/2007	Relinquished	7/16/2015	Beechey Point	1874	6063
Y01875	Shell	8/1/2007	Relinquished	7/16/2015	Beechey Point	1875	6064
Y01876	Shell	8/1/2007	Relinquished	7/16/2015	Beechey Point	1876	6065

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y01877	Shell	8/1/2007	Relinquished	7/16/2015	Beechey Point	1877	6066
Y01878	Shell	8/1/2007	Relinquished	7/16/2015	Beechey Point	1878	6067
Y01879	Shell	8/1/2007	Relinquished	7/16/2015	Beechey Point	1879	6068
Y01880	Shell	8/1/2007	Relinquished	7/16/2015	Beechey Point	1880	6114
Y01881	Shell	8/1/2007	Relinquished	7/16/2015	Beechey Point	1881	6115
Y01882	Shell	8/1/2007	Relinquished	7/16/2015	Beechey Point	1882	6116
Y01883	Shell	8/1/2007	Relinquished	7/16/2015	Beechey Point	1883	6117
Y01884	Shell	8/1/2007	Relinquished	7/16/2015	Beechey Point	1884	6118
Y01885	Total	8/1/2007	Relinquished	7/30/2013	Beechey Point	1885	6324
Y01887	Total	8/1/2007	Relinquished	7/30/2013	Flaxman Island	1887	6251
Y01888	Total	8/1/2007	Relinquished	7/30/2013	Flaxman Island	1888	6252
Y01889	Shell	8/1/2007	Relinquished	6/28/2016	Flaxman Island	1889	6259
Y01890	Total	8/1/2007	Relinquished	7/30/2013	Flaxman Island	1890	6301
Y01891	Total	8/1/2007	Relinquished	7/30/2013	Flaxman Island	1891	6302
Y01892	Total	8/1/2007	Relinquished	7/30/2013	Flaxman Island	1892	6303
Y01893	Total	8/1/2007	Relinquished	7/30/2013	Flaxman Island	1893	6304
Y01894	Total	8/1/2007	Relinquished	7/30/2013	Flaxman Island	1894	6305
Y01895	Shell	8/1/2007	Relinquished	6/28/2016	Flaxman Island	1895	6308
Y01896	Shell	8/1/2007	Relinquished	6/28/2016	Flaxman Island	1896	6309
Y01897	Shell	8/1/2007	Relinquished	6/28/2016	Flaxman Island	1897	6310
Y01898	Total	8/1/2007	Relinquished	7/30/2013	Flaxman Island	1898	6351
Y01899	Total	8/1/2007	Relinquished	7/30/2013	Flaxman Island	1899	6352
Y01900	Total	8/1/2007	Relinquished	7/30/2013	Flaxman Island	1900	6353
Y01901	Total	8/1/2007	Relinquished	7/30/2013	Flaxman Island	1901	6354
Y01902	Total	8/1/2007	Relinquished	7/30/2013	Flaxman Island	1902	6355
Y01903	Total	8/1/2007	Relinquished	7/30/2013	Flaxman Island	1903	6356
Y01904	Total	8/1/2007	Relinquished	7/30/2013	Flaxman Island	1904	6357
Y01905	Total	8/1/2007	Relinquished	7/30/2013	Flaxman Island	1905	6358
Y01906	Shell	8/1/2007	Relinquished	6/28/2016	Flaxman Island	1906	6359
Y01907	Total	8/1/2007	Relinquished	7/30/2013	Flaxman Island	1907	6401
Y01908	Total	8/1/2007	Relinquished	7/30/2013	Flaxman Island	1908	6402
Y01909	Total	8/1/2007	Relinquished	7/30/2013	Flaxman Island	1909	6403
Y01910	Total	8/1/2007	Relinquished	7/30/2013	Flaxman Island	1910	6404

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y01911	Total	8/1/2007	Relinquished	7/30/2013	Flaxman Island	1911	6405
Y01914	Total	8/1/2007	Relinquished	7/30/2013	Flaxman Island	1914	6408
Y01915	Shell	8/1/2007	Relinquished	6/28/2016	Flaxman Island	1915	6409
Y01916	Shell	8/1/2007	Relinquished	6/28/2016	Flaxman Island	1916	6410
Y01917	Total	8/1/2007	Relinquished	7/30/2013	Flaxman Island	1917	6453
Y01918	Total	8/1/2007	Relinquished	7/30/2013	Flaxman Island	1918	6454
Y01919	Total	8/1/2007	Relinquished	7/30/2013	Flaxman Island	1919	6455
Y01920	Total	8/1/2007	Relinquished	7/30/2013	Flaxman Island	1920	6456
Y01922	Total	8/1/2007	Relinquished	7/30/2013	Flaxman Island	1922	6458
Y01923	Shell	8/1/2007	Relinquished	6/28/2016	Flaxman Island	1923	6459
Y01924	Shell	8/1/2007	Relinquished	6/28/2016	Flaxman Island	1924	6460
Y01925	Shell	8/1/2007	Relinquished	6/28/2016	Flaxman Island	1925	6461
Y01926	Total	8/1/2007	Relinquished	7/30/2013	Flaxman Island	1926	6504
Y01927	Total	8/1/2007	Relinquished	7/30/2013	Flaxman Island	1927	6505
Y01928	Total	8/1/2007	Relinquished	7/30/2013	Flaxman Island	1928	6506
Y01929	ASRC Exploration	8/1/2007	Relinquished	4/16/2020	Flaxman Island	1929	6508
Y01930	Shell	8/1/2007	Relinquished	6/28/2016	Flaxman Island	1930	6510
Y01931	Shell	8/1/2007	Relinquished	6/28/2016	Flaxman Island	1931	6511
Y01932	Shell	8/1/2007	Relinquished	6/28/2016	Flaxman Island	1932	6512
Y01933	Total	8/1/2007	Relinquished	7/30/2013	Flaxman Island	1933	6554
Y01934	Total	8/1/2007	Relinquished	7/30/2013	Flaxman Island	1934	6555
Y01935	ASRC Exploration	8/1/2007	Relinquished	4/16/2020	Flaxman Island	1935	6558
Y01938	Shell	8/1/2007	Relinquished	6/28/2016	Flaxman Island	1938	6561
Y01939	Shell	8/1/2007	Relinquished	6/28/2016	Flaxman Island	1939	6562
Y01943	ASRC Exploration	8/1/2007	Relinquished	4/16/2020	Flaxman Island	1943	6612
Y01945	ASRC Exploration	8/1/2007	Relinquished	4/16/2020	Flaxman Island	1945	6662
Y01855	Forsgren	None	Unexecuted	None	Harrison Bay North	1855	6762
Y01856	Forsgren	None	Unexecuted	None	Harrison Bay North	1856	6763

Note: ASRC = Arctic Slope Regional Corporation
Source: BOEM 2023b

4.1.10.2 Surveys

As of October 25, 2023, no surveys have been documented as a result of Lease Sale 202. This may change in the future as there is one active lease.

4.1.10.3 Well Drilling

As of October 25, 2023, no wells were drilled as a result of Lease Sale 202. This may change in the future as there is one active lease.

4.1.10.4 Oil-and-Gas-Supporting Activities

As of October 25, 2023, there were no oil-and-gas-supporting activities identified as a result of Lease Sale 202. This may change in the future as there is one active lease.

4.1.10.5 E&D Scenario Summary

A scenario was developed for the Alaska OCS Beaufort Sea Oil and Gas Lease Sale 186 Final Environmental Impact Statement (MMS 2003) to assess the potential environmental impacts of the lease sale. The sale consisted of a total of 1,877 blocks, 9.77 million acres of the Beaufort Sea Planning Area. The mean resource estimate used was 460 MMbbl. Activities associated with the E&D scenario (MMS 2003) are summarized in Table 4.1.10-2.

Under the scenario, exploration and development timeframes and activities were estimated to vary somewhat from those considered for Sales 186 and 195. Exploration activities would be expected to begin 3 years after the sale date, with an estimated total of 11 exploration and delineation wells drilled over an 8-year period. Exploration platform types used for Sale 202 were expected to be the same as those described previously for Sale 195. However, deeper and more distant production operations, if they occurred, could have required bottom-founded ice-reinforced steel or concrete structures for the production phase. For Sale 202, it was assumed that a single field would produce 460 MMbbl of oil over its life from two platforms, a main and a satellite platform. It was assumed that some production could come from extended-reach drilling or subsea completions to reach oil pools that lied under deeper waters. For Sale 202, the first production platform was estimated to be completed in 2018, with production beginning the next year. Oil production could continue until 2038. It was assumed that there could be 35 miles of offshore pipeline for this scenario, which was 5 miles shorter than for Sales 186 and 195. However, Sale 202 assumed a new landfall distant from existing oil infrastructure and, therefore, its development could have required a new overland pipeline (MMS 2003).

Table 4.1.10-2. Summary of basic assumptions of Lease Sale 202 E&D scenario

Element	Mean Case
Sale acreage offering	9.77 million acres
Recoverable oil	460 MMbbl
Peak production oil	38.6 MMbbl yearly
Exploration	Exploration
Number of wells – exploration	6
Number of wells – delineation	5
Drilling rigs	1
Helicopter flights – exploration (annually)	140 trips

Element	Mean Case
Total drilling muds – exploration	925 short tons
Total cuttings – exploration	5,775 short tons
Supply boat (annually)	0–7 trips
Helicopter flights – construction (monthly)	600
Development and Production	Development and Production
Platforms – development and production	2
Number of wells – production and service	102
Number of fields	1
Helicopter flights – production (monthly)	56 trips
Helicopter flights – development (monthly)	28 trips
Total drilling muds – development and production	13,300 short tons
Total cuttings – development and production	84,000 short tons
Transportation	Transportation
Offshore pipeline miles	40
Onshore pipeline miles	85
Tanker transport – peak year of production	2020–2024
Tanker transport – number of loadings	55

Notes: E&D = Exploration and Development; MMbbl = million barrels
Source: MMS 2003

4.1.10.6 Comparison of E&D Scenario and Historical Activities

A comparison of the E&D scenario and the historical activities are provided in Table 4.1.10-3, using available information.

Table 4.1.10-3. Comparison of E&D and historical activities

Activity	E&D Scenario	Actual Activities
Recoverable oil (maximum)	460 MMbbl	--
Sale acreage offering	9.77 million acres	8,734,194 acres offered
Sale	--	490,700 acres leased
Date of exploratory activities (begin)	2010	--
Number of wells – exploration and delineation	11 (6 exploration, 5 delineation)	0
Number of wells – production and service	102	0
Average well depth	--	0
Drilling rigs	1	0
Drilling muds – exploration	925 short tons	0

Activity	E&D Scenario	Actual Activities
Drilling muds – development and production	13,300 short tons	0
Drilling cuttings – exploration	5,775 short tons	0
Drilling cuttings – development and production	84,000 short tons	0
Number of G&G or other surveys	--	0
Support facility and shorebase locations	Prudhoe Bay	--
Helicopter flights – exploration (annually)	140 trips	0
Helicopter flights – construction (monthly)	600	0
Helicopter flights – production (monthly)	56 trips	0
Helicopter flights – development (monthly)	28 trips	0
Peak production oil	38.6 MMbbl yearly	0
Platforms	2	0
Offshore pipeline miles	40	0
Onshore pipeline miles	85	0
Production treatment facilities	0	0
Supply and support boats	0–7 trips annually (exploration)	0
Tanker transport – peak year of production	2020–2024	0
Tanker transport – number of loadings	55	0

Notes: -- = no data provided; E&D = Exploration and Development; G&G = geological and geophysical; MMbbl = million barrels

4.1.11 Special Case: U.S. v. AK (1997)

Special Case: U.S. v. Alaska (S65) held that State jurisdiction extends 3 miles from the coastline of the mainland and barrier islands. With this, there were leases issued in State of Alaska waters that were determined to be federal jurisdiction. Information on those leases is below.

Historical leases associated with S65 are shown in Figure 4-13.

4.1.11.1 Leasing

As shown in Table 4.1-1 and Figure 4-13, nine tracts and two leases were determined to be federal jurisdiction as a result of S65. There were 10,149 acres in the nine tracts and 10,149 acres were leased. There are no active leases from S65. Table 4.1.11-1 summarizes documented information associated with the leasing as a result of S65.

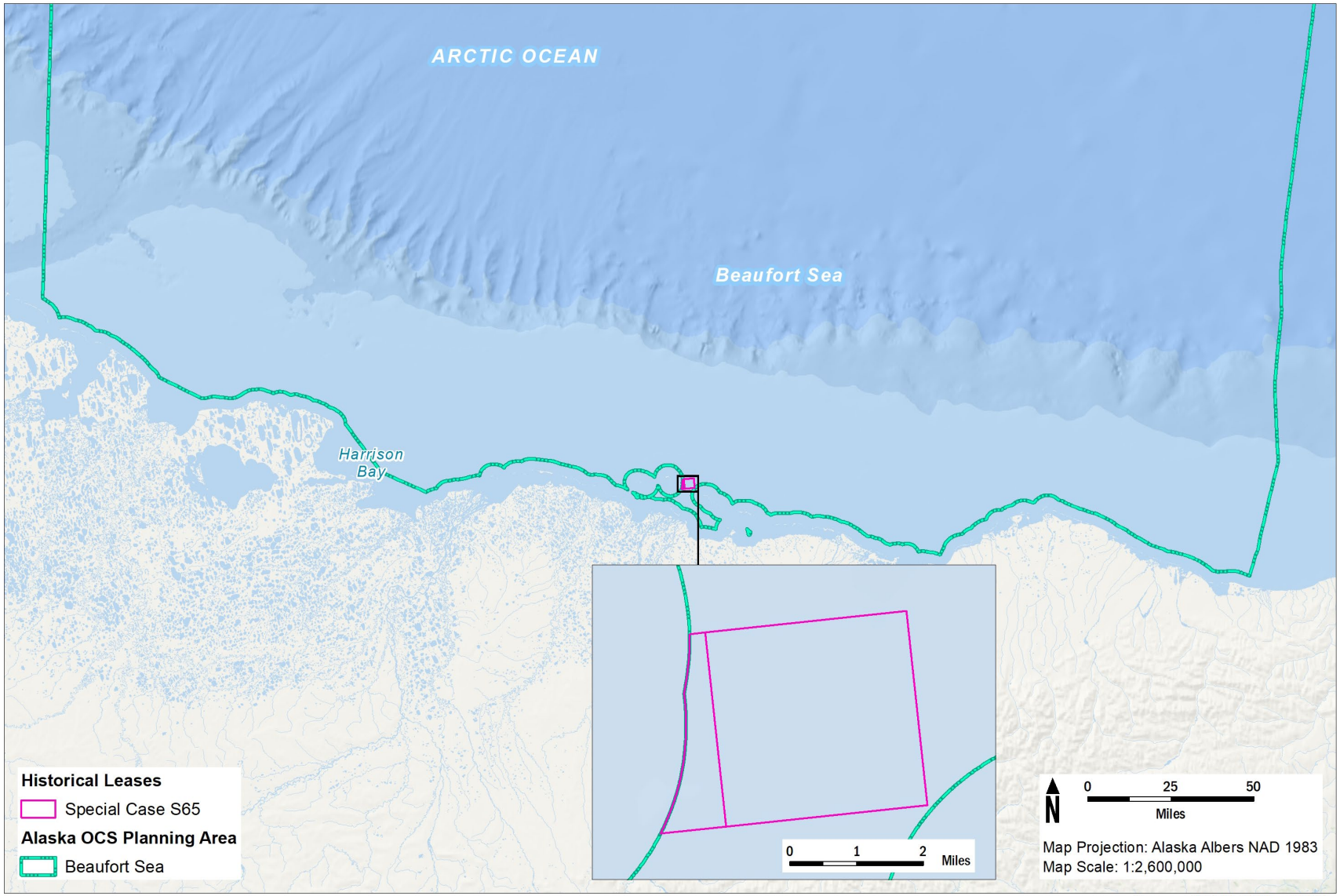


Figure 4-13. Historical oil and gas activities associated with Special Case U.S. v. AK (S65), 1997

Table 4.1.11-1. Lease information as a result of S65

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y01697	Chevron	3/13/2000	Expired	7/31/2001	Beechey Point	6618	6618
Y01698	Chevron	3/13/2000	Expired	7/31/2001	Beechey Point	6619	6619

Source: BOEM 2023b

4.1.11.2 Surveys

No surveys were documented as a result of S65.

4.1.11.3 Well Drilling

No wells were drilled as a result of S65.

4.1.11.4 Oil-and-Gas-Supporting Activities

There were no oil-and-gas-supporting activities identified as a result of S65.

4.1.11.5 E&D Scenario Summary

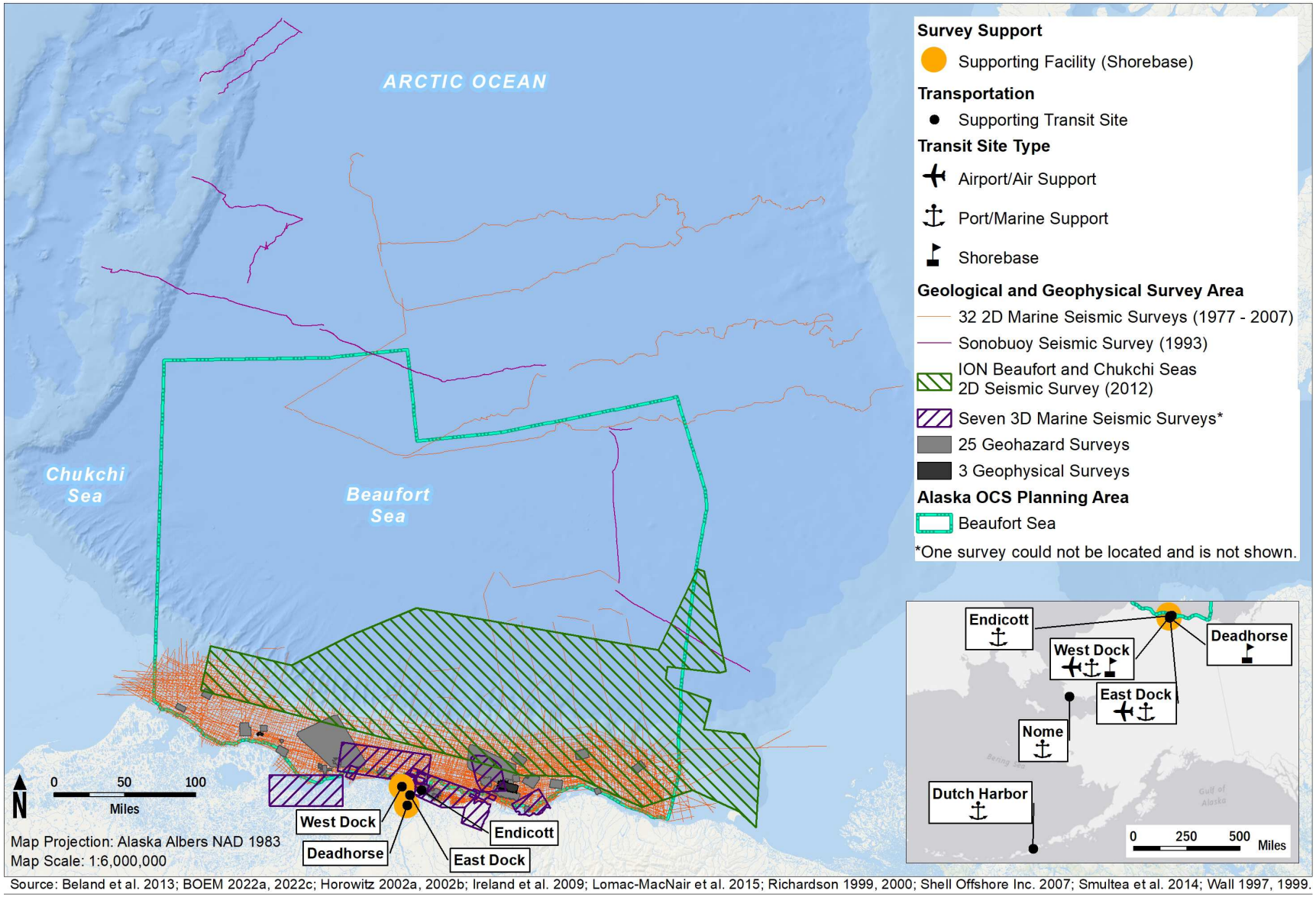
No E&D scenario was developed for S65.

4.1.11.6 Comparison of E&D Scenario and Historical Activities

No E&D scenario was developed for S65.

4.1.12 Activities Not Associated with a Lease Sale

Activities that could not be directly associated with a lease sale are shown in Figure 4-14, such as the supporting facilities, G&G survey areas, and transportation infrastructure.



Source: Beland et al. 2013; BOEM 2022a, 2022c; Horowitz 2002a, 2002b; Ireland et al. 2009; Lomac-MacNair et al. 2015; Richardson 1999, 2000; Shell Offshore Inc. 2007; Smultea et al. 2014; Wall 1997, 1999.

Figure 4-14. Historical oil and gas activities not associated with a lease sale in Beaufort Sea Planning Area

4.1.12.1 Surveys

Between 1971 and 2014, there were 33 2D seismic surveys, 7 3D seismic surveys, 3 geophysical surveys, 25 geohazard surveys, and 1 sonobuoy seismic survey documented that were not associated with a lease sale, as summarized in Table 4.1.12-1.

Table 4.1.12-1. Survey activity summary

Activity Start Date	Activity End Date	Year	Activity Name	Description	Vessel Name(s)	Operator and/or Contractor
1/1/1977	12/31/1977	1997	2D marine seismic program	The 2D multichannel seismic survey used an airgun and streamer as the data acquisition system. A total of 2,946 kilometers were shot with 42 tracklines.	Not specified	WesternGeco
1/1/1977	12/31/1977	1997	2D marine seismic program	The 2D multichannel seismic survey used an airgun and streamer as the data acquisition system. A total of 1,914 kilometers were shot with 46 tracklines.	Not specified	WesternGeco
1/1/1977	1/1/1977	1997	2D marine seismic program	The 2D multichannel seismic survey used an airgun and streamer as the data acquisition system. A total of 4,730 kilometers were shot with 72 tracklines.	Not specified	BOEM (applicant information unavailable)
1/1/1977	1/31/1977	1997	2D marine seismic program	The 2D multichannel seismic survey used an airgun and streamer as the data acquisition system. A total of 5,734 kilometers were shot with 69 tracklines.	Not specified	WesternGeco
2/17/1977	3/26/1977	1997	2D marine seismic program	The 2D multichannel seismic survey used explosives and geophones as the data acquisition system. A total of 4,808 kilometers were shot with 76 tracklines.	Not specified	National Petroleum Reserve Alaska
7/25/1977	10/10/1977	1997	2D marine seismic program	The 2D multichannel seismic survey used an airgun and streamer as the data acquisition system. A total of 5,679 kilometers were shot with 144 tracklines.	M/V Western Geo IV, M/V Western Geo V, M/V Arctic Sun	Western Geophysical Company
8/1/1977	8/31/1977	1997	2D marine seismic program	The 2D multichannel seismic survey used an airgun and streamer as the data acquisition system. A total of 1,254 kilometers were shot with 89 tracklines.	Not specified	WesternGeco

Activity Start Date	Activity End Date	Year	Activity Name	Description	Vessel Name(s)	Operator and/or Contractor
8/2/1977	9/11/1977	1997	2D marine seismic program	The 2D multichannel seismic survey used vibroseis and geophones as the data acquisition system. A total of 5,053 kilometers were shot with 79 tracklines.	M/V Bering Explorer	Geophysical Corporation of Alaska
8/25/1977	10/8/1977	1997	2D marine seismic program	The 2D multichannel seismic survey used an airgun and streamer as the data acquisition system. A total of 5,464 kilometers were shot with 71 tracklines.	Samuel Phillips Lee	Pacific Coastal and Marine Science Center
2/13/1978	5/2/1978	1978	2D marine seismic program	The 2D multichannel seismic survey used an airgun and streamer as the data acquisition system. A total of 527 kilometers were shot with 25 tracklines.	Not specified	Geophysical Service, Inc.
7/1/1978	8/31/1978	1978	2D marine seismic program	The 2D multichannel seismic survey used an airgun and streamer as the data acquisition system. A total of 1,220 kilometers were shot with 110 tracklines.	Not specified	WesternGeco
7/15/1978	9/27/1978	1978	2D marine seismic program	The 2D multichannel seismic survey used an airgun and streamer as the data acquisition system. A total of 2,276 kilometers were shot with 111 tracklines.	M/V Western Beaufort, M/V Arctic Sun	Western Geophysical Company
9/1/1978	9/30/1978	1978	2D marine seismic program	The 2D multichannel seismic survey used an airgun and streamer as the data acquisition system. A total of 1,108 kilometers were shot with 40 tracklines.	Not specified	WesternGeco
1/1/1979	12/31/1979	1979	2D marine seismic program	The 2D multichannel seismic survey used an airgun and streamer as the data acquisition system. A total of 371 kilometers were shot with 10 tracklines.	Not specified	WesternGeco
7/1/1979	9/30/1979	1979	2D marine seismic program	The 2D multichannel seismic survey used an airgun and streamer as the data acquisition system. A total of 422 kilometers were shot with a total of 65 tracklines.	Not specified	WesternGeco
8/1/1979	8/31/1979	1979	2D marine seismic program	The 2D multichannel seismic survey used an airgun and streamer as the data acquisition system. A total of 533 kilometers were shot with 20 tracklines.	Not specified	WesternGeco

Activity Start Date	Activity End Date	Year	Activity Name	Description	Vessel Name(s)	Operator and/or Contractor
2/6/1980	5/3/1980	1980	2D marine seismic program	The 2D multichannel seismic survey used vibroseis and geophones as the data acquisition system. A total of 175 kilometers were shot with six tracklines.	Not specified	Geophysical Service, Inc.
8/1/1980	9/30/1980	1980	2D marine seismic program	The 2D multichannel seismic survey used an airgun and streamer as the data acquisition system. A total of 930 kilometers were shot with 35 tracklines.	Not specified	WesternGeco
1/1/1981	2/28/1981	1981	2D marine seismic program	The 2D multichannel seismic survey used an airgun and streamer as the data acquisition system. A total of 260 kilometers were shot with 15 tracklines.	Not specified	WesternGeco
1/1/1981	12/31/1981	1981	Geophysical survey[1]	The shallow hazard survey for the Tern Island exploration well was conducted in Foggy Island Bay within Tract 42.	Not specified	Shell Oil Company
2/20/1981	4/26/1981	1981	2D marine seismic program	The 2D multichannel seismic survey used vibroseis and geophones as the data acquisition system. A total of 510 kilometers were shot with 19 tracklines.	Not specified	Geophysical Service, Inc.
8/10/1981	9/28/1981	1981	2D marine seismic program	The 2D multichannel seismic survey used an airgun and streamer as the data acquisition system. A total of 5,560 kilometers were shot with 124 tracklines.	Not specified	Western Geophysical Company
9/6/1981	9/28/1981	1981	2D marine seismic program	The 2D multichannel seismic survey used an airgun and streamer as the data acquisition system. A total of 625 kilometers were shot with 13 tracklines.	Not specified	Shell E&P
9/9/1981	9/26/1981	1981	2D marine seismic program	The 2D multichannel seismic survey used an airgun and streamer as the data acquisition system. A total of 1,240 kilometers were shot with 29 tracklines.	Not specified	Geological Services, Inc. (see if name can be confirmed elsewhere)
4/22/1982	9/13/1983	1983	Geohazard survey[1]	The Sandpiper shallow hazard survey was conducted north of Cottle Island.	Not specified	Shell Oil Company
7/24/1982	10/5/1982	1982	2D marine seismic program	The 2D multichannel seismic survey used an airgun and streamer as the data acquisition system. A total of 1,496 kilometers were shot with 34 tracklines.	Not specified	Geophysical Service, Inc.

Activity Start Date	Activity End Date	Year	Activity Name	Description	Vessel Name(s)	Operator and/or Contractor
7/29/1982	10/4/1982	1982	2D marine seismic program	The 2D multichannel seismic survey used an airgun and streamer as the data acquisition system. A total of 5,468 kilometers were shot with 108 tracklines.	Not specified	Western Geophysical Company
1/1/1983	12/31/1983	1983	Geohazard survey[1]	The Fireweed shallow hazard survey was conducted on the Beaufort Sea inner shelf, about 30 kilometers northwest of Cape Halkett.	Not specified	Shell Oil Company
2/1/1983	3/4/1983	1983	Geohazard survey[1]	The over-ice geophysical survey was conducted in Harrison Bay.	Not specified	Sohio Alaska Petroleum Company
2/17/1983	3/22/1983	1983	Geophysical survey[1]	The shallow hazard survey area was conducted on the shallow Beaufort Sea continental shelf, northwest of Cape Halkett. Activities included a multi-channel high-resolution geophysical survey, a geotechnical boring sampling program, and a scuba diving program. This survey was conducted through ice.	Not specified	Exxon Company USA
7/1/1983	8/31/1983	1983	Geohazard survey[1]	The high-resolution geophysical survey was conducted in the eastern Beaufort Sea, north-northwest of Camden Bay.	Not specified	ARCO Alaska, Inc.
8/13/1983	9/23/1983	1983	2D marine seismic program	The 2D multichannel seismic survey used an airgun and streamer as the data acquisition system. Approximately 1,573 line-miles (2,531 kilometers) were shot.	Not specified	Western Geophysical Company
9/10/1983	9/21/1983	1983	Geohazard survey[1]	The Fur Seal Island high-resolution shallow hazard survey was conducted approximately 15 kilometers north of the Colville River delta.	Not specified	Texaco USA
7/27/1984	10/4/1984	1984	2D marine seismic program	The 2D multichannel seismic survey used an airgun with both streamer and Yo-Yo systems deployed as the data acquisition system. Approximately 2,159 line-miles were shot.	Not specified	Western Geophysical Company
8/1/1984	9/30/1984	1984	Geohazard survey[1]	The shallow hazard survey for the Mars exploration well was located approximately 2 kilometers northeast of Cape Halkett.	Not specified	AMOCO Production Company

Activity Start Date	Activity End Date	Year	Activity Name	Description	Vessel Name(s)	Operator and/or Contractor
8/1/1984	9/30/1985	1985	Geohazard survey[1]	The shallow hazard survey was conducted approximately 22 kilometers north of the of the Colville River delta. Side-scan sonar, bathymetric profiler, sub-bottom profiler, boomer, water gun, and airgun arrays were used to investigate the surface and sub-surface geology.	Not specified	Tenneco Oil Company
8/13/1984	9/21/1984	1984	Geohazard survey[1]	The shallow hazard survey was located approximately 30 kilometers northwest of Cape Halkett. The geophysical systems utilized in the survey included: hydrographic echosounder, side-scan sonar, sub-bottom profiler, boomer profiler, and 24 channel seismic data.	Not specified	ARCO Alaska, Inc.
9/8/1984	9/20/1984	1984	Geohazard survey[1]	The high-resolution site-specific shallow hazard survey was conducted approximately 16 kilometers north of Flaxman Island.	Not specified	Union Oil Company of California
9/11/1984	9/25/1984	1984	Geohazard survey[1]	The shallow hazard survey for the Eric drilling prospect was conducted approximately 10 kilometers northwest of Barter Island.	Not specified	Union-Shell-AMOCO Bidding Group
9/22/1984	9/22/1984	1984	Geohazard survey[1]	The shallow hazard survey for the Corona exploration well was conducted approximately 30 kilometers north-northeast of Camden Bay.	M/V Frank Broderick, Point Thomson	Union-Shell-AMOCO Bidding Group
9/25/1984	9/27/1984	1984	Geohazard survey[1]	The shallow hazard survey was conducted approximately 30 kilometers northeast of Flaxman Island.	Not specified	Union Oil Company of California
9/28/1984	10/21/1984	1984	2D marine seismic program	The 2D multichannel seismic survey used an airgun and streamer as the data acquisition system. A total of 1,300 kilometers were shot with 31 tracklines.	Not specified	Union Oil Company of California
3/7/1985	3/31/1985	1985	Geohazard survey[1]	The shallow drilling hazard survey lies 18 kilometers north-northeast of Cape Halkett. A winter on-ice multichannel high-resolution geophysical survey and a winter geotechnical borehole sampling and scuba diving program.	Not specified	Geophysical Service, Inc.

Activity Start Date	Activity End Date	Year	Activity Name	Description	Vessel Name(s)	Operator and/or Contractor
7/22/1985	10/3/1985	1985	2D Marine Seismic Program	The 2D multichannel seismic survey used airguns as the data acquisition system. Approximately 3,677 kilometers were shot.	Not specified	Exxon Company USA
8/11/1985	8/28/1985	1985	Geohazard survey[1]	The shallow hazard survey was located approximately 64 kilometers north-northwest of Demarcation Bay.	M/V Arctic Rose	Western Geophysical Company
8/13/1985	9/16/1985	1985	2D marine seismic program	The 2D multichannel seismic survey used airguns as the data acquisition system. Approximately 3,219 kilometers were shot.	Not specified	AMOCO Production Company
8/28/1985	9/13/1985	1985	Geohazard survey[1]	The shallow hazard survey was conducted approximately 60 kilometers north-northeast of the village of Kaktovik.	M/V Arctic Rose	Geophysical Service, Inc.
8/19/1987	8/22/1987	1987	Geohazard survey[1]	The high-resolution shallow hazard survey was conducted approximately 30 kilometers northeast of the village of Kaktovik.	R/V Western Polaris	AMOCO Production Company
9/5/1987	9/28/1987	1987	2D marine seismic program	The 2D multichannel seismic survey used an airgun and streamer as the data acquisition system. A total of 1,213 kilometers were shot with 25 tracklines.	Not specified	Tenneco Oil Company
8/1/1988	8/31/1988	1988	Geohazard survey[1]	The Karluk shallow hazard survey was located northwest of Foggy Island Bay. A total of 240 kilometers of geophysical data and 12 kilometers of underwater video data were collected.	Not specified	Western Geophysical Company
8/5/1989	8/10/1989	1989	Geohazard survey[1]	The shallow hazard survey was conducted approximately 80 kilometers northeast of Point Barrow on the Beaufort Sea Continental Shelf.	Not specified	Chevron U.S.A. Inc.
9/4/1989	9/8/1989	1989	Geohazard survey[1]	The shallow hazard survey for the Galahad exploration well was located approximately 60 kilometers northeast of Flaxman Island. This was a high-resolution seismic survey.	M/V Arctic	Chevron U.S.A. Inc.
9/5/1989	9/8/1989	1989	Geohazard survey[1]	The West Maktar high-resolution shallow hazard survey was conducted approximately 40 kilometers north-northwest of Camden Bay.	M/V Western Aleutian	AMOCO Production Company

Activity Start Date	Activity End Date	Year	Activity Name	Description	Vessel Name(s)	Operator and/or Contractor
4/15/1991	4/25/1991	1991	Geohazard survey[1]	The shallow hazard survey was conducted for the proposed offshore well at the Cabot #1 Prospect, approximately 10 kilometers north of Dease Inlet.	Not specified	Chevron U.S.A. Inc.
10/1/1992	10/31/1992	1992	Geophysical survey[1]	The high-resolution geophysical survey was conducted over portions of the Kuvlum Prospect. The survey was located 15 kilometers northwest of Camden Bay.	M/V Kigoriak	ARCO Alaska, Inc.
8/17/1993	9/15/1993	1993	Sonobuoy seismic	The 2D multichannel seismic survey used an airgun and sonobuoy as the data acquisition system. A total of 1,689 kilometers were shot with 15 tracklines.	Polar Star	ARCO Alaska, Inc.
8/1/1997	8/31/1997	1997	Geohazard survey[1]	The shallow hazard survey was conducted in Camden Bay.	M/V Sea Ducer, M/V Stryker	Pacific Coastal and Marine Science Center
3/19/1998	4/30/1998	1998	3D marine seismic program[1]	The 3D marine seismic survey was conducted in the Beaufort Sea. A total of 197 square miles was acquired. Airguns were to be used as the energy source.	Western Geophysical Camp	ARCO Alaska, Inc.
7/24/1998	10/11/1998	1998	3D marine seismic program[1]	The 3D ocean bottom cable seismic survey was conducted in shallow waters of the central Alaskan Beaufort. Airgun arrays were the energy source.	R/V Arctic Star, R/V Saber Tooth, Western Endeavor, Western Frontier, La Brisa, Peregrine Falcon	Western Geophysical Company
7/23/1999	9/1/1999	1999	3D marine seismic program[1]	The 3D ocean bottom cable seismic survey was conducted near and south of Cross Island in the Beaufort Sea using an airgun array as the energy source.	R/V Arctic Star, Western Frontier, Peregrine Falcon, Western Endeavor	Western Geophysical Company
2/27/2000	4/5/2000	2000	3D marine seismic program[1]	For this 3D marine seismic survey, a total of 167 square miles of data were collected, using airguns as the energy source.	Western Geophysical Camp	Western Geophysical Company

Activity Start Date	Activity End Date	Year	Activity Name	Description	Vessel Name(s)	Operator and/or Contractor
3/10/2007	5/10/2007	2007	3D marine seismic program[1]	The 3D seismic survey was conducted over ice in the Beaufort Sea using vibrators, impact sources, and small volume airguns as energy sources. Two-wheeled GVW vibrators were permitted to be used.	Not specified	Western Geophysical Company
8/30/2007	10/11/2007	2007	2D marine seismic program	The 2D multichannel seismic survey partially occurred in the Beaufort Sea Planning Area with an airgun and streamer as the data acquisition system. A total of 2,953 kilometers were shot with 29 tracklines.	CCGS Louis S. St-Laurent	ARCO Alaska, Inc.
7/18/2008	10/11/2008	2008	3D marine seismic program[1]	The 3D deep seismic survey activities in the Chukchi Sea used a 24-airgun array. There were 905 miles of seismic data acquisition in the Chukchi Sea. The 3D deep seismic survey activities in the Beaufort Sea used a 24-airgun array. There were 1,517 miles of seismic data acquisition in the Beaufort Sea.	M/V Gilavar, M/V Gulf Provider, M/V Torsvik, and M/V Theresa, Maxime	Shell Offshore Inc.
7/22/2008	9/13/2008	2008	Geohazard survey[1]	Shallow hazards and site clearance surveys in the Chukchi Sea using airgun arrays and other types of low-energy acoustic sources. Shallow hazards and site clearance surveys in the Beaufort Sea used an airgun array and other types of low-energy acoustic sources.	M/V Alpha Helix, R/V Cape Flattery, M/V Henry Christoffer son	Geological Survey of Canada/USGS
10/20/2012	11/15/2012	2012	2D marine seismic program	The 2D seismic survey was primarily conducted in the Beaufort Sea, with some coverage in the Chukchi Sea using a 26-airgun configuration for seismic data acquisition. One seismic line in the Chukchi Sea was surveyed. A total of 1,146 miles of seismic data were collected in the Beaufort and Chukchi Seas.	M/V Geo Arctic, M/V Polar	Shell Offshore Inc.

Activity Start Date	Activity End Date	Year	Activity Name	Description	Vessel Name(s)	Operator and/or Contractor
7/2/2014	9/19/2014	2014	3D marine seismic program[1]	The 3D ocean bottom sensor seismic survey in the North Prudhoe Bay area used two airgun arrays from each source vessel. Three different types of receivers were used for differing habitats/depths.	*R/V Peregrine and R/V Maxime*, four receiver vessels, two crew/ support boats, and multiple vessels for shallow water and shoreline work	Shell Offshore Inc.
7/16/2014	8/5/2014	2014	Geohazard survey[1]	The 2D high-resolution site survey at the Liberty Prospect used a multibeam echosounder. The total line length acquired was 317.1 miles.	R/V Thunder; M/V Freedom	ION Geophysical
8/6/2014	8/30/2014	2014	Geohazard survey[1]	The seabed mapping sonar survey at the Liberty Prospect used a multibeam echosounder, sidescan sonar, subbottom profiler, and magnetometer. The total line length acquired was 387.9 miles.	R/V Thunder; M/V Freedom	BP Exploration (Alaska) Inc.

Notes: 2D = two-dimensional; 3D = three-dimensional; R/V = research vessel, M/V = motor vessel; USGS = U.S. Geological Survey
[1]Not enough information was available to confidently determine if these were related to a lease sale. Of these, the geohazard surveys were the result of an operator with a lease sale, but the lease sale was not determined.
Sources: Banet 2015a, 2015e; Beland et al. 2013; BOEM 2022a, 2023f; Horowitz 2002a, 2002b; Ireland et al. 2009; Lomac-MacNair et al. 2015; Richardson 1999, 2000; Shell Offshore Inc. 2007; Smultea et al. 2014; Triezenberg et al. 2016; USGS 2023; Wall 1997, 1999

4.1.12.2 Oil-and-Gas-Supporting Activities

Identified oil-and-gas-supporting activities not associated with a lease sale included facility support and transportation from facilities and shorebases to relevant activity sites (if documented), as summarized in Table 4.1.12-2 and Table 4.1.12-3.

Table 4.1.12-2. Facility support summary

Facility Name	Facility Type	Description	Supported Activity
Camp near West Dock	Onshore shorebase complex	Crew housing in support of the North Prudhoe Bay 3D OBS Seismic Survey occurred on the vessels, but most crew was housed at a BP Exploration-operated camp near West Dock or at housing in Deadhorse.	3D OBS Seismic Survey

Facility Name	Facility Type	Description	Supported Activity
Housing at Deadhorse	Onshore shorebase complex	Crew housing in support of the North Prudhoe Bay 3D OBS Seismic Survey occurred on the vessels, but most crew was housed at a BP Exploration-operated camp near West Dock or at housing in Deadhorse.	3D OBS Seismic Survey

Notes: 3D = three-dimensional; OBS = ocean-bottom seismometer
Source: Lomac-MacNair et al. 2015

Table 4.1.12-3. Summary of transportation activity

Facility Name	Facility Type	Supported Activity	No. Aircraft	No. Vessels	Vessel Names	No. Vehicles
Dutch Harbor Port	Port	Deep seismic survey and shallow hazard and site clearance surveys in the Chukchi Sea and Beaufort Sea	N/A	8	M/V Gilavar, M/V Gulf Provider, M/V Torsvik, M/V Theresa, Maxime, M/V Alpha Helix, R/V Cape Flattery, M/V Henry Christofferson	N/A
Nome Port	Port	Beaufort and Chukchi Seas 2D seismic survey	N/A	2	M/V Geo Arctic, M/V Polar Prince	N/A
Endicott Dock	Port	Shallow geohazard seismic survey and seabed mapping sonar survey	N/A	2	R/V Thunder, M/V Freedom	N/A
Prudhoe Bay West Dock	Port	Shallow geohazard seismic survey, seabed mapping sonar survey, ocean-bottom seismometer survey	N/A	16	*R/V Thunder, M/V Freedom, R/V Peregrine, R/V Maxime,* four receiver vessels, two crew/support boats, and multiple vessels for shallow water and shoreline work	N/A
Prudhoe Bay East Dock	Port	Ocean-bottom seismometer survey	N/A	14	*R/V Peregrine and R/V Maxime,* four receiver vessels, two crew/support boats, and multiple vessels for shallow water and shoreline work	N/A

Notes: 2D = two-dimensional; M/V = motor vessel; N/A = not applicable; R/V = research vessel
Sources: Beland et al. 2013; Ireland et al. 2009; Lomac-MacNair et al. 2015; Smultea et al. 2014

4.2 Chukchi Sea Planning Area

The Chukchi Sea Planning Area extends from a point just east of Point Barrow west and southwest to Point Hope. Between 1988 and 2007, there were three lease sales in the Chukchi Sea Planning Area:

Lease Sales 109, 126, and 193. There are no active leases in this OCS planning area. A summary of the leases in the Chukchi Sea Planning Area is shown in Table 4.2-1. Information on these leases is provided in the sections below.

Table 4.2-1. Summary of leases in the Chukchi Sea Planning Area

	Lease Sale 109	Lease Sale 126	Lease Sale 193
Year	1988	1991	2007
Tracts offered	4,694	3,476	5,354
Acres offered	25,631,122	18,987,976	29,389,241
Leases issued	350	28	487
Acres leased	1,976,912	159,213	2,758,377
Active leases	0	0	0
Active lease area (hectares)	0	0	0

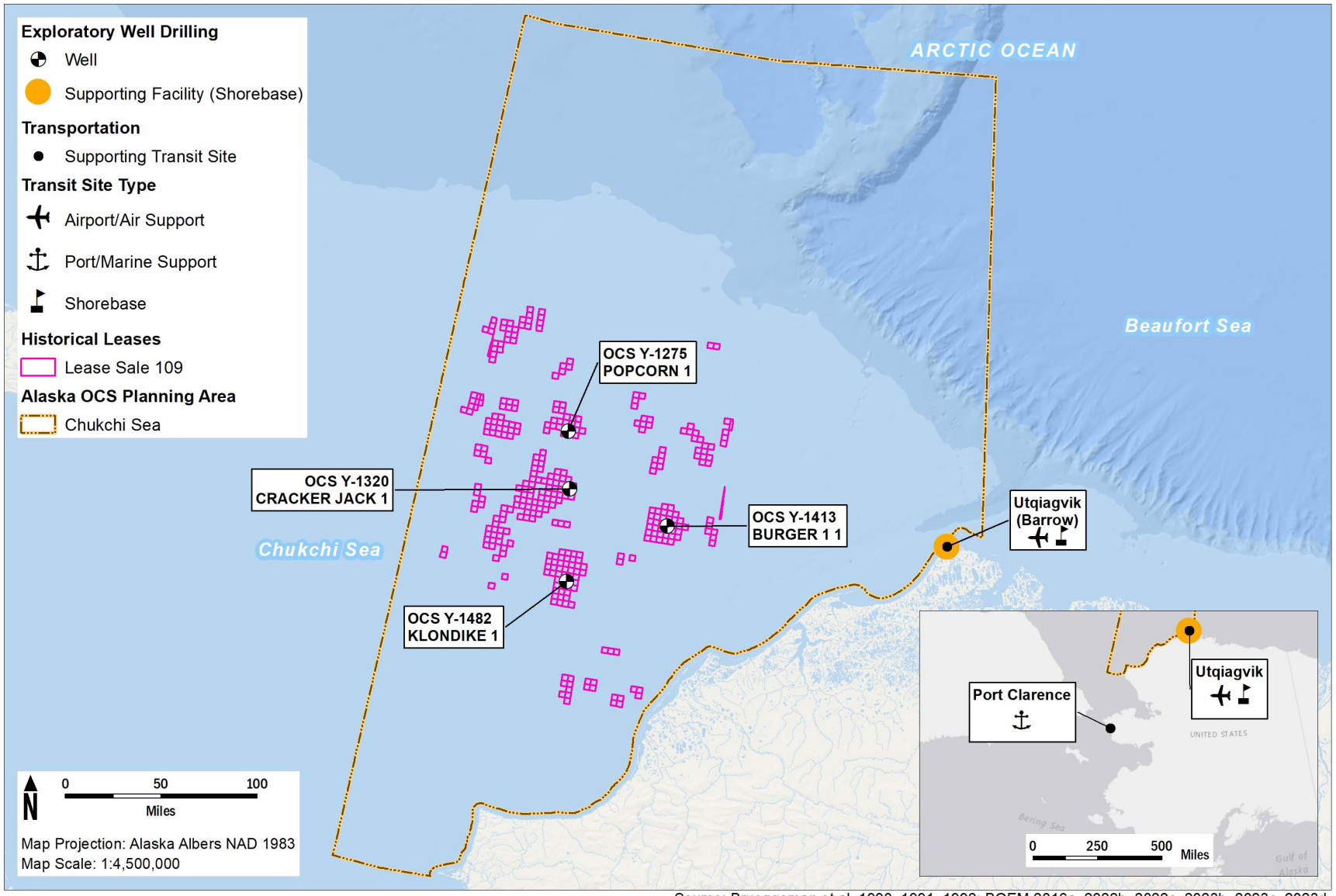
Sources: BOEM 2023b, 2023g, 2023h

4.2.1 Lease Sale 109 (1988)

The identified activities associated with Lease Sale 109 are shown in Figure 4-15, such as the locations of exploration wells and transportation facilities.

4.2.1.1 Leasing

As shown in Table 4.2-1 and Figure 4-15, as a result of Lease Sale 109, there were 4,694 tracts offered and 350 leases issued. There were 25,631,122 acres offered and 1,976,912 acres leased. There are no active leases from Lease Sale 109. Table 4.2.1-1 summarizes documented information associated with the leasing as a result of Lease Sale 109.



Source: Brueggeman et al. 1990, 1991, 1992; BOEM 2016a, 2022b, 2022c, 2023b, 2023c, 2023d.

Figure 4-15. Historical oil and gas activities associated with Lease Sale 109, 1988

Table 4.2.1-1. Lease information as a result of Lease Sale 109

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y01176	Shell	7/1/1988	Relinquished	6/24/1992	Unnamed	1176	373
Y01177	Shell	7/1/1988	Relinquished	6/24/1992	Unnamed	1177	417
Y01178	Shell	7/1/1988	Relinquished	6/24/1992	Unnamed	1178	460
Y01179	Shell	7/1/1988	Relinquished	6/24/1992	Unnamed	1179	461
Y01180	Shell	7/1/1988	Relinquished	5/31/1994	Unnamed	1180	506
Y01181	ARCO	7/1/1988	Relinquished	6/5/1992	Unnamed	1181	989
Y01182	Texaco	7/1/1988	Relinquished	6/2/1992	Unnamed	1182	990
Y01183	Shell	7/1/1988	Relinquished	6/24/1992	Unnamed	1183	227
Y01184	Shell	7/1/1988	Relinquished	6/24/1992	Unnamed	1184	229
Y01185	Shell	7/1/1988	Relinquished	6/24/1992	Unnamed	1185	271
Y01186	Shell	7/1/1988	Relinquished	6/24/1992	Unnamed	1186	273
Y01187	Shell	7/1/1988	Relinquished	6/24/1992	Unnamed	1187	314
Y01188	Shell	7/1/1988	Relinquished	6/24/1992	Unnamed	1188	315
Y01189	Shell	7/1/1988	Relinquished	6/24/1992	Unnamed	1189	317
Y01190	Shell	7/1/1988	Relinquished	5/31/1994	Unnamed	1190	355
Y01191	Shell	7/1/1988	Relinquished	5/31/1994	Unnamed	1191	356
Y01192	Shell	7/1/1988	Relinquished	6/24/1992	Unnamed	1192	358
Y01193	Shell	7/1/1988	Relinquished	6/24/1992	Unnamed	1193	359
Y01194	Shell	7/1/1988	Relinquished	6/24/1992	Unnamed	1194	361
Y01195	Shell	7/1/1988	Relinquished	5/31/1994	Unnamed	1195	399
Y01196	Shell	7/1/1988	Relinquished	5/31/1994	Unnamed	1196	400
Y01197	Shell	7/1/1988	Relinquished	5/31/1994	Unnamed	1197	401
Y01198	Shell	7/1/1988	Relinquished	5/31/1994	Unnamed	1198	444
Y01199	Shell	7/1/1988	Relinquished	5/31/1994	Unnamed	1199	445
Y01200	Shell	7/1/1988	Relinquished	5/31/1994	Unnamed	1200	488
Y01201	Shell	7/1/1988	Relinquished	5/31/1994	Unnamed	1201	489
Y01202	Shell	7/1/1988	Relinquished	5/31/1994	Unnamed	1202	530
Y01203	Shell	7/1/1988	Relinquished	5/31/1994	Unnamed	1203	531
Y01204	Shell	7/1/1988	Relinquished	5/31/1994	Unnamed	1204	574
Y01205	Shell	7/1/1988	Relinquished	5/31/1994	Unnamed	1205	575
Y01206	Texaco	7/1/1988	Relinquished	6/2/1992	Unnamed	1206	587

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y01207	Shell	7/1/1988	Relinquished	5/31/1994	Unnamed	1207	618
Y01208	Texaco	7/1/1988	Relinquished	6/2/1992	Unnamed	1208	630
Y01209	Texaco	7/1/1988	Relinquished	6/2/1992	Unnamed	1209	631
Y01210	Shell	7/1/1988	Relinquished	5/31/1994	Unnamed	1210	662
Y01211	Texaco	7/1/1988	Relinquished	6/2/1992	Unnamed	1211	674
Y01212	Texaco	7/1/1988	Relinquished	6/2/1992	Unnamed	1212	717
Y01213	Conoco	7/1/1988	Relinquished	12/27/1991	Unnamed	1213	938
Y01214	Conoco	7/1/1988	Relinquished	12/27/1991	Unnamed	1214	939
Y01215	Amoco	7/1/1988	Relinquished	6/24/1992	Unnamed	1215	969
Y01216	ARCO	7/1/1988	Relinquished	6/5/1992	Unnamed	1216	973
Y01217	ARCO	7/1/1988	Relinquished	6/5/1992	Unnamed	1217	974
Y01218	ARCO	7/1/1988	Relinquished	6/5/1992	Unnamed	1218	975
Y01219	Conoco	7/1/1988	Relinquished	12/27/1991	Unnamed	1219	982
Y01220	Conoco	7/1/1988	Relinquished	12/27/1991	Unnamed	1220	983
Y01221	Mobil	7/1/1988	Relinquished	6/10/1992	Unnamed	1221	280
Y01222	Mobil	7/1/1988	Relinquished	6/10/1992	Unnamed	1222	281
Y01223	Amoco	7/1/1988	Relinquished	6/24/1992	Unnamed	1223	753
Y01224	Amoco	7/1/1988	Relinquished	6/24/1992	Unnamed	1224	754
Y01225	Amoco	7/1/1988	Relinquished	6/24/1992	Unnamed	1225	797
Y01226	Amoco	7/1/1988	Relinquished	6/24/1992	Unnamed	1226	841
Y01227	Mobil	7/1/1988	Relinquished	6/21/1993	Unnamed	1227	857
Y01228	Mobil	7/1/1988	Relinquished	6/21/1993	Unnamed	1228	858
Y01229	Texaco	7/1/1988	Relinquished	6/2/1992	Unnamed	1229	931
Y01230	Texaco	7/1/1988	Relinquished	6/2/1992	Unnamed	1230	932
Y01231	Texaco	7/1/1988	Relinquished	6/2/1992	Unnamed	1230	939
Y01232	Texaco	7/1/1988	Relinquished	6/2/1992	Unnamed	1232	945
Y01233	Texaco	7/1/1988	Relinquished	6/2/1992	Unnamed	1233	974
Y01234	Texaco	7/1/1988	Relinquished	6/2/1992	Unnamed	1234	975
Y01235	Texaco	7/1/1988	Relinquished	6/2/1992	Unnamed	1235	976
Y01236	Texaco	7/1/1988	Relinquished	6/2/1992	Unnamed	1236	982
Y01237	Texaco	7/1/1988	Relinquished	6/2/1992	Unnamed	1237	983
Y01238	Texaco	7/1/1988	Relinquished	6/2/1992	Unnamed	1238	984
Y01239	Texaco	7/1/1988	Relinquished	6/2/1992	Unnamed	1239	989

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y01240	ARCO	7/1/1988	Relinquished	6/5/1992	Tison	1240	21
Y01241	Texaco	7/1/1988	Relinquished	6/2/1992	Tison	1241	22
Y01242	Texaco	7/1/1988	Relinquished	6/2/1992	Tison	1242	64
Y01243	Amoco	7/1/1988	Relinquished	6/24/1992	Tison	1243	66
Y01244	ARCO	7/1/1988	Relinquished	6/5/1992	Tison	1244	108
Y01245	Texaco	7/1/1988	Relinquished	6/2/1992	Tison	1245	109
Y01246	Amoco	7/1/1988	Relinquished	6/24/1992	Karo	1246	2
Y01247	ARCO	7/1/1988	Relinquished	6/5/1992	Karo	1247	6
Y01248	ARCO	7/1/1988	Relinquished	6/5/1992	Karo	1248	7
Y01249	ARCO	7/1/1988	Relinquished	6/5/1992	Karo	1249	8
Y01250	ARCO	7/1/1988	Relinquished	6/5/1992	Karo	1250	17
Y01251	ARCO	7/1/1988	Relinquished	6/5/1992	Karo	1251	18
Y01252	ARCO	7/1/1988	Relinquished	6/5/1992	Karo	1252	19
Y01253	Texaco	7/1/1988	Relinquished	6/2/1992	Karo	1253	59
Y01254	Texaco	7/1/1988	Relinquished	6/2/1992	Karo	1254	60
Y01255	ARCO	7/1/1988	Relinquished	5/22/1992	Karo	1255	61
Y01256	ARCO	7/1/1988	Relinquished	5/22/1992	Karo	1256	62
Y01257	ARCO	7/1/1988	Relinquished	5/22/1992	Karo	1257	63
Y01258	ARCO	7/1/1988	Relinquished	6/5/1992	Karo	1258	93
Y01259	ARCO	7/1/1988	Relinquished	6/5/1992	Karo	1259	94
Y01260	Amoco	7/1/1988	Relinquished	6/24/1992	Karo	1260	102
Y01261	Texaco	7/1/1988	Relinquished	6/2/1992	Karo	1261	103
Y01262	Texaco	7/1/1988	Relinquished	6/2/1992	Karo	1262	104
Y01263	Texaco	7/1/1988	Relinquished	6/2/1992	Karo	1263	105
Y01264	Shell	7/1/1988	Relinquished	6/24/1992	Karo	1264	106
Y01265	Shell	7/1/1988	Relinquished	6/24/1992	Karo	1265	107
Y01266	ARCO	7/1/1988	Relinquished	6/5/1992	Karo	1266	108
Y01267	ARCO	7/1/1988	Relinquished	6/5/1992	Karo	1267	136
Y01268	Texaco	7/1/1988	Relinquished	6/2/1992	Karo	1268	137
Y01269	Texaco	7/1/1988	Relinquished	6/2/1992	Karo	1269	138
Y01270	Texaco	7/1/1988	Relinquished	6/2/1992	Karo	1270	139
Y01271	Texaco	7/1/1988	Relinquished	6/2/1992	Karo	1271	140
Y01272	Texaco	7/1/1988	Relinquished	6/2/1992	Karo	1272	141

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y01273	Amoco	7/1/1988	Relinquished	6/24/1992	Karo	1273	146
Y01274	ARCO	7/1/1988	Relinquished	5/22/1992	Karo	1274	149
Y01275	Shell	7/1/1988	Relinquished	6/23/1993	Karo	1275	150
Y01276	Texaco	7/1/1988	Relinquished	6/2/1992	Karo	1276	151
Y01277	ARCO	7/1/1988	Relinquished	6/5/1992	Karo	1277	180
Y01278	ARCO	7/1/1988	Relinquished	6/5/1992	Karo	1278	181
Y01279	Texaco	7/1/1988	Relinquished	6/2/1992	Karo	1279	182
Y01280	Texaco	7/1/1988	Relinquished	6/2/1992	Karo	1280	183
Y01281	Texaco	7/1/1988	Relinquished	6/2/1992	Karo	1281	184
Y01282	Texaco	7/1/1988	Relinquished	6/2/1992	Karo	1282	185
Y01283	ARCO	7/1/1988	Relinquished	6/5/1992	Karo	1283	224
Y01284	ARCO	7/1/1988	Relinquished	6/5/1992	Karo	1284	225
Y01285	ARCO	7/1/1988	Relinquished	6/5/1992	Karo	1285	226
Y01286	ARCO	7/1/1988	Relinquished	6/5/1992	Karo	1286	227
Y01287	ARCO	7/1/1988	Relinquished	6/5/1992	Karo	1287	228
Y01288	Mobil	7/1/1988	Relinquished	6/8/1994	Karo	1288	322
Y01289	Mobil	7/1/1988	Relinquished	6/21/1993	Karo	1289	355
Y01290	Mobil	7/1/1988	Relinquished	6/21/1993	Karo	1290	356
Y01291	Mobil	7/1/1988	Relinquished	6/8/1994	Karo	1291	365
Y01292	Mobil	7/1/1988	Relinquished	6/8/1994	Karo	1292	366
Y01293	Mobil	7/1/1988	Relinquished	6/21/1993	Karo	1293	399
Y01294	Mobil	7/1/1988	Relinquished	6/21/1993	Karo	1294	400
Y01295	Mobil	7/1/1988	Relinquished	6/8/1994	Karo	1295	409
Y01296	Mobil	7/1/1988	Relinquished	6/8/1994	Karo	1296	410
Y01297	Mobil	7/1/1988	Relinquished	6/21/1993	Karo	1297	445
Y01298	Mobil	7/1/1988	Relinquished	6/8/1994	Karo	1298	453
Y01299	Mobil	7/1/1988	Relinquished	6/8/1994	Karo	1299	454
Y01300	Shell	7/1/1988	Relinquished	6/7/1993	Karo	1300	457
Y01301	Shell	7/1/1988	Relinquished	6/7/1993	Karo	1301	458
Y01302	ARCO	7/1/1988	Relinquished	6/8/1994	Karo	1302	497
Y01303	Shell	7/1/1988	Relinquished	6/7/1993	Karo	1303	500
Y01304	Shell	7/1/1988	Relinquished	6/28/1994	Karo	1304	501
Y01305	Shell	7/1/1988	Relinquished	6/28/1994	Karo	1305	502

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y01306	Shell	7/1/1988	Relinquished	6/28/1994	Karo	1306	503
Y01307	ARCO	7/1/1988	Relinquished	5/22/1992	Karo	1307	541
Y01308	ARCO	7/1/1988	Relinquished	5/22/1992	Karo	1308	542
Y01309	ARCO	7/1/1988	Relinquished	5/22/1992	Karo	1309	543
Y01310	Shell	7/1/1988	Relinquished	6/7/1993	Karo	1310	544
Y01311	Shell	7/1/1988	Relinquished	6/28/1994	Karo	1311	545
Y01312	Shell	7/1/1988	Relinquished	6/28/1994	Karo	1312	546
Y01313	Marathon	7/1/1988	Relinquished	6/28/1994	Karo	1313	547
Y01314	Shell	7/1/1988	Relinquished	6/7/1993	Karo	1314	548
Y01316	ARCO	7/1/1988	Relinquished	5/22/1992	Karo	1316	585
Y01317	Shell	7/1/1988	Relinquished	6/23/1993	Karo	1317	588
Y01318	Shell	7/1/1988	Relinquished	6/28/1994	Karo	1318	589
Y01319	Shell	7/1/1988	Relinquished	6/28/1994	Karo	1319	590
Y01320	Shell	7/1/1988	Relinquished	6/23/1993	Karo	1320	591
Y01321	Shell	7/1/1988	Relinquished	6/7/1993	Karo	1321	592
Y01323	Texaco	7/1/1988	Relinquished	6/29/1994	Karo	1323	628
Y01324	Texaco	7/1/1988	Relinquished	6/29/1994	Karo	1324	629
Y01325	Shell	7/1/1988	Relinquished	6/7/1993	Karo	1325	631
Y01326	Shell	7/1/1988	Relinquished	6/28/1994	Karo	1326	632
Y01327	Shell	7/1/1988	Relinquished	6/28/1994	Karo	1327	633
Y01328	Shell	7/1/1988	Relinquished	6/7/1993	Karo	1328	633
Y01329	Texaco	7/1/1988	Relinquished	12/30/1993	Karo	1329	635
Y01330	Shell	7/1/1988	Relinquished	6/7/1993	Karo	1330	636
Y01331	Mobil	7/1/1988	Relinquished	6/21/1993	Karo	1331	664
Y01332	Texaco	7/1/1988	Relinquished	6/29/1994	Karo	1332	672
Y01333	Texaco	7/1/1988	Relinquished	6/29/1994	Karo	1333	673
Y01334	Shell	7/1/1988	Relinquished	6/7/1993	Karo	1334	675
Y01335	Shell	7/1/1988	Relinquished	6/28/1994	Karo	1335	676
Y01336	Shell	7/1/1988	Relinquished	6/28/1994	Karo	1336	677
Y01337	Texaco	7/1/1988	Relinquished	12/30/1993	Karo	1337	678
Y01338	Mobil	7/1/1988	Relinquished	6/21/1993	Karo	1338	708
Y01339	Texaco	7/1/1988	Relinquished	6/29/1994	Karo	1339	715
Y01340	Texaco	7/1/1988	Relinquished	6/29/1994	Karo	1340	716

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y01341	Texaco	7/1/1988	Relinquished	6/29/1994	Karo	1341	717
Y01342	Shell	7/1/1988	Relinquished	6/7/1993	Karo	1342	718
Y01343	Shell	7/1/1988	Relinquished	6/28/1994	Karo	1343	719
Y01344	Shell	7/1/1988	Relinquished	6/28/1994	Karo	1344	720
Y01345	Texaco	7/1/1988	Relinquished	12/30/1993	Karo	1345	721
Y01346	Marathon	7/1/1988	Relinquished	6/13/1994	Karo	1346	753
Y01347	Texaco	7/1/1988	Relinquished	6/29/1994	Karo	1347	759
Y01348	Texaco	7/1/1988	Relinquished	6/29/1994	Karo	1348	760
Y01349	Shell	7/1/1988	Relinquished	6/7/1993	Karo	1349	761
Y01350	Shell	7/1/1988	Relinquished	6/28/1994	Karo	1350	762
Y01351	Shell	7/1/1988	Relinquished	6/28/1994	Karo	1351	763
Y01352	Shell	7/1/1988	Relinquished	6/28/1994	Karo	1352	764
Y01353	Mobil	7/1/1988	Relinquished	6/21/1993	Karo	1353	796
Y01354	Marathon	7/1/1988	Relinquished	6/13/1994	Karo	1354	797
Y01355	Amoco	7/1/1988	Relinquished	6/24/1992	Karo	1355	801
Y01356	Texaco	7/1/1988	Relinquished	6/24/1993	Karo	1356	802
Y01357	Shell	7/1/1988	Relinquished	6/7/1993	Karo	1357	805
Y01358	Shell	7/1/1988	Relinquished	6/28/1994	Karo	1358	806
Y01359	Shell	7/1/1988	Relinquished	6/28/1994	Karo	1359	807
Y01360	Mobil	7/1/1988	Relinquished	6/21/1993	Karo	1360	840
Y01361	Texaco	7/1/1988	Relinquished	6/24/1993	Karo	1361	854
Y01362	ARCO	7/1/1988	Relinquished	5/22/1992	Karo	1362	848
Y01363	Amoco	7/1/1988	Relinquished	6/24/1992	Karo	1363	849
Y01364	Amoco	7/1/1988	Relinquished	6/24/1992	Karo	1364	850
Y01365	Shell	7/1/1988	Relinquished	6/24/1992	Karo	1365	854
Y01366	Shell	7/1/1988	Relinquished	6/24/1992	Karo	1366	855
Y01367	Shell	7/1/1988	Relinquished	6/24/1992	Karo	1367	856
Y01368	Texaco	7/1/1988	Relinquished	6/24/1993	Karo	1368	888
Y01369	Texaco	7/1/1988	Relinquished	6/24/1993	Karo	1369	889
Y01370	Texaco	7/1/1988	Relinquished	6/24/1993	Karo	1370	932
Y01371	Texaco	7/1/1988	Relinquished	6/24/1993	Karo	1371	975
Y01372	Texaco	7/1/1988	Relinquished	6/29/1994	Karo	1372	977
Y01373	Marathon	7/1/1988	Relinquished	6/13/1994	Karo	1373	978

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y01374	Texaco	7/1/1988	Relinquished	6/2/1992	Posey	1374	7
Y01375	Texaco	7/1/1988	Relinquished	6/2/1992	Posey	1375	16
Y01376	Texaco	7/1/1988	Relinquished	6/2/1992	Posey	1376	17
Y01377	Texaco	7/1/1988	Relinquished	6/2/1992	Posey	1377	21
Y01378	Texaco	7/1/1988	Relinquished	6/2/1992	Posey	1378	62
Y01379	Texaco	7/1/1988	Relinquished	6/2/1992	Posey	1379	63
Y01380	Texaco	7/1/1988	Relinquished	6/2/1992	Posey	1380	105
Y01381	Texaco	7/1/1988	Relinquished	6/2/1992	Posey	1381	106
Y01382	Shell	7/1/1988	Relinquished	5/31/1994	Posey	1382	143
Y01383	ARCO	7/1/1988	Relinquished	6/5/1992	Posey	1383	149
Y01384	Texaco	7/1/1988	Relinquished	6/2/1992	Posey	1384	150
Y01385	Texaco	7/1/1988	Relinquished	6/2/1992	Posey	1385	151
Y01386	Shell	7/1/1988	Relinquished	5/31/1994	Posey	1386	187
Y01387	ARCO	7/1/1988	Relinquished	6/5/1992	Posey	1387	194
Y01388	Texaco	7/1/1988	Relinquished	6/2/1992	Posey	1388	195
Y01389	Shell	7/1/1988	Relinquished	5/31/1994	Posey	1389	230
Y01390	Amoco	7/1/1988	Relinquished	6/24/1992	Posey	1390	230
Y01391	Shell	7/1/1988	Relinquished	5/31/1994	Posey	1391	274
Y01392	Shell	7/1/1988	Relinquished	5/31/1994	Posey	1392	275
Y01393	Shell	7/1/1988	Relinquished	5/31/1994	Posey	1393	318
Y01394	ARCO	7/1/1988	Relinquished	4/16/1992	Posey	1394	375
Y01395	Shell	7/1/1988	Relinquished	5/27/1994	Posey	1395	585
Y01396	Shell	7/1/1988	Relinquished	5/31/1994	Posey	1396	586
Y01397	Shell	7/1/1988	Relinquished	5/31/1994	Posey	1397	627
Y01398	Shell	7/1/1988	Relinquished	5/31/1994	Posey	1398	628
Y01399	Shell	7/1/1988	Relinquished	5/31/1994	Posey	1399	629
Y01400	Shell	7/1/1988	Relinquished	5/27/1994	Posey	1400	630
Y01401	Shell	7/1/1988	Relinquished	5/27/1994	Posey	1401	631
Y01402	Texaco	7/1/1988	Relinquished	6/2/1992	Posey	1402	637
Y01403	Shell	7/1/1988	Relinquished	5/27/1994	Posey	1403	671
Y01404	Shell	7/1/1988	Relinquished	5/27/1994	Posey	1404	672
Y01405	Shell	7/1/1988	Relinquished	6/26/1995	Posey	1405	673
Y01406	Shell	7/1/1988	Relinquished	6/26/1995	Posey	1406	674

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y01407	Shell	7/1/1988	Relinquished	5/31/1994	Posey	1407	675
Y01408	Shell	7/1/1988	Relinquished	5/27/1994	Posey	1408	676
Y01409	Texaco	7/1/1988	Relinquished	6/2/1992	Posey	1409	681
Y01410	Shell	7/1/1988	Relinquished	5/27/1994	Posey	1410	715
Y01411	Shell	7/1/1988	Relinquished	5/27/1994	Posey	1411	716
Y01412	Shell	7/1/1988	Relinquished	6/26/1995	Posey	1412	717
Y01413	Shell	7/1/1988	Relinquished	6/26/1995	Posey	1413	718
Y01414	Shell	7/1/1988	Relinquished	6/26/1995	Posey	1414	719
Y01415	Shell	7/1/1988	Relinquished	5/27/1994	Posey	1416	720
Y01416	Shell	7/1/1988	Relinquished	5/27/1994	Posey	1416	721
Y01417	Texaco	7/1/1988	Relinquished	6/2/1992	Posey	1417	725
Y01418	Texaco	7/1/1988	Relinquished	6/2/1992	Posey	1418	726
Y01419	Amoco	7/1/1988	Relinquished	4/8/1993	Posey	1419	759
Y01420	Shell	7/1/1988	Relinquished	5/27/1994	Posey	1420	760
Y01421	Shell	7/1/1988	Relinquished	6/26/1995	Posey	1421	761
Y01422	Shell	7/1/1988	Relinquished	6/26/1995	Posey	1422	762
Y01423	Shell	7/1/1988	Relinquished	6/26/1995	Posey	1423	763
Y01424	Shell	7/1/1988	Relinquished	5/27/1994	Posey	1424	764
Y01425	Texaco	7/1/1988	Relinquished	6/2/1992	Posey	1425	770
Y01426	Amoco	7/1/1988	Relinquished	4/8/1993	Posey	1426	803
Y01427	Amoco	7/1/1988	Relinquished	4/8/1993	Posey	1427	804
Y01428	Amoco	7/1/1988	Relinquished	4/8/1993	Posey	1428	805
Y01429	Shell	7/1/1988	Relinquished	5/27/1994	Posey	1428	806
Y01430	Shell	7/1/1988	Relinquished	5/27/1994	Posey	1430	807
Y01431	Shell	7/1/1988	Relinquished	5/27/1994	Posey	1431	808
Y01432	Shell	7/1/1988	Relinquished	6/2/1992	Posey	1432	814
Y01433	Amoco	7/1/1988	Relinquished	4/8/1993	Posey	1433	847
Y01434	Amoco	7/1/1988	Relinquished	4/8/1993	Posey	1434	848
Y01435	Amoco	7/1/1988	Relinquished	4/8/1993	Posey	1435	849
Y01436	Shell	7/1/1988	Relinquished	5/27/1994	Posey	1436	850
Y01437	Shell	7/1/1988	Relinquished	5/27/1994	Posey	1437	851
Y01438	Mobil	7/1/1988	Relinquished	6/21/1993	Studds	1438	191
Y01439	Mobil	7/1/1988	Relinquished	6/21/1993	Studds	1439	235

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y01440	Texaco	7/1/1988	Relinquished	6/29/1994	Colbert	1440	8
Y01441	Mobil	7/1/1988	Relinquished	6/8/1994	Colbert	1441	9
Y01442	Marathon	7/1/1988	Relinquished	6/13/1994	Colbert	1442	10
Y01443	Marathon	7/1/1988	Relinquished	6/13/1994	Colbert	1443	52
Y01444	Mobil	7/1/1988	Relinquished	6/8/1994	Colbert	1444	53
Y01445	Marathon	7/1/1988	Relinquished	6/13/1994	Colbert	1445	54
Y01446	Marathon	7/1/1988	Relinquished	6/10/1992	Colbert	1446	56
Y01447	Shell	7/1/1988	Relinquished	6/24/1992	Colbert	1447	65
Y01448	Texaco	7/1/1988	Relinquished	6/29/1994	Colbert	1448	66
Y01449	Texaco	7/1/1988	Relinquished	6/29/1994	Colbert	1449	67
Y01450	Texaco	7/1/1988	Relinquished	6/29/1994	Colbert	1450	68
Y01451	Mobil	7/1/1988	Relinquished	6/8/1994	Colbert	1451	96
Y01452	Marathon	7/1/1988	Relinquished	6/13/1994	Colbert	1452	97
Y01453	Marathon	7/1/1988	Relinquished	6/10/1992	Colbert	1453	99
Y01454	Shell	7/1/1988	Relinquished	6/24/1992	Colbert	1454	107
Y01455	Shell	7/1/1988	Relinquished	6/24/1992	Colbert	1455	108
Y01456	Shell	7/1/1988	Relinquished	6/24/1992	Colbert	1456	109
Y01457	Texaco	7/1/1988	Relinquished	6/29/1994	Colbert	1457	110
Y01458	Shell	7/1/1988	Relinquished	6/29/1993	Colbert	1458	111
Y01459	Texaco	7/1/1988	Relinquished	6/29/1994	Colbert	1459	110
Y01460	Marathon	7/1/1988	Relinquished	6/10/1992	Colbert	1460	143
Y01461	Shell	7/1/1988	Relinquished	6/24/1992	Colbert	1461	151
Y01462	Shell	7/1/1988	Relinquished	6/24/1992	Colbert	1462	152
Y01463	Shell	7/1/1988	Relinquished	6/24/1992	Colbert	1463	153
Y01464	Shell	7/1/1988	Relinquished	6/29/1993	Colbert	1464	154
Y01465	Shell	7/1/1988	Relinquished	6/29/1993	Colbert	1465	155
Y01466	Shell	7/1/1988	Relinquished	6/24/1992	Colbert	1466	156
Y01467	Marathon	7/1/1988	Relinquished	6/10/1992	Colbert	1467	186
Y01468	Shell	7/1/1988	Relinquished	6/24/1992	Colbert	1468	195
Y01470	Shell	7/1/1988	Relinquished	6/24/1992	Colbert	1470	197
Y01471	Shell	7/1/1988	Relinquished	6/29/1993	Colbert	1471	198
Y01472	Shell	7/1/1988	Relinquished	6/29/1993	Colbert	1472	199
Y01473	Shell	7/1/1988	Relinquished	6/24/1992	Colbert	1473	200

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y01474	Shell	7/1/1988	Relinquished	6/24/1992	Colbert	1474	239
Y01475	Shell	7/1/1988	Relinquished	6/24/1992	Colbert	1475	240
Y01476	Shell	7/1/1988	Relinquished	6/24/1992	Colbert	1476	241
Y01477	Shell	7/1/1988	Relinquished	6/29/1993	Colbert	1477	242
Y01478	Shell	7/1/1988	Relinquished	6/29/1993	Colbert	1478	243
Y01479	Shell	7/1/1988	Relinquished	6/24/1992	Colbert	1479	244
Y01480	Shell	7/1/1988	Relinquished	6/24/1992	Colbert	1480	285
Y01481	Shell	7/1/1988	Relinquished	6/29/1993	Colbert	1481	286
Y01482	Shell	7/1/1988	Relinquished	6/29/1993	Colbert	1482	287
Y01483	Shell	7/1/1988	Relinquished	6/24/1992	Colbert	1483	288
Y01484	Marathon	7/1/1988	Relinquished	6/10/1992	Colbert	1484	320
Y01485	Shell	7/1/1988	Relinquished	6/24/1992	Colbert	1485	329
Y01486	Shell	7/1/1988	Relinquished	6/24/1992	Colbert	1486	330
Y01487	Shell	7/1/1988	Relinquished	6/24/1992	Colbert	1487	330
Y01488	Shell	7/1/1988	Relinquished	6/24/1992	Colbert	1488	332
Y01489	Shell	7/1/1988	Relinquished	6/24/1992	Colbert	1489	373
Y01490	Shell	7/1/1988	Relinquished	6/24/1992	Colbert	1490	374
Y01493	Shell	7/1/1988	Relinquished	6/24/1992	Colbert	1493	417
Y01494	Shell	7/1/1988	Relinquished	6/24/1992	Colbert	1494	418
Y01495	Shell	7/1/1988	Relinquished	6/24/1992	Colbert	1495	419
Y01496	Shell	7/1/1988	Relinquished	6/24/1992	Colbert	1496	461
Y01497	Shell	7/1/1988	Relinquished	6/24/1992	Colbert	1497	462
Y01498	Shell	7/1/1988	Relinquished	6/24/1992	Colbert	1498	463
Y01499	Shell	7/1/1988	Relinquished	6/24/1992	Colbert	1499	464
Y01500	Amoco	7/1/1988	Relinquished	12/30/1991	Solivik Island	1500	7
Y01501	Amoco	7/1/1988	Relinquished	12/30/1991	Solivik Island	1501	9
Y01502	Amoco	7/1/1988	Relinquished	12/30/1991	Solivik Island	1502	51
Y01503	Shell	7/1/1988	Relinquished	6/24/1992	Solivik Island	1503	133
Y01504	Shell	7/1/1988	Relinquished	6/24/1992	Solivik Island	1504	177
Y01505	Shell	7/1/1988	Relinquished	6/24/1992	Solivik Island	1505	755
Y01506	Shell	7/1/1988	Relinquished	6/24/1992	Solivik Island	1506	756
Y01507	Shell	7/1/1988	Relinquished	6/24/1992	Solivik Island	1507	757
Y01510	Shell	7/1/1988	Relinquished	4/19/1993	Point Lay	1510	5

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y01511	Shell	7/1/1988	Relinquished	4/19/1993	Point Lay	1511	6
Y01512	Shell	7/1/1988	Relinquished	6/24/1992	Point Lay	1512	13
Y01513	Shell	7/1/1988	Relinquished	6/24/1992	Point Lay	1513	14
Y01515	Texaco	7/1/1988	Relinquished	6/29/1994	Point Lay	1515	46
Y01516	Shell	7/1/1988	Relinquished	4/19/1993	Point Lay	1516	49
Y01517	Shell	7/1/1988	Relinquished	4/19/1993	Point Lay	1517	50
Y01518	Shell	7/1/1988	Relinquished	6/24/1992	Point Lay	1518	558
Y01520	Shell	7/1/1988	Relinquished	6/7/1993	Point Lay	1520	98
Y01521	Shell	7/1/1988	Relinquished	6/7/1993	Point Lay	1521	99
Y01524	Shell	7/1/1988	Relinquished	6/7/1993	Point Lay	1524	142
Y01525	Shell	7/1/1988	Relinquished	6/7/1993	Point Lay	1525	143
Y01315	Texaco	11/1/1988	Relinquished	6/29/1994	Karo	1315	584
Y01469	Shell	11/1/1988	Relinquished	10/28/1992	Colbert	1469	196
Y01491	Shell	11/1/1988	Relinquished	10/28/1992	Colbert	1491	375
Y01492	Marathon	11/1/1988	Relinquished	6/10/1992	Colbert	1492	406
Y01508	Shell	11/1/1988	Relinquished	6/14/1993	Point Lay	1508	1
Y01509	Shell	11/1/1988	Relinquished	6/14/1993	Point Lay	1509	2
Y01514	Texaco	11/1/1988	Relinquished	6/29/1994	Point Lay	1514	45
Y01519	Texaco	11/1/1988	Relinquished	6/29/1994	Point Lay	1519	90
Y01522	Texaco	11/1/1988	Relinquished	6/29/1994	Point Lay	1522	133
Y01523	Texaco	11/1/1988	Relinquished	6/29/1994	Point Lay	1523	134
Y01526	Texaco	11/1/1988	Relinquished	6/29/1994	Point Lay	1526	178
Y01322	ARCO	None	Relinquished	None	Karo	1322	627

Note: ARCO = Atlantic Richfield Company
Source: BOEM 2023b

4.2.1.2 Surveys

No surveys were documented as a result of Lease Sale 109.

4.2.1.3 Well Drilling

Four exploration wells were drilled as a result of Lease Sale 109, as summarized in Table 4.2.1-2.

Table 4.2.1-2. Well drilling summary

Activity Start Date	Activity End Date	Well Name (includes API no. and bottom hole lease number)	Well Type	Well Depth (feet)	Drill Rig Name
9/22/1989	8/22/1990	API no. 553520000100 (BURGER 1 1) on OCS Y-1413	Exploration	8,201	Explorer III Drillship
10/14/1989	9/15/1989	API no. 553810000100 (KLONDIKE 1) on OCS Y-1482	Exploration	12,006	Explorer III Drillship
10/14/1989	9/23/1990	API no. 553820000200 (POPCORN 1) on OCS Y-1275	Exploration	10,186	Explorer III Drillship
9/26/1990	8/30/1991	API no. 553820000300 (CRACKER JACK 1) on OCS Y-1320	Exploration	9,570	Canmar Explorer III

Notes: API = American Petroleum Institute; OCS = Outer Continental Shelf
Sources: BOEM 2016a, 2020, 2022b, 2023c, 2023d

4.2.1.4 Oil-and-Gas-Supporting Activities

Identified oil-and-gas-supporting activities as a result of Lease Sale 109 included facility support and transportation from facilities and shorebases to relevant activity sites (if documented), as summarized in Table 4.2.1-3 and Table 4.2.1-4.

Table 4.2.1-3. Facility support summary

Facility Name	Facility Type	Description	Supported Activity
Barrow shorebase	Onshore shorebase complex	Helicopters transited between the vessels and Barrow (the base of operations). Activity also occurred in the Beaufort Sea Planning Area.	Drilling well OCS Y-1320 CRACKER JACK 1

Source: Brueggeman et al. 1992

Table 4.2.1-4. Summary of transportation activity

Facility Name	Facility Type	Supported Activity	No. Aircraft	No. Vessels	Vessel Names	No. Vehicles
Barrow Airport	Airport	Helicopter support for activities at the Cracker Jack 1 (OCS Y-1320 CRACKER JACK 1) drill site	2	N/A	N/A	N/A

Facility Name	Facility Type	Supported Activity	No. Aircraft	No. Vessels	Vessel Names	No. Vehicles
Port Clarence Dock	Port	Activities at the Cracker Jack 1 (OCS Y-1320 CRACKER JACK 1) drill site	N/A	5	Robert LeMeur, Supplier III, Supplier IV, Responder, Rig Engineer	N/A

Note: N/A = not applicable
Source: Brueggeman et al. 1992

4.2.1.5 E&D Scenario Summary

A scenario was developed for the Alaska OCS Chukchi Sea Oil and Gas Lease Sale 109 Final Environmental Impact Statement (MMS 1987b) to assess the potential environmental impacts of the lease sale. The sale consisted of a total of 5,450 blocks, 29.5 million acres of the Chukchi Sea Planning Area. The blocks were located in waters ranging from 5 to 385 kilometers offshore in waters ranging from 8 to 80 meters deep. The mean resource estimate used was 2.68 Bbbl. Activities associated with the E&D scenario (MMS 1987b) are summarized in Table 4.2.1-5.

Under the scenario, drilling of exploration wells would begin in 1989. Once the delineation drilling ended in 1996, 20 exploration wells and 23 delineation wells would have been drilled. During the early years, final design and construction of drilling units designed specifically for the Chukchi Sea would be completed. This assumption would guide initial drilling to areas either shallow enough to use existing bottom-founded drilling units or deep enough for drillships (MMS 1987b).

Water depth would be a significant factor in selecting the appropriate drilling unit. The Sale 109 area was generally between 30 and 50 meters deep, although depths of 80 meters occurred in places. Existing bottom-founded units would be extended to reach a maximum depth of 22 to 30 meters. Drillships would drill in deep water; their limitation was a minimum operating depth of 16 to 20 meters (MMS 1987b).

Under the scenario, the average exploration well was assumed to use approximately 599 dry metric tons of mud; total muds used would equal 11,975 dry metric tons. Approximately 1,361 dry metric tons of drill cuttings per exploration well also were assumed to be produced; total cuttings would equal 27,215 dry metric tons. Delineation wells were assumed to require only 454 dry metric tons of mud per well, or 10,433 dry metric tons total. Cuttings were assumed to equal 1,179 dry metric tons per well, or 27,125 dry metric tons total. Total muds and cuttings for exploration and delineation would equal 22,408 dry metric tons for muds and 54,340 dry metric tons for cuttings (MMS 1987b).

It was assumed that both types of exploratory drilling units—drillships and bottom-founded units—would store drilling supplies for one to three wells. One icebreaker and two ice-strengthened support/supply boats were assumed for use in the Chukchi Sea. Three to six tugs would be required to relocate bottom-founded units. Between 1991 and 1994, four drilling units would be in use. Only two drillships were likely to be operating during any single season; the remaining units would be bottom-founded. A maximum of six ice-management/support vessels were assumed to be in the area during exploration (1989–1996) (MMS 1987b).

During the years of maximum exploration effort (1991–1994), six helicopters would be dedicated to use in the sale area. One helicopter trip per day per platform was assumed (MMS 1987b).

The initial discovery of Sale 109 oil was projected to occur in the fourth year of the lease; the first delineation well was projected to be drilled in 1991. Production was assumed to peak between 2000 and 2005 at 225 MMbbl a year and cease in 2017 (MMS 1987b).

Under the scenario, production activities were projected to begin in 1994 with the design and initiation of construction of the production platforms. Installation of the first four production platforms was assumed to occur in 1997. The remaining five production platforms were assumed to be installed in 1998. Wells were assumed to be drilled from 1997 through 1999, the year production was assumed to begin. The pipeline for the mean-case scenario was assumed to be laid from 1995 through 1998 and onshore support facilities constructed from 1996 through 1998 (MMS 1987b).

Production platforms used to produce oil from the sale area probably would be structures that rest on the seafloor. Drilling of the development wells would begin after 50 percent of the facility hookup was complete and while production facilities were being readied for operation (MMS 1987b).

It was assumed that the average total amount of mud to be used for drilling production wells would range from approximately 154 dry metric tons per well to 508 dry metric tons per well. The average "net" mud disposed of after production-well drilling was assumed to range from approximately 91 dry metric tons per well to 444 dry metric tons per well, depending upon the amount recycled. An average of 1,388 dry metric tons of drill cuttings were assumed to be produced by each production well. The maximum muds discharged for all 153 production wells drilled was assumed to be 68,005 dry metric tons; the total amount of drill cuttings would be 212,363 dry metric tons (MMS 1987b).

Under the scenario, a 1,900-meter airstrip was assumed to be constructed to serve the facility. Gravel bases for all the facilities assumed in the scenario would require approximately 500,000 cubic meters of gravel. The service base was assumed to have storage for drilling, pipelaying, and other construction needs; facilities for maintaining onshore and offshore equipment and infrastructure; utilities; and onshore support for produced oil, such as pumping stations and storage. In 1998, the year of peak barge activity, 68 barges were assumed to be included in the Chukchi sealift. About one-half of these barges were assumed to offload directly onto a production platform (MMS 1987b).

It was assumed that installation and hookup of the production platforms during the development stage would be supported by two supply boats and one helicopter per platform. A total of 8 workboats and 4 helicopters would be used in the sale area during the 11th year (1997), and 10 workboats and 5 helicopters the following year. During production, two icebreaker support/supply boats and two helicopters would be dedicated to the sale area; an additional support/supply boat and helicopter would be available for backup (MMS 1987b).

Three basic options were apparent for transporting oil to market: offshore loading, nearshore loading from an onshore terminal, and a pipeline to the TAPS. A pipeline to the TAPS was selected for the proposal's scenario to transport the conditional mean resource of 2.68 Bbbl (MMS 1987b).

Under the scenario, a 1,040-kilometer pipeline, installed between 1995 and 1998, was assumed to come onshore in the vicinity of Point Belcher and continue approximately 640 kilometers eastward to TAPS Pump Station No. 2 (MMS 1987b).

Approximately 10 to 12 helipads were assumed to be built. Helipads typically would be located at each construction camp along the route (located about every 100 kilometers) and at each pump station. At least one helicopter flight a day to each camp that was active was assumed. Four onshore pump stations were assumed for the new pipeline; one offshore booster station possibly would be required. Installation of the 400-kilometer offshore pipeline by bottom-tow or lay barges was considered feasible. Assuming that a lay barge was used, the period of time during which the barge could operate in the northeastern Chukchi Sea would be limited to about 70 days. During installation, approximately 28 million cubic meters of subsea material was estimated to be excavated. Trenching would disturb 946 hectares, and deposition of material would cover 1,892 hectares (MMS 1987b).

Table 4.2.1-5. Summary of basic assumptions of Lease Sale 109 E&D scenario

Element	Mean Case
Sale acreage offering	29.5 million acres
Recoverable oil	2.68 Bbbl
Peak production oil	225 MMbbl yearly
Exploration	Exploration
Number of wells – exploration	20
Number of wells – delineation	23
Drilled by drillship	14
Drilled by bottom-founded units	29
Drill rigs	2
Helicopter number – exploration	6
Helicopter flights – exploration	124 trips
Total drilling muds – exploration	599 metric tons
Total cuttings – exploration	1,361 metric tons
Total drilling muds – delineation	454 metric tons
Total cuttings – delineation	1,179 metric tons
Ice management vessels – per year	6
Barges – per year	1-8
Development and Production	Development and Production
Platforms – development and production	9
Number of wells – development and production	153
Number of helicopters	4–5
Helicopter flights – per day per platform	1–3
Helicopter flights – development	270-810 trips
Maximum total drilling muds – development and production	68,005 metric tons
Maximum total cuttings – development and production	212,363 metric tons
Total mud per well	91–444
Total cuttings per well	1,388
Work boats – trips per day per platform	1–2
Work boats – round trips per month	270–540
Barges – peak year	68
Transportation	Transportation
Onshore pipeline miles	640 kilometers
Support road	640 kilometers

Element	Mean Case
Offshore pipeline miles – trunked	400 kilometers
Offshore pipeline miles – trenched	946 hectares
Offshore pipeline miles – dumping	1,892 hectares
Maximum volume of fill material	28,090,000 m^3
Helicopter pads	10–12

Notes: Bbbl = billion barrels; E&D = Exploration and Development; m^3 = cubic meters; MMbbl = million barrels
Source: MMS 1987b

4.2.1.6 Comparison of E&D Scenario and Historical Activities

A comparison of the E&D scenario and the historical activities are provided in Table 4.2.1-6, using available information.

Table 4.2.1-6. Comparison of E&D and historical activities

Activity	E&D Scenario	Actual Activities
Recoverable oil (maximum)	2.68 Bbbl	--
Sale acreage offering	29.5 million acres	25,631,122 acres offered
Sale	--	1,976,912 acres leased
Date of exploratory activities (begin)	1989	1989
Number of wells – exploration and delineation	43 (20 exploration, 23 delineation)	4
Number of wells – production and service	153	0
Average well depth	--	9,991 feet
Drilling muds – exploration and delineation	1,053 metric tons (599 exploration, 454 delineation)	--
Drilling muds – development and production	68,005 metric tons	0
Drilling cuttings – exploration and delineation	2,540 metric tons (1,361 exploration, 1,179 delineation)	--
Drilling cuttings – development and production	212,363 metric tons	0
Drill rigs	2	2
Number of G&G or other surveys	--	0
Support facility and shorebase locations	--	Barrow, Port Clarence
Helicopter number – exploration	6	2
Helicopter flights – exploration	124 trips	--
Helicopter number – development and production	4–5	0
Helicopter flights – development and production	270–810 trips (1–3 per day per platform)	0
Helicopter pads	10–12	0

Activity	E&D Scenario	Actual Activities
Peak production oil	--	0
Platforms	9	0
Onshore pipeline miles	640 km	0
Offshore pipeline miles – trunked	400 km	0
Support road	640 km	0
Ice management vessels (exploration)	6 per year	0
Barges (exploration)	1–8 per year	0
Barges – peak year (development and production)	68	0
Supply and support boats – development and production	270–540 round trip per month (1–2 per day per platform)	5 vessels; trip counts undocumented

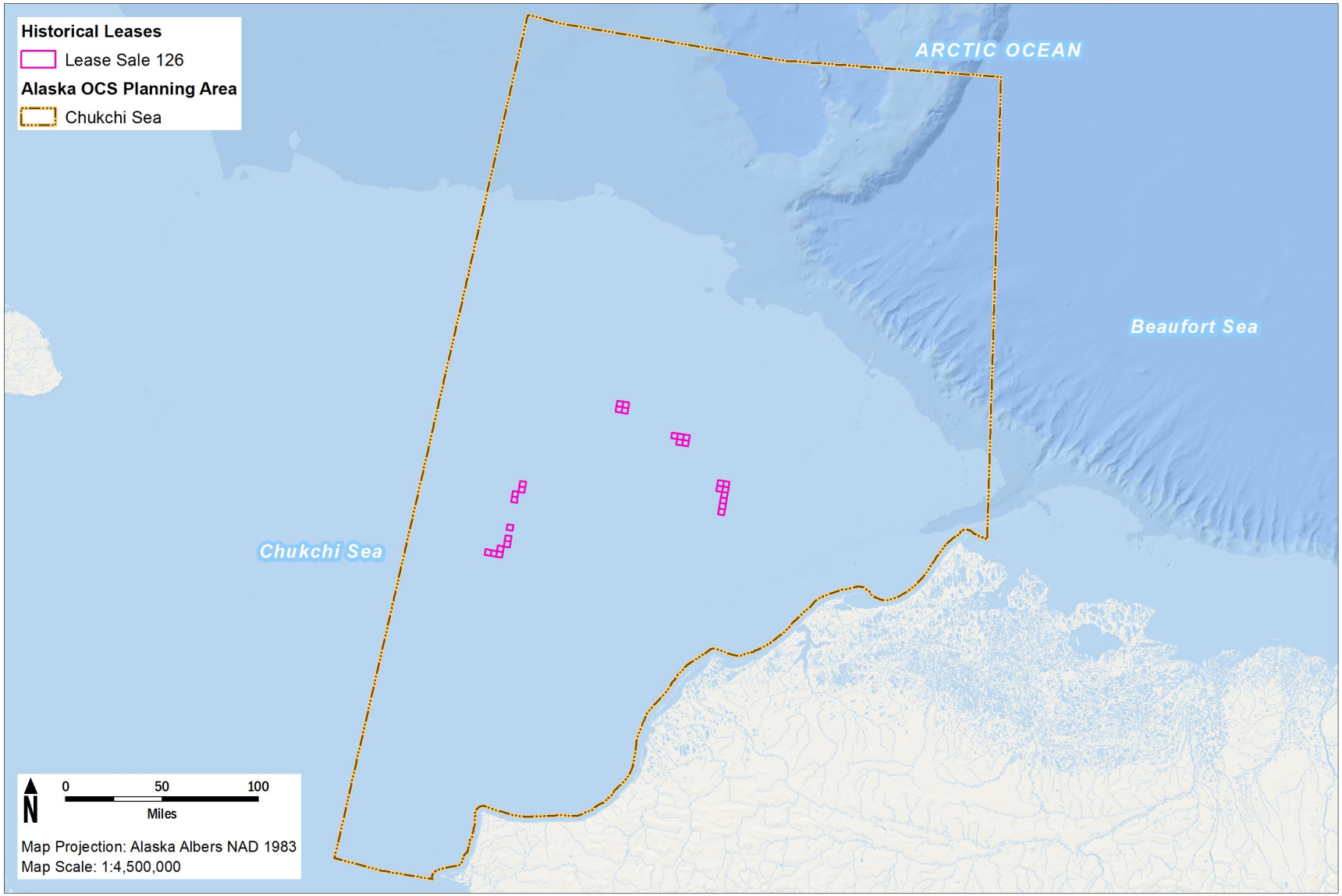
Notes: -- = no data provided; Bbbl = billion barrels; E&D = Exploration and Development; G&G = geological and geophysical; km = kilometer

4.2.2 Lease Sale 126 (1991)

The leases associated with Lease Sale 126 are shown in Figure 4-16.

4.2.2.1 Leasing

As shown in Table 4.2-1 and Figure 4-16, as a result of Lease Sale 126, there were 3,476 tracts offered and 28 leases issued. There were 18,987,976 acres offered and 159,213 acres leased. There are no active leases from Lease Sale 126. Table 4.2.2-1 summarizes documented information associated with the leasing as a result of Lease Sale 126.



Source: BOEM 2022c, 2023b.

Figure 4-16. Historical oil and gas activities associated with Lease Sale 126, 1991

Table 4.2.2-1. Lease information as a result of Lease Sale 126

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y01607	Mobil	10/1/1991	Relinquished	6/8/1994	Karo	1607	583
Y01608	Mobil	10/1/1991	Relinquished	6/8/1994	Karo	1608	627
Y01609	Mobil	10/1/1991	Relinquished	6/8/1994	Karo	1609	670
Y01610	Mobil	10/1/1991	Relinquished	6/8/1994	Karo	1610	714
Y01611	Mobil	10/1/1991	Relinquished	6/8/1994	Karo	1611	934
Y01612	Mobil	10/1/1991	Relinquished	9/17/1993	Posey	1612	12
Y01613	Mobil	10/1/1991	Relinquished	9/17/1993	Posey	1613	13
Y01614	Mobil	10/1/1991	Relinquished	9/17/1993	Posey	1614	14
Y01615	Mobil	10/1/1991	Relinquished	9/17/1993	Posey	1615	57
Y01616	Mobil	10/1/1991	Relinquished	9/17/1993	Posey	1616	58
Y01617	Mobil	10/1/1991	Relinquished	4/15/1992	Posey	1617	329
Y01618	Mobil	10/1/1991	Relinquished	4/15/1992	Posey	1618	330
Y01619	Mobil	10/1/1991	Relinquished	4/15/1992	Posey	1619	373
Y01620	Mobil	10/1/1991	Relinquished	4/15/1992	Posey	1620	374
Y01621	Mobil	10/1/1991	Relinquished	4/15/1992	Posey	1621	418
Y01622	Mobil	10/1/1991	Relinquished	4/15/1992	Posey	1622	462
Y01623	Chevron	10/1/1991	Relinquished	4/2/1992	Posey	1623	506
Y01624	Chevron	10/1/1991	Relinquished	4/2/1992	Posey	1624	550
Y01625	Petrofina	10/1/1991	Relinquished	9/19/1994	Colbert	1625	11
Y01626	Petrofina	10/1/1991	Relinquished	9/19/1994	Colbert	1626	55
Y01627	Petrofina	10/1/1991	Relinquished	9/19/1994	Colbert	1627	98
Y01628	Mobil	10/1/1991	Relinquished	6/8/1994	Colbert	1628	140
Y01629	Mobil	10/1/1991	Relinquished	6/8/1994	Colbert	1629	141
Y01630	Petrofina	10/1/1991	Relinquished	9/19/1994	Colbert	1630	142
Y01631	Petrofina	10/1/1991	Relinquished	9/17/1993	De Long Mountains	1631	838
Y01632	Mobil	10/1/1991	Relinquished	9/17/1993	De Long Mountains	1632	839
Y01633	Mobil	10/1/1991	Relinquished	9/17/1993	De Long Mountains	1633	882
Y01634	Mobil	10/1/1991	Relinquished	9/17/1993	De Long Mountains	1634	883

Source: BOEM 2023b

4.2.2.2 Surveys

No surveys were documented as a result of Lease Sale 126.

4.2.2.3 Well Drilling

No wells were drilled as a result of Lease Sale 126.

4.2.2.4 Oil-and-Gas-Supporting Activities

There were no oil-and-gas-supporting activities identified as a result of Lease Sale 126.

4.2.2.5 E&D Scenario Summary

A scenario was developed for the Alaska OCS Chukchi Sea Oil and Gas Lease Sale 126 Final Environmental Impact Statement (MMS 1991) to assess the potential environmental impacts of the lease sale. The sale consisted of a total of 4,319 blocks, 23.68 million acres of the Chukchi Sea Planning Area. The blocks were located in waters ranging from 6.5 to 370 kilometers offshore in waters ranging from 30 to 80 meters deep. The mean resource estimate used was 1,610 MMbbl. Activities associated with the E&D scenario (MMS 1991) are summarized in Table 4.2.2-2.

Under the scenario, exploratory drilling was estimated to begin in 1992 and continue through 1998. The first delineation well was expected to be drilled in 1993. A total of 39 exploration and delineation wells were assumed to be drilled between 1992 and 1998. Production-platform installation and pipeline laying were estimated to begin in 2000 and continue through 2002. The drilling of production and service wells was assumed to begin in 2000 and continue through 2004, with a total of 214 wells being drilled. Production was anticipated to begin in 2002 and continue through 2020 (MMS 1991).

It was assumed that water depth would be a significant factor in selecting the appropriate drilling unit. The Lease Sale 126 area was generally between 30 and 50 meters deep, although depths of 80 meters were present in a small portion of the northwest corner of the sale area. Existing bottom-founded units could be extended to reach a maximum depth of 22 to 30 meters. Drillships could drill in deep water; their limitation was a minimum operating depth of 16 to 20 meters. The use of existing drillships would enable drilling to begin using systems that offer proven technology and procedures and would allow exploration to proceed without construction delays (MMS 1991). Bottom-founded drilling units rest either on the seafloor or on human-made berms. Drilling from these units could occur year-round (MMS 1991).

Under the scenario, drilling of each exploration well would require the disposal of about 660 short tons of drilling muds and approximately 850 short tons of drill cuttings. The total amount of muds and cuttings estimated to be disposed was about 25,740 short tons of drilling muds and 33,150 short tons of cuttings for the 39 exploration and delineation wells assumed to be drilled in the Lease Sale 126 area (MMS 1991).

One icebreaker and two ice-strengthened support/supply boats generally had been used in the Beaufort Sea to support each drillship operation; a comparable level of support had also been used in the Chukchi Sea. It was assumed that a total of 312 supply-boat trips would take place during exploration, based on the assumption of one supply-boat trip per drilling unit per week (of a 90-day drilling period). The number of annual supply-boat trips was estimated to range from 24 to 60 per year, depending on the number of drilling units in operation. Three to six tugs would be required to relocate bottom-founded units; tugs assisting with the sealift probably could be used. Icebreaker assistance could be needed in years with unusual ice conditions. Between 1992 and 1998, up to five drilling units would be in use during any one year. Only two drillships were likely to be operating during any single season; the remaining units would be bottom-founded. At least two ice management vessels would be present for each floating drilling unit

during exploration (1992–1998) based on past experiences and commitments by lessees in the Beaufort and Chukchi Seas (MMS 1991).

Under the scenario, for most of the sale area, personnel and air freight were assumed to be transferred to helicopters at either the Barrow or Wainwright airport. Based on exploration practices elsewhere in Alaska, a minimum of one helicopter per drilling unit with a minimum of one additional helicopter for every two drilling units generally were assumed to be used to service drilling in the sale area. Therefore, three to seven helicopters were assumed to service the Lease Sale 126 area. During the peak years of exploration effort (1992–1995), there could be a maximum of 150 flights per month, based on the assumption of one helicopter trip per day per platform. A total of 2,340 helicopter flights were estimated in support of base-case-exploration drilling (MMS 1991).

Portable housing and ancillary facilities for onshore support personnel and a workshop and warehouse would require approximately 10 hectares (MMS 1991).

The first delineation well was projected to be drilled in 1993; the first oil discovery in the Lease Sale 126 leased blocks was projected to be in 1993. Production was assumed to peak between 2003 and 2007 at 135 MMbbl a year and cease in 2020 (MMS 1991).

It was assumed that construction and outfitting of the platforms would occur in ice-free harbors in the North Pacific Ocean. After staging, the platforms would be towed and installed during the open-water period. Drilling of development wells could begin after 50 percent of the facility hookup was complete and while production facilities were being readied for operation (MMS 1991).

During development drilling, it was estimated that a total of 214 production and service wells would be drilled from 6 platforms from 2000 through 2004. Drilling of the production and service wells would use from 110 to 700 short tons (dry weight) of drilling muds per well. Some of the muds used in drilling production and service wells may be recycled through each subsequent well drilled on a particular platform. Depending on the quantity recycled, the amount of drilling muds disposed could range from 23,540 to 149,800 short tons for all wells drilled. Each well was expected to produce approximately 925 short tons of drill cuttings, with a total of about 197,950 short tons of cuttings disposed (MMS 1991).

It was assumed that as delineation drilling continued, support for the development of the field would shift to Point Belcher. It was assumed for this scenario that oil fields developed in the Chukchi Sea would be located so that Point Belcher would be a viable onshore location. An advantage to locating the landfall at Point Belcher was its proximity to Barrow, Wainwright, and the western portion of the proposed Beaufort Sea Sale 124 area (MMS 1991).

Under the scenario, the 25-to-30-hectare service base at Point Belcher was assumed to provide base-camp facilities for development drilling and pipeline laying. A 1,900-meter airstrip was assumed to be constructed to serve the facility. Gravel bases for all the facilities assumed in the scenario probably would require approximately 500,000 cubic meters of gravel. In 2003, the year of peak barge activity, 53 barges were assumed to be included in the Chukchi sealift. About one-half of these barges were assumed to offload directly onto a production platform (MMS 1991).

Installation and hookup of the production platforms during the development stage would be supported by two supply boats and one helicopter per platform. Two platforms were scheduled to be installed during 2000, 2001, and 2002, with heavy supplies being transported by barges. During production, two icebreaker-support/supply boats and two helicopters would be dedicated to the sale area (MMS 1991).

An additional support/supply boat and helicopter would be available for backup. There would be an estimated 9,630 helicopter flights in support of drilling 214 production and service wells between 2000 through 2004, based on an average of 0.5 flights per well during the drilling period or 45 trips per well.

The number of flights would range from 360 in 2000, when 8 wells would be drilled, to 3,600 in 2003, when 80 wells would be drilled. From 2002 to 2020, it was estimated that the number of helicopter flights to production platforms would average about two per week per platform, or 11,856 flights (MMS 1991).

The transportation scenario for the base case assumed a pipeline connection to the TAPS. The total pipeline project of approximately 965 kilometers (approximately 600 miles) was assumed to come onshore in the vicinity of Point Belcher and continue eastward to TAPS Pump Station No. 2. Pipeline construction was assumed to begin in 1999 and end in 2001. The project included a 325-kilometer (200-mile) offshore trunk and lateral gathering system and a 640-kilometer (400-mile) onshore elevated pipeline (MMS 1991).

Four onshore pump stations were assumed for the new pipeline, and one offshore booster station possibly would be required. Helipads typically would be located at each construction camp along the route (located about every 100 kilometers) and at each pump station. Approximately 10 to 12 helipads were assumed to be built, and at least one helicopter flight a day to each active camp was assumed (MMS 1991).

Table 4.2.2-2. Summary of basic assumptions of Lease Sale 126 E&D scenario

Element	Mean Case
Sale acreage offering	23.68 million acres
Recoverable oil	1,610 MMbbl
Peak production oil	135 MMbbl yearly
Exploration	Exploration
Number of wells – exploration	39
Helicopters	3 to 7
Helicopter flights – exploration	2,340 trips
Icebreakers	1
Supply boats	2
Supply boat trips	312
Total drilling muds – exploration	25,740 short tons
Total cuttings – exploration	33,150 short tons
Ice management vessels	2
Development and Production	Development and Production
Platforms – development and production	6
Number of wells – production and service	214
Helicopter flights – during development	9,630 trips
Helicopter flights – after development	11,856 trips
Total drilling muds – development and production	23,540–149,800 short tons
Total cuttings – development and production	197,950 short tons
Helipads	10-12
Supply boats	2

Element	Mean Case
Barges – peak year	53
Transportation	Transportation
Onshore pipeline miles	400
Support road – miles	400
Offshore pipeline miles	200
Support	Support
Base – acres needed	62-74
Base – gravel needed	500,000 m^3
Airstrip – size	1,900 meters

Notes: E&D = Exploration and Development; G&G = geological and geophysical; m^3 = cubic meters; MMbbl = million barrels
Source: MMS 1991

4.2.2.6 Comparison of E&D Scenario and Historical Activities

A comparison of the E&D scenario and the historical activities are provided in Table 4.2.2-3, using available information.

Table 4.2.2-3. Comparison of E&D and historical activities

Activity	E&D Scenario	Actual Activities
Recoverable oil (maximum)	1,610 MMbbl	--
Sale acreage offering	23.68 million acres	18,987,976 acres offered
Sale	--	159,213 acres leased
Date of exploratory activities (begin)	1992	--
Number of wells – exploration and delineation	39	0
Number of wells – production and service	214	0
Average well depth	--	0
Drilling muds – exploration	25,740 short tons	0
Drilling muds – development and production	23,540–149,800 short tons	0
Drilling cuttings – exploration	33,150 short tons	0
Drilling cuttings – development and production	197,950 short tons	0
Number of G&G or other surveys	--	0
Support facility and shorebase locations	Point Belcher	--
Other sites used	Barrow	--
Helicopters – exploration	3–7	0
Helicopter flights – exploration	2,340 trips	0

Activity	E&D Scenario	Actual Activities
Helicopter flights – during development	9,630 trips	0
Helicopter flights – after development	11,856 trips	0
Helipads	10–12	0
Airstrip	1,900 meters	0
Icebreakers – exploration	1	0
Ice management vessels – exploration	2	0
Peak production oil	135 MMbbl yearly	0
Platforms	6	0
Onshore pipeline	400 miles	0
Support road	400 miles	0
Offshore pipeline	200 miles	0
Supply boats – exploration	2	0
Supply boat trips – exploration	312	0
Supply boats – development and production	2	0
Barges – peak year	53	--

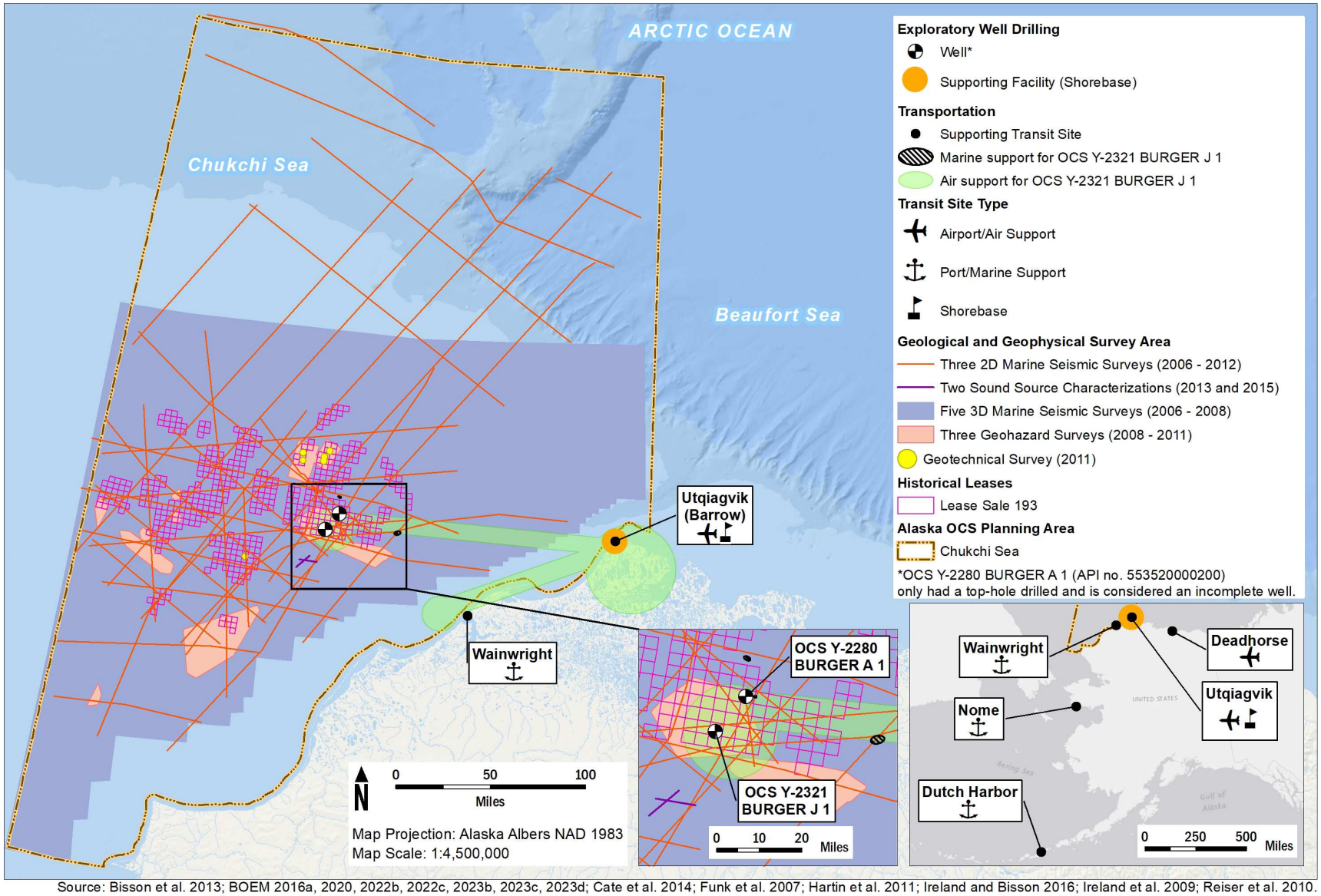
Notes: -- = no data provided; E&D = Exploration and Development; G&G = geological and geophysical; MMbbl = million barrels

4.2.3 Lease Sale 193 (2007)

The identified activities associated with Lease Sale 193 are shown in Figure 4-17, such as the locations of exploration wells, G&G survey areas, and transportation facilities.

4.2.3.1 Leasing

As shown in Table 4.2-1 and Figure 4-17, as a result of Lease Sale 193, there were 5,354 tracts offered and 487 leases issued. There were 29,389,241 acres offered and 2,758,377 acres leased. There are no active leases from Lease Sale 193. Table 4.2.3-1 summarizes documented information associated with the leasing as a result of Lease Sale 193.



Source: Bisson et al. 2013; BOEM 2016a, 2020, 2022b, 2022c, 2023b, 2023c, 2023d; Cate et al. 2014; Funk et al. 2007; Hartin et al. 2011; Ireland and Bisson 2016; Ireland et al. 2009; Reiser et al. 2010.

Figure 4-17. Historical oil and gas activities associated with Lease Sale 193, 2007

Table 4.2.3-1. Lease information as a result of Lease Sale 193

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y01947	Repsol	4/1/2008	Relinquished	5/26/2016	Posey	1947	6008
Y01948	Repsol	4/1/2008	Relinquished	5/26/2016	Unnamed	1948	6960
Y01949	Repsol	4/1/2008	Relinquished	5/26/2016	Unnamed	1949	6961
Y01950	Repsol	4/1/2008	Relinquished	5/26/2016	Unnamed	1950	6962
Y01951	Repsol	4/1/2008	Relinquished	5/26/2016	Unnamed	1951	7009
Y01952	Repsol	4/1/2008	Relinquished	5/26/2016	Unnamed	1952	7010
Y01953	Repsol	4/1/2008	Relinquished	5/26/2016	Unnamed	1953	7011
Y01954	Repsol	4/1/2008	Relinquished	5/26/2016	Unnamed	1954	7058
Y01955	Repsol	4/1/2008	Relinquished	5/26/2016	Unnamed	1955	7059
Y01956	Repsol	4/1/2008	Relinquished	5/26/2016	Unnamed	1956	7060
Y01957	Repsol	4/1/2008	Relinquished	5/26/2016	Unnamed	1957	7108
Y01958	Repsol	4/1/2008	Relinquished	5/26/2016	Unnamed	1958	7109
Y01959	Shell	4/1/2008	Relinquished	3/30/2016	Tison	1959	6819
Y01960	Shell	4/1/2008	Relinquished	3/30/2016	Tison	1960	6820
Y01961	Shell	4/1/2008	Relinquished	3/30/2016	Tison	1961	6821
Y01962	Shell	4/1/2008	Relinquished	3/30/2016	Tison	1962	6822
Y01963	Shell	4/1/2008	Relinquished	3/30/2016	Tison	1963	6868
Y01964	Shell	4/1/2008	Relinquished	3/30/2016	Tison	1964	6869
Y01965	Shell	4/1/2008	Relinquished	3/30/2016	Tison	1965	6870
Y01966	Shell	4/1/2008	Relinquished	3/30/2016	Tison	1966	6871
Y01967	Shell	4/1/2008	Relinquished	3/30/2016	Tison	1967	6872
Y01968	Shell	4/1/2008	Relinquished	3/30/2016	Tison	1968	6918
Y01969	Shell	4/1/2008	Relinquished	3/30/2016	Tison	1969	6919
Y01970	Shell	4/1/2008	Relinquished	3/30/2016	Tison	1970	6920
Y01971	Shell	4/1/2008	Relinquished	3/30/2016	Tison	1971	6921
Y01972	Shell	4/1/2008	Relinquished	3/30/2016	Tison	1972	6922
Y01973	Shell	4/1/2008	Relinquished	3/30/2016	Tison	1973	6968
Y01974	Shell	4/1/2008	Relinquished	3/30/2016	Tison	1974	6969
Y01975	Shell	4/1/2008	Relinquished	3/30/2016	Tison	1975	6970
Y01976	Shell	4/1/2008	Relinquished	3/30/2016	Tison	1976	6971
Y01977	Shell	4/1/2008	Relinquished	3/30/2016	Tison	1977	6972

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y01978	Shell	4/1/2008	Relinquished	3/30/2016	Tison	1978	7018
Y01979	Shell	4/1/2008	Relinquished	3/30/2016	Tison	1979	7019
Y01980	Shell	4/1/2008	Relinquished	3/30/2016	Tison	1980	7020
Y01981	Shell	4/1/2008	Relinquished	3/30/2016	Tison	1981	7021
Y01982	Shell	4/1/2008	Relinquished	3/30/2016	Tison	1982	7022
Y01983	Shell	4/1/2008	Relinquished	3/30/2016	Tison	1983	7023
Y01984	Shell	4/1/2008	Relinquished	3/30/2016	Tison	1984	7068
Y01985	Shell	4/1/2008	Relinquished	3/30/2016	Tison	1985	7069
Y01986	Shell	4/1/2008	Relinquished	3/30/2016	Tison	1986	7072
Y02068	Shell	4/1/2008	Relinquished	5/16/2016	Karo	2068	6667
Y02069	Shell	4/1/2008	Relinquished	5/16/2016	Karo	2069	6668
Y02074	Shell	4/1/2008	Relinquished	3/30/2016	Karo	2074	6712
Y02075	Shell	4/1/2008	Relinquished	5/16/2016	Karo	2075	6715
Y02076	Shell	4/1/2008	Relinquished	5/16/2016	Karo	2076	6716
Y02077	Shell	4/1/2008	Relinquished	5/16/2016	Karo	2077	6717
Y02084	Shell	4/1/2008	Relinquished	3/30/2016	Karo	2084	6761
Y02085	Shell	4/1/2008	Relinquished	3/30/2016	Karo	2085	6762
Y02086	Shell	4/1/2008	Relinquished	5/16/2016	Karo	2086	6765
Y02094	Shell	4/1/2008	Relinquished	3/30/2016	Karo	2094	6810
Y02095	Shell	4/1/2008	Relinquished	3/30/2016	Karo	2095	6811
Y02096	Shell	4/1/2008	Relinquished	3/30/2016	Karo	2096	6812
Y02097	Shell	4/1/2008	Relinquished	5/16/2016	Karo	2097	6813
Y02098	Shell	4/1/2008	Relinquished	5/16/2016	Karo	2098	6814
Y02099	Shell	4/1/2008	Relinquished	5/16/2016	Karo	2099	6815
Y02100	Shell	4/1/2008	Relinquished	5/16/2016	Karo	2100	6816
Y02101	Shell	4/1/2008	Relinquished	5/16/2016	Karo	2101	6817
Y02107	Shell	4/1/2008	Relinquished	3/30/2016	Karo	2107	6860
Y02108	Shell	4/1/2008	Relinquished	3/30/2016	Karo	2108	6861
Y02052	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2052	6567
Y02053	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2053	6568
Y02054	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2054	6569
Y02061	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2061	6616
Y02062	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2062	6617

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y02063	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2063	6618
Y02066	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2066	6665
Y02067	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2067	6666
Y02072	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2072	6705
Y02073	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2073	6706
Y02080	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2080	6753
Y02081	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2081	6754
Y02082	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2082	6755
Y02083	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2083	6756
Y02087	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2087	6766
Y02088	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2088	6767
Y02091	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2091	6803
Y02092	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2092	6804
Y02093	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2093	6805
Y02104	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2104	6853
Y02105	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2105	6854
Y02106	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2106	6855
Y02109	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2109	6862
Y02110	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2110	6863
Y02111	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2111	6864
Y02112	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2112	6865
Y02113	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2113	6866
Y02116	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2116	6903
Y02117	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2117	6904
Y02118	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2118	6905
Y02119	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2119	6908
Y02120	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2120	6909
Y02121	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2121	6910
Y02122	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2122	6911
Y02123	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2123	6912
Y02124	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2124	6913
Y02125	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2125	6914
Y02126	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2126	6915

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y02127	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2127	6916
Y02128	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2128	6953
Y02129	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2129	6954
Y02130	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2130	6955
Y02131	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2131	6956
Y02132	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2132	6957
Y02133	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2133	6958
Y02134	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2134	6959
Y02135	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2135	6960
Y02136	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2136	6961
Y02137	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2137	6962
Y02138	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2138	6963
Y02139	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2139	6964
Y02140	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2140	6965
Y02141	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2141	7006
Y02142	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2142	7007
Y02143	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2143	7008
Y02144	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2144	7009
Y02145	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2145	7010
Y02146	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2146	7011
Y02147	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2147	7012
Y02148	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2148	7013
Y02149	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2149	7014
Y02150	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2150	7056
Y02151	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2151	7057
Y02152	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2152	7058
Y02153	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2153	7059
Y02154	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2154	7060
Y02155	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2155	7061
Y02156	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2156	7062
Y02157	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2157	7063
Y02158	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2158	7106
Y02159	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2159	7107

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y02160	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2160	7108
Y02161	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2161	7109
Y02162	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2162	7110
Y02163	Shell	5/1/2008	Relinquished	4/27/2016	Karo	2163	7119
Y02164	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Karo	2164	7121
Y02165	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Karo	2165	7122
Y02166	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Karo	2166	7123
Y02208	Conoco Philips	5/1/2008	Relinquished	4/26/2013	Posey	2208	6363
Y02209	Conoco Philips	5/1/2008	Relinquished	4/26/2013	Posey	2209	6364
Y02216	Conoco Philips	5/1/2008	Relinquished	4/26/2013	Posey	2216	6413
Y02217	Conoco Philips	5/1/2008	Relinquished	4/26/2013	Posey	2217	6414
Y02223	Conoco Philips	5/1/2008	Relinquished	4/26/2013	Posey	2223	6462
Y02224	Conoco Philips	5/1/2008	Relinquished	4/26/2013	Posey	2224	6463
Y02225	Conoco Philips	5/1/2008	Relinquished	4/26/2013	Posey	2225	6464
Y02226	Shell	5/1/2008	Relinquished	4/27/2016	Posey	2226	6508
Y02227	Repsol	5/1/2008	Relinquished	5/26/2016	Posey	2227	6510
Y02228	Repsol	5/1/2008	Relinquished	5/26/2016	Posey	2228	6511
Y02229	Conoco Philips	5/1/2008	Relinquished	4/26/2013	Posey	2229	6512
Y02230	Conoco Philips	5/1/2008	Relinquished	4/26/2013	Posey	2230	6513
Y02233	Shell	5/1/2008	Relinquished	4/27/2016	Posey	2233	6558
Y02234	Repsol	5/1/2008	Relinquished	5/26/2016	Posey	2234	6559
Y02235	Repsol	5/1/2008	Relinquished	5/26/2016	Posey	2235	6560
Y02236	Conoco Philips	5/1/2008	Relinquished	4/26/2013	Posey	2236	6562
Y02241	Shell	5/1/2008	Relinquished	4/27/2016	Posey	2241	6608
Y02242	Repsol	5/1/2008	Relinquished	5/26/2016	Posey	2242	6609
Y02243	Repsol	5/1/2008	Relinquished	5/26/2016	Posey	2243	6610
Y02248	Shell	5/1/2008	Relinquished	4/27/2016	Posey	2248	6658
Y02249	Repsol	5/1/2008	Relinquished	5/26/2016	Posey	2249	6659
Y02250	Repsol	5/1/2008	Relinquished	5/26/2016	Posey	2250	6660
Y02251	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Posey	2251	6661
Y02252	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Posey	2252	6662
Y02253	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Posey	2253	6663
Y02254	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Posey	2254	6664

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y02261	Shell	5/1/2008	Relinquished	4/27/2016	Posey	2261	6708
Y02262	Repsol	5/1/2008	Relinquished	5/26/2016	Posey	2262	6709
Y02263	Repsol	5/1/2008	Relinquished	5/26/2016	Posey	2263	6710
Y02264	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Posey	2264	6711
Y02265	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Posey	2265	6712
Y02266	Shell	5/1/2008	Relinquished	4/27/2016	Posey	2266	6713
Y02267	Shell	5/1/2008	Relinquished	4/27/2016	Posey	2267	6714
Y02268	Shell	5/1/2008	Relinquished	4/27/2016	Posey	2268	6715
Y02275	Repsol	5/1/2008	Relinquished	5/26/2016	Posey	2275	6759
Y02276	Repsol	5/1/2008	Relinquished	5/26/2016	Posey	2276	6760
Y02277	Shell	5/1/2008	Relinquished	4/27/2016	Posey	2277	6761
Y02278	Shell	5/1/2008	Relinquished	4/27/2016	Posey	2278	6762
Y02279	Shell	5/1/2008	Relinquished	4/27/2016	Posey	2279	6763
Y02280	Shell	5/1/2008	Relinquished	4/27/2016	Posey	2280	6764
Y02281	Shell	5/1/2008	Relinquished	4/27/2016	Posey	2281	6765
Y02282	Shell	5/1/2008	Relinquished	4/27/2016	Posey	2282	6766
Y02284	Conoco Philips	5/1/2008	Relinquished	4/26/2013	Posey	2284	6768
Y02285	Conoco Philips	5/1/2008	Relinquished	4/26/2013	Posey	2285	6769
Y02291	Repsol	5/1/2008	Relinquished	5/26/2016	Posey	2291	6809
Y02292	Repsol	5/1/2008	Relinquished	5/26/2016	Posey	2292	6810
Y02293	Shell	5/1/2008	Relinquished	4/27/2016	Posey	2293	6811
Y02294	Shell	5/1/2008	Relinquished	4/27/2016	Posey	2294	6812
Y02295	Shell	5/1/2008	Relinquished	4/27/2016	Posey	2295	6813
Y02296	Shell	5/1/2008	Relinquished	4/27/2016	Posey	2296	6814
Y02297	Shell	5/1/2008	Relinquished	4/27/2016	Posey	2297	6815
Y02298	Shell	5/1/2008	Relinquished	4/27/2016	Posey	2298	6816
Y02299	Shell	5/1/2008	Relinquished	4/27/2016	Posey	2299	6817
Y02300	Conoco Philips	5/1/2008	Relinquished	4/26/2013	Posey	2300	6818
Y02301	Conoco Philips	5/1/2008	Relinquished	4/26/2013	Posey	2301	6819
Y02302	Conoco Philips	5/1/2008	Relinquished	4/26/2013	Posey	2302	6820
Y02305	Repsol	5/1/2008	Relinquished	5/26/2016	Posey	2305	6858
Y02306	Repsol	5/1/2008	Relinquished	5/26/2016	Posey	2306	6859
Y02307	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Posey	2307	6861

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y02308	Shell	5/1/2008	Relinquished	4/27/2016	Posey	2308	6862
Y02309	Shell	5/1/2008	Relinquished	4/27/2016	Posey	2309	6863
Y02310	Shell	5/1/2008	Relinquished	4/27/2016	Posey	2310	6864
Y02311	Shell	5/1/2008	Relinquished	4/27/2016	Posey	2311	6865
Y02312	Shell	5/1/2008	Relinquished	4/27/2016	Posey	2312	6866
Y02313	Conoco Philips	5/1/2008	Relinquished	4/26/2013	Posey	2313	6868
Y02314	Conoco Philips	5/1/2008	Relinquished	4/26/2013	Posey	2314	6869
Y02315	Conoco Philips	5/1/2008	Relinquished	4/26/2013	Posey	2315	6870
Y02316	Conoco Philips	5/1/2008	Relinquished	4/26/2013	Posey	2316	6871
Y02318	Repsol	5/1/2008	Relinquished	5/26/2016	Posey	2318	6908
Y02319	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Posey	2319	6910
Y02320	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Posey	2320	6911
Y02321	Shell	5/1/2008	Relinquished	4/19/2017	Posey	2321	6912
Y02322	Shell	5/1/2008	Relinquished	4/27/2016	Posey	2322	6913
Y02323	Shell	5/1/2008	Relinquished	4/27/2016	Posey	2323	6914
Y02324	Shell	5/1/2008	Relinquished	4/27/2016	Posey	2324	6915
Y02325	Shell	5/1/2008	Relinquished	4/27/2016	Posey	2325	6916
Y02326	Conoco Philips	5/1/2008	Relinquished	4/26/2013	Posey	2326	6918
Y02327	Conoco Philips	5/1/2008	Relinquished	4/26/2013	Posey	2327	6919
Y02328	Conoco Philips	5/1/2008	Relinquished	4/26/2013	Posey	2328	6920
Y02329	Conoco Philips	5/1/2008	Relinquished	4/26/2013	Posey	2329	6921
Y02330	Repsol	5/1/2008	Relinquished	5/26/2016	Posey	2330	6957
Y02331	Repsol	5/1/2008	Relinquished	5/26/2016	Posey	2331	6958
Y02332	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Posey	2332	6960
Y02333	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Posey	2333	6961
Y02334	Shell	5/1/2008	Relinquished	4/27/2016	Posey	2334	6962
Y02335	Shell	5/1/2008	Relinquished	4/27/2016	Posey	2335	6963
Y02336	Shell	5/1/2008	Relinquished	4/27/2016	Posey	2336	6964
Y02337	Shell	5/1/2008	Relinquished	4/27/2016	Posey	2337	6965
Y02338	Conoco Philips	5/1/2008	Relinquished	4/26/2013	Posey	2338	6969
Y02339	Conoco Philips	5/1/2008	Relinquished	4/26/2013	Posey	2339	6970
Y02340	Conoco Philips	5/1/2008	Relinquished	4/26/2013	Posey	2340	7019
Y02341	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Posey	2341	7101

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y02351	Shell	5/1/2008	Relinquished	4/27/2016	Colbert	2351	6007
Y02352	Shell	5/1/2008	Relinquished	4/27/2016	Colbert	2352	6008
Y02353	Shell	5/1/2008	Relinquished	4/27/2016	Colbert	2353	6009
Y02354	Shell	5/1/2008	Relinquished	4/27/2016	Colbert	2354	6010
Y02355	Shell	5/1/2008	Relinquished	4/27/2016	Colbert	2355	6017
Y02356	Shell	5/1/2008	Relinquished	4/27/2016	Colbert	2356	6018
Y02357	Shell	5/1/2008	Relinquished	4/27/2016	Colbert	2357	6020
Y02358	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Colbert	2358	6021
Y02359	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Colbert	2359	6022
Y02360	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Colbert	2360	6023
Y02361	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Colbert	2361	6024
Y02362	Shell	5/1/2008	Relinquished	4/27/2016	Colbert	2362	6056
Y02363	Shell	5/1/2008	Relinquished	4/27/2016	Colbert	2363	6057
Y02364	Shell	5/1/2008	Relinquished	4/27/2016	Colbert	2364	6058
Y02365	Shell	5/1/2008	Relinquished	4/27/2016	Colbert	2365	6059
Y02366	Eni	5/1/2008	Relinquished	4/28/2016	Colbert	2366	6060
Y02367	Shell	5/1/2008	Relinquished	4/27/2016	Colbert	2367	6067
Y02368	Shell	5/1/2008	Relinquished	4/27/2016	Colbert	2368	6068
Y02369	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Colbert	2369	6069
Y02370	Shell	5/1/2008	Relinquished	4/27/2016	Colbert	2370	6070
Y02371	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Colbert	2371	6071
Y02372	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Colbert	2372	6072
Y02373	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Colbert	2373	6073
Y02374	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Colbert	2374	6074
Y02375	Shell	5/1/2008	Relinquished	4/27/2016	Colbert	2375	6108
Y02376	Eni	5/1/2008	Relinquished	4/28/2016	Colbert	2376	6109
Y02377	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Colbert	2377	6119
Y02378	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Colbert	2378	6120
Y02379	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Colbert	2379	6121
Y02380	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Colbert	2380	6122
Y02381	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Colbert	2381	6123
Y02382	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Colbert	2382	6124
Y02383	Eni	5/1/2008	Relinquished	4/28/2016	Colbert	2383	6158

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y02384	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Colbert	2384	6168
Y02385	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Colbert	2385	6169
Y02386	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Colbert	2386	6170
Y02387	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Colbert	2387	6171
Y02388	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Colbert	2388	6172
Y02389	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Colbert	2389	6173
Y02390	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Colbert	2390	6174
Y02391	Eni	5/1/2008	Relinquished	4/28/2016	Colbert	2391	6208
Y02392	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Colbert	2392	6218
Y02393	Shell	5/1/2008	Relinquished	4/27/2016	Colbert	2393	6219
Y02394	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Colbert	2394	6220
Y02395	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Colbert	2395	6221
Y02396	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Colbert	2396	6222
Y02397	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Colbert	2397	6223
Y02398	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Colbert	2398	6224
Y02399	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Colbert	2399	6268
Y02400	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Colbert	2400	6270
Y02401	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Colbert	2401	6271
Y02402	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Colbert	2402	6272
Y02403	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Colbert	2403	6273
Y02404	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Colbert	2404	6274
Y02405	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Colbert	2405	6317
Y02406	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Colbert	2406	6321
Y02407	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Colbert	2407	6322
Y02408	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Colbert	2408	6323
Y02409	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Colbert	2409	6324
Y02410	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Colbert	2410	6372
Y02411	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Colbert	2411	6373
Y02429	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Solivik Island	2429	6001
Y02430	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Solivik Island	2430	6051
Y02431	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Solivik Island	2431	6101
Y02432	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Solivik Island	2432	6151
Y02433	Conoco Philips	5/1/2008	Relinquished	4/21/2016	Solivik Island	2433	6201

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y01987	Shell	6/1/2008	Relinquished	5/16/2016	Karo	1987	6105
Y01988	Shell	6/1/2008	Relinquished	5/16/2016	Karo	1988	6106
Y01989	Conoco Philips	6/1/2008	Relinquished	5/21/2015	Karo	1989	6154
Y01990	Shell	6/1/2008	Relinquished	5/16/2016	Karo	1990	6155
Y01991	Shell	6/1/2008	Relinquished	5/16/2016	Karo	1991	6156
Y01992	Conoco Philips	6/1/2008	Relinquished	5/21/2015	Karo	1992	6157
Y01993	Shell	6/1/2008	Relinquished	5/16/2016	Karo	1993	6161
Y01994	Shell	6/1/2008	Relinquished	5/16/2016	Karo	1994	6162
Y01995	Repsol	6/1/2008	Relinquished	5/24/2016	Karo	1995	6167
Y01996	Repsol	6/1/2008	Relinquished	5/24/2016	Karo	1996	6168
Y01997	Repsol	6/1/2008	Relinquished	5/24/2016	Karo	1997	6169
Y01998	Repsol	6/1/2008	Relinquished	5/24/2016	Karo	1998	6170
Y01999	Conoco Philips	6/1/2008	Relinquished	5/21/2015	Karo	1999	6204
Y02000	Conoco Philips	6/1/2008	Relinquished	5/21/2015	Karo	2000	6205
Y02001	Conoco Philips	6/1/2008	Relinquished	5/21/2015	Karo	2001	6206
Y02002	Conoco Philips	6/1/2008	Relinquished	5/21/2015	Karo	2002	6207
Y02003	Conoco Philips	6/1/2008	Relinquished	5/21/2015	Karo	2003	6208
Y02004	Shell	6/1/2008	Relinquished	5/16/2016	Karo	2004	6211
Y02005	Shell	6/1/2008	Relinquished	5/16/2016	Karo	2005	6212
Y02006	Repsol	6/1/2008	Relinquished	5/24/2016	Karo	2006	6218
Y02007	Repsol	6/1/2008	Relinquished	5/24/2016	Karo	2007	6219
Y02008	Repsol	6/1/2008	Relinquished	5/24/2016	Karo	2008	6220
Y02009	Repsol	6/1/2008	Relinquished	5/24/2016	Karo	2009	6221
Y02010	Conoco Philips	6/1/2008	Relinquished	5/21/2015	Karo	2010	6256
Y02011	Conoco Philips	6/1/2008	Relinquished	5/21/2015	Karo	2011	6257
Y02012	Conoco Philips	6/1/2008	Relinquished	5/21/2015	Karo	2012	6258
Y02013	Shell	6/1/2008	Relinquished	5/16/2016	Karo	2013	6261
Y02014	Repsol	6/1/2008	Relinquished	5/24/2016	Karo	2014	6268
Y02015	Repsol	6/1/2008	Relinquished	5/24/2016	Karo	2015	6269
Y02016	Repsol	6/1/2008	Relinquished	5/24/2016	Karo	2016	6270
Y02017	Repsol	6/1/2008	Relinquished	5/24/2016	Karo	2017	6271
Y02018	Repsol	6/1/2008	Relinquished	5/24/2016	Karo	2018	6318
Y02019	Repsol	6/1/2008	Relinquished	5/24/2016	Karo	2019	6319

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y02020	Repsol	6/1/2008	Relinquished	5/24/2016	Karo	2020	6320
Y02021	Shell	6/1/2008	Relinquished	5/16/2016	Karo	2021	6363
Y02022	Shell	6/1/2008	Relinquished	5/16/2016	Karo	2022	6364
Y02023	Repsol	6/1/2008	Relinquished	5/24/2016	Karo	2023	6368
Y02024	Repsol	6/1/2008	Relinquished	5/24/2016	Karo	2024	6369
Y02025	Repsol	6/1/2008	Relinquished	5/24/2016	Karo	2025	6370
Y02026	Shell	6/1/2008	Relinquished	5/16/2016	Karo	2026	6413
Y02027	Shell	6/1/2008	Relinquished	5/16/2016	Karo	2027	6414
Y02028	Shell	6/1/2008	Relinquished	5/16/2016	Karo	2028	6415
Y02029	Shell	6/1/2008	Relinquished	5/16/2016	Karo	2029	6418
Y02030	Shell	6/1/2008	Relinquished	5/16/2016	Karo	2030	6419
Y02031	Shell	6/1/2008	Relinquished	5/16/2016	Karo	2031	6462
Y02032	Shell	6/1/2008	Relinquished	5/16/2016	Karo	2032	6463
Y02033	Shell	6/1/2008	Relinquished	5/16/2016	Karo	2033	6464
Y02034	Shell	6/1/2008	Relinquished	5/16/2016	Karo	2034	6465
Y02035	Shell	6/1/2008	Relinquished	5/16/2016	Karo	2035	6467
Y02036	Shell	6/1/2008	Relinquished	5/16/2016	Karo	2036	6468
Y02037	Shell	6/1/2008	Relinquished	5/16/2016	Karo	2037	6469
Y02038	Shell	6/1/2008	Relinquished	5/16/2016	Karo	2038	6512
Y02039	Shell	6/1/2008	Relinquished	5/16/2016	Karo	2039	6513
Y02040	Shell	6/1/2008	Relinquished	5/16/2016	Karo	2040	6514
Y02041	Shell	6/1/2008	Relinquished	5/16/2016	Karo	2041	6515
Y02042	Shell	6/1/2008	Relinquished	5/16/2016	Karo	2042	6516
Y02043	Shell	6/1/2008	Relinquished	5/16/2016	Karo	2043	6517
Y02044	Shell	6/1/2008	Relinquished	5/16/2016	Karo	2044	6518
Y02045	Shell	6/1/2008	Relinquished	5/16/2016	Karo	2045	6519
Y02046	Repsol	6/1/2008	Relinquished	5/24/2016	Karo	2046	6522
Y02047	Repsol	6/1/2008	Relinquished	5/24/2016	Karo	2047	6523
Y02048	Shell	6/1/2008	Relinquished	5/16/2016	Karo	2048	6562
Y02049	Shell	6/1/2008	Relinquished	5/16/2016	Karo	2049	6563
Y02050	Shell	6/1/2008	Relinquished	5/16/2016	Karo	2050	6564
Y02051	Shell	6/1/2008	Relinquished	5/16/2016	Karo	2051	6565
Y02055	Repsol	6/1/2008	Relinquished	5/24/2016	Karo	2055	6572

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y02056	Repsol	6/1/2008	Relinquished	5/24/2016	Karo	2056	6573
Y02057	Shell	6/1/2008	Relinquished	5/16/2016	Karo	2057	6612
Y02058	Shell	6/1/2008	Relinquished	5/16/2016	Karo	2058	6613
Y02059	Shell	6/1/2008	Relinquished	5/16/2016	Karo	2059	6614
Y02060	Shell	6/1/2008	Relinquished	5/16/2016	Karo	2060	6615
Y02064	Repsol	6/1/2008	Relinquished	5/24/2016	Karo	2064	6622
Y02065	Repsol	6/1/2008	Relinquished	5/24/2016	Karo	2065	6623
Y02070	Repsol	6/1/2008	Relinquished	5/24/2016	Karo	2070	6672
Y02071	Repsol	6/1/2008	Relinquished	5/24/2016	Karo	2071	6673
Y02078	Repsol	6/1/2008	Relinquished	5/24/2016	Karo	2078	6722
Y02079	Repsol	6/1/2008	Relinquished	5/24/2016	Karo	2079	6723
Y02089	Repsol	6/1/2008	Relinquished	5/24/2016	Karo	2089	6772
Y02090	Repsol	6/1/2008	Relinquished	5/24/2016	Karo	2090	6773
Y02102	Repsol	6/1/2008	Relinquished	5/24/2016	Karo	2102	6822
Y02103	Repsol	6/1/2008	Relinquished	5/24/2016	Karo	2103	6823
Y02114	Repsol	6/1/2008	Relinquished	5/24/2016	Karo	2114	6872
Y02115	Repsol	6/1/2008	Relinquished	5/24/2016	Karo	2115	6873
Y02183	Shell	6/1/2008	Relinquished	5/16/2016	Posey	2183	6220
Y02192	Shell	6/1/2008	Relinquished	5/16/2016	Posey	2192	6270
Y02193	Shell	6/1/2008	Relinquished	5/16/2016	Posey	2193	6271
Y02200	Shell	6/1/2008	Relinquished	5/16/2016	Posey	2200	6321
Y02201	Shell	6/1/2008	Relinquished	5/16/2016	Posey	2201	6322
Y02210	Shell	6/1/2008	Relinquished	5/16/2016	Posey	2210	6371
Y02211	Shell	6/1/2008	Relinquished	5/16/2016	Posey	2211	6372
Y02215	Conoco Philips	6/1/2008	Relinquished	4/26/2013	Posey	2215	6412
Y02218	Shell	6/1/2008	Relinquished	5/16/2016	Posey	2218	6422
Y02219	Shell	6/1/2008	Relinquished	5/16/2016	Posey	2219	6423
Y02231	Repsol	6/1/2008	Relinquished	5/24/2016	Posey	2231	6551
Y02232	Repsol	6/1/2008	Relinquished	5/24/2016	Posey	2232	6552
Y02237	Repsol	6/1/2008	Relinquished	5/24/2016	Posey	2237	6601
Y02238	Repsol	6/1/2008	Relinquished	5/24/2016	Posey	2238	6602
Y02239	Repsol	6/1/2008	Relinquished	5/24/2016	Posey	2239	6605
Y02240	Repsol	6/1/2008	Relinquished	5/24/2016	Posey	2240	6606

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y02244	Repsol	6/1/2008	Relinquished	5/24/2016	Posey	2244	6651
Y02245	Repsol	6/1/2008	Relinquished	5/24/2016	Posey	2245	6652
Y02246	Repsol	6/1/2008	Relinquished	5/24/2016	Posey	2246	6655
Y02247	Repsol	6/1/2008	Relinquished	5/24/2016	Posey	2247	6656
Y02255	Shell	6/1/2008	Relinquished	5/16/2016	Posey	2255	6671
Y02256	Shell	6/1/2008	Relinquished	5/16/2016	Posey	2256	6672
Y02257	Repsol	6/1/2008	Relinquished	5/24/2016	Posey	2257	6701
Y02258	Repsol	6/1/2008	Relinquished	5/24/2016	Posey	2258	6702
Y02259	Repsol	6/1/2008	Relinquished	5/24/2016	Posey	2259	6705
Y02260	Repsol	6/1/2008	Relinquished	5/24/2016	Posey	2260	6706
Y02269	Shell	6/1/2008	Relinquished	5/16/2016	Posey	2269	6721
Y02270	Shell	6/1/2008	Relinquished	5/16/2016	Posey	2270	6722
Y02271	Repsol	6/1/2008	Relinquished	5/24/2016	Posey	2271	6751
Y02272	Repsol	6/1/2008	Relinquished	5/24/2016	Posey	2272	6752
Y02273	Repsol	6/1/2008	Relinquished	5/24/2016	Posey	2273	6755
Y02274	Shell	6/1/2008	Relinquished	5/16/2016	Posey	2274	6757
Y02286	Shell	6/1/2008	Relinquished	5/16/2016	Posey	2286	6771
Y02287	Repsol	6/1/2008	Relinquished	5/24/2016	Posey	2287	6801
Y02288	Repsol	6/1/2008	Relinquished	5/24/2016	Posey	2288	6802
Y02289	Repsol	6/1/2008	Relinquished	5/24/2016	Posey	2289	6805
Y02290	Shell	6/1/2008	Relinquished	5/16/2016	Posey	2290	6807
Y02303	Repsol	6/1/2008	Relinquished	5/24/2016	Posey	2303	6855
Y02304	Shell	6/1/2008	Relinquished	5/16/2016	Posey	2304	6856
Y02317	Shell	6/1/2008	Relinquished	5/16/2016	Posey	2317	6905
Y02342	Shell	6/1/2008	Relinquished	5/16/2016	Hanna Shoal	2342	6352
Y02343	Shell	6/1/2008	Relinquished	5/16/2016	Hanna Shoal	2343	6401
Y02344	Shell	6/1/2008	Relinquished	5/16/2016	Hanna Shoal	2344	6402
Y02345	Shell	6/1/2008	Relinquished	5/16/2016	Hanna Shoal	2345	6452
Y02346	Shell	6/1/2008	Relinquished	5/16/2016	Hanna Shoal	2346	6453
Y02347	Shell	6/1/2008	Relinquished	5/16/2016	Hanna Shoal	2347	6503
Y02348	Shell	6/1/2008	Relinquished	5/16/2016	Hanna Shoal	2348	6504
Y02349	Shell	6/1/2008	Relinquished	5/16/2016	Hanna Shoal	2349	6554
Y02350	Shell	6/1/2008	Relinquished	5/16/2016	Hanna Shoal	2350	6604

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y02421	Shell	6/1/2008	Relinquished	5/16/2016	Colbert	2421	6721
Y02422	Shell	6/1/2008	Relinquished	5/16/2016	Colbert	2422	6722
Y02423	Shell	6/1/2008	Relinquished	5/16/2016	Colbert	2423	6723
Y02425	Shell	6/1/2008	Relinquished	5/16/2016	Colbert	2425	6771
Y02426	Shell	6/1/2008	Relinquished	5/16/2016	Colbert	2426	6772
Y02427	Shell	6/1/2008	Relinquished	5/16/2016	Colbert	2427	6773
Y02428	Shell	6/1/2008	Relinquished	5/16/2016	Colbert	2428	6823
Y02167	Shell	7/1/2008	Relinquished	5/16/2016	Posey	2167	6114
Y02168	Shell	7/1/2008	Relinquished	5/16/2016	Posey	2168	6115
Y02169	Statoil	7/1/2008	Relinquished	2/11/2016	Posey	2169	6157
Y02170	Statoil	7/1/2008	Relinquished	2/11/2016	Posey	2170	6160
Y02171	Shell	7/1/2008	Relinquished	5/16/2016	Posey	2171	6161
Y02172	Shell	7/1/2008	Relinquished	5/16/2016	Posey	2172	6163
Y02173	Shell	7/1/2008	Relinquished	5/16/2016	Posey	2173	6164
Y02174	Shell	7/1/2008	Relinquished	5/16/2016	Posey	2174	6165
Y02175	Statoil	7/1/2008	Relinquished	2/11/2016	Posey	2175	6166
Y02176	Statoil	7/1/2008	Relinquished	2/11/2016	Posey	2176	6206
Y02177	Statoil	7/1/2008	Relinquished	2/11/2016	Posey	2177	6207
Y02178	Statoil	7/1/2008	Relinquished	2/11/2016	Posey	2178	6210
Y02179	Statoil	7/1/2008	Relinquished	2/11/2016	Posey	2179	6211
Y02180	Shell	7/1/2008	Relinquished	5/16/2016	Posey	2180	6213
Y02181	Shell	7/1/2008	Relinquished	5/16/2016	Posey	2181	6214
Y02182	Shell	7/1/2008	Relinquished	5/16/2016	Posey	2182	6215
Y02184	Statoil	7/1/2008	Relinquished	2/11/2016	Posey	2184	6256
Y02185	Shell	7/1/2008	Relinquished	5/16/2016	Posey	2185	6259
Y02186	Statoil	7/1/2008	Relinquished	2/11/2016	Posey	2186	6260
Y02187	Shell	7/1/2008	Relinquished	5/16/2016	Posey	2187	6261
Y02188	Repsol	7/1/2008	Relinquished	5/26/2016	Posey	2188	6262
Y02189	Shell	7/1/2008	Relinquished	5/16/2016	Posey	2189	6263
Y02190	Shell	7/1/2008	Relinquished	5/16/2016	Posey	2190	6264
Y02191	Shell	7/1/2008	Relinquished	5/16/2016	Posey	2191	6265
Y02194	Statoil	7/1/2008	Relinquished	2/11/2016	Posey	2194	6305
Y02195	Statoil	7/1/2008	Relinquished	2/11/2016	Posey	2195	6306

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y02196	Statoil	7/1/2008	Relinquished	2/11/2016	Posey	2196	6309
Y02197	Statoil	7/1/2008	Relinquished	2/11/2016	Posey	2197	6310
Y02198	Statoil	7/1/2008	Relinquished	2/11/2016	Posey	2198	6311
Y02199	Repsol	7/1/2008	Relinquished	5/26/2016	Posey	2199	6312
Y02202	Statoil	7/1/2008	Relinquished	2/11/2016	Posey	2202	6355
Y02203	Statoil	7/1/2008	Relinquished	2/11/2016	Posey	2203	6356
Y02204	Shell	7/1/2008	Relinquished	5/16/2016	Posey	2204	6359
Y02205	Shell	7/1/2008	Relinquished	5/16/2016	Posey	2205	6360
Y02206	Repsol	7/1/2008	Relinquished	5/26/2016	Posey	2206	6361
Y02207	Repsol	7/1/2008	Relinquished	5/26/2016	Posey	2207	6362
Y02212	Shell	7/1/2008	Relinquished	5/16/2016	Posey	2212	6409
Y02213	Shell	7/1/2008	Relinquished	5/16/2016	Posey	2213	6410
Y02214	Repsol	7/1/2008	Relinquished	5/26/2016	Posey	2214	6411
Y02220	Shell	7/1/2008	Relinquished	5/16/2016	Posey	2220	6459
Y02221	Repsol	7/1/2008	Relinquished	5/26/2016	Posey	2221	6460
Y02222	Repsol	7/1/2008	Relinquished	5/26/2016	Posey	2222	6461
Y02412	Shell	7/1/2008	Relinquished	5/16/2016	Colbert	2412	6560
Y02413	Shell	7/1/2008	Relinquished	5/16/2016	Colbert	2413	6561
Y02414	Shell	7/1/2008	Relinquished	5/16/2016	Colbert	2414	6609
Y02415	Shell	7/1/2008	Relinquished	5/16/2016	Colbert	2415	6610
Y02416	Shell	7/1/2008	Relinquished	5/16/2016	Colbert	2416	6611
Y02417	Shell	7/1/2008	Relinquished	5/16/2016	Colbert	2417	6658
Y02418	Shell	7/1/2008	Relinquished	5/16/2016	Colbert	2418	6659
Y02419	Shell	7/1/2008	Relinquished	5/16/2016	Colbert	2419	6660
Y02420	Shell	7/1/2008	Relinquished	5/16/2016	Colbert	2420	6709
Y02424	Shell	7/1/2008	Relinquished	5/16/2016	Colbert	2424	6759
Y02283	Iona	9/1/2008	Relinquished	3/31/2016	Posey	2283	6767
Y01946	Nacra	None	Unexecuted	None	Unnamed	1946	6314

Source: BOEM 2023b

4.2.3.2 Surveys

Between 2006 and 2015, there were three 2D seismic surveys, five 3D seismic surveys, three geohazard surveys, one geotechnical survey, and two sound source characterization surveys documented as a result of Lease Sale 193, as shown in Table 4.2.3-2.

Table 4.2.3-2. Survey activity summary

Activity Start Date	Activity End Date	Year	Activity Name	Description	Vessel Name	Operator and Contractor
7/27/2006	9/19/2006	2006	3D marine seismic program	The 3D seismic survey in the Chukchi Sea used an airgun array. In total, 3,291.7 miles of survey line were collected.	Gilavar, Kilabuk	Shell Offshore Inc.
7/27/2006	10/6/2006	2006	3D marine seismic program	The 3D seismic survey acquisition in the Chukchi Sea used one or more airguns. In total, 9,959 miles of survey line were collected.	Western Patriot	ConocoPhillips Alaska, Inc
8/20/2006	11/11/2006	2006	2D marine seismic program[1]	The 2D seismic survey acquisition used an airgun array. In total, 2,924 miles of survey line were collected.	Discoverer	GX Technology
8/28/2007	11/4/2007	2007	3D marine seismic program	The 2D seismic data in the Chukchi and Beaufort Seas used an airgun array as well as hydrophone streamers. In total, 1,812 miles of deep-seismic data were acquired in the Chukchi Sea and 491.9 miles in the Beaufort Sea.	M/V Gilavar, Gulf Provider, Norseman II, Jim Kilabuk, Nanuq, American Island, Peregrine, Maxime	Shell Offshore Inc.
7/18/2008	10/11/2008	2008	3D marine seismic program	The 3D deep seismic survey activities in the Chukchi and Beaufort Seas used a 24-airgun array. In total, 905 miles of seismic data were acquired in the Chukchi Sea, and 1,517 miles in the Beaufort Sea.	M/V Gilavar (source vessel), M/V Gulf Provider, M/V Torsvik, and M/V Theresa, Maxime	Shell Offshore Inc.
7/22/2008	9/13/2008	2008	Geohazard survey	Shallow hazards and site clearance surveys used airgun arrays and other types of low-energy acoustic sources in the Beaufort and Chukchi Seas.	M/V Alpha Helix, R/V Cape Flattery, M/V Henry Christofferson	Shell Offshore Inc.
8/1/2009	10/9/2009	2009	Geohazard survey	Shallow hazard and site clearance surveys used a relatively small airgun array and other geophysical equipment.	M/V Mt. Mitchell	Shell Offshore Inc.

Activity Start Date	Activity End Date	Year	Activity Name	Description	Vessel Name	Operator and Contractor
8/20/2010	10/1/2010	2010	2D marine seismic program[1]	This 3D and 2D seismic acquisition used a 26-airgun array as well as hydrophone streamers. In total, 2,714 miles of seismic data were acquired.	M/V Geo Celtic, m/V Tanux I, R/V Norseman I	Statoil USA E&P Inc.
8/20/2010	10/1/2010	2010	3D marine seismic program	This 3D and 2D seismic acquisition using a 26-airgun array as well as hydrophone streamers. In total, 2,714 miles of seismic data were acquired.	M/V Geo Celtic, M/V Tanux I, R/V Norseman I	Statoil USA E&P Inc.
8/6/2011	9/23/2011	2011	Geohazard survey	These shallow hazard site surveys used an airgun array and other low energy sources for marine survey activity. 2,714 miles of seismic data were acquired.	R/V Duke	Statoil USA E&P Inc.
9/3/2011	9/27/2011	2011	Geotechnical survey	Geotechnical investigation survey activities included drilling a total of 18 geotechnical cores at six drill sites.	M/V Synergy	Statoil USA E&P Inc.
9/15/2012	10/1/2012	2012	Sound source characterization	Sound source characterizations were performed on vessels. In addition to measurements of vessel sounds, various drilling and support activities were also characterized, including sounds associated with anchor placement and handling, and the drilling of top holes and sounds associated with ice management.	Kulluk, Nordica, Aiviq, Sisuaq, Lauren Foss, Arctic Seal, Warrior, Pt. Oliktok, Affinity, Nanuq	Shell Gulf of Mexico Inc.
8/25/2013	10/31/2013	2013	2D marine seismic program[1]	The 2D seismic survey used an airgun array and acquired 3,773 miles of data.	Geo Arctic, Norseman	TGS-NOPEC Geophysical Company

Activity Start Date	Activity End Date	Year	Activity Name	Description	Vessel Name	Operator and Contractor
7/24/2015	8/10/2015	2015	Sound source characterization	Monitor and report underwater sound levels from offshore operations, including deployment and recovery of acoustic monitoring equipment. Vessel sound source characterization measurements were performed with three autonomous multi-channel acoustic recorder.	Fennica	Shell Gulf of Mexico Inc.

Notes: 2D = two-dimensional, 3D = three-dimensional; M/V = motor vessel; R/V = research vessel
[1]These three 2D seismic surveys were associated with Lease Sale 193 because the source documents contained activities that were linked to this lease sale. This association was not explicitly stated in Blees et al. (2013), Cate et al. (2014), or Funk et al. (2007), but for the purpose of this study this association was inferred.
Sources: Bisson et al. 2013; Blees et al. 2013; Cate et al. 2014; Funk et al. 2007; Hartin et al. 2011; Ireland and Bisson 2016; Ireland et al. 2009; Reiser et al. 2010

4.2.3.3 Well Drilling

One exploration well and one top-hole-only (partially drilled) were drilled as a result of Lease Sale 193, as summarized in Table 4.2.3-3.

Table 4.2.3-3. Well drilling summary

Activity Start Date	Activity End Date	Well Name (includes API no. and bottom hole lease number)	Well Type	Well Depth (feet)	Drill Rig Name
9/9/2012	8/8/2016	API no. 553520000200 (BURGER A 1) on OCS Y-2280	Top Hole	1,505	M/V Noble Discoverer
7/30/2015	10/21/2015	API no. 553520000400 (BURGER J 1) on OCS Y-2321	Exploration	6,795	Polar Pioneer

Notes: API = American Petroleum Institute; OCS = Outer Continental Shelf
Sources: BOEM 2016a, 2020, 2022b, 2023c, 2023d; Ireland and Bisson 2016

4.2.3.4 Oil-and-Gas-Supporting Activities

Identified oil-and-gas-supporting activities as a result of Lease Sale 193 included facility support and transportation from facilities and shorebases to relevant activity sites (if documented), as summarized in Table 4.2.3-4 and Table 4.2.3-5.

Table 4.2.3-4. Facility support summary

Facility Name	Facility Type	Description	Supported Activity
Barrow shorebase	Onshore shorebase complex	The Barrow shorebase was where the dedicated search-and-rescue S-92 helicopter remained grounded except during training drills, emergencies, and other non-routine events. Activities also occurred in the Beaufort Sea Planning Area.	Drilling well OCS Y-2280 BURGER A 1

Source: Bisson et al. 2013

Table 4.2.3-5. Summary of transportation activity

Facility Name	Facility Type	Supported Activity	No. Aircraft	No. Vessels	Vessel Names	No. Vehicles
Barrow Airport	Airport	Drilling of Burger J (OCS Y-2321 BURGER J 1), and activities at the Burger A (OCS Y-2280 BURGER A 1) drill site	5 (4 S-92 helicopters, 1 fixed-wing)	N/A	N/A	N/A
Deadhorse Airport	Airport	Activities at the Burger A (OCS Y-2280 BURGER A 1) drill site	3 (S-92 helicopters)	N/A	N/A	N/A
Dutch Harbor Port	Port	2D and 3D seismic surveys and geotechnical surveys in the Chukchi Sea, and deep seismic surveys and shallow hazard and site clearance surveys in the Chukchi and Beaufort Seas, and drilling of Burger A (OCS Y-2280 BURGER A 1) and Burger J (OCS Y-2321 BURGER J 1)	N/A	34	M/V Gilavar, Western Patriot, M/V Gulf Provider, M/V Torsvik, M/V Theresa, Maxime, M/V Alpha Helix, R/V Cape Flattery, M/V Henry Christofferson, M/V Mt. Mitchell, M/V Geo Celtic, R/V Duke, M/V Synergy, Kulluk (drill rig), Nordica, Arctic Seal, Warrior, Pt. Oliktok, Affinity, Nanuq, Polar Pioneer, Noble Discoverer, Fennica, , Tor Viking, Ross Chouest, Aiviq, Harvey Supporter, Harvey Champion, Harvey Spirit, Harvey Explorer, Sisuaq, Marika, Minerva Antarctica, , Guardsman, Lauren Foss, Ocean Wave, Ocean Wind	N/A
Nome Port	Port	2D seismic surveys in the Chukchi Sea and deep seismic surveys in the Chukchi and Beaufort Seas	N/A	3	M/V Gilavar, Geo Arctic, Norseman	N/A
Wainwright Port	Port	Shallow hazard site survey and geotechnical surveys	N/A	2	R/V Duke, M/V Synergy	N/A

Notes: 2D = two-dimensional; 3D = three-dimensional; M/V = motor vessel; N/A = not applicable; R/V = research vessel
Helicopter support from Barrow estimated approximately 320 round trips for supply/crew and 49 search and rescue flights for Burger A and 300 trips for Burger J.
Sources: Bisson et al. 2013; Blees et al. 2013; Cate et al. 2014; Funk et al. 2007, 2008; Hartin et al. 2011; Ireland and Bisson 2016; Ireland et al. 2009; Reiser et al. 2010

4.2.3.5 E&D Scenario Summary

A scenario was developed for the Alaska OCS Chukchi Sea Oil and Gas Lease Sale 193 Final Second Supplemental Environmental Impact Statement (BOEM 2015) to assess the potential environmental impacts of the lease sale. The sale consisted of a total of 5,350 blocks, 29.4 million acres of the Chukchi Sea Planning Area. In developing this Second Supplemental EIS the level of exploration, development, production, and decommissioning activities was estimated based on what reasonably could occur from the 487 leases issued during Lease Sale 193. The resource estimate used was 4.3 Bbbl of oil and 2.2 Tcf of gas. Activities associated with the E&D scenario (BOEM 2015) are summarized in Table 4.2.3-6.

Producing that volume of oil and its associated natural gas would require eight platforms of a new Arctic-class design and drilling 457 wells (exploration, delineation, production, and service). The time from exploration to final production was estimated to be 74 years (BOEM 2015).

Under the scenario, exploration drilling operations would likely employ Mobile Offshore Drilling Units (MODUs) with ice management vessels. Examples of MODUs include drillships, semisubmersibles, and jackup rigs. Drilling operations were expected to range between 30 and 90 days at different well sites, depending on the depth of the well, delays during drilling, and time needed for well logging and testing operations. If a discovery was made during exploration well drilling, MODUs would drill delineation wells to determine the areal extent of economic production. As many as 40 wells could be associated with exploring and delineating these prospects (BOEM 2015).

It was assumed that development and production activities would include drilling production wells and installing platforms and subsea templates, pipelines, and shorebases. After an operator committed to develop a prospect, project designs would be evaluated, and the operator would make development decisions based on, among other things, experience, expectations, and availability of equipment, personnel, and materiel (BOEM 2015).

Under the scenario, water depth, sea conditions, and ice conditions were important factors in selecting a platform type. Large, bottom-founded platforms were likely to be used in the Chukchi Sea OCS, where water depths were mostly more than 100 feet. Each platform would have two drilling rigs capable of year-round drilling. It was estimated that there would be a maximum of 8 wells per rig, or 16 wells per platform per year. Each of the eight platforms in the scenario would house production and service (injection) wells, processing equipment, fuel and production storage capacity, and quarters for personnel. The first platform would be the hub, connecting pipelines from other platforms to the main pipelines to shore. It was assumed that oil would be piped to the shore as soon as it was processed. There would be some storage capacity on the platforms to accommodate periods of processing equipment downtimes (BOEM 2015).

Ninety subsea production wells on 15 subsea templates were anticipated under the development scenario. These subsea production wells would be drilled by MODUs during the summer drilling season. It was assumed that a single MODU could drill up to three subsea wells in a single season. There would be six subsea production wells on each template, which would be tied back to a platform by a subsea flowline. Subsea well templates would be located within about 2 miles (3.2 kilometers) of the host platforms, for a total of 30 miles of subsea flowlines to host platforms (BOEM 2015).

Under the scenario, pipelines were the expected method of transporting both oil and gas to market. Subsea pipelines would connect the platforms in this scenario to the hub platform, and trunk pipelines would carry oil and gas from the hub platform to the shorebase. The shorebase would provide additional processing and connect to onshore oil and gas pipelines which would be laid 300 miles across the National Petroleum Reserve-Alaska to Prudhoe Bay. At Prudhoe Bay, the oil pipeline would connect with

the TAPS and the gas pipeline would connect with the large-volume gas pipeline that had been proposed to carry gas from Prudhoe Bay to a port in southcentral Alaska (BOEM 2015).

Pipeline installation operations would occur during the same timeframe as platform construction and installation. The offshore trunk pipelines (estimated total 160 miles cumulative length under the scenario) would run between the central OCS hub platform and the shore. They would be trenched in the seafloor as a protective measure against damage by floating ice masses. At the coast, a new facility would be constructed to support the OCS operations and would serve as the first pump station (BOEM 2015).

During exploration drilling, operations would be supported by both helicopters and supply vessels. Helicopters would fly from Barrow or Wainwright at a frequency of one to six flights per day. Support-vessel traffic would be one to three trips per week, also out of Barrow or Wainwright. During the construction phase, there could be one to two barge trips and as many as five transport aircraft trips per day during peak periods. During production operations, aircraft generally would be smaller, with less frequent flights, approximately two per day (BOEM 2015).

Offshore construction (platform and pipeline installation) and development drilling operations would be supported by both helicopters and supply vessels from the new shorebase. Helicopters would fly from Barrow, Wainwright, or the new shorebase at a frequency of one to three flights per platform per day during development operations. Support-vessel traffic would be one to three trips per platform per week from Barrow, Wainwright, or the new shorebase. During normal production operations, the frequency of helicopter flights offshore would remain the same (one to three platforms per day), but marine traffic would drop to about one trip every 1 to 2 weeks to each platform. It was estimated there could be two barge trips to the new onshore facility each year for 12 years (BOEM 2015).

Geologic studies indicated that exploration wells usually test prospects from 3,000–15,000 feet in the subsurface. Based on the characteristics of the geologic plays, it was assumed that vertical exploration wells would average 8,000 feet deep. Production and service wells were assumed to average 10,000 feet (measured depth) because they would include deviated wells, which are not perfectly vertical. For the assumed drilling depths, an average exploration well would produce 600 tons of dry rock cuttings (BOEM 2015).

Table 4.2.3-6. Summary of basic assumptions of Lease Sale 193 E&D scenario

Element	Mean Case
Sale acreage offering	29.4 million acres
Total oil production	4.0–4.3 Bbbl
Total gas production	2.0–2.2 Tcf
Peak production rate – oil	558,702 bbl per day
Peak production rate – gas	314,618 Mcf per day
Peak production year – oil	204 MMbbl in peak year
Peak production year – gas	115 Mcf in peak year
Exploration	Exploration
Marine seismic surveys	4-12
Geohazard surveys	10-16
Geotechnical surveys	10-16

Element	Mean Case
Number of wells – exploration and delineation	30–40
Total drilling muds – exploration and delineation	2,850–3,800 tons
Total rock cuttings – exploration and delineation	18,000–24,000 tons
Development and Production	Development and Production
Platforms	8
Number of wells – production	400–457[1]
Number of wells – service	80–92
Helicopter flights – per week	56–168
Boat trips – per week	8–16
Transportation	Transportation
Onshore oil pipeline miles	300–320
Offshore oil pipeline miles	190–210
Onshore gas pipeline miles	300–320
Offshore gas pipeline miles	190–210
New pipelines to shore	2
New processing facility	1
New waste facility	1

Notes: E&D = Exploration and Development; G&G = geological and geophysical; Mcf = thousand cubic feet; MMbbl = million barrels; Tcf = trillion cubic feet
Source: BOEM 2015

4.2.3.6 Comparison of E&D Scenario and Historical Activities

A comparison of the E&D scenario and the historical activities are provided in Table 4.2.3-7, using available information.

Table 4.2.3-7. Comparison of E&D and historical activities

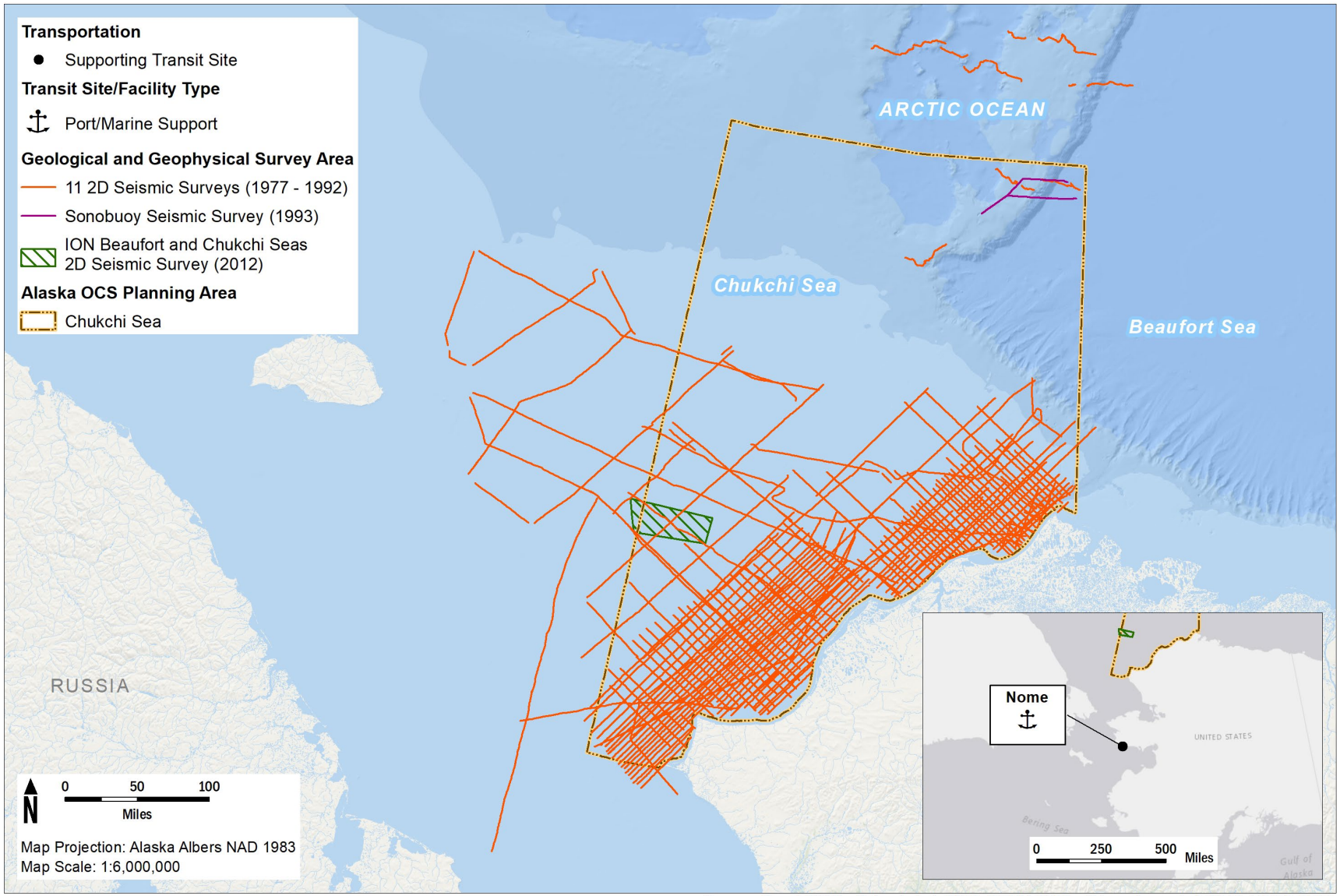
Activity	E&D Scenario	Actual Activities
Sale acreage offering	29.4 million acres	29,389,241 acres offered
Sale	--	2,758,377 acres leased
Date of exploratory activities (begin)	2011	2012
Marine seismic surveys	4-12	8
Geohazard surveys	10-16	3
Geotechnical surveys	10-16	1
Number of wells – exploration and delineation	30-40	2 (1 exploration, 1 top-hole only)
Number of wells – production	400–457[1]	0
Number of wells – service	80–92	0

Activity	E&D Scenario	Actual Activities
Average well depth	8,000 feet (exploration), 10,000 feet (production)	6,800 feet (exploration)
Drilling muds – exploration	2,850–3,800 tons	--
Drilling muds – development and production	--	0
Drilling cuttings – exploration	18,000–24,000 tons	--
Drilling cuttings – development and production	--	0
Number of G&G or other surveys	--	14
Support facility and shorebase locations	Prudhoe Bay	Barrow
Other sites used	Barrow, Wainwright	Deadhorse, Dutch Harbor, Nome, Wainwright
Helicopters – exploration	56–168 flights per week	8 aircraft, trip frequency undocumented
Peak production rate – oil	558,702 bbl per day	0
Peak production rate – gas	314,618 Mcf per day	0
Peak production year – oil	204 MMbbl in peak year	0
Peak production year – gas	115 Mcf in peak year	0
Platforms	8	0
Onshore oil pipeline	300–320 miles	0
Offshore oil pipeline	190–210 miles	0
Onshore gas pipeline	300–320 miles	0
Offshore gas pipeline	190–210 miles	0
Production treatment facilities	1	0
New waste facility	1	0
Supply and support boats	8–16 per week	0[2]
Survey and support vessels	--	34

Notes: -- = no data provided; E&D = Exploration and Development; G&G = geological and geophysical; Mcf = thousand cubic feet; MMbbl = million barrels; Tcf = trillion cubic feet
[1]457 production wells needed to produce all the recoverable oil
[2]No trip frequency documented

4.2.4 Activities Not Associated with a Lease Sale

Activities that could not be directly associated with a lease sale are shown in Figure 4-18, such as G&G survey areas and transportation infrastructure.



Source: Banet 2013b; Beland et al. 2013; BOEM 2022c; Triezenberg et al. 2016; USGS 2023.

Figure 4-18. Historical oil and gas activities not associated with a lease sale in Chukchi Sea Planning Area

4.2.4.1 Surveys

Between 1977 and 2012, there were 12 2D seismic surveys and 1 sonobuoy seismic survey documented that were not associated with a lease sale, as summarized in Table 4.2.4-1.

Table 4.2.4-1. Survey activity summary

Activity Start Date	Activity End Date	Year	Activity Name	Description	Vessel Name	Operator and Contractor
2/17/1977	3/26/1977	1977	2D marine seismic program	The 2D multichannel seismic survey used explosives and geophones as the data acquisition system. A total of 4,808 kilometers were shot with 76 tracklines. The survey occurred in the Beaufort Sea Planning Area and the Chukchi Sea Planning Area.	Not specified	National Petroleum Reserve Alaska
8/2/1977	9/11/1977	1977	2D marine seismic program	The 2D multichannel seismic survey used vibroseis and geophones as the data acquisition system. A total of 5,053 kilometers were shot with 79 tracklines. The survey occurred in the Beaufort Sea Planning Area, the Chukchi Sea Planning Area, and the Hope Basin Planning Area.	M/V Bering Explorer	Geophysical Corporation of Alaska
8/25/1977	10/8/1977	1977	2D marine seismic program	The 2D multichannel seismic survey used an airgun and streamer as the data acquisition system. A total of 5,464 kilometers were shot with 71 tracklines.	Samuel Phillips Lee	Pacific Coastal and Marine Science Center
8/26/1978	9/20/1978	1978	2D marine seismic program	The 2D multichannel seismic survey used an airgun and streamer as the data acquisition system. A total of 4,628 kilometers were shot with 26 tracklines. The survey occurred in both the Chukchi Sea Planning Area and the Hope Basin Planning Area.	Samuel Phillips Lee	Pacific Coastal and Marine Science Center
8/11/1980	9/30/1980	1980	2D marine seismic program	The 2D multichannel seismic survey used an airgun and streamer as the data acquisition system. A total of 5,049 kilometers were shot with 31 tracklines. The survey occurred in the Hope Basin Planning Area and the Chukchi Sea Planning Area.	R/V Anne Bravo, R/V Western Glacier	Western Geophysical Company

Activity Start Date	Activity End Date	Year	Activity Name	Description	Vessel Name	Operator and Contractor
8/31/1980	9/20/1980	1980	2D marine seismic program	The 2D multichannel seismic survey used an airgun and streamer as the data acquisition system. A total of 2,718 kilometers were shot with 13 tracklines. The survey occurred in both the Chukchi Sea Planning Area and the Hope Basin Planning Area.	Samuel Phillips Lee	Pacific Coastal and Marine Science Center
8/1/1981	9/30/1981	1981	2D marine seismic program	The 2D multichannel seismic survey used an airgun and streamer as the data acquisition system. A total of 9,141 kilometers were shot with 62 tracklines. The survey occurred in the Hope Basin Planning Area and the Chukchi Sea Planning Area.	Not specified	WesternGeco
8/10/1982	10/8/1982	1982	2D marine seismic program	The 2D multichannel seismic survey used an airgun and streamer as the data acquisition system. A total of 6,965 kilometers were shot with 53 tracklines.	Not specified	Western Geophysical Company
8/27/1982	9/16/1982	1982	2D marine seismic program	The 2D multichannel seismic survey used an airgun and streamer as the data acquisition system. A total of 849 kilometers were shot with five tracklines.	Samuel Phillips Lee	Pacific Coastal and Marine Science Center
9/2/1988	9/28/1988	1988	2D marine seismic program	The 2D multichannel seismic survey used an airgun and streamer as the data acquisition system. A total of 100 kilometers were shot with five tracklines.	Polar Star	Pacific Coastal and Marine Science Center
8/21/1992	9/24/1992	1992	2D marine seismic program	The 2D multichannel seismic survey used an airgun and streamer as the data acquisition system. A total of 449 kilometers were shot with 11 tracklines.	Polar Star	Pacific Coastal and Marine Science Center
8/17/1993	9/15/1993	1993	Sonobuoy seismic	The 2D multichannel seismic survey used an airgun and sonobuoy as the data acquisition system. A total of 1,689 kilometers were shot with 15 tracklines. The survey occurred in both the Chukchi Sea Planning Area and the Beaufort Sea Planning Area.	Polar Star	Pacific Coastal and Marine Science Center

Activity Start Date	Activity End Date	Year	Activity Name	Description	Vessel Name	Operator and Contractor
10/20/2012	11/15/2012	2012	2D marine seismic program	The 2D seismic survey primarily occurred in the Beaufort Sea, with some coverage in the Chukchi Sea using a 26-airgun array. A total of 1,146 miles of seismic data were acquired in the Beaufort and Chukchi Seas.	M/V Geo Arctic, M/V Polar Prince	ION Geophysical

Note: 2D = two-dimensional
Sources: Banet 2013b; Beland et al. 2013; Triezenberg et al. 2016; USGS 2023

4.2.4.2 Oil-and-Gas-Supporting Activities

Identified oil-and-gas-supporting activities not associated with a lease sale included transportation from facilities to relevant activity sites (if documented), as summarized in Table 4.2.4-2.

Table 4.2.4-2. Summary of transportation activity

Facility Name	Facility Type	Supported Activity	No. Aircraft	No. Vessels	Vessel Names	No. Vehicles
Nome Port	Port	2D seismic survey in the Beaufort and Chukchi Seas	N/A	2	M/V Geo Arctic, M/V Polar Prince	N/A

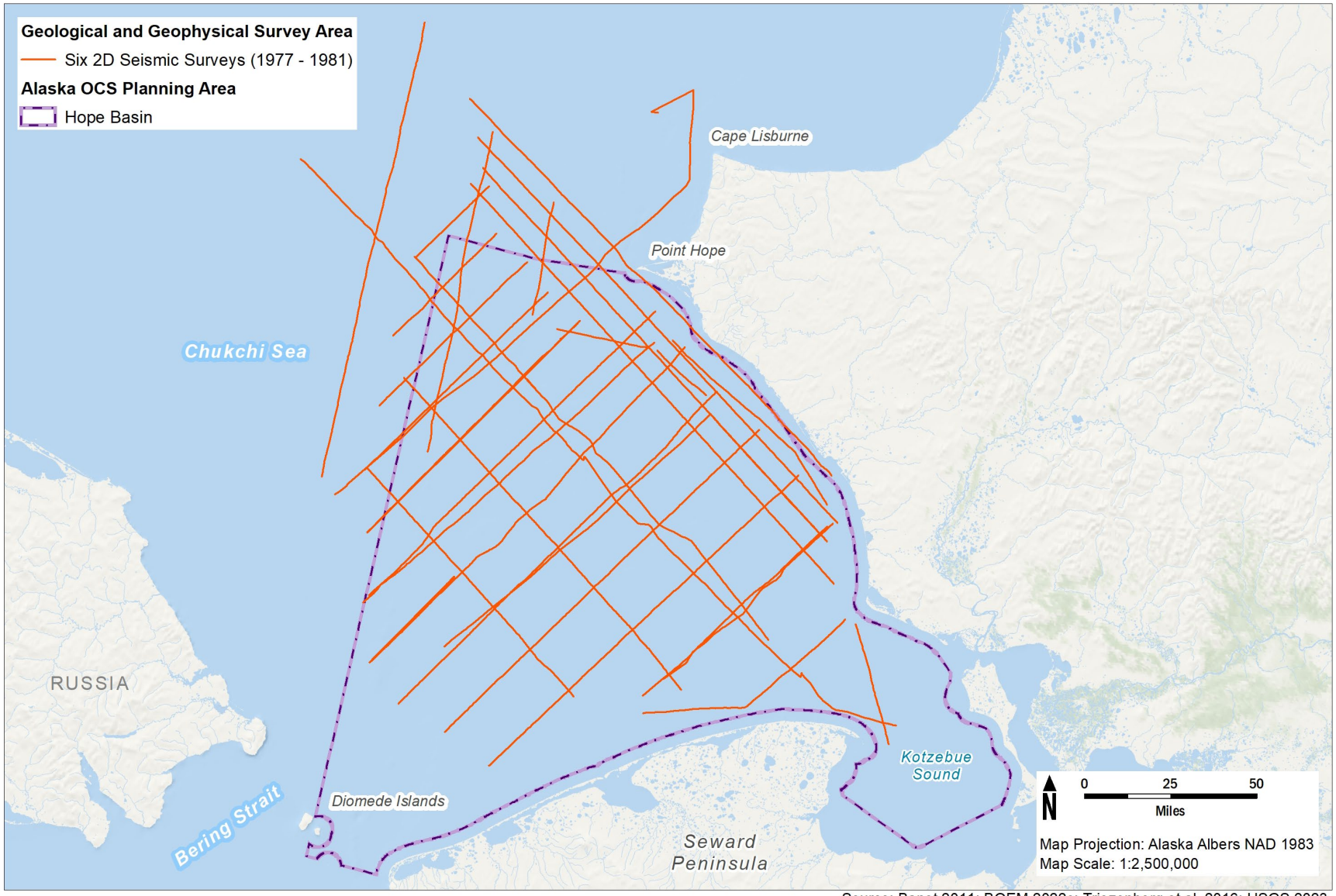
Notes: 2D = two-dimensional; M/V = motor vessel; N/A = not applicable
Source: Beland et al. 2013

4.3 Hope Basin Planning Area

The Hope Basin Planning Area extends from Point Hope south to Wales. There have been no lease sales in this OCS planning area; however, some activities have occurred. Information on activities that occurred that were not associated with a lease sale is provided in the sections below.

4.3.1 Activities Not Associated with a Lease Sale

Activities that could not be directly associated with a lease sale are shown in Figure 4-19, such as G&G survey areas.



Source: Banet 2011; BOEM 2022c; Triezenberg et al. 2016; USGS 2023.

Figure 4-19. Historical oil and gas activities not associated with a lease sale in Hope Basin Planning Area

4.3.1.1 Surveys

Between 1977 and 1981, there were six 2D seismic surveys documented that were not associated with a lease sale, as summarized in Table 4.3.1-1.

Table 4.3.1-1. Survey activity summary

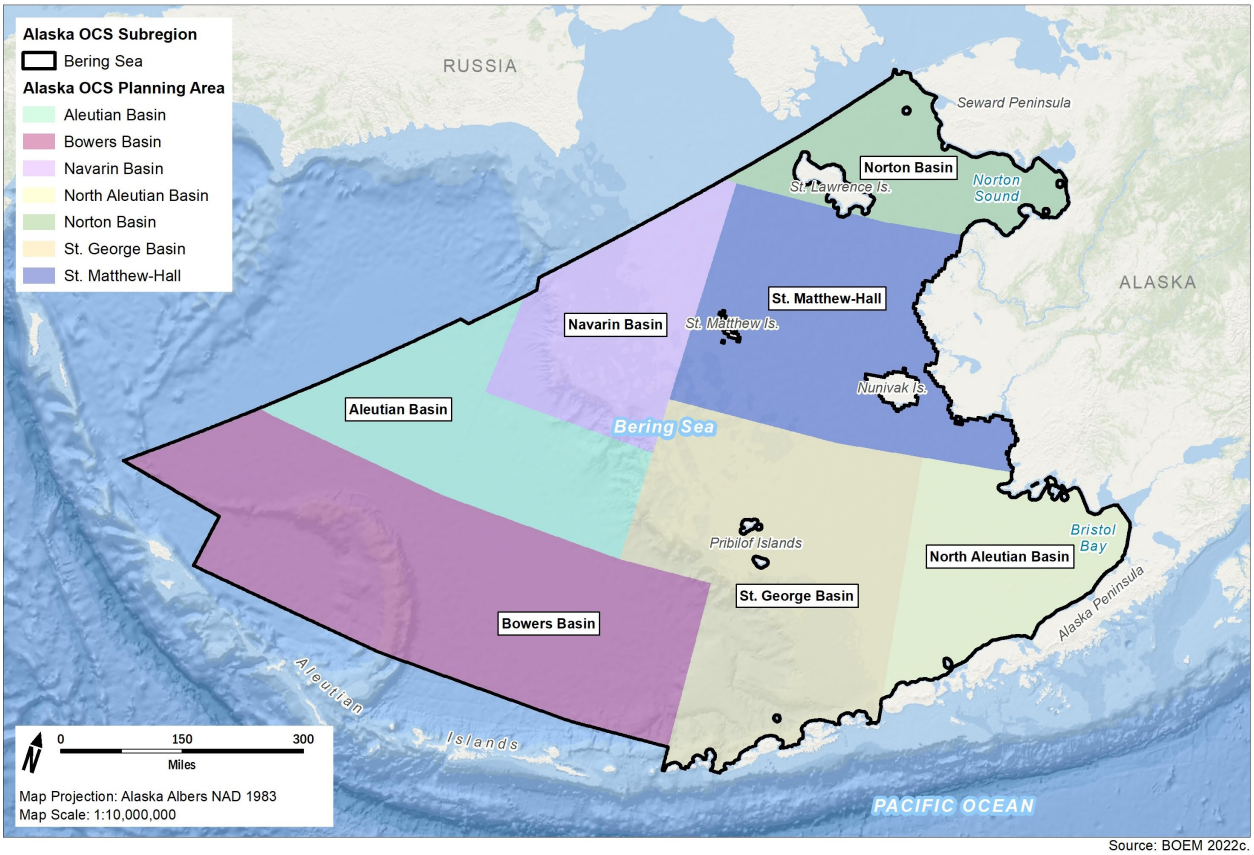
Activity Start Date	Activity End Date	Year	Activity Name	Description	Vessel Name	Operator and Contractor
8/25/1977	10/8/1977	1977	2D marine seismic program	The 2D multichannel seismic survey used an airgun and streamer as the data acquisition system. A total of 5,464 kilometers were shot with 71 tracklines. The survey occurred in the Beaufort Sea Planning Area, the Chukchi Sea Planning Area, and the Hope Basin Planning Area.	Samuel Phillips Lee	Pacific Coastal and Marine Science Center
8/26/1978	9/20/1978	1978	2D marine seismic program	The 2D multichannel seismic survey used an airgun and streamer as the data acquisition system. A total of 4,628 kilometers were shot with 26 tracklines. The survey occurred in both the Chukchi Sea Planning Area and the Hope Basin Planning Area.	Samuel Phillips Lee	Pacific Coastal and Marine Science Center
8/11/1980	9/30/1980	1980	2D marine seismic program	The 2D multichannel seismic survey used an airgun and streamer as the data acquisition system. A total of 5,049 kilometers were shot with 31 tracklines. The survey occurred in the Hope Basin Planning Area and the Chukchi Sea Planning Area.	R/V Anne Bravo, R/V Western Glacier	Western Geophysical Company

Activity Start Date	Activity End Date	Year	Activity Name	Description	Vessel Name	Operator and Contractor
8/31/1980	9/20/1980	1980	2D marine seismic program	The 2D multichannel seismic survey used an airgun and streamer as the data acquisition system. A total of 2,718 kilometers were shot with 13 tracklines. The survey occurred in both the Chukchi Sea Planning Area and the Hope Basin Planning Area.	Samuel Phillips Lee	Pacific Coastal and Marine Science Center
7/1/1981	7/31/1981	1981	2D marine seismic program	The 2D multichannel seismic survey used an airgun and streamer as the data acquisition system. A total of 2,393 kilometers were shot with 14 tracklines.	Not specified	WesternGeco
8/1/1981	9/30/1981	1981	2D marine seismic program	The 2D multichannel seismic survey used an airgun and streamer as the data acquisition system. A total of 9,141 kilometers were shot with 62 tracklines. The survey occurred in the Hope Basin Planning Area and the Chukchi Sea Planning Area.	Not specified	WesternGeco

Notes: 2D = two-dimensional
Sources: Banet 2011; Triezenberg et al. 2016; USGS 2023

5 Bering Sea Subregion

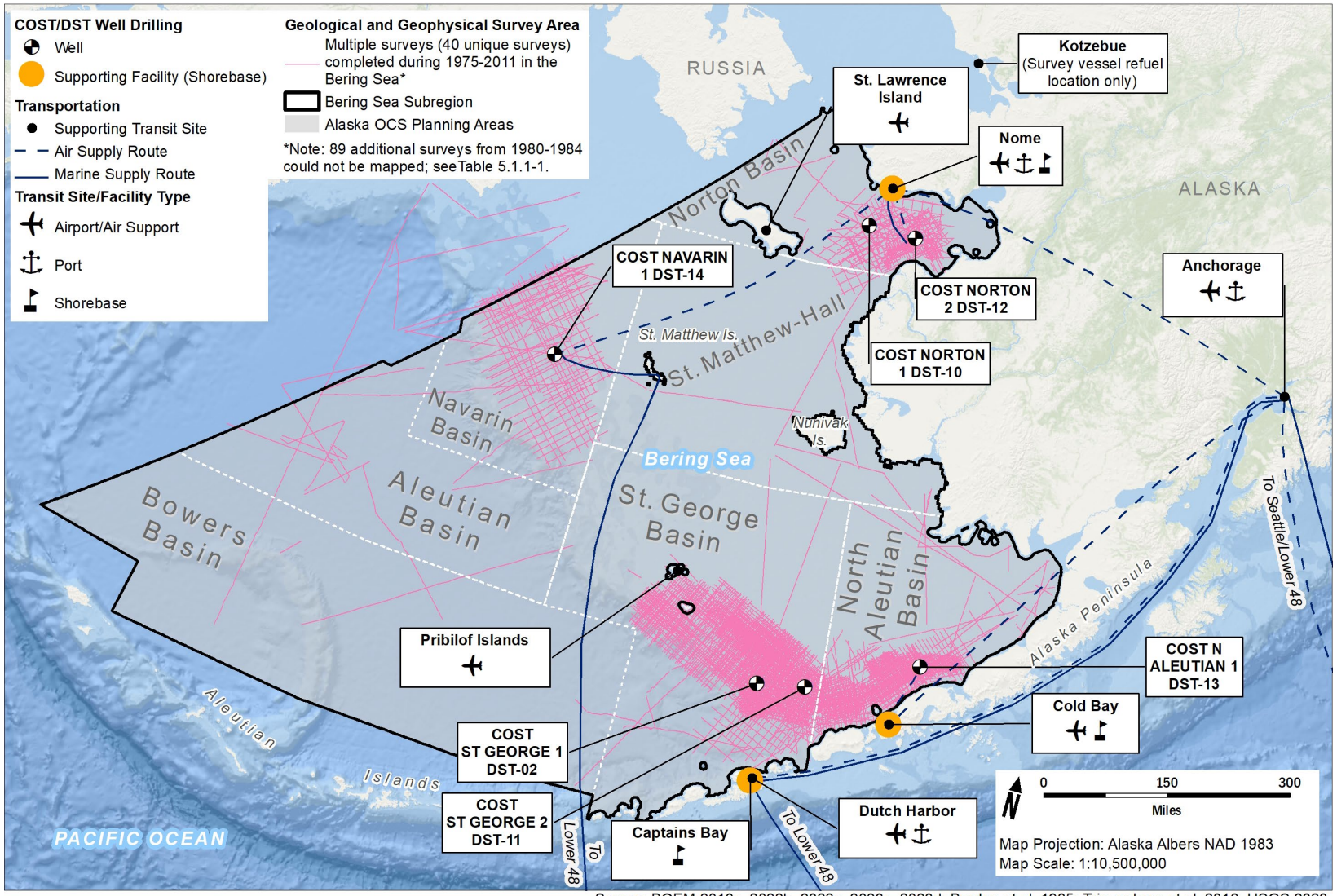
The Bering Sea OCS subregion encompasses the Bering Sea from the tip of the Seward Peninsula to a point north of the westernmost Aleutian Islands, east to the coast of the Fox Islands, and along the coast of Alaska back to the Seward Peninsula. There are seven OCS planning areas in this subregion: Navarin Basin, North Aleutian, Norton Basin, St. George Basin, Aleutian Basin, Bowers Basin, and St. Matthew-Hall, shown in Figure 5-1. Information on the lease sales in these OCS planning areas is provided in this section.



Source: BOEM 2022c.

Figure 5-1. Bering Sea subregion Alaska OCS planning areas

Several activities occurred in the Bering Sea subregion that could not be directly associated with a specific OCS planning area or lease sale. These activities included 89 surveys and the use of two airports. These activities are shown in Figure 5-2 and summarized in the following sections. Figure 5-2 also shows activities that are associated with a specific OCS planning area but are not or could not be associated with a lease sale, as well as transportation routes shared across multiple OCS planning areas, lease sales, and oil and gas activities in the Bering Sea at a small scale.



Source: BOEM 2016c, 2022b, 2022c, 2023c, 2023d; Burden et al. 1985; Triezenberg et al. 2016; USGS 2023.

Figure 5-2. Bering Sea subregion activities not associated with an OCS planning area or lease sale

5.1 Activities Not Associated with a Planning Area

5.1.1 Surveys

Early surveys were conducted in the Bering Sea between 1980 and 1984. The OCS planning areas involved are assumed to be St. George Basin, Norton Basin, Navarin Basin, North Aleutian Basin, and by proximity, St. Matthew-Hall. A map shown in Burden et al. (1985) only depicts these OCS planning areas and not the actual surveys. Only the years, operators, and type of survey are available. Information for these 89 surveys is summarized in Table 5.1.1-1.

Table 5.1.1-1. Survey activity summary

Activity Start Date	Activity End Date	Survey Type	Survey Quantity	Operator(s)
1980	1983	Geological survey	10	Geocubic; McClellan; Tetra Tech; Woodward-Clyde
1980	1984	High resolution survey	14	Harding Lawson; InterOcean; Marine Technical Services; Nekton, Inc.
1980	1984	Navigation systems	15	NCS, International; Offshore Navigation
1980	1984	Regional marine survey	45	Comap; Digicon; Energy Analysts; Geophysical Service, Inc.; WesternGeco
1981	1983	Airborne survey	5	Aeroservices; Photogravity

Source: Burden et al. 1985

5.1.2 Oil-and-Gas-Supporting Activities

Identified oil-and-gas-supporting activities that could not be directly associated with a lease sale included transportation from facilities and shorebases to relevant activity sites (if documented), as summarized in Table 5.1.2-1.

Table 5.1.2-1. Summary of transportation activity

Facility Name	Facility Type	Supported Activity	No. Aircraft	No. Vessels	Vessel Names
Anchorage Airport	Airport	Passenger and supply air transportation from Anchorage for oil and gas activities in the Bering Sea	Undocumented	0	N/A
Dutch Harbor	Airport	Air supply route from Anchorage to Dutch Harbor for oil and gas activities in the Bering Sea	Undocumented	0	N/A
Anchorage Airport	Airport	Air supply route from Lower 48 to Anchorage	Undocumented	0	N/A
Dutch Harbor	Port	Dutch Harbor as principal marine support center for geophysical survey operations in the Bering Sea	0	Undocumented	--
Port of Alaska (Anchorage)	Port	Marine supply route from Lower 48 to Anchorage	0	Undocumented	--

Note: N/A = not applicable
Source: Burden et al. 1985

5.2 Navarin Basin Planning Area

The Navarin Basin Planning Area lies to the west of Alaska between the Aleutian Islands and Russia, east of St. Matthew Island. In 1984, there was one lease sale in the Navarin Basin Planning Area: Lease Sale 83. A summary of this lease sale is shown in Table 5.2-1, and detailed information is provided in the sections below. There are no active leases in this OCS planning area.

In the Navarin Basin Planning Area between 1968 and 2022, there were an estimated 55,000 miles of 2D marine seismic surveys conducted (BOEM 2023a).

Table 5.2-1. Summary of leases in the Navarin Basin Planning Area

	Lease Sale 83
Year	1984
Tracts offered	5,036
Acres offered	28,048,995
Leases issued	163
Acres leased	927,989
Active leases	0
Active lease area (hectares)	0

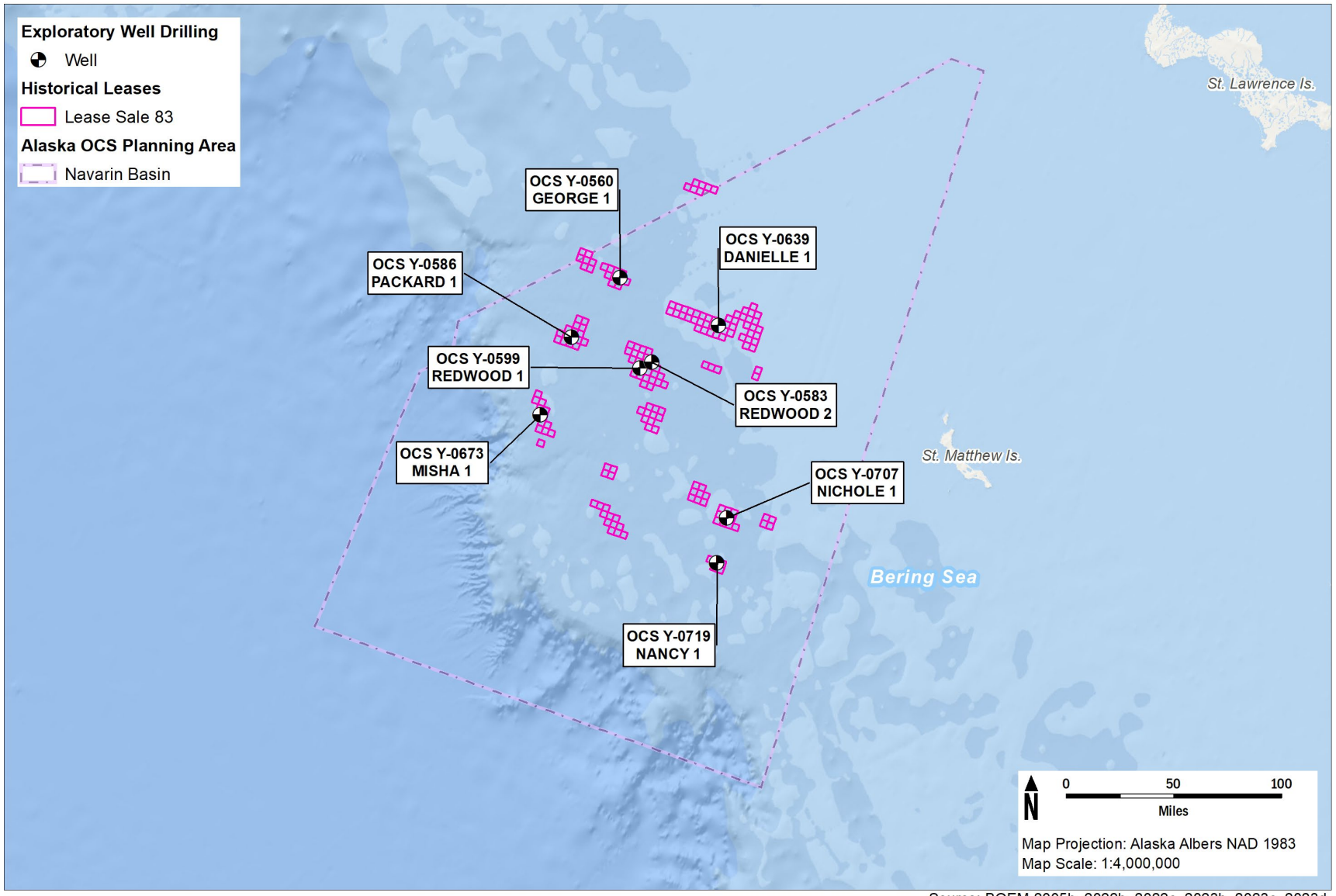
Sources: BOEM 2023b, 2023g

5.2.1 Lease Sale 83 (1984)

The identified activities associated with Lease Sale 83 are shown in Figure 5-3, such as the locations of exploration wells.

5.2.1.1 Leasing

As shown in Table 5.2-1 and Figure 5-3, as a result of Lease Sale 83, there were 5,036 tracts offered and 163 leases issued. There were 28,048,995 acres offered and 927,989 acres leased. There are no active leases from Lease Sale 83. Table 5.2.1-1 summarizes documented information associated with the leasing as a result of Lease Sale 83.



Source: BOEM 2005b, 2022b, 2022c, 2023b, 2023c, 2023d.

Figure 5-3. Historical oil and gas activities associated with Lease Sale 83, 1984

Table 5.2.1-1. Lease information as a result of Lease Sale 83

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y00626	Exxon	6/1/1984	Relinquished	5/29/1987	St. Matthew West	626	181
Y00720	Amoco	6/1/1984	Relinquished	12/22/1986	Pervenets Canyon East	720	724
Y00721	Exxon	6/1/1984	Relinquished	12/23/1988	Pervenets Canyon East	721	750
Y00722	Exxon	6/1/1984	Relinquished	12/23/1988	Pervenets Canyon East	722	751
Y00723	Exxon	6/1/1984	Relinquished	12/23/1988	Pervenets Canyon East	723	752
Y00724	Amoco	6/1/1984	Relinquished	12/22/1986	Pervenets Canyon East	724	767
Y00725	Amoco	6/1/1984	Relinquished	12/22/1986	Pervenets Canyon East	725	768
Y00719	Amoco	6/1/1984	Relinquished	12/22/1986	Pervenets Canyon East	719	723
Y00659	Exxon	6/1/1984	Relinquished	12/22/1986	St. Matthew West	659	706
Y00603	Amoco	6/1/1984	Relinquished	12/22/1986	Banks	603	737
Y00602	Exxon	6/1/1984	Relinquished	12/22/1986	Banks	602	736
Y00607	Exxon	6/1/1984	Relinquished	5/29/1987	Banks	607	783
Y00606	Exxon	6/1/1984	Relinquished	5/29/1987	Banks	606	782
Y00661	ARCO	6/1/1984	Relinquished	11/17/1986	St. Matthew West	661	882
Y00662	Shell	6/1/1984	Relinquished	5/8/1989	St. Matthew West	662	883
Y00608	ARCO	6/1/1984	Relinquished	11/17/1986	Banks	608	959
Y00663	ARCO	6/1/1984	Relinquished	1/9/1989	St. Matthew West	663	925
Y00664	ARCO	6/1/1984	Relinquished	11/17/1986	St. Matthew West	664	926
Y00665	Shell	6/1/1984	Relinquished	5/8/1989	St. Matthew West	665	927
Y00666	ARCO	6/1/1984	Relinquished	11/17/1986	St. Matthew West	666	969
Y00667	ARCO	6/1/1984	Relinquished	12/20/1990	St. Matthew West	667	970
Y00689	ARCO	6/1/1984	Relinquished	11/17/1986	Pervenets Canyon East	689	2
Y00690	ARCO	6/1/1984	Relinquished	11/17/1986	Pervenets Canyon East	690	3
Y00668	Sohio	6/1/1984	Relinquished	6/27/1991	Pervenets Canyon	668	64
Y00670	Amoco	6/1/1984	Relinquished	12/22/1986	Pervenets Canyon	670	109
Y00669	Amoco	6/1/1984	Relinquished	12/22/1986	Pervenets Canyon	669	108
Y00672	Gulf Oil	6/1/1984	Relinquished	6/20/1991	Pervenets Canyon	672	154
Y00671	Amoco	6/1/1984	Relinquished	11/12/1987	Pervenets Canyon	671	153
Y00674	Chevron	6/1/1984	Relinquished	6/27/1991	Pervenets Canyon	674	198
Y00673	Amoco	6/1/1984	Relinquished	12/22/1986	Pervenets Canyon	673	197
Y00676	Amoco	6/1/1984	Relinquished	12/22/1986	Pervenets Canyon	676	243

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y00675	Sohio	6/1/1984	Relinquished	6/27/1991	Pervenets Canyon	675	242
Y00691	Amoco	6/1/1984	Relinquished	11/12/1987	Pervenets Canyon East	691	276
Y00679	Gulf Oil	6/1/1984	Relinquished	6/20/1991	Pervenets Canyon	679	288
Y00692	Amoco	6/1/1984	Relinquished	11/12/1987	Pervenets Canyon East	692	277
Y00678	Sohio	6/1/1984	Relinquished	6/27/1991	Pervenets Canyon	678	287
Y00677	Sohio	6/1/1984	Relinquished	6/27/1991	Pervenets Canyon	677	286
Y00693	Amoco	6/1/1984	Relinquished	11/12/1987	Pervenets Canyon East	693	320
Y00694	Amoco	6/1/1984	Relinquished	11/12/1987	Pervenets Canyon East	694	321
Y00695	Exxon	6/1/1984	Relinquished	12/22/1986	Pervenets Canyon East	695	322
Y00696	ARCO	6/1/1984	Relinquished	11/17/1986	Pervenets Canyon East	696	332
Y00697	ARCO	6/1/1984	Relinquished	11/17/1986	Pervenets Canyon East	697	333
Y00682	Amoco	6/1/1984	Relinquished	5/23/1989	Pervenets Canyon	682	387
Y00681	Amoco	6/1/1984	Relinquished	5/23/1989	Pervenets Canyon	681	386
Y00698	Exxon	6/1/1984	Relinquished	5/24/1989	Pervenets Canyon East	698	364
Y00699	Amoco	6/1/1984	Relinquished	11/12/1987	Pervenets Canyon East	699	365
Y00680	Gulf Oil	6/1/1984	Relinquished	6/20/1991	Pervenets Canyon	680	375
Y00700	Exxon	6/1/1984	Relinquished	12/22/1986	Pervenets Canyon East	700	366
Y00701	Placid	6/1/1984	Relinquished	5/17/1988	Pervenets Canyon East	701	369
Y00702	Exxon	6/1/1984	Relinquished	12/22/1986	Pervenets Canyon East	702	370
Y00703	Placid	6/1/1984	Relinquished	5/17/1988	Pervenets Canyon East	703	371
Y00704	ARCO	6/1/1984	Relinquished	11/17/1986	Pervenets Canyon East	704	376
Y00705	ARCO	6/1/1984	Relinquished	11/17/1986	Pervenets Canyon East	705	377
Y00684	Amoco	6/1/1984	Relinquished	5/23/1989	Pervenets Canyon	684	431
Y00683	Amoco	6/1/1984	Relinquished	5/23/1989	Pervenets Canyon	683	430
Y00706	Placid	6/1/1984	Relinquished	5/17/1988	Pervenets Canyon East	706	413
Y00707	Amoco	6/1/1984	Relinquished	12/22/1986	Pervenets Canyon East	707	414
Y00604	Exxon	6/1/1984	Relinquished	5/24/1989	Banks	604	738
Y00708	Amoco	6/1/1984	Relinquished	12/22/1986	Pervenets Canyon East	708	415
Y00709	Placid	6/1/1984	Relinquished	5/17/1988	Pervenets Canyon East	709	457
Y00710	ARCO	6/1/1984	Relinquished	11/26/1986	Pervenets Canyon East	710	458
Y00711	ARCO	6/1/1984	Relinquished	5/11/1987	Pervenets Canyon East	711	459
Y00712	ARCO	6/1/1984	Relinquished	11/17/1986	Pervenets Canyon East	712	460
Y00687	Exxon	6/1/1984	Relinquished	12/23/1988	Pervenets Canyon	687	652

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y00686	Exxon	6/1/1984	Relinquished	12/23/1988	Pervenets Canyon	686	651
Y00685	Exxon	6/1/1984	Relinquished	12/23/1988	Pervenets Canyon	685	650
Y00688	Exxon	6/1/1984	Relinquished	12/23/1988	Pervenets Canyon	688	696
Y00713	Exxon	6/1/1984	Relinquished	5/24/1989	Pervenets Canyon East	713	661
Y00714	Exxon	6/1/1984	Relinquished	5/24/1989	Pervenets Canyon East	713	662
Y00716	Exxon	6/1/1984	Relinquished	12/23/1988	Pervenets Canyon East	716	706
Y00717	Exxon	6/1/1984	Relinquished	12/23/1988	Pervenets Canyon East	717	707
Y00718	Placid	6/1/1984	Relinquished	5/17/1988	Pervenets Canyon East	718	722
Y00627	Amoco	6/1/1984	Relinquished	12/22/1986	St. Matthew West	627	182
Y00628	Exxon	6/1/1984	Relinquished	5/24/1989	St. Matthew West	628	183
Y00629	Exxon	6/1/1984	Relinquished	5/24/1989	St. Matthew West	629	184
Y00630	Placid	6/1/1984	Relinquished	5/17/1988	St. Matthew West	630	185
Y00562	Amoco	6/1/1984	Relinquished	5/9/1989	Banks	562	200
Y00631	ARCO	6/1/1984	Relinquished	11/17/1986	St. Matthew West	631	188
Y00632	ARCO	6/1/1984	Relinquished	11/17/1986	St. Matthew West	632	189
Y00567	Exxon	6/1/1984	Relinquished	12/22/1986	Banks	567	255
Y00633	Exxon	6/1/1984	Relinquished	12/22/1986	St. Matthew West	633	221
Y00566	Exxon	6/1/1984	Relinquished	12/22/1986	Banks	566	254
Y00634	Mobil	6/1/1984	Relinquished	3/17/1995	St. Matthew West	634	222
Y00635	Mobil	6/1/1984	Relinquished	3/17/1995	St. Matthew West	635	223
Y00636	Exxon	6/1/1984	Relinquished	5/29/1987	St. Matthew West	636	224
Y00637	Union	6/1/1984	Relinquished	12/20/1990	St. Matthew West	637	225
Y00638	Amoco	6/1/1984	Relinquished	12/22/1986	St. Matthew West	638	226
Y00639	Amoco	6/1/1984	Relinquished	12/22/1986	St. Matthew West	639	227
Y00640	Exxon	6/1/1984	Relinquished	5/24/1989	St. Matthew West	640	228
Y00641	Placid	6/1/1984	Relinquished	5/17/1988	St. Matthew West	641	229
Y00642	Placid	6/1/1984	Relinquished	5/29/1991	St. Matthew West	642	231
Y00643	ARCO	6/1/1984	Relinquished	11/17/1986	St. Matthew West	643	232
Y00644	ARCO	6/1/1984	Relinquished	11/17/1986	St. Matthew West	644	233
Y00645	Exxon	6/1/1984	Relinquished	5/29/1987	St. Matthew West	645	268
Y00646	Union	6/1/1984	Relinquished	12/20/1990	St. Matthew West	646	269
Y00647	Amoco	6/1/1984	Relinquished	12/22/1986	St. Matthew West	647	270
Y00648	Amoco	6/1/1984	Relinquished	12/22/1986	St. Matthew West	648	271

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y00649	Placid	6/1/1984	Relinquished	5/17/1988	St. Matthew West	649	272
Y00650	Placid	6/1/1984	Relinquished	5/29/1991	St. Matthew West	650	276
Y00651	Placid	6/1/1984	Relinquished	5/29/1991	St. Matthew West	651	277
Y00652	Shell	6/1/1984	Relinquished	5/21/1986	St. Matthew West	652	411
Y00653	Shell	6/1/1984	Relinquished	5/21/1986	St. Matthew West	653	455
Y00654	ARCO	6/1/1984	Relinquished	12/29/1988	St. Matthew West	654	491
Y00655	ARCO	6/1/1984	Relinquished	6/1/1990	St. Matthew West	655	492
Y00656	ARCO	6/1/1984	Relinquished	12/30/1986	St. Matthew West	656	493
Y00569	Exxon	6/1/1984	Relinquished	12/22/1986	Banks	569	506
Y00568	Exxon	6/1/1984	Relinquished	12/22/1986	Banks	568	505
Y00575	Gulf Oil	6/1/1984	Relinquished	6/20/1991	Banks	575	561
Y00574	Exxon	6/1/1984	Relinquished	12/22/1986	Banks	574	560
Y00573	Exxon	6/1/1984	Relinquished	12/22/1986	Banks	573	559
Y00572	Exxon	6/1/1984	Relinquished	12/22/1986	Banks	572	558
Y00571	Chevron	6/1/1984	Relinquished	5/19/1989	Banks	571	550
Y00570	Exxon	6/1/1984	Relinquished	12/22/1986	Banks	570	549
Y00583	Exxon	6/1/1984	Relinquished	12/22/1986	Banks	583	606
Y00582	Exxon	6/1/1984	Relinquished	12/22/1986	Banks	582	605
Y00581	Exxon	6/1/1984	Relinquished	5/29/1987	Banks	581	604
Y00580	ARCO	6/1/1984	Relinquished	11/17/1986	Banks	580	603
Y00579	Gulf Oil	6/1/1984	Relinquished	6/20/1991	Banks	579	602
Y00578	ARCO	6/1/1984	Relinquished	12/29/1988	Banks	578	594
Y00577	Sohio	6/1/1984	Relinquished	5/19/1989	Banks	577	593
Y00576	Exxon	6/1/1984	Relinquished	12/22/1986	Banks	576	592
Y00593	Exxon	6/1/1984	Relinquished	12/22/1986	Banks	593	651
Y00592	Exxon	6/1/1984	Relinquished	5/29/1987	Banks	592	650
Y00591	Exxon	6/1/1984	Relinquished	5/29/1987	Banks	591	649
Y00590	Exxon	6/1/1984	Relinquished	5/29/1987	Banks	590	648
Y00589	Exxon	6/1/1984	Relinquished	5/29/1987	Banks	589	647
Y00588	ARCO	6/1/1984	Relinquished	11/17/1986	Banks	588	639
Y00587	ARCO	6/1/1984	Relinquished	12/29/1988	Banks	587	638
Y00586	ARCO	6/1/1984	Relinquished	12/29/1988	Banks	586	637
Y00585	Exxon	6/1/1984	Relinquished	12/22/1986	Banks	585	636

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y00584	Exxon	6/1/1984	Relinquished	12/22/1986	Banks	584	635
Y00601	Exxon	6/1/1984	Relinquished	5/29/1987	Banks	601	695
Y00657	Exxon	6/1/1984	Relinquished	12/22/1986	St. Matthew West	657	661
Y00600	Exxon	6/1/1984	Relinquished	5/24/1989	Banks	600	694
Y00599	Exxon	6/1/1984	Relinquished	5/29/1987	Banks	599	693
Y00598	Amoco	6/1/1984	Relinquished	12/22/1986	Banks	598	692
Y00597	ARCO	6/1/1984	Relinquished	11/17/1986	Banks	597	682
Y00596	ARCO	6/1/1984	Relinquished	12/29/1988	Banks	596	681
Y00595	Chevron	6/1/1984	Relinquished	5/19/1989	Banks	595	680
Y00605	BP Exploration	6/1/1984	Relinquished	5/30/1986	Banks	605	739
Y00658	Exxon	6/1/1984	Relinquished	12/22/1986	St. Matthew West	658	705
Y00563	Amoco	6/1/1984	Relinquished	12/22/1986	Banks	563	201
Y00609	Placid	6/1/1984	Relinquished	5/17/1988	St. Matthew West	609	11
Y00610	Amoco	6/1/1984	Relinquished	5/9/1989	St. Matthew West	610	54
Y00611	Exxon	6/1/1984	Relinquished	12/23/1988	St. Matthew West	611	55
Y00612	Gulf Oil	6/1/1984	Relinquished	6/20/1991	St. Matthew West	612	56
Y00613	Exxon	6/1/1984	Relinquished	12/23/1988	St. Matthew West	613	97
Y00614	Exxon	6/1/1984	Relinquished	12/23/1988	St. Matthew West	614	98
Y00615	Amoco	6/1/1984	Relinquished	5/9/1989	St. Matthew West	615	99
Y00616	Placid	6/1/1984	Relinquished	5/29/1991	St. Matthew West	616	100
Y00617	Exxon	6/1/1984	Relinquished	12/28/1988	St. Matthew West	617	140
Y00618	Exxon	6/1/1984	Relinquished	12/28/1988	St. Matthew West	618	141
Y00561	Amoco	6/1/1984	Relinquished	12/22/1986	Banks	561	158
Y00560	Amoco	6/1/1984	Relinquished	12/22/1986	Banks	560	157
Y00619	Gulf Oil	6/1/1984	Relinquished	6/20/1991	St. Matthew West	619	143
Y00620	Placid	6/1/1984	Relinquished	5/29/1991	St. Matthew West	620	144
Y00621	ARCO	6/1/1984	Relinquished	11/17/1986	St. Matthew West	621	145
Y00565	Exxon	6/1/1984	Relinquished	12/22/1986	Banks	565	211
Y00622	Exxon	6/1/1984	Relinquished	12/22/1986	St. Matthew West	622	177
Y00564	Exxon	6/1/1984	Relinquished	12/22/1986	Banks	564	210
Y00623	Exxon	6/1/1984	Relinquished	12/22/1986	St. Matthew West	623	178
Y00624	Exxon	6/1/1984	Relinquished	12/22/1986	St. Matthew West	624	179
Y00625	Placid	6/1/1984	Relinquished	5/17/1988	St. Matthew West	625	180

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y00660	ARCO Alaska Inc.	None	Rejected	None	St. Matthew West	660	881
Y00715	Exxon Corporation	None	Rejected	None	Pervenets Canyon East	715	705
Y00594	Exxon Corporation	None	Rejected	None	Banks	594	679
Y00543	Shell Western E&P Inc.	None	Rejected	None	St. Matthew West	543	385
Y00542	Shell Western E&P Inc.	None	Rejected	None	St. Matthew West	542	384
Y00541	Shell Western E&P Inc.	None	Rejected	None	St. Matthew West	541	383
Y00540	Amoco Production Company	None	Rejected	None	St. Matthew West	540	382
Y00546	Amoco Production Company	None	Rejected	None	St. Matthew West	546	427
Y00545	Amoco Production Company	None	Rejected	None	St. Matthew West	545	426
Y00544	Amoco Production Company	None	Rejected	None	St. Matthew West	544	425
Y00548	Amoco Production Company	None	Rejected	None	Banks	548	63
Y00547	Amoco Production Company	None	Rejected	None	Banks	547	62
Y00555	ARCO Alaska Inc.	None	Rejected	None	Banks	555	113
Y00554	ARCO Alaska Inc.	None	Rejected	None	Banks	554	112
Y00553	Amoco Production Company	None	Rejected	None	Banks	553	111
Y00552	Amoco Production Company	None	Rejected	None	Banks	552	110
Y00551	Amoco Production Company	None	Rejected	None	Banks	551	108
Y00550	Amoco Production Company	None	Rejected	None	Banks	550	107
Y00549	Amoco Production Company	None	Rejected	None	Banks	549	106
Y00559	Amoco Production Company	None	Rejected	None	Banks	559	156
Y00558	Amoco Production Company	None	Rejected	None	Banks	558	155
Y00557	Amoco Production Company	None	Rejected	None	Banks	557	152
Y00556	Amoco Production Company	None	Rejected	None	Banks	556	151

Note: ARCO = Atlantic Richfield Company
Source: BOEM 2023b

5.2.1.2 Surveys

No surveys were documented as a result of Lease Sale 83.

5.2.1.3 Well Drilling

Eight exploration wells were drilled as a result of Lease Sale 83, as summarized in Table 5.2.1-2.

Table 5.2.1-2. Well drilling summary

Activity Start Date	Activity End Date	Well Name (includes API no. and bottom hole lease number)	Well Type	Well Depth (feet)	Drill Rig Name
8/5/1985	10/21/1985	API no. 554910000100 (PACKARD 1) on OCS Y-0586	Exploration	13,741	SEDCO 712
6/7/1985	8/28/1985	API no. 554600000100 (NICHOLE 1) on OCS Y-0707	Exploration	11,020	Ocean Odyssey
6/14/1985	8/30/1985	API no. 554910000200 (REDWOOD 1) on OCS Y-0599	Exploration	11,530	Big Dipper (Doo Sung)
6/19/1985	8/21/1985	API no. 55461000020000 (DANIELLE 1) on OCS Y-0639	Exploration	10,042	SEDCO 708
8/22/1985	10/8/1985	API no. 554910000400 (GEORGE 1) on OCS Y-0560	Exploration	9,085	SEDCO 708
8/31/1985	10/12/1985	API no. 554910000300 (REDWOOD 2) on OCS Y-0583	Exploration	11,561	Big Dipper (Doo Sung)
8/31/1985	10/21/1985	API no. 554900000100 (MISHA 1) on OCS Y-0673	Exploration	7,961	Ocean Odyssey
11/14/1985	11/23/1985	API no. 554600000300 (NANCY 1) on OCS Y-0719	Exploration	8,697	SEDCO 708

Note: API = American Petroleum Institute
Sources: BOEM 2005b, 2022b, 2023c, 2023d

5.2.1.4 Oil-and-Gas-Supporting Activities

There were no oil-and-gas-supporting activities identified as a result of Lease Sale 83. Refer to section 5.1.2 for oil-and-gas-supporting activities in the Bering Sea that are not associated with a lease sale as they may be applicable to Lease Sale 83.

5.2.1.5 E&D Scenario Summary

Three scenarios were developed for the 1984 Navarin Basin Lease Offering Final Environmental Impact Statement (MMS 1984) to assess the potential environmental impacts of the lease sale. The total extent of the proposed lease sale was 5,296 blocks or 29,536,629 acres. The medium resource level for the proposal was 1.20 Bbbl of oil and 7.68 Tcf of gas. Summaries of assumptions for exploration and development are shown in Table 5.2.1-3.

Under this scenario, the exploratory period would occur from 1986 to 1992. Peak activities would take place in 1988 and 1989 with nine exploratory and delineation wells drilled each year. If this projected level of activity were to be reached, five drilling rigs would be necessary to complete exploratory activities during the peak periods. The expected average depths for the exploratory and delineation wells were 15,000 feet and 10,000 feet, respectively (MMS 1984).

The developmental period was scheduled to begin in 1991 with the construction and emplacement of two drilling platforms. By 1995, 13 platforms would be in place. Developmental drilling was expected to start in 1993, and between 1993 and 2000, a total of 227 production and service wells would be drilled. The average depth for production wells would be 10,000 feet. Developmental drilling would cease in the year 2000 (MMS 1984).

Under this scenario, pipeline construction was expected to occur from 1992 to 1993, which would have required an 18-inch oil line and a 36-inch or equivalent gas line. Depending on the volume required, booster platforms could be needed every 100 miles (MMS 1984).

Oil production was expected to begin in 1994. Peak production would occur between 1999 and 2005 with 96 MMbbl produced each year. All oil production would cease between 2011 and 2013. If gas resources were to be developed, production would begin in 1994. Peak production would occur between 2001 and 2005 with 614 Bcf produced each year. All gas production would likely cease between 2013 and 2015 (MMS 1984).

Exploration Infrastructure: During exploration, the scenario assumed that all primary marine- and air-logistics support would be operating out of existing facilities along the Aleutian Chain and the Alaska Peninsula. Marine-support operations would be out of Dutch Harbor/Unalaska. Cold Bay would serve as the primary air-support site. St. Matthew Island could serve as the forward site for air support.

Replacement crews and limited supplies arriving from Cold Bay would be transported to the offshore drilling platforms by aircraft such as the Boeing 234 helicopter.

Exploration drilling would be limited to the open-water season. This season could vary from 6 to 11 months, depending on the drilling location within the basin. Drilling would likely be carried out by heavy-duty semisubmersibles that are capable of operating in the harsh environment found in the Navarin Basin.

Development Infrastructure*:* The primary scenario was centered around the use of pipelines to transport oil and gas from an estimated 13 steel-jacket and gravity-type production platforms to a major storage, loading, and processing terminal on St. Matthew Island (MMS 1984). Crude oil piped to St. Matthew Island would be transferred onto shuttle tankers for shipment to a remote storage and transshipment terminal on the south side of the Alaska Peninsula.

Gas resources, if developed, would be piped to liquefaction and storage facilities on St. Matthew Island. After processing, the gas could be transported direct to market by ice-reinforced or ice-breaking liquified natural gas (LNG) tankers. This scenario would also require the construction of a major storage and transshipment terminal for very-large-crude-carriers-type tankers at a remote location on the south side of the Alaska Peninsula.

Cold Bay would continue to serve as an air-support facility. Aircraft facilities on St. Matthew Island would likely be expanded to handle the increased traffic resulting from increased activity. All major marine-support operations would continue to operate out of a port such as Dutch Harbor/Unalaska.

During this phase of development, the installation of intra-field and inter-field pipelines would be initiated. Long trunklines for oil and gas would be required to carry the resources to a terminal on St. Matthew Island.

Table 5.2.1-3. Summary of basic assumptions of Lease Sale 83 E&D scenario

Element	Medium Case
Sale acreage offering	29,536,629 acres
Recoverable oil	1.20 Bbbl
Recoverable gas	7.68 Tcf
Peak production oil	96 MMbbl per year
Peak production gas	614 Bcf per year
Number of drilling rigs	5
Platforms	13
Number of wells (production and service)	227
Number of wells (exploratory and delineation)[1]	39
Well depth average (exploratory and delineation)	15,000 feet and 10,000 feet
Well depth average (production)	10,000 feet
Pipelines	1 18-inch oil line; 1 36-inch gas line
LNG plant and terminal	1, St. Matthew Island
Supply and support boats	1
Air support location	Cold Bay, St. Matthew Island
Marine support location	Dutch Harbor, St. Matthew Island

Notes: Bbbl = billion barrels; Bcf = billion cubic feet; LNG = liquified natural gas; MMbbl = million barrels; Tcf = trillion cubic feet
[1]26 exploration wells; 13 delineation wells
Source: MMS 1984

5.2.1.6 Comparison of Exploration and Development Scenario and Historical Activities

A comparison of the E&D scenario and the historical activities are provided in Table 5.2.1-4, using available information.

Table 5.2.1-4. Comparison of E&D and historical activities

Activity	E&D Scenario	Actual Activities
Sale acreage offering	29,536,629 acres offered	28,048,995 acres offered
Sale	--	927,989 acres leased
Recoverable oil	1.20 Bbbl	--
Recoverable gas	7.68 Tcf	--
Peak production oil	96 MMbbl per year	N/A
Peak production gas	614 Bcf per year	N/A

Activity	E&D Scenario	Actual Activities
Number of drilling rigs	5	4: Big Dipper (Doo Sung) semisubmersible, SEDCO 708, SEDCO 712, Ocean Odyssey semisubmersible[1]
Platforms	13	0
Number of wells (production and service)	227	0
Number of wells (exploratory and delineation)	39	8
Well depth average (exploratory and delineation)	15,000 feet and 10,000 feet	10,455 feet
Well depth average (production)	10,000 feet	N/A
Pipelines	1 18-inch oil line; 1 36-inch gas line	0
LNG plant and terminal	1, St. Matthew Island	0
Supply and support boats	1	Undocumented[2]
Air support location	Cold Bay, St. Matthew Island	Undocumented[3]
Marine support location	Dutch Harbor, St. Matthew Island	--

Notes: -- = no data provided; Bbbl = billion barrels; Bcf = billion cubic feet; E&D = Exploration and Development; LNG = liquified natural gas; MMbbl = million barrels; N/A = not applicable; Tcf = trillion cubic feet
[1]It is assumed that a minimum of one supply and/or support boat was utilized as a result of Lease Sale 83, but the information was not obtained in this study.
[2]Cold Bay was used for air support in the Bering Sea, but it could not be confirmed if it was used specifically in the case of Lease Sale 83.
[3]Dutch Harbor was used for marine support in the Bering Sea, but it could not be confirmed if it was used specifically in the case of Lease Sale 83.

5.2.2 Activities Not Associated with a Lease Sale

Activities that were not or could not be directly associated with a lease sale that occurred in the Navarin Basin Planning Area are shown in Figure 5-2, such as the locations of COST/DST wells, supporting facilities, transportation infrastructure, and survey areas.

5.2.2.1 Surveys

Between 1976 and 1982, there were five 2D seismic surveys documented that could not be directly associated with a lease sale, as summarized in Table 5.2.2-1.

Table 5.2.2-1. Survey activity summary

Activity Start Date	Activity End Date	Year	Activity Name	Description	Vessel Name(s)	Operator and/or Contractor
7/28/1976	8/25/1976	1976	2D multichannel seismic survey	Seismic surveys used airguns and streamers for data acquisition. A total of 3,369 kilometers were shot with 21 tracklines. Surveys were conducted over five OCS planning areas.[1]	Samuel Phillips Lee	Pacific Coastal and Marine Science Center

Activity Start Date	Activity End Date	Year	Activity Name	Description	Vessel Name(s)	Operator and/or Contractor
7/29/1977	8/21/1977	1977	2D multichannel seismic survey	2D multichannel seismic surveys used an airgun and streamer for data acquisition. A total of 3,168 kilometers were shot with 16 tracklines.	Samuel Phillips Lee	Pacific Coastal and Marine Science Center
6/1/1978	6/30/1978	1978	2D multichannel seismic survey	2D multichannel seismic survey used an airgun and streamer for data acquisition. A total of 7,783 kilometers were shot with 41 tracklines.	--	WesternGeco
5/27/1980	10/9/1980	1980	2D multichannel seismic survey	2D multichannel seismic survey used an airgun and streamer for data acquisition. A total of 3,440 kilometers were shot with 29 tracklines. This survey was completed under Permit 80-14 and was partially completed in the Navarin Basin Planning Area and the St. George Planning Area.[1]	--	Exxon
7/11/1982	8/3/1982	1982	2D multichannel seismic survey	2D multichannel seismic survey used an airgun and streamer for data acquisition. A total of 2,615 kilometers were shot with 14 tracklines. This survey is split into four OCS planning areas: the St. George Basin Planning Area, Navarin Basin Planning Area, North Aleutian Basin Planning Area, and St. Matthew-Hall Planning Area.[1]	Samuel Phillips Lee	Pacific Coastal and Marine Science Center

Notes: 2D = two-dimensional
[1]Survey is included in activity summary for one or more other OCS planning areas due to geographic overlap.
Sources: Triezenberg et al. 2016; USGS 2023

5.2.2.2 Well Drilling

One COST/DST exploration well was drilled that was not associated with a lease sale, as summarized in Table 5.2.2-2.

Table 5.2.2-2. Well drilling summary

Activity Start Date	Activity End Date	Well Name (includes API no.)	Well Type	Well Depth (feet)	Drill Rig Name
5/27/1983	10/24/1983	API no. 554610000100 (COST NAVARIN 1 DST-14)	COST/DST	16,400	SEDCO 708

Notes: API = American Petroleum Institute; COST = continental offshore stratigraphic test; DST = deep stratigraphic test
Sources: BOEM 2022b, 2023c; Dames & Moore 1978

5.2.2.3 Oil-and-Gas-Supporting Activities

Identified oil-and-gas-supporting activities not associated with a lease sale included facility support and transportation from facilities and shorebases to relevant activity sites (if documented), as summarized in Table 5.2.2-3 and Table 5.2.2-4.

Table 5.2.2-3. Facility support summary

Facility Name	Facility Type	Description	Supported Activity
Nome shorebase	Onshore shorebase complex	Existing facilities in Nome were expanded to include two new helipads and hangars. Supplies were lightered by local small vessels to larger supply vessels outside of the Nome port, then carried by the supply ships to the rigs.	Drilling well: COST NAVARIN 1 DST-14
Offshore Systems, Inc. shorebase at Captains Bay at Dutch Harbor	Onshore shorebase complex	The shorebase leased 40 acres in Captains Bay at Port Lekanoff. There were six mobile homes at the camp with a maximum capacity of 22 people. Supply boats and barges were used to transport supplies and personnel. Vessels used were the *Biehl Traveler*, *Biehl Trader* (work boats); and the *MLC 331* (supply barge).	Drilling well: COST NAVARIN 1 DST-14

Source: Burden et al. 1985

Table 5.2.2-4. Summary of transportation activity

Facility Name	Facility Type	Supported Activity	No. Aircraft	No. Vessels	Vessel Names	Aircraft
Nome Airport	Airport	Air supply route from Nome to COST/DST well: COST NAVARIN 1 DST-14	3	0	N/A	Bell 412, two Boeing 234 ERs
St. Lawrence Island Airport	Airport	Air supply route from Nome to COST/DST well: COST NAVARIN 1 DST-14	Undocumented	0	N/A	N/A
Dutch Harbor	Port	Marine supply route from Dutch Harbor to COST/DST well: COST NAVARIN 1 DST-14	0	3	Biehl Traveler, Biehl Trader (work boats); MLC 331 (supply barge)	N/A
Port of Nome	Port	Marine supply route from the lower 48 to Dutch Harbor for COST/DST well: COST NAVARIN 1 DST-14	0	Undocumented	Unknown	N/A

Notes: COST = continental offshore stratigraphic test; DST = deep stratigraphic test; N/A = not applicable
Sources: BOEM 2016c, 2022b, 2023c, 2023d; Burden et al. 1985

5.3 North Aleutian Basin Planning Area

The North Aleutian Planning Area lies in the southern Bristol Bay region of the Bering Sea and just off the northern shore of the Alaska Peninsula. In 1988, there was one lease sale in the North Aleutian Basin Planning Area: Lease Sale 92. A summary of this lease is shown in Table 5.3-1. Information on this lease is provided in the sections below. There are no active leases in this OCS planning area.

In the North Aleutian Basin Planning Area between 1968 and 2022, there were an estimated 43,000 miles of 2D marine seismic surveys conducted (BOEM 2023a).

Table 5.3-1. Summary of leases in the North Aleutian Basin Planning Area

	Lease Sale 92
Year	1988
Tracts offered	990
Acres offered	5,603,586
Leases issued	23
Acres leased	121,757
Active leases	0
Active lease area (hectares)	0

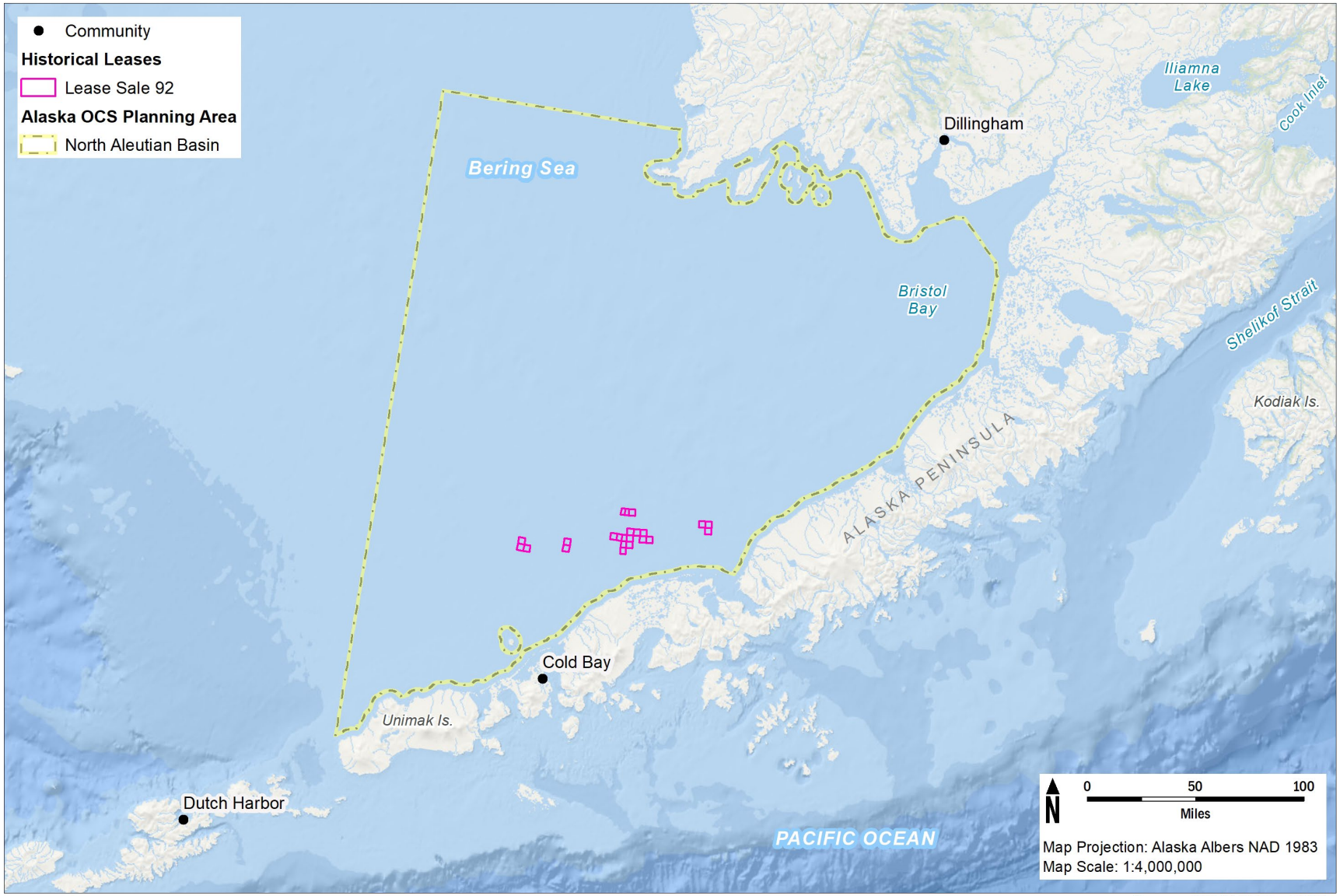
Sources: BOEM 2023b, 2023g

5.3.1 Lease Sale 92 (1988)

Lease Sale 92 is shown in Figure 5-4. No activities are associated with this Lease Sale.

5.3.1.1 Leasing

As shown in Table 5.3-1 and Figure 5-4, as a result of Lease Sale 92, there were 990 tracts offered and 23 leases issued. There were 5,603,586 acres offered and 121,757 acres leased. There are no active leases from Lease Sale 92. Table 5.3.1-1 summarizes documented information associated with the leasing as a result of Lease Sale 92.



Source: BOEM 2022c, 2023b.

Figure 5-4. Historical leases associated with Lease Sale 92, 1988

Table 5.3.1-1. Lease information as a result of Lease Sale 92

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y01531	Chevron	11/1/1988	Relinquished	8/31/1995	Bristol Bay	1531	904
Y01533	Chevron	11/1/1988	Relinquished	8/31/1995	Bristol Bay	1533	948
Y01534	Chevron	11/1/1988	Relinquished	8/31/1995	Bristol Bay	1534	949
Y01536	Chevron	11/1/1988	Relinquished	8/31/1995	Chignik	1536	579
Y01527	Chevron	11/1/1988	Relinquished	8/31/1995	Bristol Bay	1527	611
Y01535	Chevron	11/1/1988	Relinquished	8/31/1995	Chignik	1535	578
Y01542	Chevron	11/1/1988	Relinquished	8/31/1995	Chignik	1542	713
Y01546	Chevron	11/1/1988	Relinquished	8/31/1995	Chignik	1546	758
Y01545	Chevron	11/1/1988	Relinquished	8/31/1995	Chignik	1545	757
Y01528	Chevron	11/1/1988	Relinquished	8/31/1995	Bristol Bay	1528	786
Y01529	Chevron	11/1/1988	Relinquished	8/31/1995	Bristol Bay	1529	787
Y01543	Chevron	11/1/1988	Relinquished	8/31/1995	Chignik	1543	754
Y01548	Chevron	11/1/1988	Relinquished	8/31/1995	Chignik	1548	799
Y01547	Chevron	11/1/1988	Relinquished	8/31/1995	Chignik	1547	798
Y01530	Chevron	11/1/1988	Relinquished	8/31/1995	Bristol Bay	1530	867
Y01549	Mobil	12/1/1988	Relinquished	8/29/1995	Chignik	1549	842
Y01532	Chevron	12/1/1988	Relinquished	8/31/1995	Bristol Bay	1532	911
Y01538	Amoco	12/1/1988	Relinquished	8/30/1995	Chignik	1538	635
Y01537	Amoco	12/1/1988	Relinquished	8/30/1995	Chignik	1537	634
Y01539	Mobil	12/1/1988	Relinquished	8/29/1995	Chignik	1539	679
Y01541	Chevron	12/1/1988	Relinquished	8/30/1995	Chignik	1541	712
Y01540	Shell	12/1/1988	Relinquished	5/9/1995	Chignik	1540	711
Y01544	Shell	12/1/1988	Relinquished	8/30/1995	Chignik	1544	755

Source: BOEM 2023b

5.3.1.2 Surveys

No surveys were documented as a result of Lease Sale 92.

5.3.1.3 Well Drilling

No wells were drilled as a result of Lease Sale 92.

5.3.1.4 Oil-and-Gas-Supporting Activities

There were no oil-and-gas-supporting activities identified as a result of Lease Sale 92.

5.3.1.5 E&D Scenario Summary

Two scenarios were developed for the North Aleutian Basin Planning Area North Aleutian Basin Sale 92 Final Environmental Impact Statement (MMS 1985) to assess the potential environmental effects of the lease sale. The total areal extent of the lease sale was 990 blocks or 5,609,292 acres.

The scenarios were based on two transportation assumptions: a pipeline-transportation scenario and an offshore-loading scenario. The mean resource estimate for the proposal was 3.64 Bbbl of oil and 2.62 Tcf of gas. Summaries of assumptions for exploration and development (MMS 1985) are shown in Table 5.3.1-2 and Table 5.3.1-3.

Pipeline-Transportation Scenario: The pipeline-transportation scenario featured gas production from one offshore platform. The gas and oil would be transported by two pipelines, each approximately 210 kilometers long, across the Port Moller/Balboa Bay trans-peninsula transportation corridor to an LNG plant and transshipment terminal at Balboa Bay. Oil would be transported from Balboa Bay transshipment terminal to markets by tankers of the 80,000 deadweight (DWT) class. Gas would be transported by LNG tankers of the 125,000-cubic-meter tanker class directly to a Pacific Rim terminal. Marine support for offshore operations would be held in Unalaska, while Cold Bay would serve as the primary air-support base (MMS 1985).

In this scenario, pipeline construction would begin in 1991 and end in 1993. Total pipeline mileage would vary with location of production platforms; however, approximately 210 kilometers of oil pipeline and 210 kilometers of gas pipeline were projected. The Balboa Bay transshipment terminal would be completed in 1993, while the LNG plant would be completed by 1994.

A preferred trans-peninsula transportation corridor from Herendeen Bay to Balboa Bay had been identified and recommended. Under the scenario, the route would extend from Port Moller through Portage Valley to Balboa Bay. Depending on the port site selected, the route could range from 55 to 69 kilometers long.

If economically recoverable oil and gas deposits were discovered, two 210-kilometer pipelines would be installed between the production platforms and an onshore terminal. A total of 340 kilometers of overland pipeline route would require surveying. Prior to pipeline installation, an estimated 4 kilometers of high-resolution seismic survey would be required for each kilometer of planned offshore pipeline. This represented an additional 1,360 kilometers of high-resolution seismic survey.

Offshore-Loading Scenario: In the offshore-loading scenario, oil would be loaded offshore onto 80,000 DWT tankers and transported through Unimak Pass to markets. Gas production from one platform would be transported to shore and across the Port Moller/Balboa Bay transportation corridor to an LNG plant at Balboa Bay. The gas would be transported directly by LNG tankers of 125,000-cubic-meter class to a

Pacific Rim LNG terminal. Marine support for offshore operations would be based in Unalaska. Cold Bay could serve as the primary air-support site.

In this scenario, activities associated with development would begin in 1986 and end 6 years after the lease sale, in 1991. Five exploration and five delineation wells (three oil and two gas) would be drilled. The average depth of the exploration and delineation wells was expected to be approximately 3,048 meters in the eastern and central portions of the lease area and 1,524 meters in the western portion.

Planning and construction of the oil platform would start in 1987, and final placement would occur in 1990. During this period, one oil and one gas production platform would be installed, and 20 oil and 12 gas production and service wells would be drilled. The average depth of a production well could range from 3,566 meters in the central and eastern portions of the lease area to 1,981 meters in the western portion.

Total pipeline mileage would vary with location of the gas platform; however, approximately 210 kilometers of gas pipeline were projected to be constructed in 1992 and 1993. An LNG plant would be completed by 1994.

Oil production was expected to begin in 1993, with peak annual production of 31 MMbbl occurring between 1994 and 1999, with oil output ceasing in the year 2011. Gas production was expected to begin in 1994, with a peak annual production of 0.126 Tcf between 1995 and 2012, with gas output ceasing in the year 2016.

During exploration, development, and production, Unalaska and Cold Bay would likely serve as marine and air support bases, respectively. Unalaska was expected to serve a maximum of two drilling rigs per year. Support boats from Unalaska would reach drilling rigs at least once every 2 days. In the development phase, each platform would be serviced at least once a day by workboats from Unalaska. During the production phase, supply-boat traffic would be expected to decrease to an as-needed basis. The Cold Bay airfield would support a maximum of two drilling rigs in any one season. Between 1986 and 1991, drilling rigs would be served at least once a day by helicopter-support flights, which could average two to three trips every day during the development phase and one trip per day during production.

It was presumed that by 1993, a major storage and loading terminal for oil tankers would be constructed in the Balboa Bay area. The terminal (25 to 30 hectares) would accommodate a maximum production rate of about 85 thousand barrels (Mbbl) of oil daily. Tanker loading would occur every 5 to 7 days, with tanker size estimated to be 80,000 DWT. Small LNG tankers of the 125,000-cubic-meter class would visit the facility every 10 to 12 days. The terminal also would require air-support facilities to shuttle personnel from Cold Bay, and tankers estimated to be 80,000 DWT would load at the Balboa Bay terminal every 5 to 7 days.

There would be a small LNG facility (80 hectares) at Balboa Bay. Small LNG tankers of the 125,000-cubic-meter class would visit the facility every 10 to 12 days. The terminal also would require air-support facilities to shuttle personnel from Cold Bay.

Under this scenario, 10 exploration/delineation wells, 32 production wells, two platforms, and approximately 380 kilometers of offshore pipeline were estimated. Between 1986 and 1991, exploration/delineation-well-derived mud solids and drill cuttings could range between 3,500 and 7,000 tons and 10,500 and 15,500 tons, respectively. Between 1990 and 1993, production-well-derived drill cuttings could range between 38,400 and 54,400 tons. Approximately 1,344 tons of mud solids could be used during this period.

A summary of activities is provided in Table 5.3.1-2 and Table 5.3.1-3.

Table 5.3.1-2. Summary of basic assumptions of Lease Sale 92 E&D scenario

Element	Total	Oil	Gas
Sale acreage offering	5,609,292 acres	--	--
Exploration and delineations wells	5	3	2
Production platforms	2	1	1
Production wells	32	20	12
Seismic activity (trackline miles)	1,135	--	--
Total production	--	364 MMbbl	2.62 Tcf
Peak production	--	84,932 barrels per day	0.126 Tcf a year
Average annual production	--	31 MMbbl	0.126 Tcf
Helicopter flights – development	750–1,095	--	--
Helicopter flights – production	365	--	--
Supply boat trips – development	750–1,095	--	--
Supply boat trips – production	As needed	--	--
Pipeline-Transportation Scenario			
Marine pipeline	--	190 km	190 km
Onshore pipeline	--	20 km	20 km
Roads	20 km	--	--
Seismic activity (trackline miles)	845	--	--
Tanker trips	--	52–73 (1 visit every 5–7 days)	36–73 (1 visit every 10–12 days)
LNG plant (Balboa Bay)	80 hectares	--	--
Marine terminal (Balboa Bay)	25–30 hectares	--	--
Air-support base	Cold Bay	--	--
Marine-support base	Unalaska	--	--
Offshore-Loading Scenario			
Marine pipeline	--	--	190 km
Onshore pipeline	--	--	20 km
Roads	20 km	--	--
Seismic activity (trackline miles)	20	--	--
Tanker trips	--	52–73 (1 visit every 5–7 days	36–73 (1 visit every 10–12 days)
LNG plant (Balboa Bay)	80 hectares	--	--
Drill rigs	4 (2 each in Cold Bay and Unalaska)	--	--
Marine terminal	Balboa Bay	--	--
Air-support base	Cold Bay	--	--

Element	Total	Oil	Gas
Marine-support base	Unalaska	--	--

Notes: km = kilometers; LNG = liquified natural gas; MMbbl = million barrels; Tcf = trillion cubic feet
Source: MMS 1985

Table 5.3.1-3. Total estimated volumes of muds and drill cuttings

Element	Per Well (Exploration)	Per Well (Production)[1]	Total Field (Production)
Formation waters	--	--	**3.640–327.5 MMbbl**
Muds	3,500–7,000 tons	1,344 tons	--
Cuttings	10,500–15,500 tons	38,400–54,400 tons	--
Platform-derived domestic and sanitary waste	--	--	11,200 gallons/day[2]

Notes: MMbbl = million barrels
[1] Amount of mud solids used to drill 20 oil-production wells from one platform between the years 1990 and 1992 and 12 gas-production wells from one platform between 1992 and 1993 is based on the assumption that muds would be recycled between wells, it is assumed that about 10 percent of mud solids used per well would be lost in the well bore.
[2] Daily average for two platforms.
Source: MMS 1985

The level of post-sale seismic activity would depend on the number of exploratory and delineation wells drilled and the number of production platforms installed. These surveys would evaluate shallow geologic hazards for drill-site clearance. A total of 10 exploratory and delineation wells would be drilled, and a total of 32 production and service wells would be drilled. Post-sale seismic activity for site-clearance work would occur at 12 sites.

The lease had the option of running a geohazard survey, which would involve 39 trackline miles of data, or a block-wide survey, which would involve 188 trackline miles of data. For the 12 sites, it is estimated that a total of 1,362 trackline miles would be surveyed.

It was assumed that preliminary seismic work for both exploration wells and production platforms would be completed in the early years of each drilling phase. Due to the expense of surveying in the proposed lease area, several sites would be surveyed by the same vessel. The estimated average time required to survey a site is 1 week. For the first 6 years, an estimated one or two sites per year would be surveyed for the 10 exploration and delineation wells. For the two production-platform sites, one site probably would be surveyed in the fifth year and one in the eighth year after award of leases.

If economically recoverable oil and gas deposits were discovered, one 210-kilometer pipeline would be installed between the gas-production platform and an LNG terminal. Oil would be loaded offshore; thus, a pipeline would not be required. Assuming 20 kilometers of overland routing for the pipeline, a total of 190 kilometers of offshore pipeline route would require surveying. Prior to pipeline installation, an estimated 4 kilometers of high-resolution seismic survey would be required for each kilometer of planned offshore pipeline. This represents an additional 760 kilometers of high-resolution seismic survey, which would be run either concurrently with drilling discoveries or in the first 1 or 2 years following a discovery.

5.3.1.6 Comparison of Exploration and Development Scenario and Historical Activities

A comparison of the E&D scenario and the historical activities are provided in Table 5.3.1-4, using available information.

Table 5.3.1-4. Comparison of E&D and historical activities

Activity	E&D Scenario	Actual Activities
Sale acreage offering	5,609,292 acres	5,603,586 acres
Sale	--	121,757 acres
Exploration and delineations wells	5 (3 oil, 2 gas)	0
Production platforms	2 (1 oil, 1 gas)	0
Production wells	32 (20 oil, 12 gas)	0
Average well depth	--	0
Seismic activity (trackline miles)	1,135	0
Total production	364 MMbbl (oil), 2.62 Tcf (gas)	0
Peak production	84,932 barrels per day (oil), 126 Tcf per year (gas)	N/A
Average annual production	31 MMbbl (oil), 126 Tcf (gas)	N/A
Helicopter flights – development	750–1,095 (development), 365 (production)	0
Supply boat trips – development	750–1,095 (development), as needed (production)	0
Formation waters	3.640–327.5 MMbbl (total field)	0
Muds	3,500–7,000 tons per well (exploration), 1,344 tons (production)	0
Cuttings	10,500–15,500 tons (exploration), 38,400–54,400 tons (production)	0
Platform-derived domestic and sanitary waste	11,200 gallons per day	0
Pipeline-Transportation Scenario		
Marine pipeline	190 km (oil), 190 km (gas)	0
Onshore pipeline	20 km (oil), 20 km (gas)	0
Roads	20 km	0
Seismic activity (trackline miles)	845	0
Tanker trips	52–73 (oil), 36–73 (gas)	0
LNG plant (Balboa Bay)	80 hectares	N/A
Drill rigs	4 (2 each in Cold Bay and Unalaska)	0
Marine terminal (Balboa Bay)	25–30 hectares	N/A
Air-support base	Cold Bay	N/A
Marine-support base	Unalaska	N/A

Activity	E&D Scenario	Actual Activities
Offshore-Loading Scenario		
Marine pipeline	190 km (gas)	0
Onshore pipeline	20 km (gas)	0
Roads	20 km	0
Seismic activity (trackline miles)	20	0
Tanker trips	52–73 (oil), 36–73 (gas)	0
LNG plant (Balboa Bay)	80 hectares	N/A
Marine terminal	Balboa Bay	N/A
Air-support base	Cold Bay	N/A
Marine-support base	Unalaska	N/A

Notes: E&D = Exploration and Development; km = kilometers; LNG = liquified natural gas; MMbbl = million barrels; N/A = not applicable; Tcf = trillion cubic feet

5.3.2 Activities Not Associated with a Lease Sale

Activities that could not be directly associated with a lease sale that occurred in the North Aleutian Basin Planning Area are shown in Figure 5-2, such as the locations of COST/DST wells, supporting facilities, transportation infrastructure, and survey areas.

5.3.2.1 Surveys

Between 1975 and 1984, there were 14 2D seismic surveys documented that could not be associated with a lease sale, as summarized in Table 5.3.2-1.

Table 5.3.2-1. Survey activity summary

Activity Start Date	Activity End Date	Year	Activity Name	Description	Vessel Name(s)	Operator and/or Contractor
4/27/1975	7/25/1975	1975	2D multichannel seismic survey	2D multichannel seismic survey used an airgun and streamer for data acquisition. A total of 5,791 km were shot with 63 tracklines.	M/V Canadian Olympic; M/V U.S. Olympic; M/V State	Union Oil Company (Operator), Dresser Industries, Inc. (Contractor)
5/18/1975	6/20/1975	1975	2D multichannel seismic survey	2D multichannel seismic survey used an airgun and streamer for data acquisition system. A total of 3,179 km were shot with 62 tracklines.	M/V Cecil H. Green	Geophysical Service, Inc.
1/1/1976	12/31/1976	1976	2D multichannel seismic survey	2D multichannel seismic survey used an airgun and streamer for data acquisition. A total of 2,407 km were shot with 39 tracklines.	--	WesternGeco
7/28/1976	8/25/1976	1976	2D multichannel seismic survey	Seismic surveys used airguns and streamers for data acquisition. A total of 3,369 km were shot with 21 tracklines. Surveys were conducted over 5 OCS planning areas.[1]	Samuel Phillips Lee	Pacific Coastal and Marine Science Center

Activity Start Date	Activity End Date	Year	Activity Name	Description	Vessel Name(s)	Operator and/or Contractor
9/1/1979	9/30/1979	1979	2D multichannel seismic survey	2D multichannel seismic survey used an airgun and streamer for data acquisition. A total of 1,478 km were shot with seven tracklines. The survey is split into the St. Matthew-Hall Planning Area and the North Aleutian Basin Planning Area.	--	WesternGeco
4/29/1980	10/2/1980	1980	2D multichannel seismic survey	2D multichannel seismic survey used an airgun and streamer for data acquisition. A total of 200 km were shot with two tracklines.	--	Shell Western E&P Inc.
5/29/1981	6/25/1981	1981	2D multichannel seismic survey	2D multichannel seismic survey used an airgun and streamer for data acquisition. A total of 3,199 km were shot with 47 tracklines.	--	Geophysical Exploration Company
6/8/1981	7/29/1981	1981	2D multichannel seismic survey	2D multichannel seismic survey used an airgun and streamer for data acquisition. Approximately 9,292 km were shot with 144 tracklines total, with 2,224 km captured within the St. George OCS Planning Area, and 7,002 km captured within the North Aleutian Basin OCS Planning Area.	--	Geophysical Company of Norway
4/27/1982	9/22/1982	1982	2D multichannel seismic survey	2D multichannel seismic survey used an airgun and streamer for data acquisition. A total of 3,274 km were shot with 23 tracklines. This survey has two discrete geographic locations in both the St. George OCS Planning Area and the North Aleutian Basin OCS Planning Area.	--	Atlantic Richfield Company
5/1/1982	9/15/1982	1982	2Dd multichannel seismic survey	2D multichannel seismic survey used an airgun and streamer for data acquisition. A total of 2,050 km were shot with 37 tracklines.	--	Geophysical Service Inc.
5/5/1982	11/7/1982	1982	2D multichannel seismic survey	2D multichannel seismic survey used an airgun and streamer for data acquisition. A total of 14,631 km were shot with 239 tracklines. This This survey has two discrete geographic locations in both the St. George OCS Planning Area and the North Aleutian Basin OCS Planning Area.	--	WesternGeco
7/11/1982	8/3/1982	1982	2D multichannel	2D multichannel seismic survey used an airgun and streamer for data acquisition. A total of	Samuel Phillips Lee	Pacific Coastal and Marine

Activity Start Date	Activity End Date	Year	Activity Name	Description	Vessel Name(s)	Operator and/or Contractor
			seismic survey	2,615 km were shot with 14 tracklines. This survey is split into four OCS planning areas: the St. George Basin Planning Area, Navarin Basin Planning Area, North Aleutian Basin Planning Area, and St. Matthew-Hall Planning Area.[1]		Science Center
8/9/1983	8/10/1983	1983	2D multichannel seismic survey	2D multichannel seismic survey used an airgun and streamer for data acquisition. A total of 240 km were shot with four tracklines.	--	Shell Western E&P Inc.
7/1/1984	9/30/1984	1984	2D multichannel seismic survey	2D multichannel seismic survey used an airgun and streamer for data acquisition. Available data show 1,629 km were shot with 29 tracklines.	--	Amoco Production

Notes: 2D = two-dimensional; km = kilometers; OCS = Outer Continental Shelf
[1]Survey is included in activity summary for one or more other OCS planning areas due to geographic overlap.
Sources: Banet 2001b; Banet 2001c; Triezenberg et al. 2016; USGS 2023

5.3.2.2 Well Drilling

One COST/DST exploration well was drilled that was not associated with a lease sale, as summarized in Table 5.3.2-2.

Table 5.3.2-2. Well drilling summary

Activity Start Date	Activity End Date	Well Name (includes API no.)	Well Type	Well Depth (feet)	Drill Rig Name
9/8/1982	1/14/1983	API no. 553070000100 (COST N ALEUTIAN 1 DST-13)	COST/DST	17,155	SEDCO 708

Notes: API = American Petroleum Institute; COST = continental offshore stratigraphic test; DST = deep stratigraphic test
Sources: BOEM 2016c, 2022b, 2023c, 2023d

5.3.2.3 Oil-and-Gas-Supporting Activities

Identified oil-and-gas-supporting activities not associated with a lease sale included facility support and transportation from facilities and shorebases to relevant activity sites (if documented), as summarized in Table 5.3.2-3 and Table 5.3.2-4.

Table 5.3.2-3. Facility support summary

Facility Name	Facility Type	Description	Supported Activity
Cold Bay shorebase	Onshore shorebase complex	Facilities included quarters for up to 60 people with a kitchen and septic system on site. There were also two 60-by-80-foot hangars owned by Air Logistics and Evergreen that were used to store helicopters. Other facilities included a flight service station and storage and maintenance structures leased by oil companies.	Drilling well: COST N ALEUTIAN 1 DST-13
Offshore Systems, Inc. shorebase at Captains Bay at Dutch Harbor	Onshore shorebase complex	The shorebase leased 40 acres in Captains Bay at Port Lekanoff. There were 6 mobile homes at the camp with a maximum capacity of 22 people. Supply boats and barges were used to transport supplies and personnel. Vessels used were the *Biehl Traveler*, *Biehl Trader* (work boats)	Drilling well: COST N ALEUTIAN 1 DST-13

Source: Burden et al. 1985

Table 5.3.2-4. Summary of transportation activity

Facility Name	Facility Type	Supported Activity	No. Aircraft	No. Vessels	Vessel Names	Aircraft
Cold Bay Airport	Airport	Air supply route from Cold Bay to COST/DST well: COST N ALEUTIAN 1 DST-13	2	0	N/A	Two Bell 412s
Cold Bay Airport	Airport	Air supply route from Anchorage to Cold Bay for COST/DST well: COST N ALEUTIAN 1 DST-13	--	0	N/A	Fixed-wing aircraft
Dutch Harbor	Port	Marine supply route from Dutch Harbor to COST/DST well: COST N ALEUTIAN 1 DST-13	0	2	Biehl Traveler, Biehl Trader (work boats)	N/A

Notes: -- = no data provided; COST = continental offshore stratigraphic test; DST = deep stratigraphic test; N/A = not applicable
Sources: BOEM 2016c, 2022b, 2023c, 2023d; Burden et al. 1985

5.4 Norton Basin Planning Area

The Norton Basin Planning Area is located off the coast of west-central Alaska, encompassing St. Lawrence Island. In 1983, there was one lease sale in the Norton Basin Planning Area: Lease Sale 57. A summary of this lease sale is shown in Table 5.4-1. Information on this lease sale is provided in the sections below. There are no active leases in this OCS planning area.

In the Norton Basin Planning Area between 1968 and 2022, there were an estimated 25,000 miles of 2D marine seismic surveys conducted (BOEM 2023a).

Table 5.4-1. Summary of leases in the Norton Basin Planning Area

	Lease Sale 57
Year	1983
Tracts offered	418
Acres offered	2,379,751
Leases issued	59
Acres leased	335,898
Active leases	0
Active lease area (hectares)	0

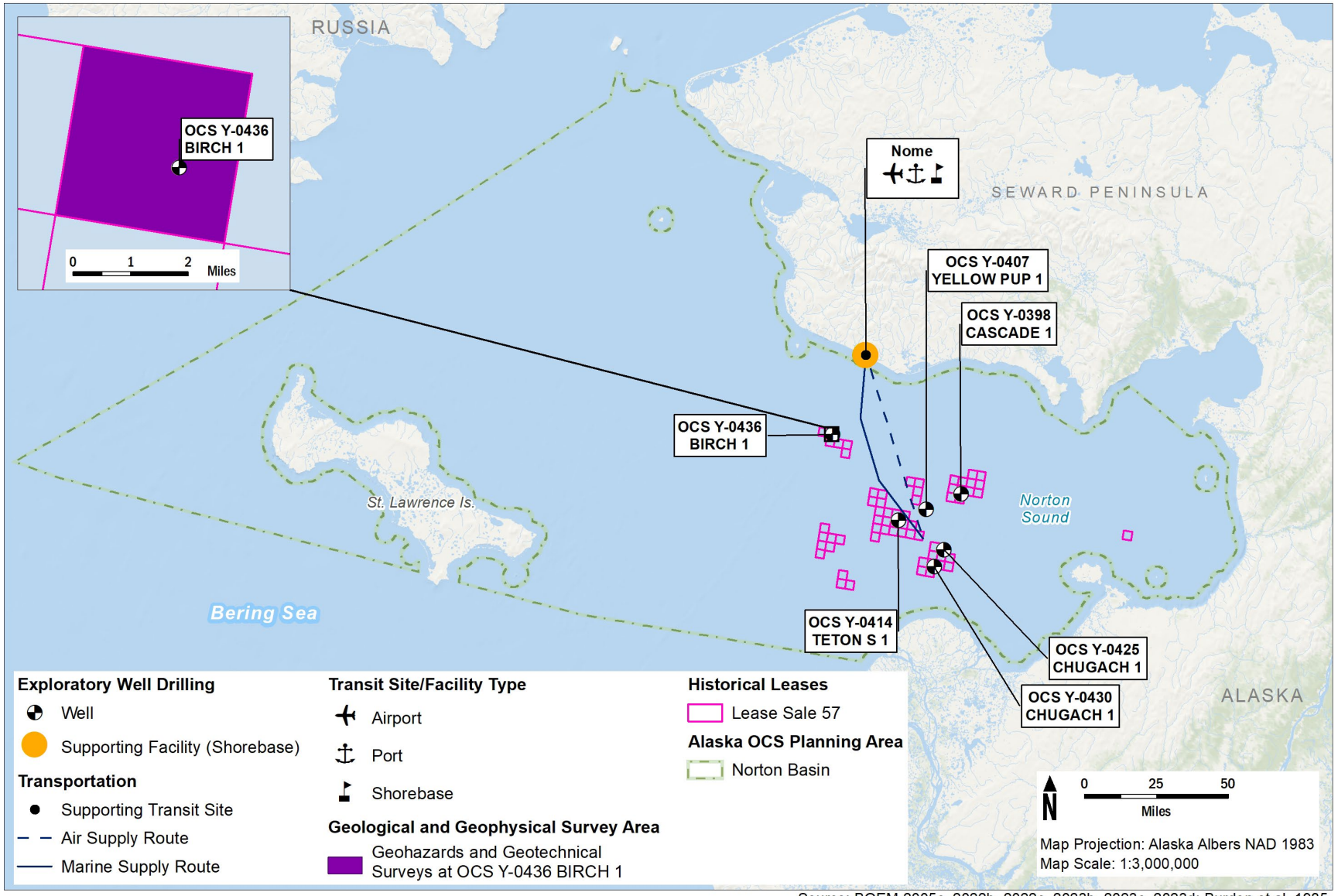
Sources: BOEM 2023b, 2023g

5.4.1 Lease Sale 57 (1983)

The identified activities associated with Lease Sale 57 are shown in Figure 5-5, such as the locations of exploration wells, G&G survey areas, and transportation facilities.

5.4.1.1 Leasing

As shown in Table 5.4-1 and Figure 5-5, as a result of Lease Sale 57, there were 418 tracts offered and 59 leases issued. There were 2,379,751 acres offered and 335,898 acres leased. There are no active leases from Lease Sale 57. Table 5.4.1-1 summarizes documented information associated with the leasing as a result of Lease Sale 57.



Source: BOEM 2005c, 2022b, 2022c, 2023b, 2023c, 2023d; Burden et al. 1985.

Figure 5-5. Historical oil and gas activities associated with Lease Sale 57, 1983

Table 5.4.1-1. Lease information as a result of Lease Sale 57

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y00436	ARCO	6/1/1983	Relinquished	12/29/1988	Nome	57386	949
Y00435	ARCO	6/1/1983	Relinquished	11/17/1986	Nome	57385	948
Y00439	ARCO	6/1/1983	Relinquished	12/29/1988	Nome	57394	995
Y00438	ARCO	6/1/1983	Relinquished	12/29/1988	Nome	57393	994
Y00437	ARCO	6/1/1983	Relinquished	11/17/1986	Nome	57392	993
Y00440	ARCO	6/1/1983	Relinquished	11/17/1986	Nome	57401	1039
Y00441	Exxon	6/1/1983	Relinquished	12/22/1986	Solomon	57424	1023
Y00442	Exxon	6/1/1983	Relinquished	12/22/1986	Solomon	57425	1024
Y00391	Exxon	6/1/1983	Relinquished	12/22/1986	St. Michael	57167	9
Y00392	Exxon	6/1/1983	Relinquished	12/22/1986	St. Michael	57168	10
Y00393	Exxon	6/1/1983	Relinquished	12/22/1986	St. Michael	57169	11
Y00394	Exxon	6/1/1983	Relinquished	12/22/1986	St. Michael	57170	12
Y00395	Exxon	6/1/1983	Relinquished	12/22/1986	St. Michael	57179	48
Y00396	Exxon	6/1/1983	Relinquished	12/22/1986	St. Michael	57180	49
Y00397	Exxon	6/1/1983	Relinquished	12/22/1986	St. Michael	57184	53
Y00398	Exxon	6/1/1983	Relinquished	12/22/1986	St. Michael	57185	54
Y00399	Exxon	6/1/1983	Relinquished	12/22/1986	St. Michael	57186	55
Y00400	Exxon	6/1/1983	Relinquished	12/22/1986	St. Michael	57187	56
Y00401	Exxon	6/1/1983	Relinquished	12/22/1986	St. Michael	57198	93
Y00402	ARCO	6/1/1983	Relinquished	8/9/1990	St. Michael	57202	97
Y00403	ARCO	6/1/1983	Relinquished	8/9/1990	St. Michael	57203	98
Y00379	Exxon	6/1/1983	Relinquished	12/22/1986	Norton Sound	57026	164
Y00404	Exxon	6/1/1983	Relinquished	12/22/1986	St. Michael	57212	133
Y00405	Exxon	6/1/1983	Relinquished	12/22/1986	St. Michael	57216	137
Y00407	Exxon	6/1/1983	Relinquished	5/29/1987	St. Michael	57235	182
Y00380	Exxon	6/1/1983	Relinquished	8/27/1990	Norton Sound	57032	208
Y00406	Exxon	6/1/1983	Relinquished	8/27/1990	St. Michael	57230	177
Y00408	Exxon	6/1/1983	Relinquished	12/22/1986	St. Michael	57248	221
Y00409	Exxon	6/1/1983	Relinquished	12/22/1986	St. Michael	57249	222
Y00410	Exxon	6/1/1983	Relinquished	5/29/1987	St. Michael	57250	223
Y00411	Exxon	6/1/1983	Relinquished	5/29/1987	St. Michael	57251	224
Y00412	ARCO	6/1/1983	Relinquished	11/17/1986	St. Michael	57266	265

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y00413	Exxon	6/1/1983	Relinquished	12/22/1986	St. Michael	57267	266
Y00414	Exxon	6/1/1983	Relinquished	5/29/1987	St. Michael	57268	267
Y00415	Exxon	6/1/1983	Relinquished	5/29/1987	St. Michael	57269	268
Y00416	Exxon	6/1/1983	Relinquished	5/29/1987	St. Michael	57270	269
Y00417	Exxon	6/1/1983	Relinquished	12/29/1988	St. Michael	57283	309
Y00418	Exxon	6/1/1983	Relinquished	12/22/1986	St. Michael	57284	310
Y00419	Exxon	6/1/1983	Relinquished	12/20/1985	St. Michael	57285	311
Y00420	Exxon	6/1/1983	Relinquished	5/29/1987	St. Michael	57286	312
Y00421	Exxon	6/1/1983	Relinquished	5/29/1987	St. Michael	57287	313
Y00422	Exxon	6/1/1983	Relinquished	12/20/1985	St. Michael	57288	314
Y00424	Exxon	6/1/1983	Relinquished	12/20/1985	St. Michael	57307	360
Y00425	Exxon	6/1/1983	Relinquished	12/22/1986	St. Michael	57308	361
Y00384	Chevron	6/1/1983	Relinquished	12/28/1988	Norton Sound	57073	425
Y00382	Chevron	6/1/1983	Relinquished	12/28/1988	Norton Sound	57071	423
Y00426	Exxon	6/1/1983	Relinquished	5/29/1987	St. Michael	57323	404
Y00427	Exxon	6/1/1983	Relinquished	5/29/1987	St. Michael	57324	405
Y00385	Shell	6/1/1983	Relinquished	9/25/1990	Norton Sound	57079	467
Y00429	Exxon	6/1/1983	Relinquished	5/29/1987	St. Michael	57338	447
Y00430	Exxon	6/1/1983	Relinquished	5/29/1987	St. Michael	57339	448
Y00431	Exxon	6/1/1983	Relinquished	5/29/1987	St. Michael	57340	449
Y00387	Shell	6/1/1983	Relinquished	9/25/1990	Norton Sound	57086	511
Y00433	Exxon	6/1/1983	Relinquished	5/29/1987	St. Michael	57352	491
Y00434	Exxon	6/1/1983	Relinquished	5/29/1987	St. Michael	57353	492
Y00388	Shell	6/1/1983	Relinquished	12/21/1987	Norton Sound	57108	511
Y00390	Shell	6/1/1983	Relinquished	5/21/1986	Norton Sound	57124	647
Y00389	Shell	6/1/1983	Relinquished	12/21/1987	Norton Sound	57123	646
Y00423	ARCO	6/1/1983	Relinquished	12/29/1988	St. Michael	57300	353
Y00381	Exxon Corporation	None	Rejected	None	Norton Sound	57062	379
Y00383	Exxon Corporation	None	Rejected	None	Norton Sound	57072	424
Y00428	Exxon Corporation	None	Rejected	None	St. Michael	57325	406
Y00386	Amoco Production Company	None	Rejected	None	Norton Sound	57080	468
Y00432	Exxon Corporation	None	Rejected	None	St. Michael	57341	450

Note: ARCO = Atlantic Richfield Company
Source: BOEM 2023b

5.4.1.2 Surveys

In 1983, there were two G&G surveys documented as a result of Lease Sale 57, as shown in Table 5.4.1-2.

Table 5.4.1-2. Survey activity summary

Activity Start Date	Activity End Date	Activity Name	Operator and Contractor
9/8/1983	9/9/1983	Geohazards survey at OCS Y-0436 BIRCH 1	ARCO Alaska, Inc.
9/8/1983	9/10/1983	Geotechnical survey at OCS Y-0436 BIRCH 1	ARCO Alaska, Inc.

Note: G&G = geological and geophysical
Source: BOEM 2023b

5.4.1.3 Well Drilling

Six exploration wells were drilled as a result of Lease Sale 57, as summarized in Table 5.4.1-3.

Table 5.4.1-3. Well drilling summary

Activity Start Date	Activity End Date	Well Name (includes API no. and bottom hole lease number)	Well Type	Well Depth (feet)	Drill Rig Name
6/19/1984	7/23/1984	API no. 553440000200 (TETON S 1) on OCS Y-0414	Exploration	3,636	Rowan Middletown Jackup
6/25/1984	8/20/1984	API no. 553750000100 (BIRCH 1) on OCS Y-0436	Exploration	10,915	Key Hawaii Jackup
7/25/1984	8/16/1984	API no. 553440000500 (CHUGACH 1) on OCS Y-0430	Exploration	4,951	Rowan Middletown Jackup
7/2/1985	7/23/1985	API no. 553440000900 (CASCADE 1) on OCS Y-0398	Exploration	6,912	Key Hawaii Jackup
7/24/1985	8/11/1985	API no. 553440001000 (YELLOW PUP 1) on OCS Y-0407	Exploration	7,864	Key Hawaii Jackup
8/13/1985	8/24/1985	API no. 553440000800 (CHUGACH 1) on OCS Y-0425	Exploration	6,093	Key Hawaii Jackup

Sources: BOEM 2005c, 2022b, 2023c, 2023d

5.4.1.4 Oil-and-Gas-Supporting Activities

Identified oil-and-gas-supporting activities as a result of Lease Sale 57 included facility support and transportation from facilities and shorebases to relevant activity sites (if documented), as summarized in Table 5.4.1-4 and Table 5.4.1-5. Refer to section 5.1.2 for oil-and-gas-supporting activities in the Bering Sea that are not associated with a lease sale as they may be applicable to Lease Sale 57.

Table 5.4.1-4. Facility support summary

Facility Name	Facility Type	Description	Supported Activity
Nome shorebase	Onshore shorebase complex	Existing facilities in Nome were expanded to include 2 new helipads and hangars. Supplies were lightered by local small vessels to larger supply vessels outside of the Nome port, then carried by the supply ships to the rigs.	Well drilling: exploration wells OCS Y-0414 TETON S 1; OCS Y-0436 BIRCH 1, OCS Y-0430 CHUGACH 1, OCS Y-0398 CASCADE 1, OCS Y-0407 YELLOW PUP 1, OCS Y-0425 CHUGACH 1
Offshore Systems, Inc. shorebase at Captains Bay at Dutch Harbor	Onshore shorebase complex	The shorebase leased 40 acres in Captains Bay at Port Lekanoff. There were 6 mobile homes at the camp with a maximum capacity of 22 people. Supply boats and barges were used to transport supplies and personnel. Vessels used were the *Indian Seahorse* (work boat) and the *MLC 330* (supply barge).	Well drilling: exploration wells OCS Y-0414 TETON S 1, OCS Y-0436 BIRCH 1, OCS Y-0430 CHUGACH 1

Source: Burden et al. 1985

Table 5.4.1-5. Summary of transportation activity

Facility Name	Facility Type	Supported Activity	No. Aircraft	No. Vessels	Vessel Names	Aircraft
Nome Airport	Airport	Air supply route from Nome to exploration wells: OCS Y-0414 TETON S 1; OCS Y-0436 BIRCH 1, OCS Y-0430 CHUGACH 1, OCS Y-0398 CASCADE 1, OCS Y-0407 YELLOW PUP 1, OCS Y-0425 CHUGACH 1	5[1]	0	N/A	Bell 212
Port of Nome	Port	Marine supply route from Nome to exploration wells: OCS Y-0414 TETON S 1; OCS Y-0436 BIRCH 1, OCS Y-0430 CHUGACH 1, OCS Y-0398 CASCADE 1, OCS Y-0407 YELLOW PUP 1, OCS Y-0425 CHUGACH 1	0	6	Indian Seahorse Biehl Traveler, Biehl Trader (work boats); MLC 331, MLC 330 (supply barges); MLC 165 (tank barge)	N/A

Notes: N/A = not applicable
Some wells used two aircraft, and BIRCH-1 used one aircraft. The data may show some aircraft as being double counted but this is not confirmed.
Source: Burden et al. 1985

5.4.1.5 E&D Scenario Summary

A scenario was developed for the 1982 Norton Sound Basin Final Environmental Impact Statement to assess the potential environmental impacts of the lease sale (BLM 1982b). The environmental analysis is based on the average case of resource mean production estimate, which is the scenario summarized here. The total areal extent of the proposed lease sale was 429 blocks, or 2.4 million acres. The blocks were located 9 to 62 miles offshore in water depths that ranged from 16 to 89 feet. The mean resource estimate for the proposal was 480 MMbbl of oil and 2.01 Tcf of gas. Summaries of assumptions for exploration and development are shown in Table 5.4.1-6.

In this scenario, the exploratory period of the proposal would occur from 1984 to 1987. Peak exploratory drilling would occur in 1986 with 13 wells completed by five drilling rigs. The average depth of these

exploration and delineation wells is expected to be approximately 9,700 feet. Maximum employment attributable to exploratory activities would occur in 1986 with the expenditure of 33,690 work months (approximately 2,800 people) of labor.

If hydrocarbons were located during the exploratory period, the developmental period would begin as early as 1985 with the placement of an ice-resistant platform or island. The developmental and exploratory phases could occur simultaneously. The developmental period would cease by 1991. During this period, nine production platforms may drill as many as 172 production and service wells. Average depth of the wells would be approximately 6,500 feet.

Pipeline construction would be expected to occur from 1987 to 1988. A total of 299 kilometers of 18-inch oil pipe and 299 kilometers of 14-inch gas pipe may have been laid. The pipelines would be entirely underwater, except for the final few kilometers which would be on land or through an ice-resistant, rubble-mound causeway. It was expected that the underwater pipeline would be buried. The pipelines would terminate in a storage, processing, and loading complex near Cape Nome. Oil production was expected to begin in 1988, reaching peak production of 100 MMbbl in 1990. Gas production was expected to begin in 1988, reaching a maximum output of 142 Bcf in 1991.

Maximum employment realized from developmental activities would be expected to occur in 1988 with the expenditure of 39,581 work months (approximately 3,300 people) of labor.

Beyond 1991, industry activities were expected to be confined to production. The volume of recoverable hydrocarbons was expected to gradually decline, with oil operations ceasing 26 years after the sale date (2008), and gas reserves exhausted 38 years following the sale date (2020).

Table 5.4.1-6. Summary of basic assumptions of Lease Sale 83 E&D scenario

Element	Mean Case
Sale acreage offering	2.4 million acres
Recoverable oil	480 MMbbl
Recoverable gas	2.01 Tcf
Peak production oil	100 MMbbl
Peak production gas	142 Bcf
Platforms	9
Number of wells	217 (172 development, 45 exploratory)
Number of drilling rigs	5
Well depth average	9,700 feet (exploratory), 6,500 (development)
Pipelines	1 18-inch oil line; 1 36-inch gas line
Pipeline burial excavation volume	3,600 cubic meters per kilometer
Onshore pipeline acreage required	299 km
Onshore oil terminal facilities number required	2
Support / supply facilities number and acreage required	1 on 25–30 acres
LNG plant and terminal	1
Production treatment facilities	1

Element	Mean Case
Petroleum refineries	1

Notes: Bcf = billion cubic feet; E&D = Exploration and Development; km = kilometers; LNG = liquified natural gas; MMbbl = million barrels; Tcf = trillion cubic feet
Source: BLM 1982b

5.4.1.6 Comparison of Exploration and Development Scenario and Historical Activities

A comparison of the E&D scenario and the historical activities are provided in Table 5.2.1-4, using available information.

Table 5.2.1-4. Comparison of E&D and historical activities

Activity	E&D Scenario	Actual Activities
Sale acreage offering	2.4 million acres	2,379,751 acres
Sale	--	335,898 acres leased
Recoverable oil	480 MMbbl	--
Recoverable gas	2.01 Tcf	--
Peak production oil	100 MMbbl	N/A
Peak production gas	142 Bcf	N/A
Platforms	9	0
Number of wells	217 (172 development, 45 exploratory)	6 exploratory
Number of drilling rigs	5	2: Rowan Middletown Jackup, Key Hawaii Jackup
Well depth average	9,700 feet (exploratory), 6,500 (development)	6,729 feet (exploratory)
Pipelines	1 18-inch oil line; 1 36-inch gas line	0
Pipeline burial excavation volume	3,600 cubic meters per kilometer	0
Onshore pipeline acreage required	299 km	N/A
Onshore oil terminal facilities number required	2	N/A
Support / supply facilities number and acreage required	1 on 25-30 acres	2: Dutch Harbor (40 acres), Nome (unknown acres)
LNG plant and terminal	1	0
Production treatment facilities	1	0
Petroleum refineries	1	0
G&G surveys	--	2[1]

Notes: -- = no data provided; Bbbl = billion barrels; Bcf = billion cubic feet; E&D = Exploration and Development; LNG = liquified natural gas; MMbbl = million barrels; N/A = not applicable; Tcf = trillion cubic feet
[1]Few documented surveys were confirmed to be associated with this lease sale, and the actual number may be higher.

5.4.2 Activities Not Associated with a Lease Sale

Activities that could not be directly associated with a lease sale that occurred in the North Aleutian Basin Planning Area are shown in Figure 5-2, such as the locations of COST/DST wells, supporting facilities, transportation infrastructure, and survey areas.

5.4.2.1 Surveys

Between 1975 and 1983, there were seven 2D seismic surveys documented that could not be associated with a lease sale, as summarized in Table 5.4.2-1.

Table 5.4.2-1. Survey activity summary

Activity Start Date	Activity End Date	Year	Activity Name	Description	Vessel Name(s)	Operator and/or Contractor
9/3/1975	9/17/1975	1975	2D multichannel seismic survey	2D multichannel seismic survey used an airgun and streamer for data acquisition. A total of 2,383 km were shot with 25 tracklines.	M/V Cecil H. Green	Geophysical Service, Inc.
6/1/1977	6/30/1977	1977	2D multichannel seismic survey	2D multichannel seismic survey used an airgun and streamer for data acquisition. A total of 1,671 km were shot with 34 tracklines.	--	WesternGeco
8/5/1978	8/9/1978	1978	2D multichannel seismic survey	2D multichannel seismic survey used an airgun and streamer for data acquisition. A total of 2,991 km were shot with 31 tracklines.	Samuel Phillips Lee	Pacific Coastal and Marine Science Center
7/1/1979	9/30/1979	1979	2D multichannel seismic survey	2D multichannel seismic survey used an airgun and streamer for data acquisition. A total of 1,742 km were shot with 33 tracklines.	--	WesternGeco
6/1/1980	6/30/1980	1980	2D multichannel seismic survey	2D multichannel seismic survey used an airgun and streamer for data acquisition. A total of 3,342 km were shot with 37 tracklines.	--	WesternGeco
9/24/1980	10/6/1980	1980	2D multichannel seismic survey	2D multichannel seismic survey used an airgun and streamer for data acquisition. A total of 731 km were shot with 12 tracklines.	Samuel Phillips Lee	Pacific Coastal and Marine Science Center
9/16/1983	10/2/1983	1983	2D multichannel seismic survey	2D multichannel seismic survey used an airgun and streamer for data acquisition. A total of 629 km were shot with five tracklines.	Samuel Phillips Lee	Pacific Coastal and Marine Science Center

Notes: 2D = two-dimensional; km = kilometers
Sources: Banet 2015c; Triezenberg et al. 2016; USGS 2023

5.4.2.2 Well Drilling

Two COST/DST exploration wells were drilled that were not associated with a lease sale, as summarized in Table 5.4.2-2.

Table 5.4.2-2. Well drilling summary

Activity Start Date	Activity End Date	Well Name (includes API no.)	Well Type	Well Depth (feet)	Drill Rig Name
6/13/1980	9/28/1980	API no. 553740000100 (COST NORTON 1 DST-10)	COST/DST	14,683	Dan Prince
6/7/1982	9/15/1982	API no. 553440000100 (COST NORTON 2 DST-12)	COST/DST	14,889	Key Singapore

Notes: API = American Petroleum Institute; COST = continental offshore stratigraphic test; DST = deep stratigraphic test
Sources: BOEM 2016c, 2022b, 2023c, 2023d

5.4.2.3 Oil-and-Gas-Supporting Activities

Identified oil-and-gas-supporting activities not associated with a lease sale included facility support and transportation from facilities and shorebases to relevant activity sites (if documented), as summarized in Table 5.4.2-3 and Table 5.4.2-4.

Table 5.4.2-3. Facility support summary

Facility Name	Facility Type	Description	Supported Activity
Crowley Maritime Corporation shorebase at Captains Bay at Dutch Harbor	Onshore shorebase complex	Peak activity was about 12 to 15 boat dockings per week during the peak activity in the summer and fall of 1982 (assuming 2 work boats per well docked 3 times per week). Vessels used were the *Biehl Traveler*, the *Vigilant* (work boats); and the *Cordova* (supply barge)	Drilling well: COST NORTON 1 DST-10
Crowley Maritime Corporation shorebase at Captains Bay at Dutch Harbor	Onshore shorebase complex	Peak activity was about 12 to 15 boat dockings per week during the peak activity in the summer and fall of 1982 (assuming 2 work boats per well docked 3 times per week). Vessels used were the *Ocean Ray*, the *Ocean Dolphin* (work boats); and the *Super Servant's* (supply barge)	Drilling well: COST NORTON 2 DST-12

Source: Burden et al. 1985

Table 5.4.2-4. Summary of transportation activity

Facility Name	Facility Type	Supported Activity	No. Aircraft	No. Vessels	Vessel Names	Aircraft
Nome Airport	Airport	Air supply route from Anchorage to Nome for Norton Basin airborne surveys	6	0	N/A	Two Boeing 737s, four Hercules C-130 cargo planes
Nome Airport	Airport	Air supply route from Nome to COST/DST well: COST NORTON 1 DST-10	2	0	N/A	Two Bell 212s

Facility Name	Facility Type	Supported Activity	No. Aircraft	No. Vessels	Vessel Names	Aircraft
Port of Nome	Port	Marine supply route from Nome to COST/DST well: COST NORTON 1 DST-10	0	3	Biehl Traveler, Vigilant (work boats); Cordova (supply barge)	N/A
Nome Airport	Airport	Air supply route from Nome to COST/DST well: COST NORTON 2 DST-12	2	0	N/A	Two Bell 212s

Notes: COST = continental offshore stratigraphic test; DST = deep stratigraphic test; N/A = not applicable
Source: Burden et al. 1985

5.5 St. George Basin Planning Area

The St. George Basin Planning Area extends from the 3-mile limit of the State of Alaska waters on the south to 59°N latitude in the north and encompasses the Pribilof Islands. In 1983, there was one lease sale in the St. George Planning Area: Lease Sale 70. A summary of this lease sale is shown in Table 5.5-1. Information on this lease is provided in the sections below. There are no active leases in this OCS planning area.

In the St. George Basin Planning Area between 1968 and 2022, there were an estimated 50,000 miles of 2D marine seismic surveys conducted (BOEM 2023a).

Table 5.5-1. Summary of leases in the St. George Basin Planning Area

	Lease Sale 70
Year	1983
Tracts offered	479
Acres offered	2,688,787
Leases issued	96
Acres leased	540,917
Active leases	0
Active lease area (hectares)	0

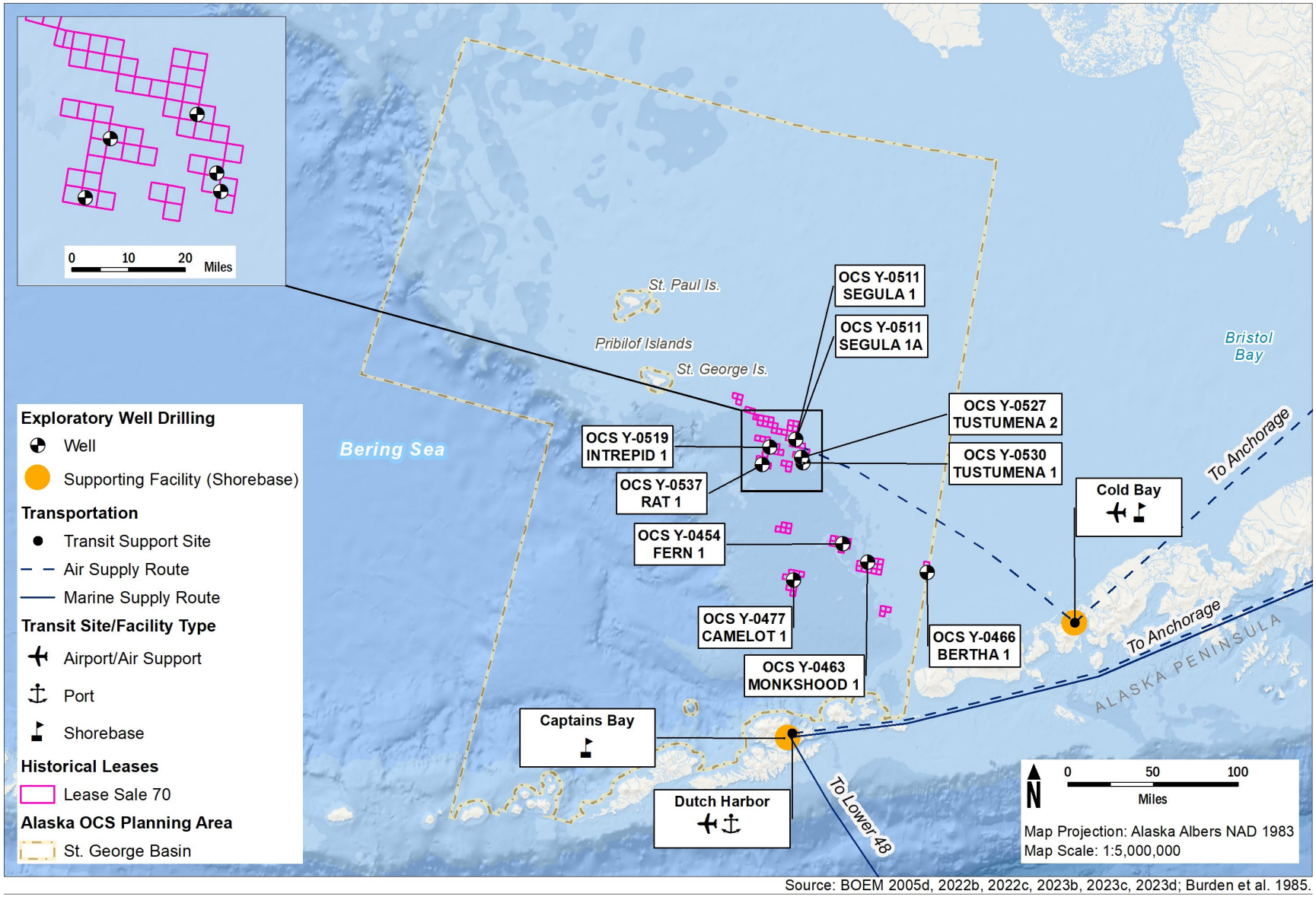
Sources: BOEM 2023b, 2023g

5.5.1 Lease Sale 70 (1983)

The identified activities associated with Lease Sale 70 are shown in Figure 5-6, such as the locations of exploration wells, G&G survey areas, and transportation facilities.

5.5.1.1 Leasing

As shown in Table 5.5-1 and Figure 5-6, as a result of Lease Sale 70, there were 479 tracts offered and 96 leases issued. There were 2,688,787 acres offered and 540,917 acres leased. There are no active leases from Lease Sale 70. Table 5.5.1-1 summarizes documented information associated with the leasing as a result of Lease Sale 70.



Source: BOEM 2005d, 2022b, 2022c, 2023b, 2023c, 2023d; Burden et al. 1985.

Figure 5-6. Historical oil and gas activities associated with Lease Sale 70, 1983

Table 5.5.1-1. Lease information as a result of Lease Sale 70

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y00514	Chevron	2/1/1984	Relinquished	1/3/1992	St. George East	70415	669
Y00513	Chevron	2/1/1984	Relinquished	1/3/1992	St. George East	70414	668
Y00512	Getty Oil	2/1/1984	Relinquished	1/3/1992	St. George East	70413	667
Y00520	Chevron	2/1/1984	Relinquished	1/3/1992	St. George East	70429	715
Y00519	Chevron	2/1/1984	Relinquished	12/28/1990	St. George East	70428	714
Y00524	Chevron	2/1/1984	Relinquished	1/3/1992	St. George East	70441	759
Y00469	Sohio	3/1/1984	Relinquished	12/19/1990	Cape Mendenhall	70228	649
Y00468	Sohio	3/1/1984	Relinquished	12/19/1990	Cape Mendenhall	70227	648
Y00467	Mobil	3/1/1984	Relinquished	12/19/1990	Cape Mendenhall	70226	647
Y00474	Mobil	3/1/1984	Relinquished	12/19/1990	Cape Mendenhall	70275	768
Y00473	Mobil Oil Company	3/1/1984	Relinquished	12/19/1990	Cape Mendenhall	70274	767
Y00472	Mobil	3/1/1984	Relinquished	12/19/1990	Cape Mendenhall	70273	766
Y00477	Gulf Oil	3/1/1984	Relinquished	12/19/1990	Cape Mendenhall	70283	811
Y00476	Amoco	3/1/1984	Relinquished	12/22/1986	Cape Mendenhall	70282	810
Y00475	Mobil	3/1/1984	Relinquished	12/19/1990	Cape Mendenhall	70281	809
Y00479	Gulf Oil	3/1/1984	Relinquished	2/25/1987	Cape Mendenhall	70292	855
Y00478	Amoco	3/1/1984	Relinquished	2/26/1987	Cape Mendenhall	70291	854
Y00481	Amoco	3/1/1984	Relinquished	2/26/1987	Cape Mendenhall	70302	899
Y00480	Amoco	3/1/1984	Relinquished	2/26/1987	Cape Mendenhall	70301	898
Y00484	Amoco	3/1/1984	Relinquished	12/4/1987	Cape Mendenhall	70322	962
Y00483	Amoco	3/1/1984	Relinquished	12/4/1987	Cape Mendenhall	70321	961
Y00482	Gulf Oil Corporation	3/1/1984	Relinquished	2/25/1987	Cape Mendenhall	70315	943
Y00485	Amoco	3/1/1984	Relinquished	12/4/1987	Cape Mendenhall	70328	1005
Y00470	Sohio	3/1/1984	Relinquished	12/19/1990	Cape Mendenhall	70229	650
Y00491	ARCO	3/1/1984	Relinquished	2/6/1987	St. George	70353	523
Y00492	ARCO	3/1/1984	Relinquished	2/6/1987	St. George East	70375	490
Y00503	Shell	3/1/1984	Relinquished	2/24/1986	St. George East	70392	542
Y00502	Shell	3/1/1984	Relinquished	2/24/1986	St. George East	70391	541
Y00501	ARCO	3/1/1984	Relinquished	11/17/1986	St. George East	70388	538
Y00500	ARCO	3/1/1984	Relinquished	1/13/1987	St. George East	70387	537
Y00499	Shell	3/1/1984	Relinquished	2/27/1992	St. George East	70386	536
Y00498	Shell	3/1/1984	Relinquished	2/27/1992	St. George East	70385	535

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y00508	Shell	3/1/1984	Relinquished	2/24/1986	St. George East	70401	586
Y00507	ARCO	3/1/1984	Relinquished	11/17/1986	St. George East	70400	585
Y00506	ARCO	3/1/1984	Relinquished	11/17/1986	St. George East	70399	584
Y00505	ARCO	3/1/1984	Relinquished	12/29/1988	St. George East	70398	583
Y00504	ARCO	3/1/1984	Relinquished	12/29/1988	St. George East	70397	582
Y00511	ARCO	3/1/1984	Relinquished	2/6/1987	St. George East	70411	631
Y00510	ARCO	3/1/1984	Relinquished	1/13/1987	St. George East	70410	630
Y00517	ARCO	3/1/1984	Relinquished	2/6/1987	St. George East	70422	676
Y00516	ARCO	3/1/1984	Relinquished	2/6/1987	St. George East	70421	675
Y00515	Cities Service Company	3/1/1984	Relinquished	2/22/1988	St. George East	70420	674
Y00521	Shell	3/1/1984	Relinquished	2/27/1992	St. George East	70435	721
Y00518	Exxon	3/1/1984	Relinquished	12/20/1985	St. George East	70427	713
Y00527	Exxon	3/1/1984	Relinquished	12/20/1985	St. George East	70446	764
Y00526	Exxon	3/1/1984	Relinquished	12/20/1985	St. George East	70445	763
Y00525	Shell	3/1/1984	Relinquished	2/26/1987	St. George East	70442	760
Y00523	Union	3/1/1984	Relinquished	12/20/1993	St. George East	70440	758
Y00522	Union	3/1/1984	Relinquished	12/20/1993	St. George East	70439	757
Y00530	Exxon	3/1/1984	Relinquished	12/20/1985	St. George East	70459	809
Y00528	Exxon	3/1/1984	Relinquished	12/20/1985	St. George East	70451	801
Y00535	Union	3/1/1984	Relinquished	12/20/1993	St. George East	70470	853
Y00534	Shell	3/1/1984	Expired	2/28/1994	St. George East	70467	850
Y00533	Shell	3/1/1984	Expired	2/28/1994	St. George East	70466	849
Y00532	ARCO	3/1/1984	Relinquished	12/29/1988	St. George East	70462	845
Y00531	ARCO	3/1/1984	Relinquished	11/17/1986	St. George East	70461	844
Y00444	Amoco	3/1/1984	Relinquished	2/26/1987	Cape Mendenhall	70059	368
Y00443	Amoco	3/1/1984	Relinquished	2/26/1987	Cape Mendenhall	70058	367
Y00451	Amoco	3/1/1984	Relinquished	2/26/1987	Cape Mendenhall	70103	424
Y00450	Amoco	3/1/1984	Relinquished	2/26/1987	Cape Mendenhall	70102	423
Y00449	Amoco	3/1/1984	Relinquished	2/26/1987	Cape Mendenhall	70101	422
Y00448	Amoco	3/1/1984	Relinquished	2/26/1987	Cape Mendenhall	70100	421
Y00447	Amoco	3/1/1984	Relinquished	2/26/1987	Cape Mendenhall	70091	412
Y00446	Amoco	3/1/1984	Relinquished	2/26/1987	Cape Mendenhall	70090	411
Y00445	Amoco	3/1/1984	Relinquished	2/26/1987	Cape Mendenhall	70089	410

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y00455	Amoco	3/1/1984	Relinquished	2/26/1987	Cape Mendenhall	70135	468
Y00454	Amoco	3/1/1984	Relinquished	2/26/1987	Cape Mendenhall	70134	467
Y00493	ARCO	3/1/1984	Relinquished	1/13/1987	St. George East	70376	491
Y00453	Amoco	3/1/1984	Relinquished	2/26/1987	Cape Mendenhall	70133	466
Y00452	Amoco	3/1/1984	Relinquished	2/26/1987	Cape Mendenhall	70132	465
Y00457	ARCO	3/1/1984	Relinquished	2/28/1986	Cape Mendenhall	70173	457
Y00456	Amoco	3/1/1984	Relinquished	2/26/1987	Cape Mendenhall	70156	511
Y00461	Placid	3/1/1984	Relinquished	2/27/1987	Cape Mendenhall	70186	563
Y00460	Amoco	3/1/1984	Relinquished	2/26/1987	Cape Mendenhall	70185	562
Y00459	Mobil	3/1/1984	Relinquished	12/19/1990	Cape Mendenhall	70184	561
Y00458	Mobil	3/1/1984	Relinquished	12/19/1990	Cape Mendenhall	70183	560
Y00466	Gulf Oil	3/1/1984	Relinquished	2/25/1987	Cape Mendenhall	70217	616
Y00465	Placid	3/1/1984	Relinquished	2/27/1987	Cape Mendenhall	70208	607
Y00464	Amoco	3/1/1984	Relinquished	2/26/1987	Cape Mendenhall	70206	605
Y00463	Amoco	3/1/1984	Relinquished	2/26/1987	Cape Mendenhall	70205	604
Y00462	Sohio	3/1/1984	Relinquished	12/19/1990	Cape Mendenhall	70204	603
Y00471	Amoco	3/1/1984	Relinquished	12/22/1986	Cape Mendenhall	70230	651
Y00488	Shell	3/1/1984	Relinquished	2/27/1992	St. George	70342	431
Y00489	ARCO	3/1/1984	Relinquished	2/6/1987	St. George	70348	477
Y00490	ARCO	3/1/1984	Relinquished	2/6/1987	St. George	70349	478
Y00497	Shell	3/1/1984	Relinquished	2/24/1986	St. George East	70383	498
Y00496	Shell	3/1/1984	Relinquished	2/24/1986	St. George East	70382	497
Y00495	ARCO	3/1/1984	Relinquished	11/17/1986	St. George East	70378	493
Y00494	ARCO	3/1/1984	Relinquished	12/26/1990	St. George East	70377	492
Y00539	Shell	3/1/1984	Expired	2/28/1994	St. George East	70477	894
Y00538	ARCO	3/1/1984	Relinquished	11/17/1986	St. George East	70473	890
Y00537	ARCO	3/1/1984	Relinquished	12/29/1988	St. George East	70472	889
Y00536	ARCO	3/1/1984	Relinquished	11/17/1986	St. George East	70471	888
Y00486	Shell	3/1/1984	Relinquished	2/27/1992	St. George	70336	386
Y00529	ARCO	3/1/1984	Relinquished	12/20/1985	St. George East	70458	808
Y00509	ARCO	3/1/1984	Relinquished	11/17/1986	St. George East	70409	629
Y00487	Shell Oil Company	None	Rejected	None	St. George	70337	387

Note: ARCO = Atlantic Richfield Company
Source: BOEM 2023b

5.5.1.2 Surveys

No surveys were documented as a result of Lease Sale 70.

5.5.1.3 Well Drilling

Ten exploration wells were drilled as a result of Lease Sale 70, as summarized in Table 5.5.1-2.

Table 5.5.1-2. Well drilling summary

Activity Start Date	Activity End Date	Well Name (includes API no. and bottom hole lease number)	Well Type	Well Depth (feet)	Drill Rig Name
6/29/1984	9/4/1984	API no. 553670000100 (TUSTUMENA 1) on OCS Y-0530	Exploration	8,798	Big Dipper (Doo Sung)
7/20/1984	9/25/1984	API no. 553670000200 (INTREPID 1) on OCS Y-0519	Exploration	11,594	SEDCO 712
8/4/1984	10/30/1984	API no. 553670000300 (RAT 1) on OCS Y-0537	Exploration	12,427	SEDCO 708
9/13/1984	11/9/1984	API no. 553670000700 (TUSTUMENA 2) on OCS Y-0527	Exploration	12,422	Big Dipper (Doo Sung)
9/29/1984	11/3/1984	API no. 553660000600 (BERTHA 1) on OCS Y-0466	Exploration	8,083	SEDCO 712
11/6/1984	2/14/1985	API no. 553670000600 (SEGULA 1) on OCS Y-0511	Exploration	10,862	SEDCO 708
11/20/1984	1/24/1985	API no. 553660000400 (FERN 1) on OCS Y-0454	Exploration	10,273	Ocean Odyssey
11/27/1984	1/23/1985	API no. 553660000500 (CAMELOT 1) on OCS Y-0477	Exploration	9,590	Big Dipper (Doo Sung)
12/17/1984	2/14/1985	API no. 553670000601 (SEGULA 1A) on OCS Y-0511	Exploration	12,460	SEDCO 708
1/26/1985	3/31/1985	API no. 553660000700 (MONKSHOOD 1) on OCS Y-0463	Exploration	8,509	Ocean Odyssey

Notes: API = American Petroleum Institute; OCS = Outer Continental Shelf
Sources: BOEM 2005d, 2022b, 2023c, 2023d

5.5.1.4 Oil-and-Gas-Supporting Activities

Identified oil-and-gas-supporting activities as a result of Lease Sale 70 included facility support and transportation from facilities and shorebases to relevant activity sites (if documented), as summarized in Table 5.5.1-3 and Table 5.5.1-4. Refer to section 5.1.2 for oil-and-gas-supporting activities in the Bering Sea that are not associated with a lease sale as they may be applicable to Lease Sale 70.

Table 5.5.1-3. Facility support summary

Facility Name	Facility Type	Description	Supported Activity
Offshore Systems, Inc. shorebase at Captains Bay at Dutch Harbor	Onshore shorebase complex	The shorebase leased 40 acres in Captains Bay at Port Lekanoff. There were six mobile homes at the camp with a maximum capacity of 22 people. Supply boats and barges were used to transport supplies and personnel. Vessels used were Atlantic Seahorse, Pacific Seahorse, Ocean Tarpon, Ocean Ray, Constitution SVC, Liberty SVC, Biehl Traveler, Biehl Trader, Ocean Fin, Ocean Marlin (work boats)	Well drilling: exploration wells OCS Y-0530 TUSTUMENA 1, OCS Y-0519 INTREPID 1, OCS Y-0537 RAT 1, OCS Y-0527 TUSTUMENA 2, OCS Y-0466 BERTHA 1, OCS Y-0511 SEGULA 1, OCS Y-0454 FERN 1, OCS Y-0477 CAMELOT 1
Cold Bay shorebase	Onshore shorebase complex	Facilities included quarters for up to 60 people with a kitchen and septic system on site. There were also two 60-by-80-foot hangars owned by Air Logistics and Evergreen that were used to store helicopters. Other facilities included a flight service station and storage and maintenance structures leased by oil companies.	Well drilling: exploration wells OCS Y-0530 TUSTUMENA 1, OCS Y-0519 INTREPID 1, OCS Y-0537 RAT 1, OCS Y-0527 TUSTUMENA 2, OCS Y-0466 BERTHA 1, OCS Y-0511 SEGULA 1, OCS Y-0454 FERN 1, OCS Y-0477 CAMELOT 1, OCS Y-0511 SEGULA 1A

Sources: Burden et al. 1985

Table 5.5.1-4. Summary of transportation activity

Facility Name	Facility Type	Supported Activity	No. Aircraft	No. Vessels	Vessel Names	Aircraft
Cold Bay Airport	Airport	Air support from Cold Bay for exploration wells: OCS Y-0530 TUSTUMENA 1, OCS Y-0519 INTREPID 1, OCS Y-0537 RAT 1, OCS Y-0527 TUSTUMENA 2, OCS Y-0466 BERTHA 1, OCS Y-0511 SEGULA 1, OCS Y-0454 FERN 1, OCS Y-0477 CAMELOT 1, OCS Y-0511 SEGULA 1A	14[1]	0	N/A	Two AS 33C Puma, Bell 214 ST, two Sikorsky 5-61N, two Bell 212s
Cold Bay Airport	Airport	Air support route from Anchorage to Cold Bay for exploration wells: OCS Y-0530 TUSTUMENA 1, OCS Y-0519 INTREPID 1, OCS Y-0537 RAT 1, OCS Y-0527 TUSTUMENA 2, OCS Y-0466 BERTHA 1, OCS Y-0511 SEGULA 1, OCS Y-0454 FERN 1, OCS Y-0477 CAMELOT 1, OCS Y-0511 SEGULA 1A	Undocumented	0	N/A	Unspecified fixed wing
Dutch Harbor	Port	Marine transportation support from Dutch Harbor to exploration wells: OCS Y-0530 TUSTUMENA 1, OCS Y-0519 INTREPID 1, OCS Y-0537 RAT 1, OCS Y-0527 TUSTUMENA 2, OCS Y-0466	0	10	Atlantic Seahorse, Pacific Seahorse, Ocean Tarpon, Ocean Ray, Constitution	N/A

Facility Name	Facility Type	Supported Activity	No. Aircraft	No. Vessels	Vessel Names	Aircraft
		BERTHA 1, OCS Y-0511 SEGULA 1, OCS Y-0454 FERN 1, OCS Y-0477 CAMELOT 1, OCS Y-0511 SEGULA 1A			SVC, Liberty SVC, Biehl Traveler, Biehl Trader, Ocean Fin, Ocean Marlin (work boats)	
Dutch Harbor	Port	Barge/container ship route from Seattle to Dutch Harbor for oil and gas activities.	0	5	Biehl Traveler, Biehl Trader, Ocean Tarpon, Ocean Ray, Constitution SVC (work boats)	N/A

Notes: N/A = not applicable
[1]Aircraft reported numbers may be duplicated
Source: Burden et al. 1985

5.5.1.5 E&D Scenario Summary

A scenario was developed for the St. George Basin Final Supplemental Environmental Impact Statement (MMS 1982) to assess the potential environmental impacts of the lease sale. The sale consisted of a total of 2,688,787 acres. The scenario used the mean resource estimate to predict levels of drilling activity. The mean resource estimate used was 1,120 MMbbl of oil and 3,660 Bcf of gas. A summary of activities associated with the E&D scenario is provided in Table 5.5.1-5.

Under this scenario, five drilling rigs would be used to drill a total of 55 exploratory and delineation wells, and 251 production and service wells would be drilled from 11 production platforms. The revised lease terms would be for 10 years. Surveys would likely begin in the first summer after award of leases. It is not likely that more than two vessels would be involved in preliminary site surveys in any given year. It was estimated that the average time required to survey a site is 1 week, allowing for downtime due to bad weather and equipment failure. It was also estimated that eight sites per year for the first 6 years and seven sites in the seventh year would be surveyed for the 55 exploration and delineation wells. For the 11 production platform sites, it was estimated that four sites would be surveyed in the eighth year, four in the ninth year, and three in the tenth year after award of leases.

Table 5.5.1-5. Summary of basic assumptions of Lease Sale 83 E&D scenario

Element	Mean Case
Sale acreage offering	2,688,787 acres
Recoverable oil	1,120 MMbbl
Recoverable gas	3,660 Bcf
Platforms	11
Number of drilling rigs	5
Number of wells	55 (exploratory), 251 (production)
Pipeline miles	521 (St. Paul), 697 (Makushin)
Onshore oil terminal facilities number and acreage required	1

Element	Mean Case
Surveys	7–8 per year (exploration), 3–4 (production platform)
Number of vessels for surveys	2 per year

Notes: Bcf = billion cubic feet, MMbbl = million barrels
Source: MMS 1982

5.5.1.6 Comparison of Exploration and Development Scenario and Historical Activities

A comparison of the E&D scenario and the historical activities are provided in Table 5.5.1-6, using available information.

Table 5.5.1-6. Comparison of E&D and historical activities

Activity	E&D Scenario	Actual Activities
Sale acreage offering	2,688,787 acres offered	2,688,787 acres offered
Sale	--	540,917 acres leased
Recoverable oil	1,120 MMbbl	--
Recoverable gas	3,660 Bcf	--
Platforms	11	0
Number of drilling rigs	5	4: Big Dipper (Doo Sung) semisubmersible, Ocean Odyssey semisubmersible, SEDCO 708, SEDCO 712
Number of wells	55 (exploratory), 251 (production)	10 (exploratory)
Well depth average	--	10,502 feet
Pipeline miles	521 (St. Paul), 697 (Makushin)	0
Onshore oil terminal facilities number and acreage required	1	0
Surveys	7–8 per year (exploration), 3-4 (production platform)	0[1]
Number of vessels for surveys	2 per year	N/A[1]
Support facilities	--	Cold Bay, Dutch Harbor

Notes: -- = no data provided; Bcf = billion cubic feet; E&D = Exploration and Development; MMbbl = million barrels; N/A = not applicable
[1]No documented surveys were confirmed to be associated with this lease sale, and the actual number of surveys and vessels may be higher.

5.5.2 Activities Not Associated with a Lease Sale

Activities that could not be directly associated with a lease sale that occurred in the St. George Basin Planning Area are shown in Figure 5-2, such as the locations of COST/DST wells, supporting facilities, transportation infrastructure, and survey areas.

5.5.2.1 Surveys

Between 1975 and 1984, there were 20 2D seismic surveys documented in the St. George Basin Planning Area that were not associated with a lease sale, as summarized in Table 5.5.2-1.

Table 5.5.2-1. Survey activity summary

Activity Start Date	Activity End Date	Year	Activity Name	Description	Vessel Name(s)	Operator and/or Contractor
1/1/1975	1/1/1975	1975	2D multichannel seismic survey	2D multichannel seismic survey used an airgun and streamer for data acquisition. A total of 5,905 km were shot with 69 tracklines.	M/V American Delta III	Delta Exploration Company
6/1/1975	7/31/1975	1975	2D multichannel seismic survey	2D multichannel seismic survey used an airgun and streamer for data acquisition. A total of 5,432 km were shot with 64 tracklines.	M/V State Wave	Dresser Industries, Inc.
6/1/1975	11/1/1975	1975	2D multichannel seismic survey	2D multichannel seismic survey used an airgun and streamer for data acquisition. A total of 9,067 km were shot with 65 tracklines.	M/V Canadian Olympic; M/V U.S. Olympic	Dresser Industries, Inc.
6/4/1975	8/3/1975	1975	2D multichannel seismic survey	2D multichannel seismic survey used an airgun and streamer for data acquisition. A total of 1,677 km were shot with 29 tracklines.	R/V Seamark	Nekton, Inc.
7/28/1976	8/25/1976	1976	2D multichannel seismic survey	2D multichannel seismic survey used an airgun and streamer for data acquisition. A total of 3,369 km were shot with 21 tracklines. The survey was performed in five OCS planning areas: the North Aleutian Basin Planning Area, the St. George Basin Planning Area, the Navarin Basin Planning Area, the Aleutian Basin Planning Area, and the Bowers Basin Planning Area.[1]	Samuel Phillips Lee	Pacific Coastal and Marine Science Center
5/27/1980	10/9/1980	1980	2D multichannel seismic survey	2D multichannel seismic survey used an airgun and streamer for data acquisition. A total of 3,440 km were shot with 29 tracklines. This survey was partially completed in the Navarin Basin Planning Area and the St. George Planning Area.[1]	--	Exxon
5/29/1980	10/6/1980	1980	2D multichannel seismic survey	2D multichannel seismic survey used an airgun and streamer for data acquisition. A total of 6,951 km were shot with 78 tracklines.	--	Western Geophysical Company

Activity Start Date	Activity End Date	Year	Activity Name	Description	Vessel Name(s)	Operator and/or Contractor
7/8/1980	7/28/1980	1980	2D multichannel seismic survey	2D multichannel seismic survey used an airgun and streamer for data acquisition. A total of 3,108 km were shot with 20 tracklines. The survey occurred in the St. George Basin Planning Area and in waters just outside of the Navarin Planning Area that appeared to be Russian waters (which have not been included).	Samuel Phillips Lee	Pacific Coastal and Marine Science Center
5/1/1981	10/31/1981	1981	2D multichannel seismic survey	2D multichannel seismic survey used an airgun and streamer for data acquisition. A total of 2,810 km were shot with 41 tracklines.	--	WesternGeco
6/8/1981	7/29/1981	1981	2D multichannel seismic survey	2D multichannel seismic survey used an airgun and streamer for data acquisition. Approximately 9,292 km were shot with 144 tracklines total, with 2,224 km captured within the St. George OCS Planning Area and 7,002 km captured within the North Aleutian Basin OCS Planning Area.[1]	--	Geophysical Company of Norway
6/8/1981	10/23/1981	1981	2D multichannel seismic survey	2D multichannel seismic survey used an airgun and streamer for data acquisition. A total of 1,203 km were shot with 35 tracklines.	--	Exxon
4/27/1982	9/22/1982	1982	2D multichannel seismic survey	2D multichannel seismic survey used an airgun and streamer for data acquisition. A total of 3,274 km were shot with 23 tracklines. This survey has two discrete geographic locations in both the St. George OCS Planning Area and the North Aleutian Basin OCS Planning Area.[1]	--	Atlantic Richfield Company
5/5/1982	11/7/1982	1982	2D multichannel seismic survey	2D multichannel seismic survey used an airgun and streamer for data acquisition. A total of 14,631 km were shot with 239 tracklines. This survey has two discrete geographic locations in both the St. George OCS Planning Area and the North Aleutian Basin OCS Planning Area.[1]	--	WesternGeco
5/15/1982	9/6/1982	1982	2D multichannel seismic survey	2D multichannel seismic survey used an airgun and streamer for data acquisition. A total of 341 km were shot with two tracklines.	--	Shell Western E&P Inc.

Activity Start Date	Activity End Date	Year	Activity Name	Description	Vessel Name(s)	Operator and/or Contractor
5/17/1982	11/15/1982	1982	2D multichannel seismic survey	2D multichannel seismic survey used an airgun and streamer for data acquisition. A total of 1,703 km were shot with 17 tracklines.	--	Geophysical Service, Inc.
5/26/1982	7/9/1982	1982	2D multichannel seismic survey	2D multichannel seismic survey used an airgun and streamer for data acquisition. A total of 222 km were shot with four tracklines.	--	Mobil Exploration
7/11/1982	8/3/1982	1982	2D multichannel seismic survey	2D multichannel seismic survey used an airgun and streamer for data acquisition. A total of 2,615 km were shot with 14 tracklines. This survey is split into four OCS planning areas: the St. George Basin Planning Area, Navarin Basin Planning Area, North Aleutian Basin Planning Area, and St. Matthew-Hall Planning Area.[1]	Samuel Phillips Lee	Pacific Coastal and Marine Science Center
5/6/1983	10/30/1983	1983	2D multichannel seismic survey	2D multichannel seismic survey used an airgun and streamer for data acquisition. A total of 3,653 km were shot with 41 tracklines.	--	Geophysical Service, Inc.
7/15/1983	8/30/1983	1983	2D multichannel seismic survey	2D multichannel seismic survey used an airgun and streamer for data acquisition. A total of 159 km were shot with two tracklines.	--	Atlantic Richfield Company
6/25/1984	12/19/1984	1984	2D multichannel seismic survey	2D multichannel seismic survey used an airgun and streamer for data acquisition. A total of 741 km were shot with nine tracklines.	--	Geophysical Service, Inc.

Notes: 2D = two-dimensional; km = kilometers; M/V = motor vessel; R/V = research vessel
[1]Survey is included in activity summary for one or more other OCS planning areas due to geographic overlap.
Sources: Banet 2001e; Banet 2001i; Triezenberg et al. 2016; USGS 2023

5.5.2.2 Well Drilling

Two COST/DST exploration wells were drilled that were not associated with a lease sale, as summarized in Table 5.5.2-2.

Table 5.5.2-2. Well drilling summary

Activity Start Date	Activity End Date	Well Name (includes API no.)	Well Type	Well Depth (feet)	Drill Rig Name
7/2/1976	9/22/1976	API no. 553660000100 (COST ST GEORGE 1 DST-02)	COST/DST	13,771	ODECO Ocean Ranger

Activity Start Date	Activity End Date	Well Name (includes API no.)	Well Type	Well Depth (feet)	Drill Rig Name
5/19/1982	9/2/1982	API no. 553660000200 (COST ST GEORGE 2 DST-11)	COST/DST	14,626	SEDCO 708

Notes: API = American Petroleum Institute; COST = continental offshore stratigraphic test; DST = deep stratigraphic test
Sources: BOEM 2016c, 2022b, 2023c, 2023d

5.5.2.3 Oil-and-Gas-Supporting Activities

Identified oil-and-gas-supporting activities not associated with a lease sale included facility support and transportation from facilities and shorebases to relevant activity sites (if documented), as summarized in Table 5.5.2-3 and Table 5.5.2-4.

Table 5.5.2-3. Facility support summary

Facility Name	Facility Type	Description	Supported Activity
Crowley Maritime Corporation shorebase at Captains Bay at Dutch Harbor	Onshore shorebase complex	Facilities included two covered storage areas and an open storage area, a bunkhouse with sleeping quarters, and a washroom and recreation area to accommodate 34. A mess hall and kitchen were located next to the bunkhouse, and a duplex apartment was also available. Supply boats and barges were used to transport supplies and personnel.	Well drilling: COST ST GEORGE 1 DST-02
Crowley Maritime Corporation shorebase at Captains Bay at Dutch Harbor	Onshore shorebase complex	Peak activity was about 12 to 15 boat dockings per week during the peak activity in the summer and fall of 1982 (assuming two work boats per well docked three times per week). Vessels used were the *Biehl Traveler* and the *Biehl Trader* (work boats).	Well drilling: COST ST GEORGE 2 DST-11

Note: COST = continental offshore stratigraphic test
Sources: BOEM 2016c, 2022b, 2023c, 2023d; Burden et al. 1985

Table 5.5.2-4. Summary of transportation activity

Facility Name	Facility Type	Supported Activity	No. Aircraft	No. Vessels	Vessel Names	Aircraft
Cold Bay Airport	Airport	Air supply route from Cold Bay to COST/DST well: COST ST GEORGE 1 DST-02	Undocumented	0	N/A	N/A
Cold Bay Airport	Airport	Air supply route from Cold Bay to COST/DST well: COST ST GEORGE 2 DST-11	2	0	N/A	Two Bell 412s
Cold Bay Airport	Airport	Air supply route from Cold Bay to St. George COST/DST wells and exploration wells	Undocumented	0	N/A	N/A

Facility Name	Facility Type	Supported Activity	No. Aircraft	No. Vessels	Vessel Names	Aircraft
Cold Bay Airport	Airport	Air support from Cold Bay for St. George Basin airborne surveys	Undocumented	0	N/A	N/A
Cold Bay Airport	Airport	Air supply route from Anchorage to Cold Bay	Undocumented	0	N/A	N/A
Pribilof Islands Airport	Airport	Air support from Pribilof Islands for St. George Basin airborne surveys	Undocumented	0	N/A	N/A
Dutch Harbor	Port	Marine supply route from Dutch Harbor to COST/DST well: COST ST GEORGE 1 DST-02	0	Undocumented	--	N/A
Dutch Harbor	Port	Marine supply route from Dutch Harbor to COST/DST well: COST ST GEORGE 2 DST-11	0	2	Biehl Traveler, Biehl Trader (work boats)	N/A
Dutch Harbor	Port	Barge/container ship route from Seattle to Dutch Harbor to support drilling of COST/DST wells: COST ST GEORGE 2 DST-11, COST ST GEORGE 2 DST-11	0	5	Biehl Traveler, Biehl Trader, Ocean Tarpon, Ocean Ray, Constitution SVC	N/A

Notes: -- = no data provided; COST = continental offshore stratigraphic test; DST = deep stratigraphic test; N/A = not applicable
Source: Burden et al. 1985

5.6 Aleutian Basin Planning Area

5.6.1 Activities Not Associated with a Lease Sale

Activities that could not be directly associated with a lease sale that occurred in the Aleutian Basin Planning Area are shown in Figure 5-2, such as survey areas.

5.6.1.1 Surveys

Between 1976 and 2011, there were two 2D seismic surveys documented that were not associated with a lease sale, as summarized in Table 5.6.1-1.

Table 5.6.1-1. Survey activity summary

Activity Start Date	Activity End Date	Year	Activity Name	Description	Vessel Name(s)	Operator and/or Contractor
7/28/1976	8/25/1976	1976	2D multichannel seismic survey	Seismic surveys used airguns and streamers for data acquisition. A total of 3,369 km were shot with 21 tracklines. Surveys were conducted over five OCS planning areas.[1]	Samuel Phillips Lee	Pacific Coastal and Marine Science Center
8/6/2011	9/1/2011	2011	2D multichannel	Seismic surveys used a bolt airgun and sentry solid streamer for data acquisition. A	R/V Marcus G. Langseth	United States Geological Survey

Activity Start Date	Activity End Date	Year	Activity Name	Description	Vessel Name(s)	Operator and/or Contractor
			seismic survey	total of 2,052 km were shot with a total of 18 tracklines.		

Notes: 2D = two-dimensional; km = kilometers; R/V = research vessel
[1]Survey is included in activity summary for one or more other OCS planning areas due to geographic overlap.
Sources: Triezenberg et al. 2016; USGS 2023

5.7 Bowers Basin Planning Area

5.7.1 Activities Not Associated with a Lease Sale

Activities that could not be directly associated with a lease sale that occurred in the Bowers Basin Planning Area are shown in Figure 5-2, such as survey areas.

5.7.1.1 Surveys

In 1976, there were two 2D seismic surveys documented that were not associated with a lease sale, as summarized in Table 5.7.1-1.

Table 5.7.1-1. Survey activity summary

Activity Start Date	Activity End Date	Year	Activity Name	Description	Vessel Name(s)	Operator and/or Contractor
1/1/1976	1/2/1976	1976	2D multichannel seismic survey	2D multichannel seismic surveys used an airgun and streamer as for data acquisition. A total of 554 km were shot with one trackline.	--	Exxon
7/28/1976	8/25/1976	1976	2D multichannel seismic survey	Seismic surveys used airguns and streamers for data acquisition. A total of 3,369 km were shot with 21 tracklines. Surveys were conducted over five OCS planning areas.[1]	Samuel Phillips Lee	Pacific Coastal and Marine Science Center

Notes: 2D = two-dimensional; km = kilometers; R/V = research vessel
[1]Survey is included in activity summary for one or more other OCS planning areas due to geographic overlap.
Sources: Triezenberg et al. 2016; USGS 2023

5.8 St. Matthew-Hall Planning Area

5.8.1 Activities Not Associated with a Lease Sale

Activities that could not be directly associated with a lease sale that occurred in the St. Matthew-Hall Planning Area are shown in Figure 5-2, such as survey areas.

5.8.1.1 Surveys

In 1979 and 1982, there were two 2D seismic surveys documented that were not associated with a lease sale, as summarized in Table 5.8.1-1.

Table 5.8.1-1. Survey activity summary

Activity Start Date	Activity End Date	Year	Activity Name	Description	Vessel Name(s)	Operator and/or Contractor
9/1/1979	9/30/1979	1979	2D multichannel seismic survey	2D multichannel seismic surveys used an airgun and streamer as for data acquisition. A total of 1,478 km were shot with seven tracklines. The survey is split into the St. Matthew-Hall Planning Area and the North Aleutian Basin Planning Area.[1]	--	WesternGeco
7/11/1982	8/3/1982	1982	2D multichannel seismic survey	2D multichannel seismic surveys used an airgun and streamer as for data acquisition. A total of 2,615 km were shot with 14 tracklines. This survey is split into four OCS planning areas: the St. George Basin Planning Area, Navarin Basin Planning Area, North Aleutian Basin Planning Area, and St. Matthew-Hall Planning Area.[1]	Samuel Phillips Lee	Pacific Coastal and Marine Science Center

Notes: 2D = two-dimensional; km = kilometers
[1]Survey is included in activity summary for one or more other OCS planning areas due to geographic overlap.
Sources: Triezenberg et al. 2016; USGS 2023

6 Gulf of Alaska Subregion

The Gulf of Alaska OCS subregion extends from the southeastern to the western most point of the State of Alaska. It covers the full Gulf of Alaska, the Aleutian Islands, and the waters north of Kodiak Island through Lower Cook Inlet. There are five OCS planning areas in this subregion: Cook Inlet, Gulf of Alaska, Aleutian Arc, Kodiak, and Shumagin, shown in Figure 6-1. Information on the lease sales in these OCS planning areas is provided in this section.

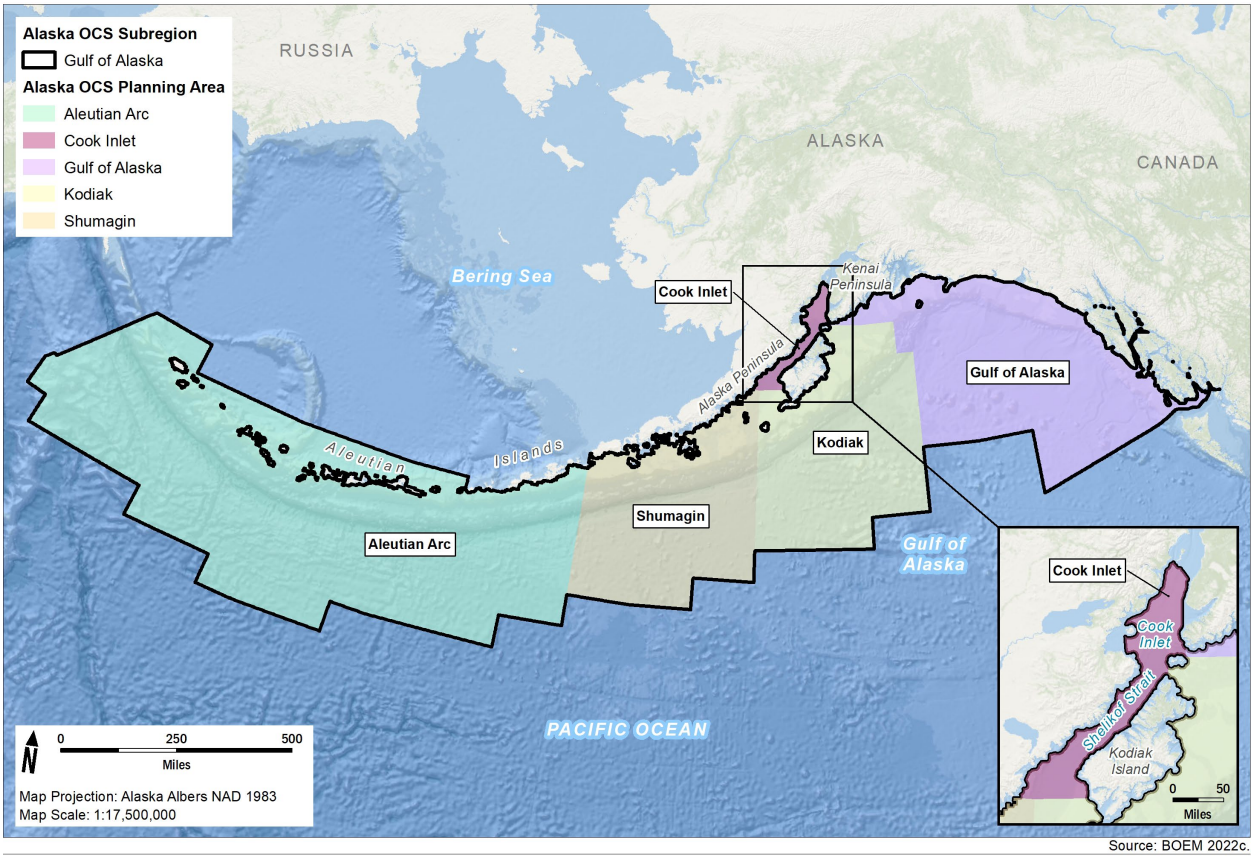


Figure 6-1. Gulf of Alaska subregion Alaska OCS planning areas

6.1 Cook Inlet Planning Area

The Cook Inlet Planning Area comprises the waters west of the Kenai Peninsula extending south through Shelikof Strait, bordered by the Alaska Peninsula to the west and Kodiak Island to the east. Between 1977 and 2022, there were six lease sales in the Cook Inlet Planning Area: Lease Sales Cook Inlet (CI), 60, 149, 191, 244, and 258. Lease Sale 191 did not result in any leases. A summary of the leases in the Cook Inlet Planning Area is shown in Table 6.1-1. Information on these leases is provided in the sections below.

In the Cook Inlet Planning Area between 1968 and 2022, there were an estimated 23,000 miles of 2D marine seismic surveys conducted (BOEM 2023a). Although this report focuses on activities occurring from 1975 to present, the timelines in the available summary survey data are aggregated and therefore include years before 1975.

Table 6.1-1. Summary of leases in the Cook Inlet Planning Area

	Lease Sale CI	Lease Sale 60	Lease Sale 149	Lease Sale 244	Lease Sale 258
Year	1977	1981	1997	2017	2022
Tracts offered	135	153	101	224	193
Acres offered	768,580	858,247	427,886	1,093,533	958,202
Leases issued	87	13	2	14	1
Acres leased	495,307	73,157	9,766	76,615	5,693
Active leases	0	0	0	14	1
Active lease area (hectares)	0	0	0	31,005.18	2,304.00

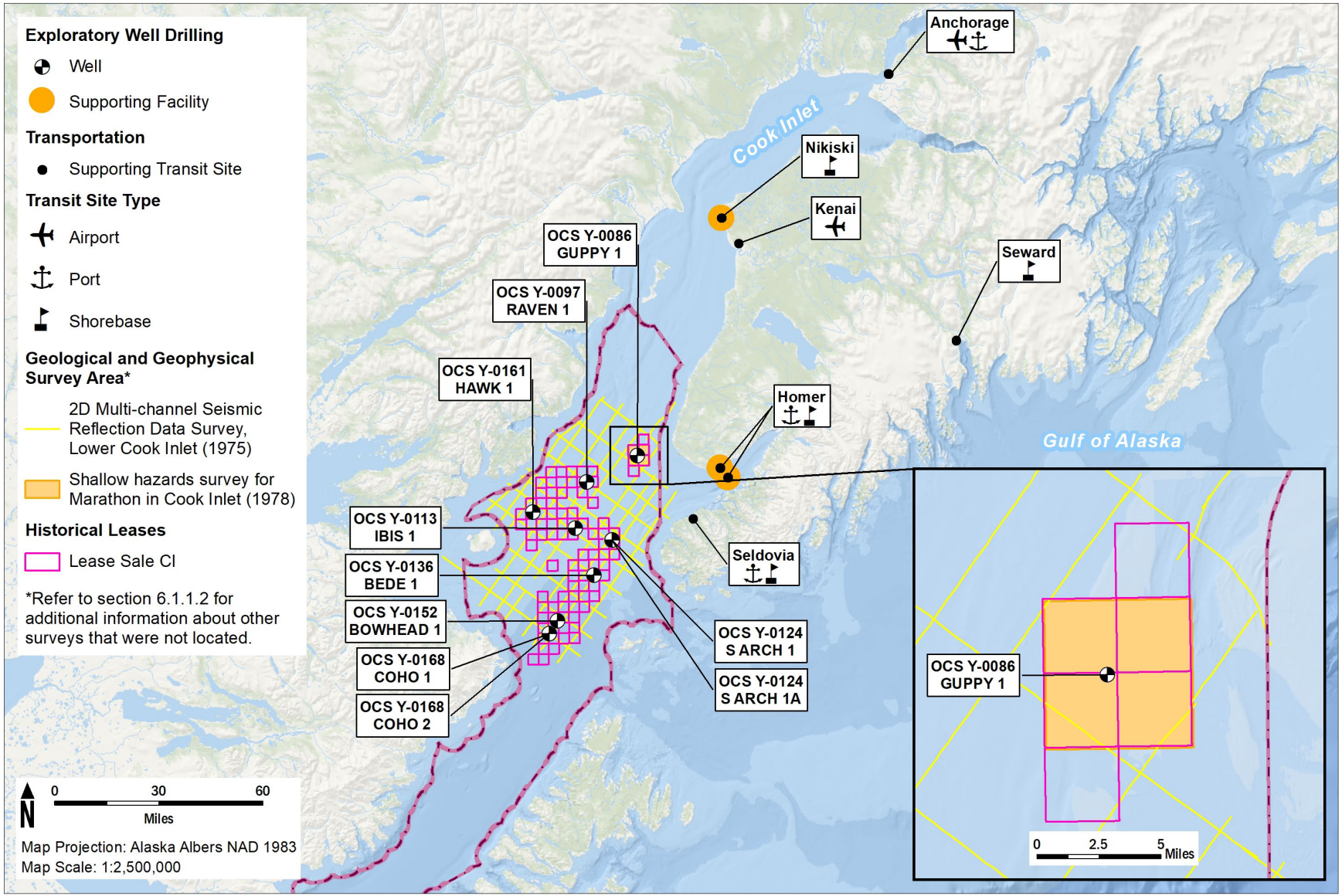
Notes: CI = Cook Inlet
Lease Sale RS-2 (1982) and 191 (2004) have not been included in this table/section as they did not result in any leases sold. These were both Cook Inlet sales.
Sources: BOEM 2023b, 2023g, 2023h

6.1.1 Lease Sale CI (1977)

The identified activities associated with Lease Sale CI are shown in Figure 6-2, such as the locations of exploration wells, supporting facilities, transportation infrastructure, and survey areas.

6.1.1.1 Leasing

As shown in Table 6.1-1 and Figure 6-2, as a result of Lease Sale CI, there were 135 tracts offered and 87 leases issued. There were 768,580 acres offered and 495,307 acres leased. There are no active leases from Lease Sale CI. Table 6.1.1-1 summarizes documented information associated with the leasing as a result of Lease Sale CI.



Sources: Banet 2001f; BOEM 2022b, 2022c, 2022d, 2023b, 2023c, 2023d; BSEE 2021; Carr 2018; Northern Resource Management 1980; Triezenberg et al. 2016.

Figure 6-2. Historical oil and gas activities associated with Lease Sale CI, 1977

Table 6.1.1-1. Lease information as a result of Lease Sale CI

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y00164	Union	12/1/1977	Relinquished	11/23/1981	Iliamna	CI142	660
Y00116	ARCO	12/1/1977	Relinquished	11/24/1981	Seldovia	CI069	617
Y00117	ARCO	12/1/1977	Relinquished	11/24/1981	Seldovia	CI070	618
Y00118	ARCO	12/1/1977	Relinquished	11/24/1981	Seldovia	CI071	619
Y00119	ARCO	12/1/1977	Relinquished	11/25/1981	Seldovia	CI072	620
Y00120	Murphy	12/1/1977	Expired	11/30/1982	Seldovia	CI074	622
Y00121	Exxon Mobil	12/1/1977	Relinquished	11/27/1981	Seldovia	CI075	623
Y00122	Exxon Mobil	12/1/1977	Relinquished	11/28/1980	Seldovia	CI076	624
Y00165	Texas Gulf	12/1/1977	Relinquished	11/3/1981	Iliamna	CI144	704
Y00123	ARCO	12/1/1977	Relinquished	11/26/1980	Seldovia	CI084	667
Y00124	Philips	12/1/1977	Expired	11/30/1982	Seldovia	CI085	668
Y00125	Hunt Oil	12/1/1977	Expired	11/30/1982	Seldovia	CI091	709
Y00126	ARCO	12/1/1977	Relinquished	11/21/1980	Seldovia	CI092	710
Y00127	Amoco	12/1/1977	Expired	11/30/1982	Seldovia	CI093	711
Y00128	ARCO	12/1/1977	Relinquished	11/30/1981	Seldovia	CI094	712
Y00129	Amoco	12/1/1977	Expired	11/30/1982	Seldovia	CI097	750
Y00130	ARCO	12/1/1977	Relinquished	11/21/1980	Seldovia	CI099	752
Y00131	ARCO	12/1/1977	Relinquished	11/21/1980	Seldovia	CI100	753
Y00132	ARCO	12/1/1977	Relinquished	11/21/1980	Seldovia	CI101	754
Y00133	Amerada	12/1/1977	Expired	11/30/1982	Seldovia	CI102	755
Y00134	ARCO	12/1/1977	Relinquished	11/21/1980	Seldovia	CI107	796
Y00135	ARCO	12/1/1977	Relinquished	11/26/1980	Seldovia	CI108	797
Y00136	Philips	12/1/1977	Expired	11/30/1982	Seldovia	CI109	798
Y00137	Philips	12/1/1977	Expired	11/30/1982	Seldovia	CI110	799
Y00138	ARCO	12/1/1977	Relinquished	11/21/1980	Seldovia	CI113	840
Y00139	Texas Eastern	12/1/1977	Relinquished	11/25/1980	Seldovia	CI114	841
Y00140	Amoco	12/1/1977	Expired	11/30/1982	Seldovia	CI115	842
Y00141	Shell Oil	None	Rejected	None	Seldovia	CI116	881
Y00142	Louisiana LND	12/1/1977	Expired	11/30/1982	Seldovia	CI118	883
Y00143	Texas Eastern	12/1/1977	Relinquished	11/25/1980	Seldovia	CI119	884
Y00144	Amoco	12/1/1977	Expired	11/30/1982	Seldovia	CI120	885

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y00145	Amoco	12/1/1977	Expired	11/30/1982	Seldovia	CI121	886
Y00146	Shell Oil	None	Rejected	None	Seldovia	CI122	925
Y00147	Louisiana LND	12/1/1977	Expired	11/30/1982	Seldovia	CI123	926
Y00148	Louisiana LND	12/1/1977	Expired	11/30/1982	Seldovia	CI124	927
Y00149	Texas Eastern	12/1/1977	Relinquished	11/25/1980	Seldovia	CI125	928
Y00150	Amoco	12/1/1977	Expired	11/30/1982	Seldovia	CI126	929
Y00151	Exxon	12/1/1977	Relinquished	11/27/1981	Seldovia	CI127	969
Y00152	Philips	12/1/1977	Expired	11/30/1982	Seldovia	CI128	970
Y00153	Philips	12/1/1977	Expired	11/30/1982	Seldovia	CI129	971
Y00154	Texas Eastern	12/1/1977	Relinquished	11/25/1980	Seldovia	CI130	972
Y00155	Shell Oil	12/1/1977	Expired	11/30/1982	Seldovia	CI131	1013
Y00156	Marathon	12/1/1977	Expired	11/30/1982	Seldovia	CI132	1014
Y00157	ARCO	12/1/1977	Relinquished	11/30/1981	Seldovia	CI133	1015
Y00158	ARCO	12/1/1977	Relinquished	11/30/1981	Seldovia	CI134	1016
Y00167	Marathon	12/1/1977	Expired	11/30/1982	Afognak	CI146	1
Y00168	Marathon	12/1/1977	Expired	11/30/1982	Afognak	CI147	2
Y00169	ARCO	12/1/1977	Relinquished	11/21/1980	Afognak	CI148	3
Y00170	ARCO	12/1/1977	Relinquished	11/21/1980	Afognak	CI149	4
Y00171	Texas Eastern	12/1/1977	Expired	11/30/1982	Afognak	CI150	45
Y00172	ARCO	12/1/1977	Relinquished	11/21/1980	Afognak	CI151	46
Y00115	ARCO	12/1/1977	Relinquished	11/21/1980	Seldovia	CI066	579
Y00166	Chevron	None	Rejected	None	Mt. Katmai	CI145	132
Y00173	Chevron	12/1/1977	Relinquished	11/30/1981	Afognak	CI152	89
Y00083	Oxy Petroleum	12/1/1977	Expired	11/30/1982	Seldovia	CI005	231
Y00084	Philips	12/1/1977	Expired	11/30/1982	Seldovia	CI008	274
Y00085	Exxon	12/1/1977	Relinquished	11/28/1980	Seldovia	CI009	275
Y00086	Marathon	12/1/1977	Relinquished	12/29/1981	Seldovia	CI014	318
Y00087	Hamilton	12/1/1977	Expired	11/30/1982	Seldovia	CI015	319
Y00088	Murphy	12/1/1977	Expired	11/30/1982	Seldovia	CI016	354
Y00089	Delta Energy & Petroleum	12/1/1977	Expired	11/30/1982	Seldovia	CI017	355
Y00090	ARCO	12/1/1977	Expired	11/30/1982	Seldovia	CI018	356
Y00091	Amoco	12/1/1977	Expired	11/30/1982	Seldovia	CI019	357
Y00092	Texas Eastern	12/1/1977	Expired	11/30/1982	Seldovia	CI020	358

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y00093	Amoco	12/1/1977	Expired	11/30/1982	Seldovia	CI022	362
Y00094	Murphy	12/1/1977	Expired	11/30/1982	Seldovia	CI024	397
Y00095	Murphy	12/1/1977	Expired	11/30/1982	Seldovia	CI025	398
Y00096	ARCO	12/1/1977	Expired	11/30/1982	Seldovia	CI027	400
Y00097	ARCO	12/1/1977	Expired	11/30/1982	Seldovia	CI028	401
Y00098	Texas Eastern	12/1/1977	Expired	11/30/1982	Seldovia	CI029	402
Y00099	Union	12/1/1977	Relinquished	11/23/1981	Seldovia	CI033	441
Y00100	ARCO	12/1/1977	Relinquished	11/24/1981	Seldovia	CI034	442
Y00101	ARCO	12/1/1977	Relinquished	11/24/1981	Seldovia	CI035	443
Y00102	Diamond	12/1/1977	Relinquished	11/9/1981	Seldovia	CI037	445
Y00159	ARCO	12/1/1977	Relinquished	11/25/1981	Iliamna	CI136	528
Y00103	ARCO	12/1/1977	Relinquished	11/25/1981	Seldovia	CI042	485
Y00104	ARCO	12/1/1977	Relinquished	11/24/1981	Seldovia	CI043	486
Y00105	Murphy	12/1/1977	Expired	11/30/1982	Seldovia	CI047	490
Y00161	ARCO	12/1/1977	Relinquished	11/25/1981	Iliamna	CI138	572
Y00106	Union	12/1/1977	Relinquished	11/23/1981	Seldovia	CI051	529
Y00160	ARCO	12/1/1977	Relinquished	11/24/1981	Iliamna	CI137	571
Y00107	ARCO	12/1/1977	Relinquished	11/25/1981	Seldovia	CI052	530
Y00108	ARCO	12/1/1977	Relinquished	11/24/1981	Seldovia	CI053	531
Y00109	ARCO	12/1/1977	Relinquished	11/24/1981	Seldovia	CI054	532
Y00163	Union	12/1/1977	Relinquished	11/23/1981	Iliamna	CI140	616
Y00110	ARCO	12/1/1977	Relinquished	11/25/1981	Seldovia	CI060	573
Y00162	ARCO	None	Rejected	None	Iliamna	CI139	615
Y00111	ARCO	12/1/1977	Relinquished	11/25/1981	Seldovia	CI061	574
Y00112	ARCO	12/1/1977	Relinquished	11/25/1981	Seldovia	CI062	575
Y00113	ARCO	12/1/1977	Relinquished	11/25/1981	Seldovia	CI063	576
Y00114	ARCO	12/1/1977	Relinquished	11/25/1981	Seldovia	CI064	577

Note: ARCO = Atlantic Richfield Company
Source: BOEM 2023b

6.1.1.2 Surveys

Between 1975 and 1978, there were 22 G&G surveys documented as a result of Lease Sale CI, which include 19 early surveys (many with minimal information), one 2D multichannel seismic reflection data survey, and two shallow hazard surveys, as summarized in Table 6.1.1-2. Those prior to the lease sale date in 1977 are assumed to be associated with pre-lease-sale exploration, as Dames & Moore (1978) summarizes available information concerning geophysical surveys in the Lease Sale CI area. It is possible that two other early G&G surveys (from 1975 and 1977) referenced in Table 6.1.6-1 are the same as surveys reported in Table 6.1.1-2, but not enough information was available to confidently determine these surveys were the same.

Table 6.1.1-2. Survey activity summary

Activity Start Date	Activity End Date	Year	Activity Name[1]	Description	Vessel Name	Operator and/or Contractor
--	--	1975	Early G&G survey	--	--	Exxon Mobil Corporation
--	--	1975	Early G&G survey	--	M/V Niobe	Shell Oil Company
--	--	1975	Early G&G survey	--	M/V Bering Explorer	Operator not named, but GCA listed as the contractor
--	--	1975	Early G&G survey	--	M/V Sitkin	Occidental Petroleum and Western Geophysical (contractor)
--	--	1975	Early G&G survey	--	M/V Trinity	Texaco Inc.
5/1/1975	6/15/1975	1975	2D multichannel seismic reflection data survey, Lower Cook Inlet, 1975	Survey used an airgun and streamer as the energy source. This was collected under Permit 75-33. Survey acquired 1,130 miles of multichannel seismic reflection data and data are available through the National Archive of Marine Seismic Surveys.	M/V Sitkin	Standard Oil Company of California and Western Geophysical (contractor) “with 11 other companies”
4/3/1976	9/7/1976	1976	Early G&G survey	Survey used a sparker as the energy source resulting for 2,300 miles, and 650 miles of fill-in survey.	M/V Bering Explorer	Operator not named; GCA listed as the contractor
4/25/1976	10/7/1976	1976	Early G&G survey	Survey used an airgun as the energy source.	M/V Niobe	Shell Oil Company
8/24/1976	10/30/1976	1976	Early G&G survey	Survey used an airgun as the energy source.	Cecil Green	ARCO and GSI (contractor)
9/10/1976	10/6/1976	1976	Early G&G survey	Survey used a sparker as the energy source.	Greve	U.S. Geological Survey and Petty Ray (contractor)
9/10/1976	10/15/1976	1976	Early G&G survey	--	Cecil Green	Operator not named; GSI listed as the contractor
9/25/1976	10/1/1976	1976	Early G&G survey	--	Robray I	Operator not named; Petty Ray listed as the contractor
9/28/1976	10/15/1976	1976	Early G&G survey	Survey used a sparker as the energy source.	M/V Sitkin	U.S. Geological Survey and Petty Ray (contractor)

Activity Start Date	Activity End Date	Year	Activity Name[1]	Description	Vessel Name	Operator and/or Contractor
3/13/1977	4/7/1977	1977	Early G&G survey	Survey used an airgun as the energy source.	M/V Bering Explorer	Shell Oil Company and GCA (contractor)
5/6/1977	5/11/1977	1977	Early G&G survey	Survey used an airgun as the energy source.	M/V Bering Explorer	Marathon LL & E, and GCA (contractor)
5/9/1977	5/15/1977	1977	Early G&G survey	Survey used an airgun as the energy source.	Cecil Green	ARCO and GSI (contractor)
5/16/1977	5/30/1977	1977	Early G&G survey	Survey used an airgun as the energy source.	M/V Niobe	Shell Oil Company
5/22/1977	8/1/1977	1977	Early G&G survey	Survey used an airgun as the energy source.	Hollis Hedberg	Gulf
6/10/1977	7/20/1977	1977	Early G&G survey	Survey used an airgun as the energy source.	Cecil Green	Operator not named; GSI listed as the contractor
6/20/1977	6/30/1977	1977	Early G&G survey	Survey used an airgun as the energy source.	M/V Bering Explorer	Operator not named; GCA listed as the contractor
1/19/1978	2/21/1978	1978	Shallow hazards survey	The documented area was less than 300 square miles	M/V Sitkin	Marathon Oil Company and Tetra-Tech (contractor)
4/22/1978	6/16/1978	1978	Shallow hazards survey	The documented area was the “vicinity of each drilling vessel” which are not specifically named	Big Valley	Marathon Oil Company, Exxon Mobil Corporation, Atlantic Richfield Company, and ConocoPhillips Company and Dames & Moore (contractor)

Note: -- = no data provided, ARCO = Atlantic Richfield Company; GCA = Geophysical Corporation of Alaska; GSI = Geophysical Service, Inc.; M/V = motor vessel
[1]The early G&G surveys and 2D seismic survey were associated with Lease Sale CI because Dames & Moore (1978) identified these as information concerning geophysical surveys in the lease sale area.
Sources: Banet 2001f; Dames & Moore 1978; Northern Resource Management 1980; Triezenberg et al. 2016

6.1.1.3 Well Drilling

Ten exploration wells were drilled as a result of Lease Sale CI, as summarized in Table 6.1.1-3.

Table 6.1.1-3. Well drilling summary

Activity Start Date	Activity End Date	Well Name (includes API no. and bottom hole lease number)	Well Type	Well Depth (feet)	Drill Rig Name
7/21/1978	12/22/1978	API no. 5522000003 (GUPPY 1) on OCS Y-0086	Exploration	13,305	Diamond M. Dragon
10/9/1978	10/19/1978	API no. 5522000004 (S ARCH 1) on OCS Y-0124	Exploration	1,254	Ocean Bounty
10/20/1978	5/18/1979	API no. 5522000007 (S ARCH 1A) on OCS Y-0124	Exploration	11,303	Ocean Bounty
1/11/1979	4/27/1979	API no. 5521900003 (COHO 1) on OCS Y-0168	Exploration	2,797	Diamond M. Dragon
4/28/1979	8/21/1979	API no. 5521900005 (COHO 2) on OCS Y-0168	Exploration	8,892	Diamond M. Dragon
5/28/1979	9/18/1979	API no. 5522000005 (BEDE 1) on OCS Y-0136	Exploration	10,317	Ocean Bounty
7/15/1979	1/21/1980	API no. 5525000001 (HAWK 1) on OCS Y-0161	Exploration	14,911	Dan Prince
9/24/1979	4/26/1980	API no. 5522000006 (BOWHEAD 1) on OCS Y-0152	Exploration	13,109	Ocean Bounty
4/6/1980	5/29/1980	API no. 5522000002 (RAVEN 1) on OCS Y-0097	Exploration	7,481	Dan Prince
5/9/1980	6/24/1980	API no. 5522000008 (IBIS 1) on OCS Y-0113	Exploration	7,022	Ocean Bounty

Notes: API = American Petroleum Institute
Sources: BOEM 2022b, 2023c, 2023d; Northern Resource Management 1980

6.1.1.4 Oil-and-Gas-Supporting Activities

Identified oil-and-gas-supporting activities as a result of Lease Sale CI included facility support and transportation from facilities and shorebases to relevant activity sites (if documented), as summarized in Table 6.1.1-4 and Table 6.1.1-5.

Table 6.1.1-4. Facility support summary

Facility Name	Facility Type	Description	Supported Activity
Homer Airport (helicopter base)	Onshore shorebase complex	Facilities included two hangars (northwest hangar leased to ARCO and a southeast private hangar) landing pad, office space, parking, and fuel. The northwest hangar was operated by Maritime Helicopters, and the southeast hangar was operated by Earl Cooper. For all wells drilled during the given timeframe, one to three flights per day per drilling vessel were estimated, with a maximum six to eight flights per day.	Drilling wells: OCS Y-0086 GUPPY 1, OCS Y-0124 S ARCH 1, OCS Y-0124 S ARCH 1A, OCS Y-0136 BEDE 1, OCS Y-0152 BOWHEAD 1, OCS Y-0161 HAWK 1, OCS Y-0168 COHO 1, OCS Y-0168 COHO 2

Facility Name	Facility Type	Description	Supported Activity
Homer City Dock	Onshore shorebase complex	Facilities included a dock, water, fuel, cargo load and unload, and two warehouses. The contractor was the City of Homer. Used by supply boats, it had an average of 26.6 dockings per month between December 1978 to February 1980. During peak activity in April 1979 there were 35 dockings.	Drilling wells: OCS Y-0086 GUPPY 1, OCS Y-0124 S ARCH 1, OCS Y-0124 S ARCH 1A, OCS Y-0136 BEDE 1, OCS Y-0152 BOWHEAD 1, OCS Y-0161 HAWK 1, OCS Y-0168 COHO 1, OCS Y-0168 COHO 2
Nikiski Rig Tenders Dock	Onshore shorebase complex	Facilities included a dock, warehouse, open storage, water, fuel, and cargo load and unload. The contractor was Crowley Maritime. Used by supply boats, it had an average of 25.7 dockings per month between July 1978 to February 1980. During peak activity in November 1978 there were a total of 47 dockings.	Drilling wells: OCS Y-0086 GUPPY 1, OCS Y-0124 S ARCH 1, OCS Y-0124 S ARCH 1A, OCS Y-0136 BEDE 1, OCS Y-0152 BOWHEAD 1, OCS Y-0161 HAWK 1, OCS Y-0168 COHO 1, OCS Y-0168 COHO 2

Note: ARCO = Atlantic Richfield Company
Sources: Dames & Moore 1978; Northern Resource Management 1980

Table 6.1.1-5. Summary of transportation activity

Facility Name	Facility Type	Supported Activity	No. Aircraft	No. Vessels	Vessel Names	No. Vehicles
Anchorage Airport	Airport	Drilling wells: OCS Y-0086 GUPPY 1, OCS Y-0124 S ARCH 1, OCS Y-0124 S ARCH 1A, OCS Y-0136 BEDE 1, OCS Y-0152 BOWHEAD 1, OCS Y-0161 HAWK 1, OCS Y-0168 COHO 1, OCS Y-0168 COHO 2, COST/DST exploration well COOK INLET 1 DST-07	1	9	Ocean Bounty, Ranger, Ocean Marlin, Diamond M. Dragon, Heritage Service, Stonington, Dan Prince, Vigilant, Biehl Traveler	--
Kenai Airport	Airport	Drilling wells: OCS Y-0086 GUPPY 1, OCS Y-0124 S ARCH 1, OCS Y-0124 S ARCH 1A, OCS Y-0136 BEDE 1, OCS Y-0152 BOWHEAD 1, OCS Y-0161 HAWK 1, OCS Y-0168 COHO 1, OCS Y-0168 COHO 2	1	9	Ocean Bounty, Ranger, Ocean Marlin, Diamond M. Dragon, Heritage Service, Stonington, Dan Prince, Vigilant, Biehl Traveler	--
Port of Alaska (Anchorage)	Port	Drilling wells: OCS Y-0086 GUPPY 1, OCS Y-0124 S ARCH 1, OCS Y-0124 S ARCH 1A, OCS Y-0136 BEDE 1, OCS Y-0152 BOWHEAD 1, OCS Y-0161 HAWK 1, OCS Y-0168 COHO 1, OCS Y-0168 COHO 2	1	9	Ocean Bounty, Ranger, Ocean Marlin, Diamond M. Dragon, Heritage Service, Stonington, Dan Prince, Vigilant, Biehl Traveler	--
Cook Inlet Port of Operation (Homer)	Port	Shallow hazards survey for Marathon in Lower Cook Inlet, Shallow hazards survey for multiple operators in Cook Inlet	1	1	M/V Sitkin	--

Facility Name	Facility Type	Supported Activity	No. Aircraft	No. Vessels	Vessel Names	No. Vehicles
Cook Inlet Port of Operation (Seldovia)	Port	Shallow hazards survey for Marathon in Lower Cook Inlet	1	1	M/V Sitkin	--
Homer Airport (Helicopter Base)	Shorebase	Drilling wells: OCS Y-0086 GUPPY 1, OCS Y-0124 S ARCH 1, OCS Y-0124 S ARCH 1A, OCS Y-0136 BEDE 1, OCS Y-0152 BOWHEAD 1, OCS Y-0161 HAWK 1, OCS Y-0168 COHO 1, OCS Y-0168 COHO 2	1	9	Ocean Bounty, Ranger, Ocean Marlin, Diamond M. Dragon, Heritage Service, Stonington, Dan Prince, Vigilant, Biehl Traveler	--
Homer City Dock	Shorebase	Drilling wells: OCS Y-0086 GUPPY 1, OCS Y-0124 S ARCH 1, OCS Y-0124 S ARCH 1A, OCS Y-0136 BEDE 1, OCS Y-0152 BOWHEAD 1, OCS Y-0161 HAWK 1, OCS Y-0168 COHO 1, OCS Y-0168 COHO 2	1	9	Ocean Bounty, Ranger, Ocean Marlin, Diamond M. Dragon, Heritage Service, Stonington, Dan Prince, Vigilant, Biehl Traveler	8
Nikiski Rig Tenders Dock	Shorebase	Drilling wells: OCS Y-0086 GUPPY 1, OCS Y-0124 S ARCH 1, OCS Y-0124 S ARCH 1A, OCS Y-0136 BEDE 1, OCS Y-0152 BOWHEAD 1, OCS Y-0161 HAWK 1, OCS Y-0168 COHO 1, OCS Y-0168 COHO 2	1	9	Ocean Bounty, Ranger, Ocean Marlin, Diamond M. Dragon, Heritage Service, Stonington, Dan Prince, Vigilant, Biehl Traveler	--
Seldovia Dock	Shorebase	Drilling wells: OCS Y-0086 GUPPY 1, OCS Y-0124 S ARCH 1, OCS Y-0124 S ARCH 1A, OCS Y-0136 BEDE 1, OCS Y-0152 BOWHEAD 1, OCS Y-0161 HAWK 1, OCS Y-0168 COHO 1, OCS Y-0168 COHO 2	1	9	Ocean Bounty, Ranger, Ocean Marlin, Diamond M. Dragon, Heritage Service, Stonington, Dan Prince, Vigilant, Biehl Traveler	--
Seward shorebase	Shorebase	Drilling wells: OCS Y-0086 GUPPY 1, OCS Y-0124 S ARCH 1, OCS Y-0124 S ARCH 1A, OCS Y-0136 BEDE 1, OCS Y-0152 BOWHEAD 1, OCS Y-0161 HAWK 1, OCS Y-0168 COHO 1, OCS Y-0168 COHO 2	1	9	Ocean Bounty, Ranger, Ocean Marlin, Diamond M. Dragon, Heritage Service, Stonington, Dan Prince, Vigilant, Biehl Traveler	--

Notes: -- = no data provided; M/V = motor vessel
Aircraft use was often documented in source documents but not quantified. A minimum of one aircraft has been assumed but is expected to have been higher.
Source: Northern Resource Management 1980

6.1.1.5 E&D Scenario Summary

In the E&D scenario in the Final Environmental Statement: Proposed 1976 Outer Continental Shelf Oil and Gas Lease Sale, Lower Cook Inlet (BLM 1976b), the U.S. Geological Survey estimated the recoverable oil resources within the proposed sale area were 0.09 Bbbl (minimum) to 2.6 Bbbl (maximum). For gas, the estimate was 0.6 Tcf (minimum) and 3.3 Tcf (maximum). To give maximum consideration to environmental impacts, the maximum "high case," or high development scenario, was

used for analysis. The estimated peak volume of crude oil produced was 930,000 barrels (bbl) per day or 340,000,000 bbl per year, and the peak gas production was 465 million cubic feet (MMcf) per day or 170 Bcf per year. A summary of basic assumptions used by the U.S. Department of the Interior, Bureau of Land Management (BLM) to develop the E&D scenario (BLM 1976b) is shown in Table 6.1.1-6.

BLM assumed exploratory drilling would begin the year after leases were issued and would be completed at the end of the eighth year. Onsite platform installation would begin during the fourth year after the lease sale and continue through the ninth year. Peak oil production would occur approximately 8 years after the lease sale. The life expectancy of the oil and gas fields would be 25 years, and the last platforms would be removed about 40 years after production had commenced (BLM 1976b).

Of total peak annual production, all 340 MMbbl would be transported from production platforms to shore by pipeline and from shore storage to market areas by tanker (BLM 1976b).

Potential support and supply facilities would likely be located at Homer, Kenai, the Seldovia English Bay/Port Graham area, and Seward. Potential onshore crude oil terminal and treatment sites were the Seldovia English Bay/Port Graham area and the Cape Douglas area for any discoveries in the southern part of the sale area, and for discoveries in the northern part of the sale area, the Anchor Point area and the west side of the Inlet might have been used. The existing terminal and storage facilities at Nikiski and Drift River might have also been used for production from oil and gas fields in the northern part of the sale area. For the purposes of this analysis, two new onshore terminals and two production treatment facilities (may or may not be with terminals) were assumed, with all other production going to existing facilities (BLM 1976b).

The support and supply fleet required to service the offshore rigs would be three to 18 boats during the exploratory phase and approximately 21 boats during the peak development phase (BLM 1976b).

Table 6.1.1-6. Summary of basic assumptions of the CI Lease Sale E&D scenario

Element	Maximum Case
Sale acreage offering	865,000 acres
Anticipated sale	692,000 acres
Recoverable oil (maximum)	2.6 Bbbl
Recoverable gas (maximum)	3.3 Tcf
Peak production oil	930,000 bbl/day, 340 MMbbl/year
Peak production gas	465 MMcf/day, 170 Bcf/year
Platforms	23 (21 oil; two gas)
Number of wells	604 (84 exploratory; 80 service; 440 production)
Pipelines	300 miles (200 miles offshore; 100 miles onshore)
Pipeline burial excavation volume	3,000 to 8,000 yards/mile
Onshore pipeline acreage required	630 acres permanent right-of-way
Onshore oil terminal facilities number and acreage required	2; 240 acres, 120 acres each
Support / supply facilities number and acreage required	3; 120–240 acres, 40–80 acres each
LNG plant and terminal	1; 60–120 acres

Element	Maximum Case
Production treatment facilities	2; 160 acres, 80 acres each
Total direct land requirements	1,339–1,519 acres
Petroleum refineries	0
Platform fabrication	0
Supply and support boats	6–24
Annual crude shipped by tanker	Up to 340 MMbbl/year

Notes: Bbbl = billion barrels; bbl = barrel(s); cf = cubic feet; MMbbl = million barrels; MMcf = million cubic feet; Tcf = trillion cubic feet
Source: BLM 1976b

6.1.1.6 Comparison of Exploration and Development Scenario and Historical Activities

A comparison of the E&D scenario and the historical activities are provided in Table 6.1.1-7, using available information.

Table 6.1.1-7. Comparison of E&D and historical activities

Activity	E&D Scenario	Actual Activities
Recoverable oil (maximum)	2.6 Bbbl	--
Recoverable gas (maximum)	3.3 Tcf	--
Sale acreage offering	865,000 acres	768,580 acres offered
Anticipated sale	692,000 acres	495,307 acres leased
Date of exploratory activities	1977 through 1987	1976 through 1980
Number of wells	604 (84 exploratory; 80 service; 440 production)	10 (10 exploratory; 0 service; 0 production)
Well depth average	--	9,039 feet
Number of G&G surveys	--	22
Support facility and shorebase locations	Homer, Kenai, Seldovia/Port Graham, Seward, Cape Douglas, Anchor Point	Nikiski Rig Tenders Dock, Homer City Dock, Homer Airport
Average shorebase dockings/flights	3 to 18 boats (exploratory), 21 boats (peak development)	8 unique vessel names provided in data
Flights per drilling vessel	--	1.5–3 flights per day
Other sites used	--	Seldovia Dock, Seward Dock, Kenai Airport, Anchorage Airport, Port of Alaska (Anchorage)
Peak production oil	930,000 bbl/day, 340 MMbbl/year	0
Peak production gas	465 MMcf/day, 170 Bcf/year	0
Platforms	23 (21 oil; 2 gas)	0
Pipelines	300 miles (200 miles offshore; 100 miles onshore)	0
Pipeline burial excavation volume	3,000 to 8,000 yards/mile	0

Activity	E&D Scenario	Actual Activities
Onshore pipeline acreage required	630 acres permanent right-of-way	0
Onshore oil terminal facilities number and acreage required	2; 240 acres; 120 acres each	0
Support / supply facilities number and acreage required	3; 120–240 acres; 40–80 acres each	3 support facilities; acres not available
LNG plant and terminal	1; 60–120 acres	0
Production treatment facilities	2; 160 acres, 80 acres each	0
Total direct land requirements	1,339–1,519 acres	Unknown
Petroleum refineries	0	0
Platform fabrication	0	0
Supply and support boats	6–24	6 unique vessel names provided in data
Annual crude shipped by tanker	Up to 340 MMbbl/year	0

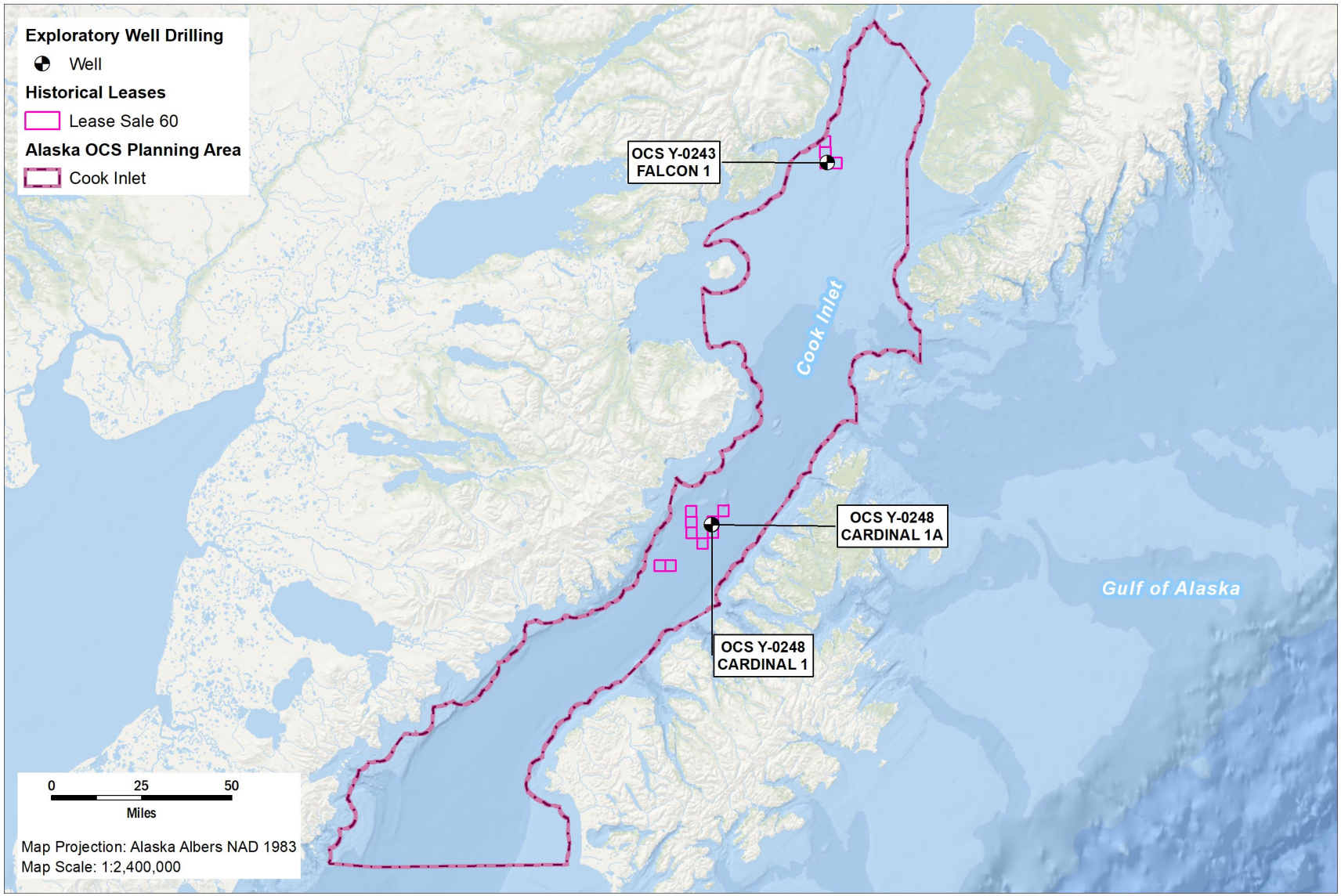
Notes: -- = no data provided; Bbbl = billion barrels; bbl = barrel(s); Bcf = billion cubic feet; cf = cubic feet; E&D = Exploration and Development; G&G = geological and geophysical; LNG = liquified natural gas; MMbbl = million barrels; MMcf = million cubic feet; Tcf = trillion cubic feet
It is assumed that all production-related activities in the E&D scenario did not occur. Additionally, the number of vessels was determined by the number of unique names associated with shorebase and transportation activity to avoid overcounting and includes all vessel types. As this data was not always recoverable, the number of vessels is estimated to be lower than what occurred.

6.1.2 Lease Sale 60 (1981)

The identified activities associated with Lease Sale 60 are shown in Figure 6-3, such as the locations of exploration wells.

6.1.2.1 Leasing

As shown in Table 6.1-1 and Figure 6-3, as a result of Lease Sale 60, there were 153 tracts offered and 13 leases issued. There were 858,247 acres offered and 73,157 acres leased. There are no active leases from Lease Sale 60. Table 6.1.2-1 summarizes documented information associated with the leasing as a result of Lease Sale 60.



Sources: BOEM 2022b, 2022c, 2023b, 2023c, 2023d; BSEE 2021.

Figure 6-3. Historical oil and gas activities associated with Lease Sale 60, 1981

Table 6.1.2-1. Lease information as a result of Lease Sale 60

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y00241	Chevron	11/1/1981	Expired	10/31/1986	Seldovia	60018	137
Y00242	Chevron	11/1/1981	Expired	10/31/1986	Seldovia	60020	181
Y00243	Chevron	11/1/1981	Relinquished	10/31/1986	Seldovia	60024	225
Y00244	Chevron	11/1/1981	Expired	10/31/1986	Seldovia	60025	226
Y00246	Chevron	11/1/1981	Relinquished	10/31/1986	Mt. Katmai	60114	611
Y00245	Chevron	11/1/1981	Relinquished	10/31/1986	Mt. Katmai	60111	608
Y00248	Chevron	11/1/1981	Relinquished	10/31/1986	Mt. Katmai	60120	654
Y00247	Chevron	11/1/1981	Relinquished	10/31/1986	Mt. Katmai	60118	652
Y00250	Chevron	11/1/1981	Relinquished	10/31/1986	Mt. Katmai	60126	698
Y00249	Chevron	11/1/1981	Relinquished	10/31/1986	Mt. Katmai	60124	696
Y00251	Chevron	11/1/1981	Relinquished	10/31/1986	Mt. Katmai	60132	741
Y00253	Chevron	11/1/1981	Relinquished	10/31/1986	Mt. Katmai	60140	826
Y00252	Chevron	11/1/1981	Relinquished	10/31/1986	Mt. Katmai	60139	825

Source: BOEM 2023b

6.1.2.2 Surveys

No surveys were documented as a result of Lease Sale 60.

6.1.2.3 Well Drilling

Three exploration wells were drilled as a result of Lease Sale 60, as summarized in Table 6.1.2-2.

Table 6.1.2-2. Well drilling summary

Activity Start Date	Activity End Date	Well Name (includes API no. and bottom hole lease number)	Well Type	Well Depth (feet)	Drill Rig Name
9/19/1984	11/12/1984	API no. 5522000009 (FALCON 1) on OCS Y-0243	Exploration	5,564	Key Hawaii Jack Up
11/21/1984	12/8/1984	API no. 5524900001 (CARDINAL 1) on OCS Y-0248	Exploration	1,890	SEDCO 712
12/18/1984	3/18/1985	API no. 5524900003 (CARDINAL 1A) on OCS Y-0248	Exploration	10,041	SEDCO 712

Note: API = American Petroleum Institute
Sources: BOEM 2022b, 2023c; BSEE 2021

6.1.2.4 Oil-and-Gas-Supporting Activities

There were no oil-and-gas-supporting activities identified as a result of Lease Sale 60.

6.1.2.5 E&D Scenario Summary

For the Final Environmental Impact Statement: Lower Cook Inlet – Shelikof Strait (BLM 1981), the U.S. Geological Survey estimated the maximum resource level, the mean, and the minimum resource level of recoverable oil and natural gas resources within the proposed lease area. For oil, the maximum was 1,015 MMbbl, the mean was 670 MMbbl, and the minimum was 332 MMbbl. For gas, the maximum was 1,776 Bcf, the mean was 1,173 Bcf, and the minimum was 581 Bcf. The analysis was based on the mean scenario. The average vertical depth of an exploration well would be 16,000 feet. For production wells, the average depth would be 10,000 feet. One service well for every four production wells would be drilled (BLM 1981). A summary of activities is shown in Table 6.1.2-3, and a summary of drill cuttings is shown in Table 6.1.2-4.

For the development scenario of the proposed action, crude oil produced in Lower Cook Inlet would be transported via pipeline to an oil storage and tanker loading terminal constructed at a point between Anchor Point and Stariski Creek. Crude oil extracted from the Shelikof Strait would be transported by pipeline to an oil storage and tanker loading terminal located near Talnik Point on the shore of Marmot Bay. Natural gas produced in both the Shelikof Strait and Lower Cook Inlet would be piped to a gas compressor station located on or near the Anchor Point terminal (BLM 1981).

The U.S. Geological Survey estimated that the 153 blocks offered for lease by this proposal may have contained undiscovered recoverable resources ranging from 332 to 1,015 MMbbl of oil and from 581 to 1,776 Bcf of natural gas. Based on these estimates, the proposed action was estimated to result in a peak daily production of between 151,500 and 342,200 bbl of oil, and between 265.2 and 598.9 MMcf of gas per day (BLM 1981).

Exploration would have likely begun in 1982 and continued through 1986, with a total of 16 exploration and delineation wells drilled. No more than three rigs were assumed to be working during any one year of the exploratory period. Drilling during the exploratory phase would be carried out by semisubmersibles; however, jack-up rigs could be used in selected locations of shallow water depths of about 61 meters (200 feet) or less. One rig per production platform (though not necessarily the same rig) would accomplish all production-related drilling (BLM 1981).

Primary maritime support and supply activities would occur from existing hydrocarbon industry facilities located at Nikiski. Aircraft support would be launched from fields located on the Kenai Peninsula in Port Lions, the city of Kodiak, and, possibly, at Cape Chiniak (BLM 1981).

Supply boats and helicopters would move supplies and personnel between shore and platforms. The combined air and water fleet would range between three to four units per platform. The fleet size was dependent on the phase of OCS activity. During a later period of production, the fleet size may have decreased to one to two units for every two platforms (BLM 1981).

It was assumed a total of 640 kilometers (400 miles) of pipeline would be constructed. This mileage would have been divided between two separate oil pipelines and one gas pipeline. One oil pipeline system would drain the Lower Cook Inlet, would total about 128 kilometers (80 miles), and would be emplaced entirely under water. It would terminate in an oil storage terminal located between Stariski Creek and Anchor Point on the Kenai Peninsula. The second oil pipeline would service Shelikof Strait. It could be constructed through Kupreanof Strait to Chernof Point, and then overland to the vicinity of Talnik Point. Total length of the Talnik Point pipeline could be about 144 kilometers (90 miles), with 16 kilometers (10 miles) of the total allotted for overland passage. The gas pipeline would traverse both the Shelikof Strait and Lower Cook Inlet. It could landfall at or near the Stariski/Anchor Point oil terminal. Total length of the gas pipeline would have been approximately 368 kilometers (230 miles) (BLM 1981).

Pipeline diameters assumed for the mean case of the proposal would be 22 inches for oil and 18 inches for gas. Pipeline construction was estimated to begin in 1984 and finish during 1986 (BLM 1981).

The Phillips LNG plant located in Nikiski would process the natural gas and export LNG. By 1982, a second LNG facility was planned to be constructed adjacent to the Phillips plant. Taken together, the combined refining capacity of the two plants was thought to be sufficient to process any LNG produced from the Cook Inlet and Shelikof Strait (BLM 1981).

Oil and gas production was estimated to begin by 1986. By that year, four pile-supported steel tower production platforms would be installed. By 1991, some 195 production wells could have been drilled. It was assumed that oil would be produced until 2011. Natural gas production would cease in 2012. The total life of the field was estimated at 26 years (BLM 1981).

Table 6.1.2-3. Summary of activities required to develop the estimated resources within the mean case

Element	Total	Oil	Gas
Sale acreage offering	864,646 acres	N/A	N/A
Exploration and delineations wells	16	N/A	N/A
Production platforms	4	N/A	N/A
Production wells	195	N/A	N/A
Workover wells	624	N/A	N/A

Element	Total	Oil	Gas
Pipeline offshore length	N/A	129 km (80 miles to Anchor Point); 129 km (80 miles to Chernof Point)	225 km (160 miles to Anchor Point)
Pipeline onshore length	N/A	16 km (10 miles to Talnik Point)	113 km (70 miles to Nikiski)
Pipeline terminals	N/A	Anchor Point and Talnik Point	Use existing terminal at Nikiski
Total production	N/A	670.0 MMbbl	1,173.0 Bcf
Peak production	N/A	265.2 Mbbl per day	464.4 MMcf per day
Average annual production	N/A	26.8 MMbbl	45.1 Bcf
Estimated peak annual transportation by tanker	N/A	96.8 MMbbl	50.0 MMbbl

Note: Bcf = billion cubic feet; km = kilometers; Mbbl = thousand barrels; MMbbl = million barrels; MMcf = million cubic feet; N/A = not applicable
Source: BLM 1981

Table 6.1.2-4. Estimated volumes of commercial muds and drill cuttings within the mean case

Element	Per Well (Exploration)	Total Field (Exploration)	Per Well (Production)	Total Field (Production)
Muds	947 metric tons (1,044 tons)	15,152 metric tons (16,704 tons)	680 metric tons (750 tons)	15,708 metric tons (17,278 tons)
Cuttings	539 m^3 (704 cy)	8,624m^3 (11,264 cy)	206m^3 (269 cy)	40,170m^3 (52,455 cy)

Notes: m^3 = cubic meters; cy = cubic yards
During the production and development period, drill mud is reused. Approximately 10 percent of the total drill mud used is lost downhole.
Source: BLM 1981

6.1.2.6 Comparison of Exploration and Development Scenario and Historical Activities

A comparison of the E&D scenario and the historical activities are provided in Table 6.1.2-5, using available information.

Table 6.1.2-5. Comparison of E&D and historical activities

Activity	E&D Scenario	Actual Activities
Recoverable oil (mean)	670 MMbbl	--
Recoverable gas (mean)	1,173 Bcf	--
Sale acreage offering	864,646 acres	858,247 acres offered
Sale	--	73,157 acres leased
Date of exploratory activities	1982-1986	1984
Number of wells	835 (16 exploratory, 195 production, 624 workover)	3 (exploratory)
Well depth average	16,000 feet (exploratory), 10,000 feet (production)	5,832 feet (exploratory)
Number of drill rigs	3 (exploratory)	3 (exploratory)

Activity	E&D Scenario	Actual Activities
Production platforms	4	--
Aircraft support	Port Lions, Kodiak, Cape Chiniak	--
Maritime support	Nikiski	--
Average shorebase dockings/flights	3–4 per platform	--
Total production	670.0 MMbbl (oil), 1,173.0 Bcf (gas)	0
Peak production	265.2 Mbbl per day (oil), 464.4 MMcf per day (gas)	0
Average annual production	26.8 MMbbl (oil), 45.1 Bcf (gas)	0
Oil pipelines	170 (160 miles offshore, 10 miles onshore)	0
Gas pipelines	130 miles (60 miles offshore, 70 miles onshore)	0
Pipeline terminals	Anchor Point and Talnik Point (oil), Nikiski (gas)	0
Annual shipped by tanker	96.8 MMbbl (oil), 50 MMbbl (gas)	--

Notes: -- = no data provided; Bcf = billion cubic feet; E&D = Exploration and Development; Mbbl = thousand barrels; MMbbl = million barrels; MMcf = million cubic feet
It is assumed that all production-related activities in the E&D scenario did not occur. Additionally, vessels were determined by the number of unique names associated with shorebase.

6.1.3 Lease Sale 149 (1997)

The identified activities associated with Lease Sale 149 are shown in Figure 6-4.

6.1.3.1 Leasing

As shown in Table 6.1-1 and Figure 6-4, as a result of Lease Sale 149, there were 101 tracts offered and two leases issued. There were 427,886 acres offered, and 9,766 acres leased. There are no active leases from Lease Sale 149. Table 6.1.3-1 summarizes documented information associated with the leasing as a result of Lease Sale 149.

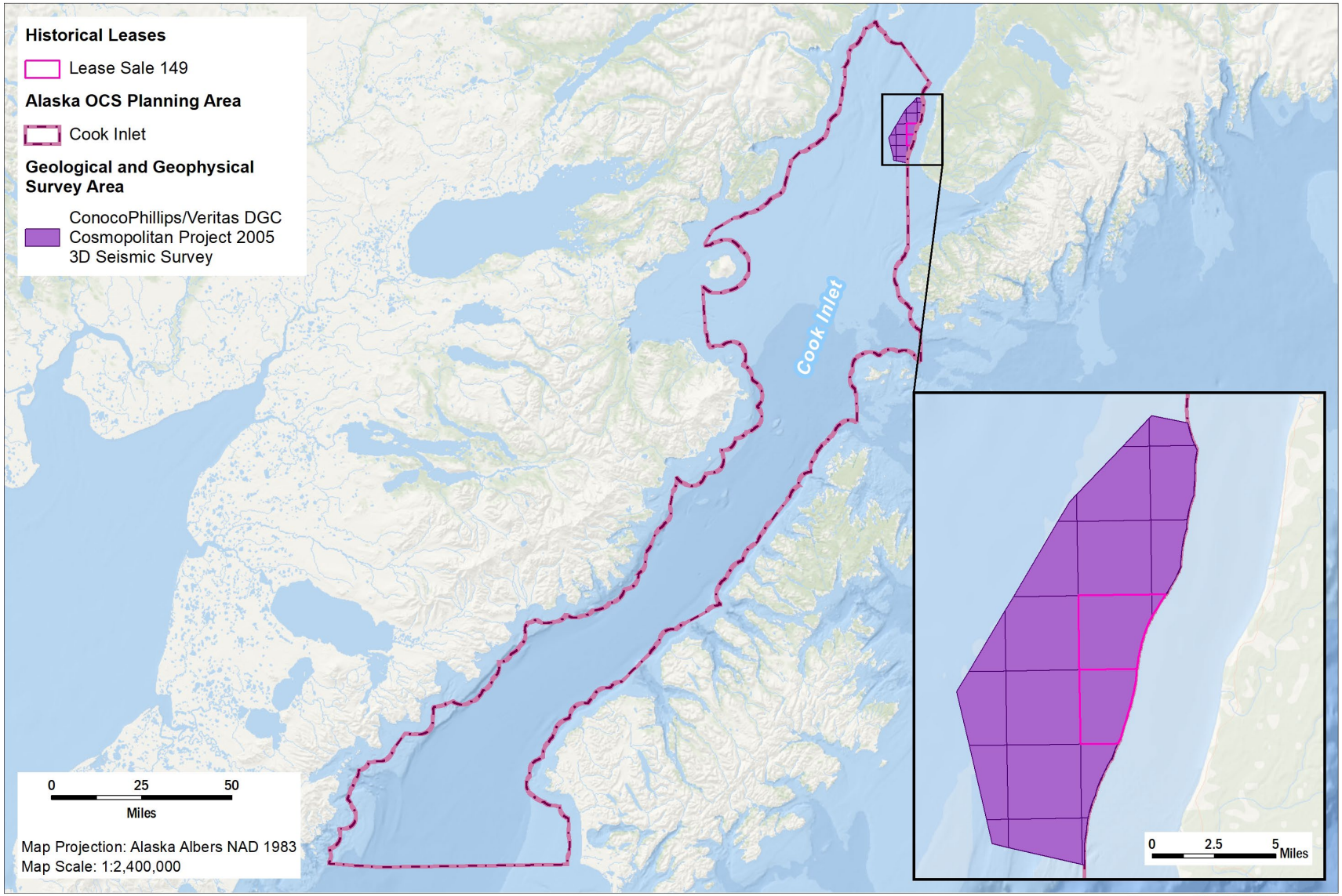


Figure 6-4. Historical oil and gas activities associated with Lease Sale 149, 1997

Table 6.1.3-1. Lease information as a result of Lease Sale 149

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y01665	Forcenergy Inc.	8/1/1997	Terminated	11/15/2010	Seldovia	1665	6163B
Y01664	Forcenergy Inc.	8/1/1997	Terminated	11/15/2010	Seldovia	1664	6113

Source: BOEM 2023b

6.1.3.2 Surveys

In 2005, there was one 3D seismic survey documented as a result of Lease Sale 149, as shown in Table 6.1.3-2.

Table 6.1.3-2. Survey activity summary

Activity Start Date	Activity End Date	Year	Activity Name	Description	Transportation	Operator and Contractor
9/5/2005	11/15/2005	2005	ConocoPhillips/ Veritas DGC Cosmopolitan Project 2005 3D Seismic Survey	The activities were confirmed completed, but only G&G permit information is available at this time.	Peregrine, Falcon, Arctic Wolf, Polar Bear	ConocoPhillips Company, Veritas DGC (contractor)

Note: 3D = three-dimensional
Source: MMS 2005

6.1.3.3 Well Drilling

No wells were drilled as a result of Lease Sale 149.

6.1.3.4 Oil-and-Gas-Supporting Activities

There were no oil-and-gas-supporting activities identified as a result of Lease Sale 149.

6.1.3.5 E&D Scenario Summary

Three scenarios were developed for the Cook Inlet Planning Area Oil and Gas Lease Sale 149 Final Environmental Impact Statement (MMS 1996b) to assess the potential environmental effects of the lease sale. The scenarios were based on an estimated range of oil resources for a low case, base case, and high case. The base case scenario was used for analysis. Summaries of assumptions for exploration and development (MMS 1996b) are shown in Table 6.1.3-3 and Table 6.1.3-4, respectively.

Low Case: The low case of the proposed action featured an exploration-only scenario. It was assumed no commercially producible resources would be discovered. The types of drilling units expected to be used were heavy-duty semisubmersibles or jack-ups. The most likely support base for exploration-drilling activities was estimated to be in the Kenai/Nikiski area, but alternative bases may have been located elsewhere on the Kenai Peninsula (MMS 1996b).

Base Case: For the base case, the range of resources varied from 100 MMbbl produced over the 19-year life of the field to 300 MMbbl produced during the same period. The types of drilling units most likely to be used were heavy-duty semisubmersibles or jack-ups. The most likely support base for exploration-drilling activities was estimated to be Kenai, but alternative bases may have been located elsewhere on the Kenai Peninsula (MMS 1996b).

Activities associated with development and production would begin in 1999 with the installation of a production platform. Crude oil production was estimated to begin in 2002 or 2003 and continue through 2020 or 2021. The production life of the Lease Sale 149 field was expected to be 19 years. Peak production was estimated to occur between 2003 and 2008. Peak production would range from 8 to 25 MMbbl per year. Steel production platforms similar to those used in Upper Cook Inlet may have been the most likely type of platform used to develop and produce Lease Sale 149 oil. Support for development and production activities were estimated to be from a shore base in the Kenai/Nikiski area (MMS 1996b).

Lease Sale 149 oil most likely would have been transported from the field to Nikiski industrial complex through approximately 75 to 150 miles of 12-inch offshore pipeline. Pipeline installation would have occurred between 2001 and 2002 (MMS 1996b).

The primary road systems affected by the base case of the proposed action would have been those of southcentral Alaska. In the base case scenario, produced crude would be transported by undersea pipeline to the Nikiski petrochemical complex for refining or transport to market. The ports of Anchorage and Seward would have been the probable points of entry for the heavy machinery and material required to construct any additional oil processing, tanker dock, or petroleum-storage facilities in Nikiski. Trucked freight would travel by way of the Seward and Sterling highways to the Kenai Peninsula. Based on the use of 36,000-pound tandem truck rigs, the proposal would have probably generated less than 1,000 trips per year (one way), even at the height of development activity. Most of the trips would have been devoted to the movement of oil-pipe- and construction-related materials from port to construction site (MMS 1996b).

For the base case, air support for offshore drilling and construction activities was expected to issue from the Kenai Peninsula. Marine support activities for the base case would issue from the Kenai/Nikiski area. This area had a history of oil-related activities and existing oil-field support contractors and would have provided logistics support for both the exploration and production of the developmental phases. Operating from the subject area would be one or two supply boats. These boats would have been responsible for transporting material to the drill site. The support base and oil terminal were expected to be resupplied by barge or highway. The number of trips per day the support boats would make would decrease from a high of one or two or more per day during exploration and development into the much less active production phase (MMS 1996b).

High Case: The high case featured a range of resources that varied from 550 MMbbl produced over the 19-year life of the field to 1,100 MMbbl produced during the same period. This resource estimate ranged from four to five times that of the base case (MMS 1996b).

Exploratory drilling activities were expected to occur in 1997 through 1999. The types of drilling units expected to be used were heavy-duty semisubmersibles or jack-ups. The most likely support base for exploration drilling activities was Kenai, but alternative bases may have been located elsewhere on the Kenai Peninsula (MMS 1996b).

Activities associated with development and production would have begun in 2000 with the installation of a production platform. Crude oil production was estimated to begin in 2003 and continue through 2021. Peak production was estimated to occur between 2004 and 2008. Peak production would have ranged from 46 to 92 MMbbl per year. Steel production platforms similar to those used in Upper Cook Inlet were estimated to be the most likely type of platform used to develop and produce Lease Sale 149 oil. Depending on site and environmental conditions, the size and shape of the field, and the oil reserves, other types of platforms that could have been used included concrete gravity-based platforms or semisubmersible floating production systems with subsea wells. Support for development and production activities most likely would have been from a shore base in the Kenai/Nikiski area (MMS 1996b).

Leases Sale 149 oil was expected to be transported from the field to the Nikiski industrial complex through approximately 150 to 200 miles of 12-inch pipeline. Pipeline installation would have occurred between 2001 and 2002 (MMS 1996b).

Table 6.1.3-3. Summary of basic exploration and transportation assumptions for exploration

Element	Low Case	Base Case	High Case
Timeframe	1997–1998	1997–1998	1997–1999
Exploration wells	3	1–5	8–20
Delineation wells	--	3–8	12–24
Drilling muds (short tons)	1,080	1,440–4,680	7,200–15,840
Cuttings (short tons)	1,320	1,760–5,270	8,800–19,360
Helicopter flights[1]	180–270	240–1,170	1,200–3,960
Supply boat trips[2]	21–33	28–143	140–484
Shallow-hazard site surveys: total area covered (square miles)	26.7	35.5–115.4	117.6–390.7
Shallow-hazard site surveys: total number of days required	6	8–26	40–88

Notes: -- = no data provided
[1]The number of helicopter flights assumes that there will be one flight per day per well for 60 to 90 days.
[2]The number of supply-boat trips assumes that there will be one trip per week per well for 60 to 90 days.
Source: MMS 1996b

Table 6.1.3-4. Summary of basic exploration, development and production, and transportation assumptions for development and production

Element	Base Case	High Case
Timeframe	1999–2021	2000–2021
Platforms	2–5	8–20
Production and service wells	24–84	122–360
Production (MMbbl)	100–300	550–1,1000
Helicopter flights during drilling[1]	1,080–3,780	5,490–16,200
Helicopter flights after drilling[2]	5,928–14,820	23,712–59,280
Supply boat trips[3]	1,976–4,940	7,904–19,760
Drilling muds (short tons)[4]	1,920–31,080	9,760–133,200
Drilling cuttings (short tons)[4]	13,440–47,040	68,320–201,600
Shallow-hazard site surveys: total area covered (square miles)	71.0–177.6	284.2–710.4
Shallow-hazard site surveys: total number of days required	14–35	56–140
Oil pipeline offshore length	75–150	150–200

Notes: MMbbl = million barrels
[1]The number of helicopter flights assumes that there will be one flight per day per well for 45 days.
[2]The number of helicopter flights assumes that there will be three flights per week per platform for 19 years.
[3]The number of supply-boat trips assumes that there will be one trip per week per platform for 19 years.
[4]Amounts are based on each production or service well using between 80 and 370 tons of drilling muds and producing 560 tons of cuttings.

6.1.3.6 Comparison of Exploration and Development Scenario and Historical Activities

A comparison of the E&D scenario and the historical activities are provided in Table 6.1.3-5, using available information.

Table 6.1.3-5. Comparison of E&D and historical activities

Activity	E&D Scenario	Actual Activities
Sale acreage offering	--	427,886 acres offered
Sale	--	9,766 acres leased
Date of exploratory activities	1997–1998	--
Number of wells	26–89 (2–5 exploratory, 24–84 production and service)	0
Well depth average	--	0
Helicopter flights during drilling	1,080–3,780	0
Helicopter flights after drilling	5,928–14,820	0
Supply boat trips	1,976–4,940 (1 or 2 per day)	0
Number of drilling rigs	1–4	0
Truck trips	Less than 1,000 per year (one way), primarily during construction	0
Shallow-hazard site surveys	71.0–177.6 square miles covered	1 survey
Support facility and shorebase locations	Kenai/Nikiski area	--
Total oil production	100–300 MMbbl	0
Peak production oil	8–25 MMbbl per year	0
Platforms	2–5	0
Offshore pipelines	75–150 miles	0

Notes: -- = no data provided; E&D = Exploration and Development; MMbbl = million barrels

6.1.4 Lease Sale 244 (2017)

The identified activities associated with Lease Sale 244 as of October 25, 2023, are shown in Figure 6-5, such as transportation infrastructure and survey areas.

6.1.4.1 Leasing

As shown in Table 6.1-1 and Figure 6-5, as a result of Lease Sale 244, there were 224 tracts offered and 14 leases issued. There were 1,093,533 acres offered and 76,615 acres leased. There are 14 active leases on 31,005 acres as of July 2023. Table 6.1.4-1 summarizes documented information associated with the leasing as a result of Lease Sale 244.

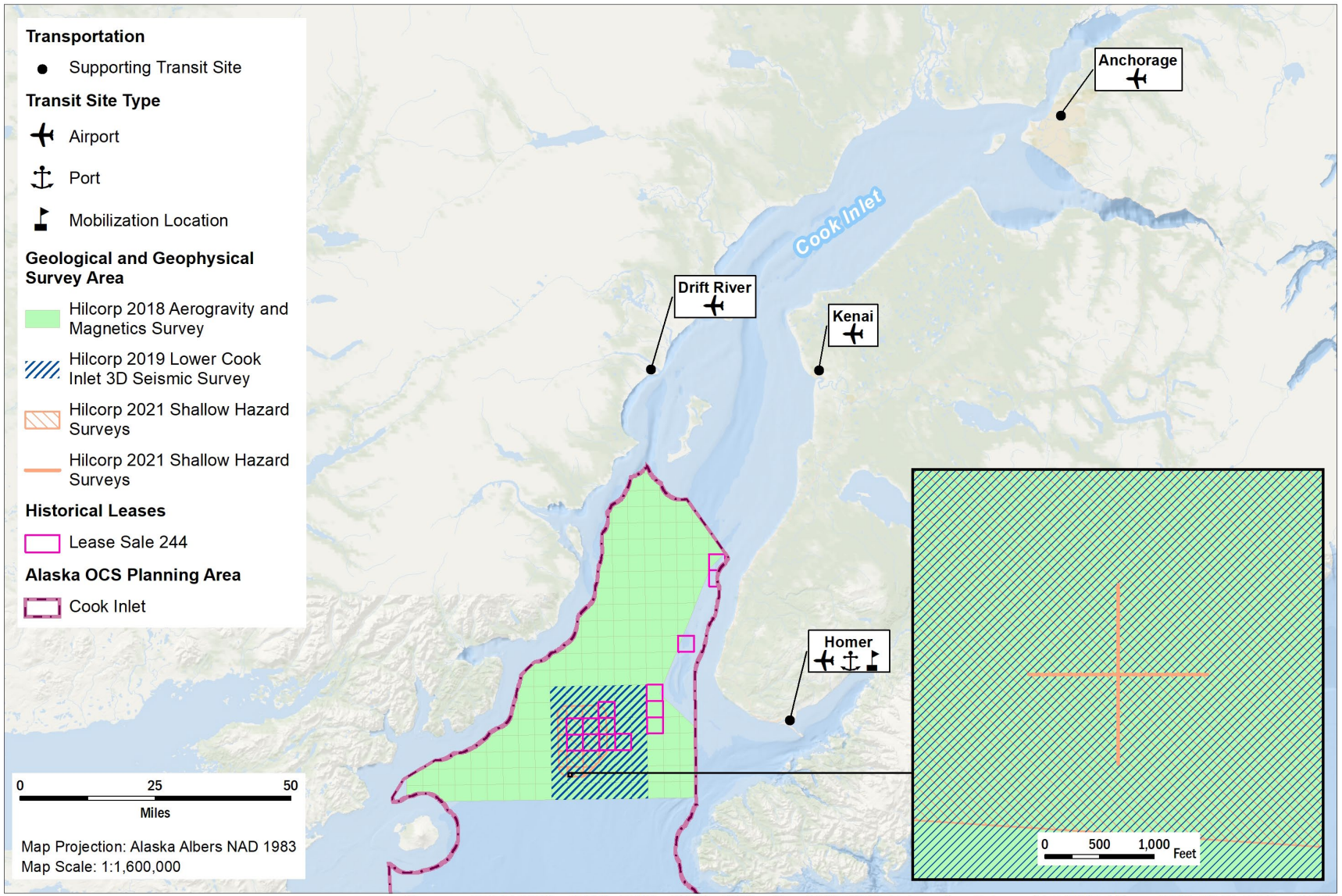


Figure 6-5. Historical oil and gas activities associated with Lease Sale 244, 2017

Table 6.1.4-1. Lease information as a result of Lease Sale 244

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y02434	Hilcorp	10/1/2017	Primary	-	Kenai	2434	7064
Y02435	Hilcorp	10/1/2017	Primary	-	Kenai	2435	7114
Y02436	Hilcorp	10/1/2017	Primary	-	Seldovia	2436	6162
Y02437	Hilcorp	10/1/2017	Primary	-	Seldovia	2437	6310
Y02438	Hilcorp	10/1/2017	Primary	-	Seldovia	2438	6357
Y02439	Hilcorp	10/1/2017	Primary	-	Seldovia	2439	6360
Y02440	Hilcorp	10/1/2017	Primary	-	Seldovia	2440	6405
Y02441	Hilcorp	10/1/2017	Primary	-	Seldovia	2441	6406
Y02442	Hilcorp	10/1/2017	Primary	-	Seldovia	2442	6407
Y02443	Hilcorp	10/1/2017	Primary	-	Seldovia	2443	6410
Y02444	Hilcorp	10/1/2017	Primary	-	Seldovia	2444	6455
Y02445	Hilcorp	10/1/2017	Primary	-	Seldovia	2445	6456
Y02446	Hilcorp	10/1/2017	Primary	-	Seldovia	2446	6457
Y02447	Hilcorp	10/1/2017	Primary	-	Seldovia	2447	6458

Source: BOEM 2023b

6.1.4.2 Surveys

In 2021, there was one shallow hazard G&G survey documented as a result of Lease Sale 244. Other surveys associated with Lease Sale 244 include one aerogravity and magnetics survey and one shallow hazard survey, as summarized in Table 6.1.4-2. Additional surveys may occur in the future, as there are active leases.

Table 6.1.4-2. Survey activity summary

Activity Start Date	Activity End Date	Year	Activity Name	Description	Transportation	Operator and/or Contractor
7/7/2018	8/17/2018	2018	Aerogravity and magnetics survey out of Anchorage (Merrill Field), Kenai, Homer, Drift River	Survey collected airborne gravity and magnetic data recording passive measurements of the Earth's magnetic and gravitational fields.	Basler BT-67 turboprop helicopter	Hilcorp Alaska, LLC, and CGG Canada Services Ltd (contractor)
9/10/2019	10/17/2019	2019	Lower Cook Inlet 3D Seismic survey in Central Lower Cook Inlet	Survey collected 449.25 km^2 of 3D seismic data over an area of 790 km^2. Eight federal OCS lease blocks were crossed: 6357, 6405, 6406, 6407, 6455, 6456, 6457, and 6458.	Vessel names: Polarcus Alima, R/V Qualifier 105, R/V Spirit, R/V Discovery	Hilcorp Alaska, LLC
4/1/2021	10/24/2021	2021	Shallow hazard surveys out of Homer	G&G surveys across four federal OCS lease blocks: 6405, 6406, 6455, and 6456	Vessel names: R/V Wolstad, R/V Thunder	Hilcorp Alaska, LLC, and eTrac, Inc. (contractor)

Notes: 3D = three-dimensional; G&G = geological and geophysical; km^2 = square kilometers; OCS = Outer Continental Shelf; R/V = research vessel
Sources: Carr 2018, 2019; Fairweather Science 2020; Hilcorp 2017, 2018

6.1.4.3 Well Drilling

As of October 25, 2023, no wells were drilled as a result of Lease Sale 244. This may change in the future as there are active leases.

6.1.4.4 Oil-and-Gas-Supporting Activities

As of October 25, 2023, no oil-and-gas-supporting activities have been identified as a result of Lease Sale 244. This may change in the future as there are active leases.

6.1.4.5 E&D Scenario Summary

The most likely case in the BOEM's 2016 National Resource Assessment in the Oil and Gas Lease Sale 244 In the Cook Inlet, Alaska Final Environmental Impact Statement (BOEM 2016d) assigned the Cook Inlet Planning Area an undiscovered economic recoverable resource potential of approximately 0.98 Bbbl of oil and 0.77 Tcf of gas, based upon a price pair of $100 per barrel for oil and $5.34 per thousand cubic feet for gas. These were volumes which could conceivably be economically recovered using current technology. The E&D scenario did not defer gas sales until oil production was depleted. It was believed

that the natural gas distribution system in southcentral Alaska could be extended to transport gas from the Cook Inlet OCS to the greater Anchorage and Kenai Peninsula areas. In the E&D scenario, an oil field and a gas field were assumed to be discovered and developed.

The schedule for the E&D scenarios is shown in Table 6.1.4-3, and the activities are shown in Table 6.1.4-4.

Exploration Activities: The E&D model considered two types of seismic surveys: 1) marine seismic surveys, which generally cover a larger area of leased and/or unleased acreage, and 2) geohazard surveys, which include side scan sonar and shallow-penetrating reflection-seismic profiling conducted on a more specific site. BOEM assumed that two marine seismic surveys could be conducted during the first 2 years of the E&D scenario. The most likely support base for seismic exploration was estimated to be Kenai/Nikiski or Homer. Marine seismic surveys were anticipated to be 3D surveys focused on groups of leased tracts offering detailed geologic data for locating exploration wells (BOEM 2016d).

Exploration and Delineation Drilling: Exploration drilling operations were expected to employ MODUs. Examples of MODUs include drillships, semisubmersibles, and jack-up rigs. Drilling operations in Cook Inlet were expected to range between 30 and 60 days per well at different well sites. BOEM estimated three wells per drilling rig could be drilled, tested, and plugged during a single drilling season using one MODU. To ensure that potential environmental impacts were not underestimated, this scenario assumed that exploration and delineation wells would be plugged with cement and new wells would be drilled for production. This E&D scenario schedule assumed that the operator would commission subsequent platforms without an extended period of evaluation of the initial wells. Setting the platforms and drilling the production wells was estimated to occur over a period of 7 years (BOEM 2016d).

Platforms and Development Wells: In this scenario, it was assumed that the production platform would be a steel-caisson platform constructed and designed to be tide and ice resistant. Each platform would contain up to 24 well slots. Each of the three platforms in the scenario would house production and service (injection) wells, processing equipment, fuel, and quarters for personnel. The first platform would have served as a hub, connecting pipelines from other platforms to the main pipelines to shore. A maximum of six wells per year could be drilled per platform in the scenario development (BOEM 2016d).

Drilling Wastes: Based on the geologic analysis, exploration and delineation wells would average approximately 1,829 meters (6,000 feet) in true vertical depth. The average exploration or delineation well would produce approximately 435 tons of fluid and 747 tons of dry rock cuttings. BOEM assumed that drilling wastes (fluids and cuttings) would be disposed of at the seven to 10 exploration and delineation well sites that were scattered throughout the Cook Inlet Program Area. If a discovery was made, development wells were estimated to average 2,286 meters (7,500 feet) in measured depth. The average development well was expected to produce approximately 839 tons of dry rock cuttings. Drilling fluids from development wells would have been reused or injected into disposal wells; cuttings would have been either ground and injected or barged to an onshore disposal site (BOEM 2016d).

Pipelines: The preferred method to transport oil and gas from the platform was subsea pipelines to the nearest landfall location, probably on the Kenai Peninsula between Homer and Nikiski, depending upon where the first commercial oil discovery was located. Based upon the distance from pipelines already in place in Upper Cook Inlet, it was not anticipated that any of the production platforms from new discoveries in the Lower Cook Inlet would have been able to utilize any existing pipelines. The primary pipeline carrying produced oil from the initial platform to shore would have been a 30-centimeter (12-inch) diameter pipeline, based upon the anticipated production rates from the discovered prospects (BOEM 2016d).

Transportation: One key assumption made regarding this E&D scenario was that the existing onshore infrastructure serving the proposed Lease Sale 244 area had sufficient capabilities without requiring major expansion efforts or modifications. During exploration drilling, operations would have been supported by both helicopters and supply vessels. Helicopters would have probably flown from Nikiski or Homer. Support-vessel marine traffic would be expected to occur also out of Homer or Nikiski. OCS construction (i.e., platform and pipeline installation) and development drilling operations would be supported by both helicopters and supply vessels from existing facilities located in either Homer or Nikiski. If barges were used to transport the drill cuttings and spent fluid from production wells, during drilling operations, a dedicated barge could make one to two trips per week to an onshore disposal facility (BOEM 2016d).

Production Activities: Oil production would commence with the drilling of the first platform production well and ramp up as more wells were drilled. In Cook Inlet, the associated gas produced with the oil could be sold to the local natural gas distribution system. Gas sales would begin when the first oil production well was brought online. Service wells would continue to re-inject produced water throughout oil and gas sales operations (BOEM 2016d).

Timing: Each field schedule had a 3-year environmental analysis process between delineation and development on the proposed development. Due to the inability to estimate accurately which issues may be litigated or how long the process could take, the scenario assumed no delays for litigation provided in the schedule. It was expected to take 4 years to install the three required production platforms. A maximum of six wells per platform were allowed to be drilled per year. The timing of well drilling would determine the production schedule. The real driver of the timeline would be the time needed to install platforms and drill their associated wells after a discovery was made. Each platform would be installed, commissioned, and producing in its first year. The oil and gas fields may have been physically overlain, but the scenario depicted assumed no wells or facilities could be shared. If the oil and gas fields overlapped, wells from the platforms could be completed in both oil and gas zones, reducing the overall number of platforms and the number of wells (BOEM 2016d).

Decommissioning: After oil and gas resources were depleted and income from production no longer paid operating expenses, the operator would begin to shut down the facilities. In a typical situation, wells would be permanently plugged with cement, wellhead equipment would be removed, and casings would be cut off to 15 feet below the mudline. Processing modules would be moved off the platforms. Subsea pipelines would be decommissioned by cleaning the pipeline, plugging both ends, and leaving them buried in the seabed. Lastly, the platform would be disassembled and removed from the area. Post decommissioning surveys would be required to confirm that no debris remained and pipelines were decommissioned properly (BOEM 2016d).

Table 6.1.4-3. Schedule for the E&D scenario

Activity	Beginning Year	Ending Year	Total Years
Perform marine seismic surveys	1	2	2
Perform geohazard surveys	1	3	3
Perform geotechnical surveys	1	3	3
Drill exploration and delineation wells	2	5	4
Install platforms	7	10	4
Drill production and service wells	7	13	7
Install onshore oil pipeline	6	6	1
Install onshore gas pipeline	6	6	1

Activity	Beginning Year	Ending Year	Total Years
Install offshore oil pipelines	6	9	2
Install offshore gas pipelines	6	9	3
Oil production	7	34	28
Gas production	7	39	33
Decommissioning	35	40	6

Source: BOEM 2016d

Table 6.1.4-4. Exploration and development activities projected under the E&D scenario

Element	Range	Comment
Marine seismic surveys	1–2	Will vary within the range based on number of operators
Geohazard surveys	4–5	Will vary within the range based on number of operators
Geotechnical surveys	4–5	Will vary within the range based on number of operators
Platforms	2–3	Will vary within the range based on number of operators and overlying prospects
Exploration and delineation wells	7–10	Includes dry holes and additional unsuccessful wells from other Cook Inlet OCS prospects
Production wells	55–66	Depends on ability to have multiple completions in overlaying oil producing strata
Service wells	10–12	15–23 percent of production wells
Onshore oil pipeline (miles)	50	Longer distance may be required for rerouting
Onshore gas pipeline (miles)	50	Longer distance may be required for rerouting
Offshore oil pipeline (miles)	60–85	Miles vary within the range based on location of actual prospects
Offshore gas pipeline (miles)	60–115	Miles vary within the range based on location of actual prospects
Total oil production (MMbbl)	150–215	None
Total gas production (Bcf)	81–571	None
Peak oil rate (Mbbl/day)	68	None
Peak gas rate (MMcf/day)	181	None
New pipelines to shore	2	1 oil export line, followed by 1 gas export line in same corridor between Homer and Nikiski
New shorebases	0	Not required, existing infrastructure is adequate
New processing facility	0	Not required, existing infrastructure is adequate
New drilling and production waste handling facility	0	None
Drilling fluids from exploration and delineation wells (tons)	3,045–4,350	Estimated at 435 tons/well
Rock cuttings discharge for exploration and delineation wells (tons)	5,229–7,470	Estimated at 747 tons/well. Cuttings volume assumes the normal practice of drilling exploration wells significantly deeper than the target formation.
Drilling fluids from service and production wells (tons)	6,318–18,954	Estimated at 486 tons/well. Drilling fluids will be disposed of in service wells or barged to shore based upon a material reuse of 50–80 percent.

Element	Range	Comment
Rock cuttings from production and service wells (tons)	54,535–65,442	Estimated at 839 tons/well, disposed of in service wells or barged to shore. Although these wells are deviated, they are generally not drilled much below the target formation.
Flights per week during exploration drilling	7–21	1 to 3 flights daily per MODU while on location
Boat trips per week during exploration drilling	1–2	1 to 2 trips weekly per MODU during exploration drilling
Flights per week during development phase	21–63	1 to 3 flights per platform per day
Boat trips per week during development phase	3–9	1 to 3 trips per platform per week
Flights per week during production phase	21–63	1 to 3 flights per platform per day
Boat trips per week during production phase	3–6	1 to 2 trips per platform per week
Years of activity	36–39	Final gas production may be truncated for economic reasons

Notes: Bcf = billion cubic feet; Mbbl = thousand barrels; MMbbl = million barrels; MMcf = million cubic feet; MODU = Mobile Offshore Drilling Unit
Source: BOEM 2016d

6.1.4.6 Comparison of Exploration and Development Scenario and Historical Activities

A comparison of the E&D scenario and the historical activities as of October 25, 2023, are provided in Table 6.1.4-5, using available information.

Table 6.1.4-5. Comparison of E&D and historical activities

Activity	E&D Scenario	Actual Activities
Recoverable oil	0.98 Bbbl	--
Recoverable gas	0.77 Tcf	--
Sale acreage offering	--	1,093,533 acres offered
Sale	--	76,615 acres leased
Years of surveys	3	3
Number of wells	72–89 (7–10 exploration and delineation, 55–66 production, 10–12 service)	0
Well depth average	--	0
Number of G&G surveys	4–5	1
Number of marine seismic surveys	1–2 3D surveys	1
Number of aerogravity surveys	0	1
Support base for seismic surveys	Kenai/Nikiski or Homer	Homer
Number of vessels for exploration	--	6
Flights during exploration	7–21 per week	14 per week
Flights during development	21–63 per week	0
Flights during production	3–6 per week	0
Boat trips during exploration	1–2 per week	--
Boat trips during development	3–9 per week	0
Boat trips during production	3–6 per week	0

Activity	E&D Scenario	Actual Activities
New shorebases	0	0
Total production oil	150–215 MMbbl	0
Total production gas	81–571 Bcf	0
Peak production oil	68 Mbbl per day	0
Peak production gas	181 MMcf per day	0
Platforms	2–3	0
Onshore pipelines	100 miles (50 gas, 50 oil)	0
Offshore pipelines	125–200 (65–115 gas, 60–85 oil)	0

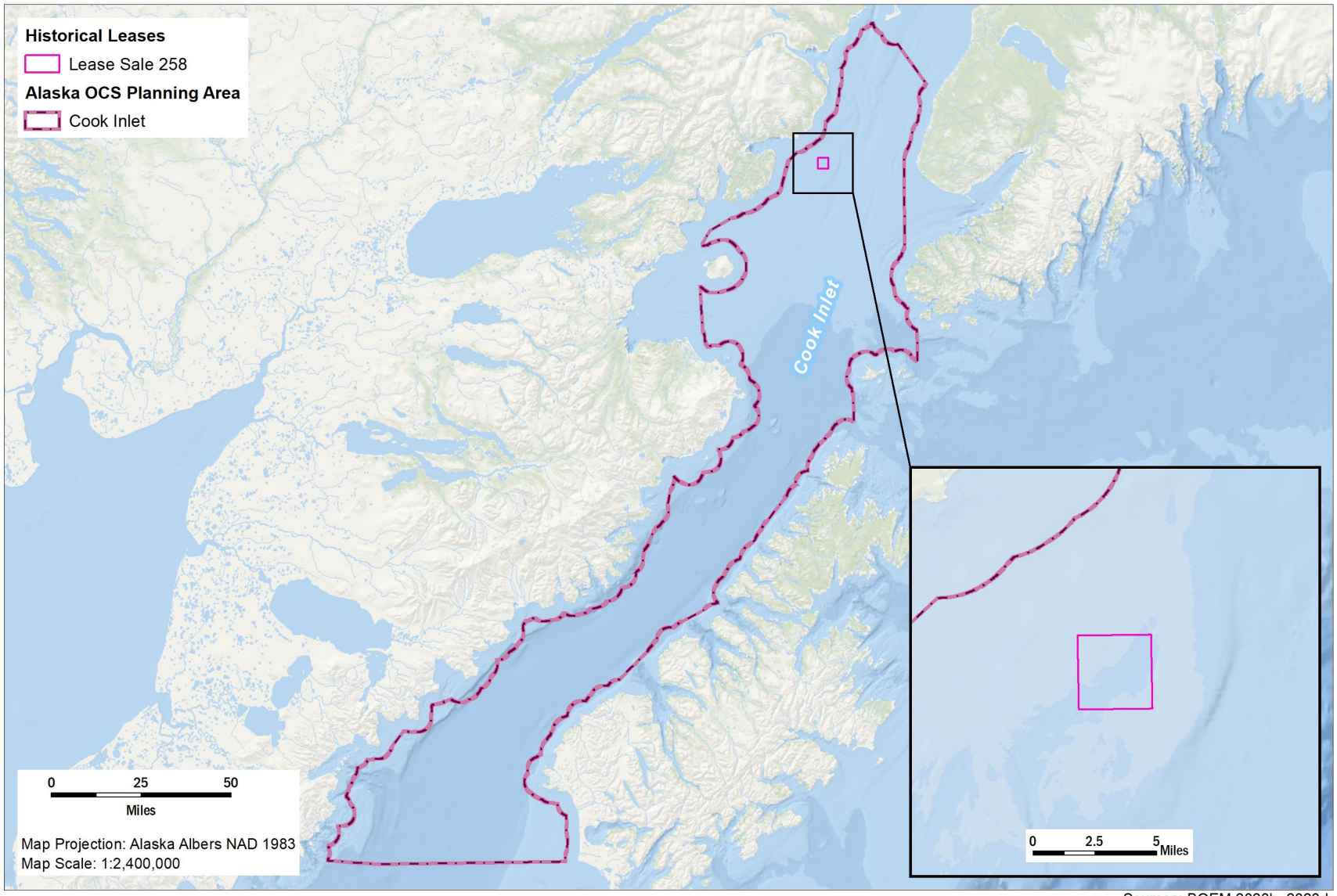
Notes: -- = no data provided; 3D = three-dimensional; Bbbl = billion barrels; Bcf = billion cubic feet; E&D = Exploration and Development; G&G = geological and geophysical; Mbbl = thousand barrels; MMbbl = million barrels; MMcf = million cubic feet; Tcf = trillion cubic feet
It is assumed that all production-related activities in the E&D scenario did not occur.

6.1.5 Lease Sale 258 (2022)

The identified activities associated with Lease Sale 258 as of October 25, 2023, are shown in Figure 6-6, such as the resulting single lease from the lease sale.

6.1.5.1 Leasing

As shown in Table 6.1-1 and Figure 6-6, as a result of Lease Sale 258, there were 193 tracts offered and one lease issued. There were 958,202 acres offered and 5,693 acres leased. There is one active lease on 5,693 acres as of September 2023. Table 6.1.5-1 summarizes documented information associated with the leasing as a result of Lease Sale 258.



Sources: BOEM 2023b, 2023d.

Figure 6-6. Historical oil and gas activities associated with Lease Sale 258, 2022

Table 6.1.5-1. Lease information as a result of Lease Sale 258

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y02448	Hilcorp	4/1/2023	Primary	--	Seldovia	2448	6255

Note: -- = no data provided
Source: BOEM 2023b

6.1.5.2 Surveys

As of October 25, 2023, no surveys have been documented as a result of Lease Sale 258. This may change in the future as there is one active lease.

6.1.5.3 Well Drilling

As of October 25, 2023, no wells were drilled as a result of Lease Sale 258. This may change in the future as there are active leases.

6.1.5.4 Oil-and-Gas-Supporting Activities

As of October 25, 2023, no oil-and-gas-supporting activities have been identified as a result of Lease Sale 258. This may change in the future as there are active leases.

6.1.5.5 E&D Scenario Summary

In order to derive specific production estimates and activity levels for BOEM's environmental analyses for the Oil and Gas Lease Sale 258 In Cook Inlet, Alaska Final Environmental Impact Statement (BOEM 2021b), the E&D scenario's range of activities was characterized by three distinct cases. Details of all three cases are outlined in Table 6.1.5-2 through Table 6.1.5-6. The low case estimated activities expected if a 229.5 Bcf natural gas field was discovered and developed. No oil would be produced under the low case. The medium case provided an estimate of activities expected if a 192.3 MMbbl oil field was discovered and developed. Under the medium case, it was estimated that 72.4 Bcf of associated natural gas would also be produced. The high case estimated the activities associated with development of both the gas field described in the low case and the oil field described in the medium case, for a total of 192.3 MMbbl oil and 301.9 Bcf natural gas produced (BOEM 2021b). The E&D scenario below is based on the high case estimate, which was also used for analysis in the environmental impact statement.

To produce the estimated 192.3 MMbbl of oil and 301.9 Bcf of natural gas in the high case, a maximum of six 24-slot platforms would be required, from which 108 wells (production and service) would be drilled. The scenario assumed separate platforms and production wells would be required to produce from each prospect (BOEM 2021b).

Exploration Activities: The E&D model considered two types of seismic surveys: 1) deep penetrating marine seismic surveys and 2) geohazard surveys. The seismic survey was expected to be a 3D survey focused on clusters of tracts offering resource potential as identified in regional surveys. Prior to drilling exploration wells, operators would examine the proposed exploration drilling locations for geologic hazards and archeological features using geohazard seismic surveys and geotechnical studies, together referenced as G&G surveys. The E&D scenario expected a range of one to six G&G surveys would occur as a result of Lease Sale 258. It was assumed that the required G&G surveys for exploration drilling could usually be completed with a single survey. Additional G&G surveys were then estimated for placement of infrastructure on the seafloor such as pipelines and platforms (BOEM 2021b).

Exploration and Delineation Drilling: Based on the size and reservoir characteristics of the proxy pools identified above, as many as eight wells might have been associated with exploring and delineating the prospects, including unsuccessful exploration wells on other prospects in the proposed lease sale area, the drilling of which could have been prompted by news of the first commercial discovery (BOEM 2021b).

Drilling Wastes: Based on analysis of historical exploration wells in the Cook Inlet OCS, exploration and delineation wells were expected to average about 6,000 feet in true vertical depth. The average exploration or delineation well was expected to produce approximately 9,000 bbl of mud and 588 cubic yards of dry rock cuttings. BOEM assumed that drilling wastes (muds and cuttings) would be disposed of

at the three to eight drilling sites that were scattered throughout the Cook Inlet lease sale area (BOEM 2021b).

Platforms and Production Wells: It was assumed that the production platform would be a steel-caisson platform constructed and designed to be tide and ice resistant. Each platform would contain up to 24 well slots. Each of the six platforms would house production and service (injection) wells, processing equipment, fuel, and personnel quarters. The first platform would serve as a hub, connecting pipelines from other platforms to the main pipelines to shore. Based on the average time required to drill a well, a maximum of six wells per year could be drilled per platform (BOEM 2021b).

Pipelines: The preferred method to transport oil and gas from the platform was subsea pipelines to the nearest landfall location, likely on the southern Kenai Peninsula near either Homer or Nikiski, depending upon where the first commercial oil discovery was located. Based upon the proximity of pipelines already in place in Upper Cook Inlet, it was not anticipated that any of the production platforms from any new discoveries in the Lower Cook Inlet would be able to utilize any existing pipelines. Based upon the anticipated production rates from the fields, the primary pipeline carrying produced oil from the platform to shore would be a 12-inch-diameter pipeline (BOEM 2021b).

Transportation: One key assumption made regarding this E&D scenario was that the existing onshore infrastructure (i.e., boat harbors, airports, onshore pipelines, roads, etc.) serving the proposed Lease Sale 258 area had capacity to support the activities considered in the E&D scenario without requiring major expansion efforts or modifications. During exploration drilling, operations would have been supported by both helicopters and supply vessels. During normal production operations, the frequency of helicopter flights offshore would remain the same (one to three flights per platform per day), but marine traffic would drop to about one to two trips per week to each platform. If barges were used to transport the drill cuttings and spent mud from production wells during drilling operations, a dedicated barge could make one to two trips per week to an onshore disposal facility (BOEM 2021b).

Production Activities: Oil production would commence with the drilling of the first platform production well and ramp up as more wells were drilled. In Cook Inlet, the associated gas produced with the oil was expected to be sold to the local natural gas distribution system. Gas sales would have begun when the first oil production well was brought online. Service wells would have continued to re-inject produced water throughout oil and gas sales operations (BOEM 2021b).

Timing: This E&D scenario had a lifespan of 40 years. As described above, the scenario assumed that exploration drilling could be completed within a 3-year time span. In the high case scenario, it would take 13 years to install the six required production platforms. A maximum of six wells per platform would be allowed to be drilled per year. Oil and gas wells typically decline immediately after they begin production. The E&D scenario assumed that the wells would have an average economic life expectancy of approximately 18 years. The first wells would begin production in year 7, and the last development wells would be drilled in year 21. Based upon the expected economic life of the well, it was expected that the project would begin decommissioning after year 34 (BOEM 2021b).

Decommissioning: After oil and gas resources were depleted and income from production no longer paid operating expenses, the operator would begin to shut down the facilities. In a typical situation, wells would be permanently plugged with cement, and wellhead equipment will be removed. Processing modules would be moved off the platforms. Subsea pipelines would be decommissioned by cleaning the pipeline, plugging both ends, and leaving them buried in the seabed. Lastly, the platform would be disassembled and removed from the area, and the seafloor site would be restored to some practicable predevelopment condition. Post abandonment surveys would be required to confirm that no debris remained following decommissioning and that pipelines were abandoned properly. It was expected the

final decommissioning phase would take 2 years, making the total expected lifespan of the E&D scenario 40 years (BOEM 2021b).

Table 6.1.5-2. Exploration activities for the low, medium, and high activity cases

Element	Low Case	Medium Case	High Case	Season	Comment
Deep penetrating marine seismic surveys	1 survey of 28 blocks (3D)	1 survey of 28 blocks (3D)	1 survey of 28 blocks (3D)	Open water	One 3D seismic survey will be conducted.
Airborne geophysical (gravity) survey	1 survey of 1 million acres	1 survey of 1 million acres	1 survey of 1 million acres	Year round	Airborne geophysical survey could be conducted over the leasing area.
Geohazard and geotechnical surveys	1 survey, 11 site clearances; 1,403 line-miles and point sampling locations	Up to 2 surveys could conduct 27 site clearances; 3,076 line-miles and point sampling locations	Up to 4 surveys could conduct 36 site clearances; 4,596 line-miles and point sampling locations	Open water	G&G surveys include shallow hazard site clearances and point sampling. For geohazard surveys, multiple sites may be cleared in a single survey.
Total number of exploration and delineation wells drilled	3	6	8	Open water	Drilling would be done from MODUs such as a jack-up or drillship.
Maximum number of exploration and delineation rigs operating simultaneously in a year	1	1	1	Open water	Exploration and delineation wells are drilled from the same rig.
Volume of rock cuttings discharged for exploration and delineation wells	1,764 cy	3,528 cy	4,704 cy	Open water	Exploration and delineation wells would average 588 cy of dry rock cutting per well.
Volume of drilling fluids from exploration and delineation wells	27,000 bbl	54,000 bbl	72,000 bbl	Open water	On average, 9,000 bbl of drilling fluid would be used per exploration well.

Notes: 3D = three-dimensional; bbl = barrels; cy = cubic yards; G&G = geological and geophysical; MODU = Mobile Offshore Drilling Unit
Source: BOEM 2021b

Table 6.1.5-3. Wells, platforms, and facilities for the low, medium, and high activity cases

Element	Low Case	Medium Case	High Case	Season	Comment
Production wells	8	73	81	Year round	Production wells area disturbance is included in the platform seafloor disturbance.
Service wells	4	23	27	Year round	Service wells area disturbance is included in the platform seafloor disturbance.

Element	Low Case	Medium Case	High Case	Season	Comment
Rock cuttings from production and service wells	7,056 cy	56,448 cy	63,504 cy	Year round	Production and service wells would average 588 cy of dry rock cutting, which would be disposed of in service wells or barged to shore for disposal and established treatment facilities.
Drilling fluids from service and production wells	9,360 bbl	74,880 bbl	84,240 bbl	Year round	On average, 2,369 bbl of drilling fluid would be used to drill each production well. Eighty percent of the drilling fluid is expected to be recycled; 20 percent would be injected into disposal wells or discharged.
Steel jacketed platforms installed	1	5	6	Open water	0.14-acre footprint/platform (85 feet by 70 feet)
New shore bases	0	0	0	0	None
New onshore drilling and production waste handling facilities	0	0	0		None

Notes: bbl = barrels; cy = cubic yards
Source: BOEM 2021b

Table 6.1.5-4. Pipelines for the low, medium, and high activity cases

Element	Low Case	Medium Case	High Case	Season	Comment
Onshore oil pipeline	No oil pipeline	Up to 80 miles of pipeline; up to 290-acre footprint	Up to 80 miles of pipeline; up to 290-acre footprint	Year round	Footprint based on an estimated 30-foot-wide disturbance for pipeline installation. Onshore pipeline would be buried where practical.
Onshore gas pipeline	1 pipeline; 4-acre footprint	1 pipeline; 4-acre footprint	1 pipeline; 4-acre footprint	Year round	Footprint based on an estimated 30-foot-wide disturbance for pipeline installation. Onshore pipeline would be buried where practical.
Offshore oil pipeline	No oil pipeline	Up to 80 miles of pipeline; up to 291-acre footprint	Up to 80 miles of pipeline; up to 291-acre footprint	Open water	Footprint based on an estimated 30-foot-wide disturbance for pipeline installation. Offshore pipeline would be buried where practical.
Offshore gas pipeline	Up to 40 miles of pipeline; up to 145-acre footprint	Up to 80 miles of pipeline; up to 291-acre footprint	Up to 120 miles of pipeline; up to 437-acre footprint	Open water	Footprint based on an estimated 30-foot-wide disturbance for pipeline installation. Offshore pipeline would be buried where practical.
New pipelines to shore	1	2	2	N/A	New shoreline crossings of pipelines provided in this table.

Note: N/A = not applicable

Table 6.1.5-5. Helicopter flight and boat trip distance and frequency for the low, medium, and high activity cases

Element	Low Case	Medium Case	High Case	Season	Comment
Flights per week during peak exploration activity	14 flights; 700 miles[1]	14 flights; 700 miles[1]	14 flights; 700 miles[1]	Year round	Approximately two flights per day. Flights would depart from Homer or Nikiski.
Boat trips per week during peak exploration activity	5 trips; 250 miles[1]	5 trips; 250 miles[1]	5 trips; 250 miles[1]	Open water	Marine vessels would depart from Homer.
Flights per week during peak development, production, and decommissioning phases	7 flights; 350 miles[1]	7 flights; 350 miles[1]	42 flights; 2,100 miles[1]	Year round	One flight could service multiple platforms. Flights would depart from Homer or Nikiski.
Boat trips per week during peak development, production, and decommissioning phases	7 trips; 350 miles[1]	35 trips; 1,750 miles[1]	42 trips; 2,100 miles[1]	Open water	Marine vessels would depart from Homer.

Note: [1]Estimates use 50 miles as the typical one-way distance traveled.

Table 6.1.5-6. Total production and peak daily production rates for the low, medium, and high activity cases

Element	Low Case	Medium Case	High Case
Total oil production (MMbbl)	0	192.3	192.3
Total gas production (Bcf)	229.5	72.4	301.9
Peak oil rate (Mbbl/day)	0	36.7	36.7
Peak gas rate (MMcf/day)	61.94	13.73	85.64

Notes: Bcf = billion cubic feet; Mbbl = thousand barrels; MMbbl = million barrels; MMcf = million cubic feet
There is no oil production in the low activity case.

6.1.5.6 Comparison of Exploration and Development Scenario and Historical Activities

A comparison of the E&D scenario and the historical activities as of October 25, 2023, are provided in Table 6.1.5-7, using available information.

Table 6.1.5-7. Comparison of E&D and historical activities

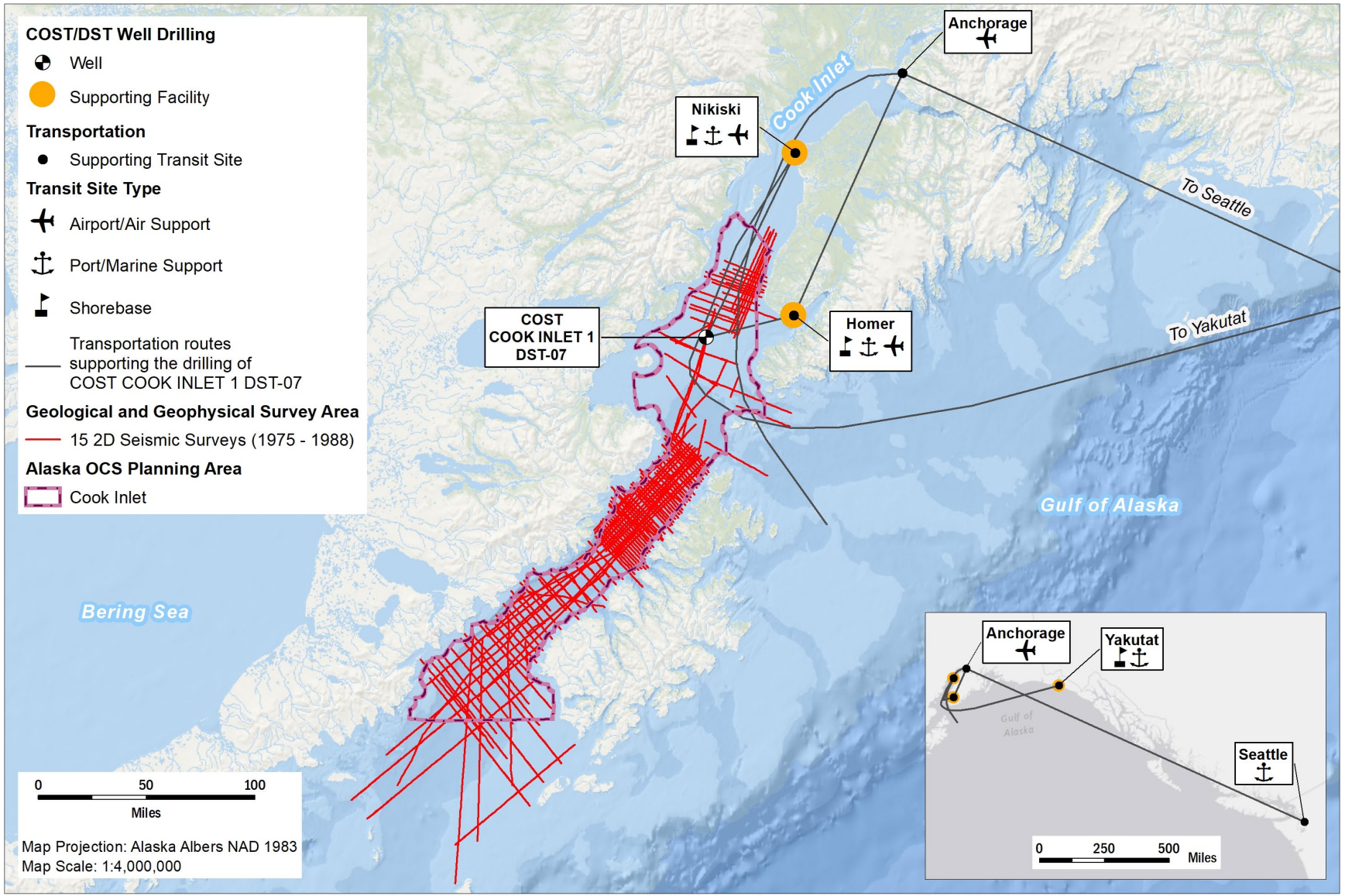
Activity	E&D Scenario	Actual Activities
Recoverable oil (maximum)	192.3 MMbbl	--
Recoverable gas (maximum)	301.9 Bcf	--
Sale acreage offering	--	958,202 acres offered
Sale	--	5,693 acres leased
Number of marine surveys	1	0

Activity	E&D Scenario	Actual Activities
Number of airborne surveys	1	0
Number of G&G surveys	4	0
Number of wells	116 (8 exploration and delineation, 81 production, 27 service)	0
Well depth average	--	0
Number of drilling rigs	1 per year	0
Support facility locations	Homer or Nikiski	0
New shorebases	0	0
Flights during exploration	14 per week	0
Flights after exploration	42 per week	0
Boat trips during exploration	5 per week	0
Boat trips after exploration	42 per week	0
Total production	192.3 MMbbl oil, 301.9 Bcf gas	0
Peak production	36.7 Mbbl per day oil, 85.64 MMcf per day gas	0
Platforms	6	0
Onshore pipelines	80 miles oil, 1 pipeline gas	0
Offshore pipelines	200 miles (80 miles oil, 120 miles gas)	0
Onshore pipeline area	294 acres (290 acres oil,4 acres gas)	0
Offshore pipeline area	728 acres (291 acres oil, 437 acres gas)	0

Notes: -- = no data provided; Bcf = billion cubic feet; E&D = Exploration and Development; G&G = geological and geophysical; Mbbl = thousand barrels; MMbbl = million barrels; MMcf = million cubic feet
Comparisons in this table were based on the 'high case' activity case in the E&D.

6.1.6 Activities Not Associated with a Lease Sale

Activities that could not be directly associated with a lease sale are shown in Figure 6-7, such as the locations of a COST/DST well, supporting facilities, transportation infrastructure, and survey areas.



Sources: Banet 2015e; BOEM 2022b, 2022c, 2022d, 2023c, 2023d; Dames & Moore 1978; Northern Resource Management 1980; USGS 2023; Triezenberg et al. 2016; Veritas DGC 2005.

Figure 6-7. Historical oil and gas activities not associated with a lease sale in Cook Inlet Planning Area

6.1.6.1 Surveys

Between 1975 and 1988, there were fifteen 2D seismic surveys documented that were not associated with a lease sale, as summarized in Table 6.1.6-1. It is possible that two other early G&G surveys (from 1975 and 1977) referenced in Table 6.1.6-1 are the same as surveys reported in Table 6.1.1-2, but not enough information was available to confidently determine these surveys were the same.

Table 6.1.6-1. Survey activity summary

Activity Start Date	Activity End Date	Year	Activity Name	Description	Vessel Name(s)	Operator and/or Contractor
1/1/1975	1/2/1975	1975	2D multichannel seismic survey	Survey used an airgun and streamer data acquisition system resulting in 124 tracklines and a total of 10,358 km shot.	--	USGS
7/3/1977	7/22/1977	1977	2D multichannel seismic survey	Survey used an airgun and streamer data acquisition system resulting in 33 tracklines and a total of 4,292 km shot.	--	Pacific Coastal and Marine Science Center
10/1/1979	11/30/1979	1979	2D multichannel seismic survey	Survey used an airgun and streamer data acquisition system resulting in 26 tracklines and a total of 2,781 km shot.	--	Western Geophysical Company
10/1/1979	11/1/1979	1979	2D multichannel seismic survey	Survey used an airgun and streamer data acquisition system resulting in 18 tracklines and a total of 1,052 km shot.	--	Western Geophysical Company
10/1/1979	11/1/1979	1979	2D multichannel seismic survey	Survey used an airgun and streamer data acquisition system resulting in four tracklines and a total of 407 km shot.	--	Shell Oil Company
10/1/1980	10/31/1980	1980	2D multichannel seismic survey	Survey used an airgun and streamer data acquisition system resulting in 64 tracklines and a total of 4,027 km shot.	--	Western Geophysical Company
10/11/1980	11/12/1980	1980	2D multichannel seismic survey	Survey used an airgun and streamer data acquisition system resulting in 44 tracklines and a total of 2,069 km shot.	--	Western Geophysical Company
5/1/1981	10/8/1981	1981	2D multichannel seismic survey	Survey used an airgun and streamer data acquisition system resulting in six tracklines and a total of 167 km shot.	--	Digicon Geophysical Corp

Activity Start Date	Activity End Date	Year	Activity Name	Description	Vessel Name(s)	Operator and/or Contractor
6/11/1981	6/30/1981	1981	2D multichannel seismic survey	Surveyed used an airgun and streamer data acquisition system resulting in 33 tracklines and a total of 2,691 km shot.	--	Pacific Coastal and Marine Science Center
5/1/1982	11/30/1982	1982	2D multichannel seismic survey	Surveyed used an airgun and streamer data acquisition system resulting in 17 tracklines and a total of 1,511 km shot.	--	Western Geophysical Company
5/28/1982	11/15/1982	1982	2D multichannel seismic survey	Surveyed used an airgun and streamer data acquisition system resulting in 16 tracklines and a total of 1,507 km shot.	--	Western Geophysical Company
8/1/1982	8/31/1982	1982	2D multichannel seismic survey	Surveyed used an airgun and streamer data acquisition system resulting in 11 tracklines and a total of 815 km shot.	--	Western Geophysical Company
6/1/1983	11/1/1983	1983	2D multichannel seismic survey	Surveyed used an airgun and streamer data acquisition system resulting in 26 tracklines and a total of 2,828 km shot.	--	Western Geophysical Company
6/22/1984	7/25/1984	1984	2D multichannel seismic survey	Survey used an airgun and streamer data acquisition system resulting in 12 tracklines and a total of 554 km shot.	--	ARCO Alaska, Inc. and Digicon Geophysical Corp (contractor)
6/14/1988	6/19/1988	1988	2D multichannel seismic survey	Survey used an airgun and streamer data acquisition system resulting in four tracklines and a total of 258 km shot.	--	ARCO Alaska, Inc.

Note: 2D = two-dimensional; 3D = three-dimensional; BOEM = U.S. Department of the Interior, Bureau of Ocean Energy Management; km = kilometers; M/V = motor vessel; MMS = U.S. Department of the Interior, Minerals Management Service; USGS = U.S. Geological Survey
Sources: Banet 2015e; Triezenberg et al. 2016; USGS 2023; Veritas DGC 2005

6.1.6.2 Well Drilling

One COST/DST well was drilled that was not associated with a lease sale, as summarized in Table 6.1.6-2.

Table 6.1.6-2. Well drilling summary

Activity Start Date	Activity End Date	Well Name (includes API no.)	Well Type	Well Depth (feet)	Drill Rig Name
6/10/1977	9/24/1977	API no. 5522000001 (COST COOK INLET 1 DST-07)	Exploration	12,385	ODECO Ocean Ranger

Sources: BOEM 2022b, 2023c; Dames & Moore 1978

6.1.6.3 Oil-and-Gas-Supporting Activities

Identified oil-and-gas-supporting activities not associated with a lease sale included facility support and transportation from facilities and shorebases to relevant activity sites (if documented), as summarized in Table 6.1.6-3 and Table 6.1.6-4.

Table 6.1.6-3. Facility support summary

Facility Name	Facility Type	Description	Supported Activity
Nikiski shorebase	Onshore shorebase complex	Facilities included a rig tenders dock, earth fill berth to handle barges and 200-foot class work boats, and a helicopter pad, owned by Crowley Maritime. Facilities were used approximately 4 days per month. Aircraft and supply vessels from Nikiski were used for support of this well, but details are not available.	Drilling well: COST/DST exploration well COOK INLET 1 DST-07
Homer shorebase	Onshore shorebase complex	Facilities included a gravel airstrip, helicopter hangars, a deep-water dock, and a freshwater/fuel line on the dock, owned by the Municipality. Facilities were used daily by helicopters and approximately 7 days per month by supply boats. The drill rig *ODECO Ocean Ranger* was served by supply vessel *Northern Lights*. Helicopters Sikorski S61N and Bell 212 also served the drill rig.	Drilling well: COST/DST exploration well COOK INLET 1 DST-07
Yakutat shorebase	Onshore shorebase complex	Facilities included a 77-acre industrial park, a 120-foot-dock for barges and 200-foot supply boats, a 75-ton crane, an 8,300-square foot covered storage, housing for 48 men in transit, a commercial hotel and restaurant, diesel generation on site, physical-chemical sewage treatment plant on site, bilge treatment plant, waste incinerator, fresh water supply, 7,800-foot paved runway, and helicopter hangars. Facilities were used infrequently, with an occasional work boat trip to or from Nikiski.	Drilling well: COST/DST exploration well COOK INLET 1 DST-07

Source: Dames & Moore 1978

Table 6.1.6-4. Summary of transportation activity

Facility Name	Facility Type	Supported Activity	No. Aircraft	Aircraft	No. Vessels	Vessel Names
Anchorage Airport	Airport	COST/DST exploration well COOK INLET 1 DST-07	--	--	N/A	N/A
Port of Seattle	Port	COST/DST exploration well COOK INLET 1 DST-07	N/A	N/A	--	--
Homer shorebase	Shorebase	COST/DST exploration well COOK INLET 1 DST-07	1	Sikorski S61N, Bell 212	1	Northern Lights (Support Vessel)
Nikiski shorebase	Shorebase	COST/DST exploration well COOK INLET 1 DST-07	--	--	--	--
Yakutat shorebase	Shorebase	COST/DST exploration well COOK INLET 1 DST-07	--	--	--	Unnamed workboats

Notes: -- = no data provided; COST = continental offshore stratigraphic test; DST = deep stratigraphic test; N/A = not applicable
Source: Dames & Moore 1978

6.2 Gulf of Alaska Planning Area

The Gulf of Alaska Planning Area extends along an 850-mile-long segment of the Alaska continental margin from the southwest tip of the Kenai Peninsula on the west to Dixon Entrance at the U.S.-Canadian border on the southeast. It extends from the 3-mile limit of State of Alaska waters seaward to approximately the 2,000-meter isobath on the north (continental) side of the Amatuli Trough. Between 1976 and 1981, there were three lease sales in the Gulf of Alaska Planning Area: Lease Sales 39, 58, and RS-1. There are no active leases in this OCS planning area. A summary of the leases in the Gulf of Alaska Planning Area is shown in Table 6.2-1. Information on these leases is provided in the sections below.

Table 6.2-1. Summary of leases in the Gulf of Alaska Planning Area

	Lease Sale 39	Lease Sale 55	Lease Sale RS-1
Year	1976	1980	1981
Tracts offered	189	210	175
Acres offered	1,008,499	1,195,569	996,300
Leases issued	76	35	1
Acres leased	409,058	199,261	5,693
Active leases	0	0	0
Active lease area (hectares)	0	0	0

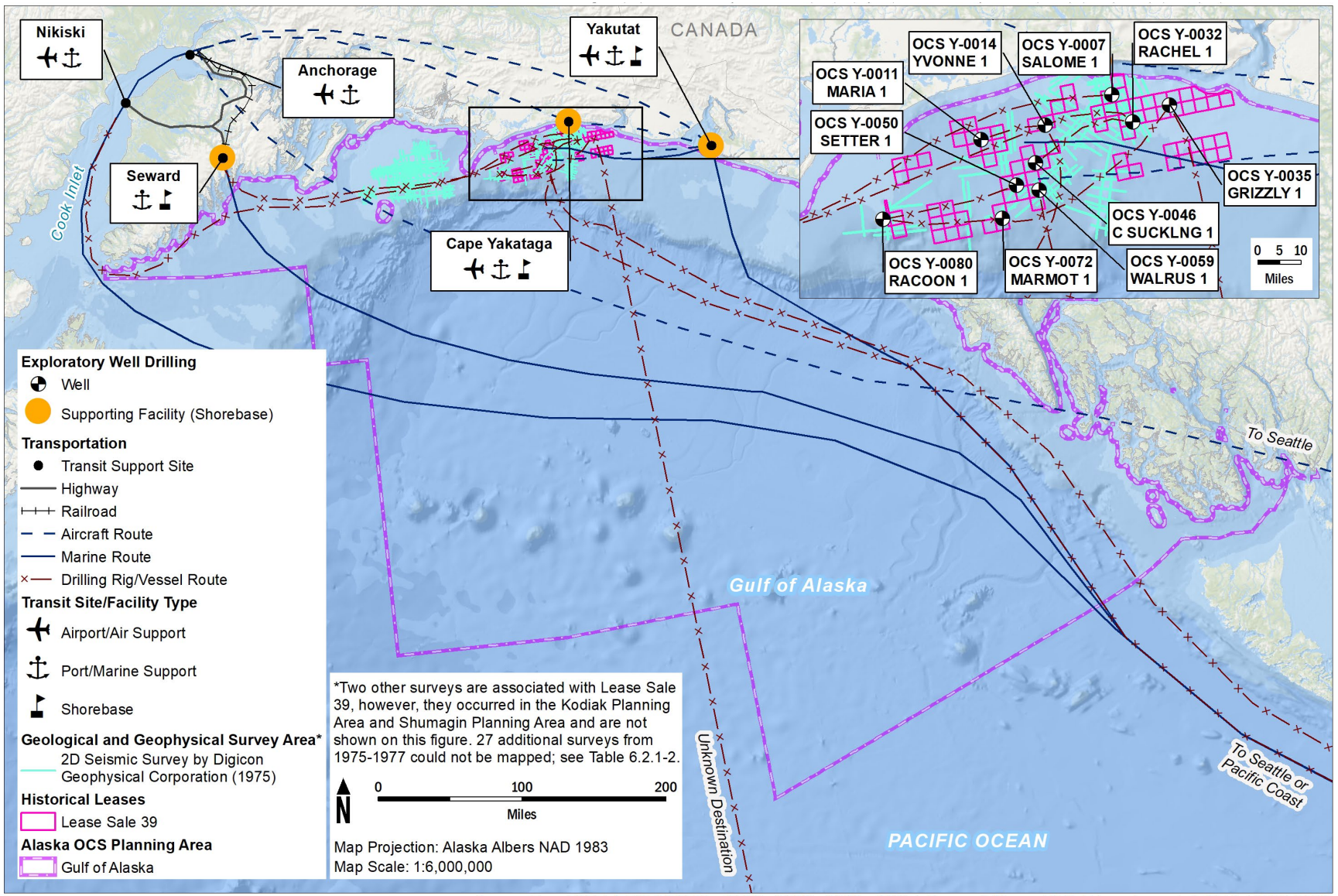
Sources: BOEM 2023b, 2023g

6.2.1 Lease Sale 39 (1976)

The identified activities associated with Lease Sale 39 are shown in Figure 6-8, such as the locations of exploration wells, supporting facilities, transportation infrastructure, and survey areas.

6.2.1.1 Leasing

As shown in Table 6.2-1 and Figure 6-8, as a result of Lease Sale 39, there were 189 tracts offered and 76 leases issued. There were 1,008,499 acres offered and 409,058 acres leased. There are no active leases from Lease Sale 39. Table 6.2.1-1 summarizes documented information associated with the leasing as a result of Lease Sale 39.



Source: Banet 2001d; BOEM 2005a, 2022b, 2023b, 2023c, 2023d; Dames & Moore 1978; Triezenberg et al. 2016; USGS 2023.

Figure 6-8. Historical leases associated with Lease Sale 39, 1988

Table 6.2.1-1. Lease information as a result of Lease Sale 39

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y00072	Exxon	6/1/1976	Relinquished	12/29/1978	Icy Bay	39169	414
Y00073	Gulf Oil	6/1/1976	Relinquished	5/30/1979	Middleton Island	39197	296
Y00074	Exxon	6/1/1976	Relinquished	5/29/1980	Middleton Island	39198	297
Y00075	Exxon	6/1/1976	Relinquished	5/29/1980	Middleton Island	39199	298
Y00076	Exxon	6/1/1976	Relinquished	5/30/1979	Middleton Island	39200	299
Y00077	Mobil	6/1/1976	Relinquished	5/30/1979	Middleton Island	39201	300
Y00078	Shell	6/1/1976	Relinquished	2/6/1980	Middleton Island	39202	340
Y00079	Placid	6/1/1976	Relinquished	11/15/1978	Middleton Island	39203	342
Y00080	Exxon	6/1/1976	Relinquished	5/29/1980	Middleton Island	39204	343
Y00081	Mobil	6/1/1976	Relinquished	5/30/1979	Middleton Island	39205	344
Y00061	Shell	6/1/1976	Relinquished	12/5/1979	Icy Bay	39145	337
Y00071	Exxon	6/1/1976	Relinquished	12/29/1978	Icy Bay	39168	413
Y00005	Shell	6/1/1976	Relinquished	12/5/1979	Icy Bay	39026	68
Y00006	Shell	6/1/1976	Relinquished	12/5/1979	Icy Bay	39027	69
Y00007	Shell	6/1/1976	Relinquished	11/29/1978	Icy Bay	39030	72
Y00008	Shell	6/1/1976	Relinquished	11/29/1978	Icy Bay	39031	73
Y00010	Gulf Oil	6/1/1976	Relinquished	9/30/1980	Icy Bay	39041	105
Y00011	Shell	6/1/1976	Relinquished	5/17/1979	Icy Bay	39042	106
Y00012	Shell	6/1/1976	Relinquished	5/17/1979	Icy Bay	39043	107
Y00013	Shell	6/1/1976	Relinquished	11/29/1978	Icy Bay	39046	110
Y00014	Shell	6/1/1976	Relinquished	11/29/1978	Icy Bay	39047	111
Y00016	Exxon	6/1/1976	Relinquished	5/29/1980	Icy Bay	39053	117
Y00017	Shell	6/1/1976	Relinquished	12/5/1979	Icy Bay	39054	118
Y00018	Shell	6/1/1976	Relinquished	12/5/1979	Icy Bay	39055	119
Y00019	Gulf Oil	6/1/1976	Relinquished	9/30/1980	Icy Bay	39056	120
Y00020	Placid	6/1/1976	Relinquished	11/15/1978	Icy Bay	39057	121
Y00021	Mobil	6/1/1976	Relinquished	5/13/1980	Icy Bay	39058	122
Y00022	Exxon	6/1/1976	Relinquished	5/29/1980	Icy Bay	39059	123
Y00023	Exxon	6/1/1976	Relinquished	5/29/1980	Icy Bay	39060	124
Y00024	Shell	6/1/1976	Relinquished	2/6/1980	Icy Bay	39062	143

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y00025	Shell	6/1/1976	Relinquished	2/6/1980	Icy Bay	39063	144
Y00026	Shell	6/1/1976	Relinquished	2/6/1980	Icy Bay	39064	145
Y00027	Shell	6/1/1976	Relinquished	12/5/1979	Icy Bay	39065	149
Y00028	Shell	6/1/1976	Relinquished	12/5/1979	Icy Bay	39066	150
Y00030	Pennzoil	6/1/1976	Relinquished	12/22/1980	Icy Bay	39075	159
Y00031	Amoco	6/1/1976	Relinquished	5/25/1979	Icy Bay	39077	161
Y00032	Texaco	6/1/1976	Relinquished	11/27/1979	Icy Bay	39078	162
Y00033	Shell	6/1/1976	Relinquished	11/29/1978	Icy Bay	39079	163
Y00034	Shell	6/1/1976	Relinquished	12/5/1979	Icy Bay	39080	164
Y00035	Exxon	6/1/1976	Relinquished	5/29/1980	Icy Bay	39081	165
Y00036	Exxon	6/1/1976	Relinquished	5/29/1980	Icy Bay	39082	166
Y00037	Exxon	6/1/1976	Relinquished	5/29/1980	Icy Bay	39083	167
Y00038	Exxon	6/1/1976	Relinquished	5/29/1980	Icy Bay	39084	168
Y00039	Exxon	6/1/1976	Relinquished	5/29/1980	Icy Bay	39085	169
Y00040	Shell	6/1/1976	Relinquished	2/6/1980	Icy Bay	39088	187
Y00041	Shell	6/1/1976	Relinquished	12/5/1979	Icy Bay	39092	194
Y00043	Exxon	6/1/1976	Relinquished	12/29/1978	Icy Bay	39097	199
Y00044	Shell	6/1/1976	Relinquished	11/29/1978	Icy Bay	39103	205
Y00045	Exxon	6/1/1976	Relinquished	12/29/1978	Icy Bay	39115	240
Y00046	Texaco	6/1/1976	Relinquished	6/11/1980	Icy Bay	39116	241
Y00047	Cities Serv	6/1/1976	Relinquished	5/30/1979	Icy Bay	39117	242
Y00048	Mobil	6/1/1976	Relinquished	5/30/1979	Icy Bay	39122	273
Y00049	Exxon	6/1/1976	Relinquished	12/29/1978	Icy Bay	39125	283
Y00050	Exxon	6/1/1976	Relinquished	12/29/1978	Icy Bay	39126	284
Y00051	Exxon	6/1/1976	Relinquished	12/29/1978	Icy Bay	39127	285
Y00052	Sohio	6/1/1976	Relinquished	6/23/1980	Icy Bay	39129	292
Y00053	Mobil	6/1/1976	Relinquished	5/30/1979	Icy Bay	39133	317
Y00004	Shell	6/1/1976	Relinquished	5/17/1979	Icy Bay	39019	61
Y00055	ARCO	6/1/1976	Relinquished	12/5/1979	Icy Bay	39137	321
Y00056	ARCO	6/1/1976	Relinquished	12/5/1979	Icy Bay	39138	322
Y00057	Exxon	6/1/1976	Relinquished	12/29/1978	Icy Bay	39140	327
Y00058	Exxon	6/1/1976	Relinquished	12/29/1978	Icy Bay	39141	328

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y00059	Gulf Oil	6/1/1976	Relinquished	9/30/1980	Icy Bay	39142	329
Y00060	Shell	6/1/1976	Relinquished	12/5/1979	Icy Bay	39144	336
Y00062	Shell	6/1/1976	Relinquished	10/31/1980	Icy Bay	39149	362
Y00063	Mobil	6/1/1976	Relinquished	5/13/1980	Icy Bay	39152	365
Y00064	Mobil	6/1/1976	Expired	5/31/1981	Icy Bay	39153	366
Y00065	Mobil	6/1/1976	Relinquished	5/27/1980	Icy Bay	39154	367
Y00066	Exxon	6/1/1976	Relinquished	12/29/1978	Icy Bay	39157	370
Y00067	ARCO	6/1/1976	Relinquished	11/29/1978	Icy Bay	39160	373
Y00070	Mobil	6/1/1976	Relinquished	5/27/1980	Icy Bay	39166	411
Y00002	ARCO	6/1/1976	Relinquished	12/5/1979	Icy Bay	39013	29
Y00003	Shell	6/1/1976	Relinquished	5/17/1979	Icy Bay	39018	60
Y00001	ARCO	6/1/1976	Relinquished	12/5/1979	Icy Bay	39009	25
Y00009	Shell	6/1/1976	Relinquished	5/17/1979	Icy Bay	39040	104
Y00042	General Crude	6/1/1976	Relinquished	5/13/1980	Icy Bay	39095	197
Y00015	ARCO	None	Rejected	None	Icy Bay	39052	116
Y00029	Exxon	None	Rejected	None	Icy Bay	39067	151
Y00054	Amoco	None	Rejected	None	Icy Bay	39134	381
Y00068	Exxon	None	Rejected	None	Icy Bay	39164	409
Y00069	Exxon	None	Rejected	None	Icy Bay	39165	410
Y00082	Alaska Oil and Minerals Corp.	None	Not issued	None	Icy Bay	6	9

Source: BOEM 2023b

6.2.1.2 Surveys

In 1975, there were three 2D multichannel seismic surveys documented as a result of Lease Sale 39. Two surveys which occurred outside of the Gulf of Alaska Planning Area were anomalous. Despite being reported in relation to Lease Sale 39 in the northeastern Gulf of Alaska in Dames & Moore (1978), one was conducted within both the Kodiak Planning Area and the Shumagin Planning Area, and the other was conducted in the Kodiak Planning Area. For the two surveys, the dates of survey, survey operator, and vessel name could be cross-referenced from Dames & Moore (1978) with other sources (Banet 2001h, 2001j; BOEM 2023f; Triezenberg et al. 2016; USGS 2023). Additionally, other surveys associated with Lease Sale 39 include a series of 27 G&G surveys spanning from 1975 to 1977 for which available information is limited. Survey activity is summarized in Table 6.2.1-2.

Table 6.2.1-2. Survey activity summary

Activity Start Date	Activity End Date	Year	Activity Name[1]	Description	Vessel(s)	Operator and/or Contractor
--	--	1975	Early G&G survey	Survey occurred on the Kodiak Shelf.	White Plume	BB&N Geomarine
--	--	1975	Early G&G survey	Survey used an airgun as the energy source. It was a tie-in survey with Riou Bay #1.	--	Energy Analysis, Inc.
--	8/25/1975	1975	Early G&G survey	No information documented.	M/V Sitkin	Western Geophysical
4/1/1975	6/16/1975	1975	Early G&G survey	Survey covered 5,000 miles on the Kodiak Shelf,	Sea Bird	BB&N Geomarine
5/15/1975	--	1975	Early G&G survey	Survey occurred on the western rim of the gulf.	Anna Bravo	--
5/22/1975	10/16/1975	1975	2D multichannel seismic survey[2]	Multichannel seismic reflection data in predominantly the Kodiak Planning Area, with additional tracklines occurring in the Gulf of Alaska Planning Area (and minimal overlap with the Cook Inlet Planning Area). A 20-airgun array was used.	M/V Doris Candies	Digicon Geophysical Corporation
5/25/1975	--	1975	Early G&G survey	No information documented.	Hollis Hedberg	--
6/1/1975	6/24/1975	1975	Early G&G survey	Survey covered 1,000 miles.	M/V Bering Explorer	GCA

Activity Start Date	Activity End Date	Year	Activity Name[1]	Description	Vessel(s)	Operator and/or Contractor
6/2/1975	9/9/1975	1975	2D multichannel seismic survey[3]	2D multichannel seismic survey using an airgun and streamer. A total of 4,698 km were shot with a total of 45 tracklines. The survey occurred in both the Kodiak Planning Area and the Shumagin Planning Area.	M/V American Delta III	Delta Exploration Company, Inc.
6/6/1975	9/30/1975	1975	Early G&G survey	Survey covered 2,500 miles.	Dabney Petty	Petty Ray
6/18/1975	8/30/1975	1975	2D multichannel seismic survey	2D multichannel seismic survey using an airgun and streamer. A total of 3,862 km were shot with 182 tracklines.	M/V West Wind	Digicon Geophysical Corporation
6/23/1975	--	1975	Early G&G survey	Coring	Mediterranean Seal	BB&N Geomarine
6/25/1975	8/28/1975	1975	Early G&G survey	Proposed area was 3,000–4,000 miles. 4B channel seismic program.	Cecil Green	GSI
6/30/1975	7/15/1975	1975	Early G&G survey	Survey used a digital sparker.	Acquisition	Aquatronics
6/8/1976	--	1976	Early G&G survey	No information documented.	Alaska Trader	General Oceanographics
6/8/1976	10/3/1976	1976	Early G&G survey	No information documented.	Alaska Trader	BB&N Geomarine
9/10/1976	--	1976	Early G&G survey	No information documented.	Cecil Green	GSI
4/22/1977	5/1/1977	1977	Early G&G survey	Survey covered 125 miles, east of St. Elias.	Cecil Green	GSI
8/21/1976	10/3/1976	1976	Early G&G survey	Survey used an airgun as the energy source.	Dabney E. Petty	Petty Ray
7/10/1975	--	1975	Early G&G survey	Survey covered 3,000 miles and was a 24- and 30-fold seismic program	M/V Bering Explorer	GCA
8/6/1975	--	1975	Early G&G survey	No information documented.	M/V Niobe	--
8/13/1975	8/22/1975	1975	Early G&G survey	Survey was a tie-in with Riou Bay #1.	Krystal	Western Geophysical
8/15/1975	--	1975	Early G&G survey	No information documented.	Sea Mark	General Oceanographics
8/20/1975	--	1975	Early G&G survey	No information documented.	M/V Trinity	--

Activity Start Date	Activity End Date	Year	Activity Name[1]	Description	Vessel(s)	Operator and/or Contractor
6/16/1976	7/2/1976	1976	Early G&G survey	Survey used an airgun as the energy source.	M/V Niobe	--
6/29/1976	9/13/1976	1976	Early G&G survey	Soil boring	Mediterranean Seal	BB&N Geomarine
7/1/1976	9/3/1976	1976	Early G&G survey	Survey covered 4,000 miles in Icy Bay and Kayak Island.	Sea Transporter	--
7/20/1976	--	1976	Early G&G survey	No information documented.	Robray I	Petty Ray
8/18/1976	--	1976	Early G&G survey	Survey used a sparker.	Sitkin	Petty Ray
5/12/1977	6/12/1977	1977	Early G&G survey	Survey used an airgun as the energy source.	M/V Niobe	--

Notes: -- = no data provided; 2D = two-dimensional; G&G = geological and geophysical; GCA = Geophysical Corporation of Alaska; GSI = Geophysical Service, Inc.; km = kilometers; M/V = motor vessel; OCS = Outer Continental Shelf; R/V = research vessel
[1]The early G&G surveys and 2D seismic surveys were associated with Lease Sale CI because Dames & Moore (1978) identified these as information concerning geophysical surveys in the lease sale area.
[2]Occurred in Kodiak only, a result of cross-check with Dames & Moore (1978), BOEM (2023f), and Banet (2001h).
[3]Occurred in both Kodiak and Shumagin Planning Areas, a result of cross-check with Dames & Moore (1978), Triezenberg et al. (2016), USGS (2023), and Banet (2001j).
Sources: Banet 2001d; Dames & Moore 1978; Triezenberg et al. 2016; USGS 2023

6.2.1.3 Well Drilling

Eleven exploration wells were drilled as a result of Lease Sale 39, as summarized in Table 6.2.1-3.

Table 6.2.1-3. Well drilling summary

Activity Start Date	Activity End Date	Well Name (includes API no. and bottom hole lease number)	Well Type	Well Depth (feet)	Drill Rig Name
9/1/1976	1/28/1977	API no. 551300000200 (MARIA 1) on OCS Y-0011	Exploration	13,565	SEDCO 706
2/11/1977	6/19/1977	API no. 551300000600 (YVONNE 1) on OCS Y-0014	Exploration	13,562	SEDCO 706
3/8/1977	1/28/1978	API no. 551300001000 (SETTER 1) on OCS Y-0050	Exploration	12,995	Alaskan Star
4/14/1977	7/15/1977	API no. 551300000800 (C SUCKLNG 1) on OCS Y-0046	Exploration	14,690	ODECO Ocean Bounty
4/17/1977	6/3/1977	API no. 551300000300 (SALOME 1) on OCS Y-0007	Exploration	17,887	ODECO Ocean Ranger
5/13/1977	8/16/1977	API no. 551300001300 (WALRUS 1) on OCS Y-0059	Exploration	12,170	Aleutian Key
8/21/1977	9/12/1977	API no. 551300000601 (YVONNE 2) on OCS Y-0014	Exploration	15,254	SEDCO 706

Activity Start Date	Activity End Date	Well Name (includes API no. and bottom hole lease number)	Well Type	Well Depth (feet)	Drill Rig Name
10/13/1977	1/4/1978	API no. 551600000100 (RACOON 1) on OCS Y-0080	Exploration	13,502	Alaskan Star
10/25/1977	2/20/1978	API no. 551300000900 (RACHEL 1) on OCS Y-0032	Exploration	15,573	ODECO Ocean Bounty
1/9/1978	3/17/1978	API no. 551300001800 (MARMOT 1) on OCS Y-0072	Exploration	9,835	Alaskan Star
3/23/1978	7/1/1978	API no. 551300002000 (GRIZZLY 1) on OCS Y-0035	Exploration	11,731	Alaskan Star

Note: API = American Petroleum Institute
Sources: BOEM 2005a, 2022b, 2023c, 2023d; Dames & Moore 1978

6.2.1.4 Oil-and-Gas-Supporting Activities

Identified oil-and-gas-supporting activities as a result of Lease Sale 39 included facility support and transportation from facilities and shorebases to relevant activity sites (if documented), as summarized in Table 6.2.1-4 and Table 6.2.1-5.

Table 6.2.1-4. Facility support summary

Facility Name	Facility Type	Description	Supported Activity
Cape Yakataga shorebase	Onshore shorebase complex	The shorebase included facilities such as a gravel airstrip and aviation fuel storage.	Oil and gas activities, such as the drilling of exploration wells
Seward shorebase	Onshore shorebase complex	The shorebase included facilities such as the Alaska Railroad dock/warehouse complex, dock space for up to six 200-foot work boats, a freshwater line and fuel line on the dock, a conduit for bulk loading mud and cement, bulk mud and cement storage, and a covered warehouse.	Oil and gas activities, such as the drilling of exploration wells
Yakutat shorebase	Onshore shorebase complex	A 77-acre industrial park was partially developed, which included a 120-foot dock with dolphins for barges and supply boats, a 75-ton crane, covered storage, crew housing, a hotel/restaurant, diesel generation on site, a physical-chemical sewage treatment plant, a bilge treatment plant, a waste incinerator, fresh water supply, a paved runway, and a helicopter hangar.	Oil and gas activities, such as the drilling of exploration wells

Source: Dames & Moore 1978

Table 6.2.1-5. Summary of transportation activity

Facility Name	Facility Type	Supported Activity	No. Aircraft	No. Vessels	Vessel Names	Aircraft
Anchorage Port and Airport	Transportation location	Anchorage served as both air support and marine transportation support for oil and gas activities.	--	--	--	--
Seattle Port and Airport	Transportation location	Seattle served as both air support and marine transportation support for oil and gas activities.	--	--	--	--
Nikiski Port and Airport	Transportation location	Nikiski served as both air support and marine transportation support for oil and gas activities.	--	--	--	--
Ocean Bounty Vessel Route	Drilling rig/vessel route	Drilling vessel route to exploration well (C SUCKLING 1).	0	1	Ocean Bounty	N/A
Ocean Bounty Vessel Route	Drilling rig/vessel route	Drilling vessel route south to Seward from exploration well (RACHEL 1).	0	1	Ocean Bounty	N/A
Alaskan Star Vessel Routes	Drilling rig/vessel route	Drilling vessel routes between exploration wells (MARMOT 1, GRIZZLY 1, RACOON 1, and SETTER 1).	0	1	Alaskan Star	N/A
Alaskan Star Vessel Route	Drilling rig/vessel route	Drilling vessel route south from unknown destinations from exploration well (GRIZZLY 1).	0	1	Alaskan Star	N/A
Aleutian Key Vessel Route	Drilling rig/vessel route	Drilling vessel route south to Pacific coast from exploration well WALRUS 1).	0	1	Aleutian Key	N/A
SEDCO 706 Vessel Route	Drilling rig/vessel route	Drilling vessel route to Brazil (via Seattle) from exploration well (YVONNE 2).	0	1	SEDCO 706	N/A
SEDCO 706 Vessel Route	Drilling rig/vessel route	Drilling vessel route to exploration well (YVONNE 1).	0	1	SEDCO 706	N/A
Ocean Ranger Vessel Route	Drilling rig/vessel route	Drilling vessel route south to Cook Inlet from exploration well (SALOME 1).	0	1	Ocean Ranger	N/A
New Seward Highway and Sterling Highway	Highway transportation route	Truck service from Nikiski and Anchorage to Seward. Number and types of vehicles is undocumented.	0	0	N/A	0

Facility Name	Facility Type	Supported Activity	No. Aircraft	No. Vessels	Vessel Names	Aircraft
Marine Route from Anchorage to Seattle	Marine transportation route	Freight arrived at Anchorage by ocean-going barges, container ships, and roll-on-roll-off truck and rail ships from Seattle.	0	--	--	0
Marine Route from Yakutat to Drilling Vessels	Marine transportation route	Marine transportation route from Yakutat to drilling vessels.	0	--	Unknown supply boat(s)	0
Marine Route from Seward to Seattle	Marine transportation route	Goods were shipped to Seward by barge and then transshipped to the drilling rig by work boat.	0	--	--	0
Barge and Freight Route from Yakutat to Seattle	Marine transportation route	Goods were shipped to Yakutat by barge and then transshipped to the drilling rig by work boat.	0	--	--	0
Air Service from Anchorage to Seattle	Aircraft transportation route	Scheduled passenger and air freight services served between Anchorage and Seattle.	--	0	N/A	--
Air Route from Anchorage to Yakataga	Aircraft transportation route	Bulk airlift/charter passenger and freight services. Bulk aircraft fuel was also airlifted to Yakataga from Anchorage.	--	0	N/A	--
Air Route from Anchorage to Yakutat	Aircraft transportation route	Scheduled and charter passenger and freight.	--	0	N/A	--
Air Route from Yakataga to Yakutat	Aircraft transportation route	Crews flew by charter fixed-wing aircraft between Yakataga and Yakutat to connect with scheduled jet service for Seattle.	--	0	N/A	--
Helicopter Route from Yakutat to Drilling Vessels	Aircraft transportation route	Occasionally a crew change was made directly to Yakutat by helicopter.	1	0	N/A	Sikorski S61N
Alaska Railroad	Railroad transportation route	Rail service from Anchorage (where mud, concrete, and service vendors maintained yards) to Seward.	0	0	N/A	N/A

Notes: -- = no data provided; Note: N/A = not applicable
Source: Dames & Moore 1978

6.2.1.5 E&D Scenario Summary

The proposed lease sale evaluated in the Northern Gulf of Alaska Final Environmental Impact Statement (BLM 1976b) encompasses an area of 1.8 million acres of the OCS in the northern Gulf of Alaska. Of the 1.8 million acres offered, it was anticipated that 1.4 million acres would be leased. The Northern Gulf of Alaska Final Environmental Impact Statement used the high resource estimate to evaluate impacts; therefore, that is the scenario summarized here. The sale area would produce 2.8 Bbbl of oil and 9 Tcf of gas. The estimated peak volume of crude oil produced would be 550,000 bbl per day or 200,000,000 bbl per year, and peak gas production would be 1 Bcf per day or 360 Bcf per year. The average distance of oil and gas fields from shore would be 22 miles.

Under this scenario, exploratory drilling would begin the year after leases are issued and would be completed at the end of the seventh year. Construction and installation of the onsite platform would begin during the fifth year after the lease sale and continue through the tenth year. Peak oil production would occur 10 to 11 years after the lease sale. The life expectancy of each of the 7 oil and gas fields would be 25 years, and the last platforms would be removed about 40 years after production had commenced.

During peak production, 22 platforms would be required—18 oil platforms and 4 gas platforms. Approximately 70 to 100 exploration wells and a total of 800 production wells would be drilled for a total of 870 to 900 wells. Of the 800 development wells, 640 would be platform wells and 160 would be subsea wells. There would be 7 to 14 major pipelines totaling 300 miles in length constructed. Fifty miles would be constructed onshore, and 250 miles would be submarine. Of the total annual production, 120 MMbbl would be transported from production platforms to shore by pipeline and from shore to storage market areas by tanker. Approximately 80 MMbbl would be loaded from offshore terminals in the vicinity of the field for direct transport to market areas by tanker.

The location of support and supply facilities, crude oil terminal sites, and onshore production treatment facilities would depend on the location of producing fields in relation to the physical environment. For the Northern Gulf of Alaska Final Environmental Impact Statement, it is assumed there would be three onshore loading, storage, and treatment facilities, two offshore facilities, and three supply and staging facilities. No petroleum refineries or fabrication platforms were expected to be constructed in Alaska as a result of the sale. In 1983, there would be one LNG plant constructed around 1983. It was estimated the fleet required to support and service the offshore platforms would range between 20 to 60 work boats. Table 6.2.1-6 provides a summary of the basic assumptions of Lease Sale 39's E&D scenario.

Table 6.2.1-6. Summary of basic assumptions of Lease Sale 39 E&D scenario

Element	High Case
Sale acreage offering	1.8 million acres
Anticipated sale	1.4 million acres
Oil and gas fields	7
Recoverable oil	2.8 Bbbl
Recoverable gas	9 Tcf
Peak production oil	200 MMbbl per year
Peak production gas	365 Bcf per year
Platforms – oil	18
Platforms – gas	4

Element	High Case
Number of wells – exploration	100
Number of wells – development	800
Pipelines	7 to 14
Total pipeline miles	300 (50 onshore; 250 offshore)
Pipeline burial excavation volume	0.9 to 2.4 MMcf
Onshore pipeline acreage required	315
Offshore terminal facilities	2
Onshore oil terminal facilities number and acreage required	3; 360 acres
Support / supply facilities number and acreage required	3; 240 acres
LNG plant and terminal	1; 120 acres
Production treatment facilities	1
Total direct land requirements	1,035 acres
Petroleum refineries	0
Platform fabrication	0
Supply and support boats	20 to 60
Annual crude shipped by tanker	200 MMbbl per year

Notes: Bbbl = billion barrels; Bcf = billion cubic feet; cf = cubic feet; E&D = Exploration and Development; MMbbl = million barrels; MMcf = million cubic feet; LNG = liquified natural gas; Tcf = trillion cubic feet
Source: BLM 1976b

6.2.1.6 Comparison of Exploration and Development Scenario and Historical Activities

A comparison of the E&D scenario and the historical activities are provided in Table 6.2.1-7, using available information.

Table 6.2.1-7. Comparison of E&D and historical activities

Activity	E&D Scenario	Actual Activities
Sale acreage offering	1.8 million acres	1,008,499 acres offered
Anticipated sale	1.4 million acres	409,058 acres leased
Oil and gas fields	7	--
Recoverable oil	2.8 Bbbl	--
Recoverable gas	9 Tcf	--
Peak production oil	200 MMbbl per year	N/A
Peak production gas	365 Bcf per year	N/A
Platforms – oil	18	0
Platforms – gas	4	0
Number of wells – exploration	100	11

Activity	E&D Scenario	Actual Activities
Number of wells – development	800	0
Well depth average	--	13,706 feet
Pipelines	7 to 14	0
Total pipeline miles	300 (50 onshore; 250 offshore)	0
Pipeline burial excavation volume	0.9 to 2.4 MMcf	N/A
Onshore pipeline acreage required	315	N/A
Offshore terminal facilities	2	0
Onshore oil terminal facilities number and acreage required	3; 360 acres	0
Support / supply facilities number and acreage required	3; 240 acres	3; 77 acres
LNG plant and terminal	1; 120 acres	0
Production treatment facilities	1	0
Total direct land requirements	1,035 acres	--
Petroleum refineries	0	0
Platform fabrication	0	0
Supply and support boats	20 to 60	12[1]
Annual crude shipped by tanker	200 MMbbl per year	N/A

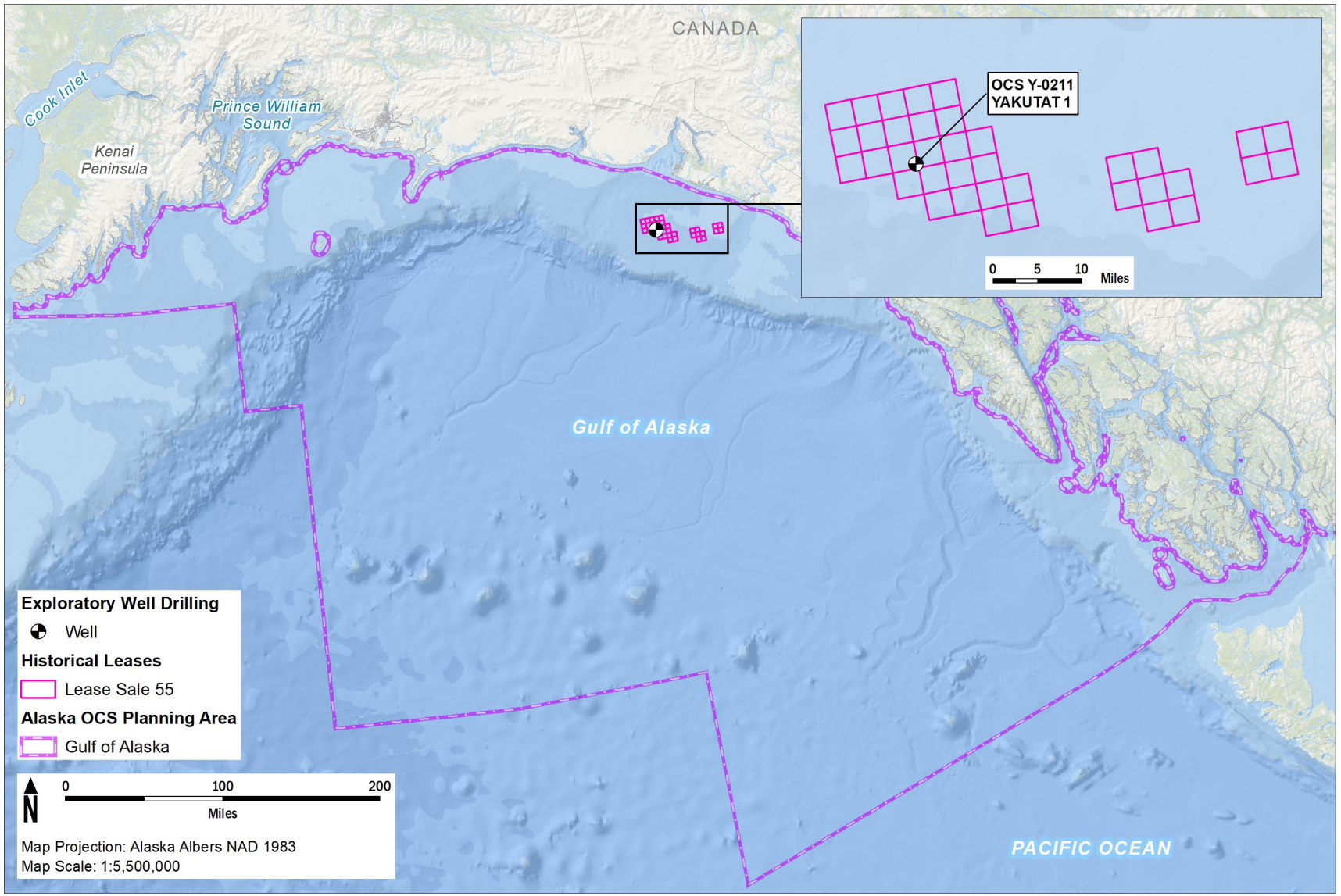
Notes: -- = no data provided; Bbbl = billion barrels; Bcf = billion cubic feet; E&D = Exploration and Development; LNG = liquified natural gas; MMbbl = million barrels; MMcf = million cubic feet; N/A = not applicable; Tcf = trillion cubic feet
[1]The minimum count was 12, but other records of supply and support vessels were documented but no counts were available.

6.2.2 Lease Sale 55 (1980)

The identified activities associated with Lease Sale 55 are shown in Figure 6-9, such as the location of the exploration well.

6.2.2.1 Leasing

As shown in Table 6.2-1 and Figure 6-9, as a result of Lease Sale 55, there were 210 tracts offered and 35 leases issued. There were 1,195,569 acres offered and 199,261 acres leased. There are no active leases from Lease Sale 55. Table 6.2.2-1 summarizes documented information associated with the leasing as a result of Lease Sale 55.



Source: BOEM 2005a, 2022b, 2023b, 2023c, 2023d.

Figure 6-9. Historical leases associated with Lease Sale 55, 1980

Table 6.2.2-1. Lease information as a result of Lease Sale 55

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y00199	ARCO	12/1/1980	Relinquished	11/17/1983	Yakutat	55101	842
Y00200	ARCO	12/1/1980	Relinquished	11/17/1983	Yakutat	55102	843
Y00201	ARCO	12/1/1980	Relinquished	11/17/1983	Yakutat	55103	844
Y00202	ARCO	12/1/1980	Relinquished	11/17/1983	Yakutat	55104	845
Y00203	ARCO	12/1/1980	Relinquished	11/17/1983	Yakutat	55105	846
Y00204	ARCO	12/1/1980	Relinquished	11/17/1983	Yakutat	55127	886
Y00205	ARCO	12/1/1980	Relinquished	11/17/1983	Yakutat	55128	887
Y00206	ARCO	12/1/1980	Relinquished	11/17/1983	Yakutat	55129	888
Y00207	ARCO	12/1/1980	Relinquished	11/17/1983	Yakutat	55130	889
Y00209	ARCO	12/1/1980	Relinquished	11/17/1983	Yakutat	55148	930
Y00210	ARCO	12/1/1980	Relinquished	11/17/1983	Yakutat	55149	931
Y00211	ARCO	12/1/1980	Relinquished	11/17/1983	Yakutat	55150	932
Y00212	ARCO	12/1/1980	Relinquished	11/17/1983	Yakutat	55151	933
Y00214	ARCO	12/1/1980	Relinquished	11/17/1983	Yakutat	55153	935
Y00215	ARCO	12/1/1980	Relinquished	11/17/1983	Yakutat	55173	976
Y00216	Chevron	12/1/1980	Expired	11/30/1985	Yakutat	55174	977
Y00217	ARCO	12/1/1980	Relinquished	11/17/1983	Yakutat	55175	978
Y00218	ARCO	12/1/1980	Relinquished	11/17/1983	Yakutat	55176	979
Y00219	ARCO	12/1/1980	Relinquished	11/17/1983	Yakutat	55197	1021
Y00220	ARCO	12/1/1980	Relinquished	11/17/1983	Yakutat	55198	1022
Y00221	Chevron	12/1/1980	Expired	11/30/1985	Yakutat	55199	1023
Y00222	Chevron	12/1/1980	Expired	11/30/1985	Yakutat	55200	1024
Y00223	ARCO	12/1/1980	Relinquished	11/17/1983	Yakutat	55204	1028
Y00224	Chevron	12/1/1980	Expired	11/30/1985	Yakutat	55205	1029
Y00225	ARCO	12/1/1980	Relinquished	10/10/1984	Yakutat	55209	1033
Y00226	Chevron	12/1/1980	Relinquished	10/10/1984	Yakutat	55210	1034
Y00227	Chevron	12/1/1980	Expired	11/30/1985	Alsek Valley	55222	11
Y00228	Chevron	12/1/1980	Expired	11/30/1985	Alsek Valley	55223	12
Y00229	Shell	12/1/1980	Relinquished	11/10/1983	Alsek Valley	55227	16
Y00230	Chevron	12/1/1980	Expired	11/30/1985	Alsek Valley	55228	17
Y00231	Shell	12/1/1980	Relinquished	11/10/1983	Alsek Valley	55229	18

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y00232	Shell	12/1/1980	Relinquished	11/10/1983	Alsek Valley	55232	21
Y00233	ARCO	12/1/1980	Relinquished	10/10/1984	Alsek Valley	55233	22
Y00234	Shell	12/1/1980	Relinquished	11/10/1983	Alsek Valley	55247	61
Y00235	Shell	12/1/1980	Relinquished	11/10/1983	Alsek Valley	55248	62
Y00213	Atlantic Richfield Co.	None	Rejected	None	Yakutat	55152	934
Y00208	Chevron	None	Rejected	None	Yakutat	55131	890

Source: BOEM 2023b

6.2.2.2 Surveys

No surveys were documented as a result of Lease Sale 55.

6.2.2.3 Well Drilling

One exploration well was drilled as a result of Lease Sale 55, as summarized in Table 6.2.2-2.

Table 6.2.2-2. Well drilling summary

Activity Start Date	Activity End Date	Well Name (includes API no. and bottom hole lease number)	Well Type	Well Depth (feet)	Drill Rig Name
4/10/1983	10/22/1983	API no. 551000000100 (YAKUTAT 1) on OCS Y-0211	Exploration	17,810	Ocean Odyssey

Note: API = American Petroleum Institute
Sources: BOEM 2005a, 2022b, 2023c, 2023d

6.2.2.4 Oil-and-Gas-Supporting Activities

There were no oil-and-gas-supporting activities identified as a result of Lease Sale 55.

6.2.2.5 E&D Scenario Summary

The proposed lease sale evaluated in the Eastern Gulf of Alaska Final Environmental Impact Statement (BLM 1980) encompasses 350 blocks, approximately 1,857,242 acres, located about 4–58 miles offshore. The mean resource estimate is 450 MMbbl of oil and 1,250 Bcf of gas. Peak production under the mean resource estimate was expected to result in a daily production of 140,300 bbl of oil and 198 MMcf of gas. The estimated production life was 37 years.

Exploration was expected to begin in 1981 and continue through 1985 with a total of 14 exploration and delineation wells drilled. No more than two rigs would be assumed to be working during the year. Jack-up rigs would be used in shallow water, and drill ships and semisubmersibles would be used in deeper water.

Primary support and supply activities would be based at the existing Yakutat facility with some marine traffic utilizing the existing facilities in Seward. Aircraft support would be conducted at the state-owned airport at Yakutat.

Development would begin in 1984 with the expansion of the support and supply base at Yakutat. An additional 25 acres were anticipated for the expansion. In 1985, two steel-jacketed, bottom-founded production platforms would be installed. Between 1987 and 1991, 70 production and service wells would be drilled.

Pipeline construction would start in 1986 and continue through 1988. A total of 60 miles of 20-inch oil pipeline would be constructed, with 49 miles being offshore. All offshore pipelines would be placed by a lay or reel barge, as appropriate.

An oil terminal would be constructed in 1988 adjacent to Monti Bay (Yakutat). A storage capacity of approximately 850,000 bbl of oil was assumed to be sufficient. Oil and gas production was estimated to begin in 1989 with oil production ceasing in 2007 and gas ceasing in 2023.

It was assumed that a possible offshore loading scenario including a barge connected to a single buoy mooring device would be installed 20–30 miles offshore in 1988.

Table 6.2.2-3 describes the summary of activities associated with the E&D scenario.

Table 6.2.2-3. Summary of basic assumptions of Lease Sale 55 E&D scenario

Element	Mean Case
Sale acreage offering	1,957,242 acres
Recoverable oil	450 MMbbl
Recoverable gas	1,250 Bcf
Peak production oil	140.3 Mbbl per day
Peak production gas	198 MMcf per year
Platforms	2
Number of drill rigs	2
Number of wells – exploration and delineation	14
Number of wells – production and service	70
Number of wells – workover	150
Pipelines – oil	1
Pipelines – gas	1
Total pipeline miles – oil	60 miles
Total pipeline miles – gas	60 miles
Pipeline burial excavation volume – onshore	600 acres
Pipeline burial excavation volume – offshore	1,460 acres
Onshore oil terminal facilities number	1
Support / supply facilities number and acreage required	1
Total direct land requirements	115 acres
Annual crude shipped by tanker – oil	51.2 MMbbl
Annual crude shipped by tanker – gas	72.3 Bcf

Notes: Bcf = billion cubic feet; cf = cubic feet; E&D = Exploration and Development; Mbbl = thousand barrels; MMbbl = million barrels; MMcf = million cubic feet
Source: BLM 1980

6.2.2.6 Comparison of Exploration and Development Scenario and Historical Activities

A comparison of the E&D scenario and the historical activities are provided in Table 6.2.2-4, using available information.

Table 6.2.2-4. Comparison of E&D and historical activities

Activity	E&D Scenario	Actual Activities
Sale acreage offering	1,957,242 acres	1,195,569 acres offered
Sale	--	199,261 acres leased
Recoverable oil	450 MMbbl	--

Activity	E&D Scenario	Actual Activities
Recoverable gas	1250 Bcf	--
Peak production oil	140.3 Mbbl per day	N/A
Peak production gas	198 MMcf per year	N/A
Platforms	2	0
Number of drill rigs	2	1
Number of wells – exploration and delineation	14	1
Number of wells – production and service	70	0
Number of wells – workover	150	0
Well depth average	--	17,810 feet
Pipelines – oil	1	0
Pipelines – gas	1	0
Total pipeline miles – oil	60 miles	0
Total pipeline miles – gas	60 miles	0
Pipeline burial excavation volume – onshore	600 acres	N/A
Pipeline burial excavation volume – offshore	1,460 acres	N/A
Onshore oil terminal facilities number	1	0
Support / supply facilities number and acreage required	1	0
Total direct land requirements	115 acres	--
Annual crude shipped by tanker – oil	51.2 MMbbl	0
Annual crude shipped by tanker – gas	72.3 Bcf	0

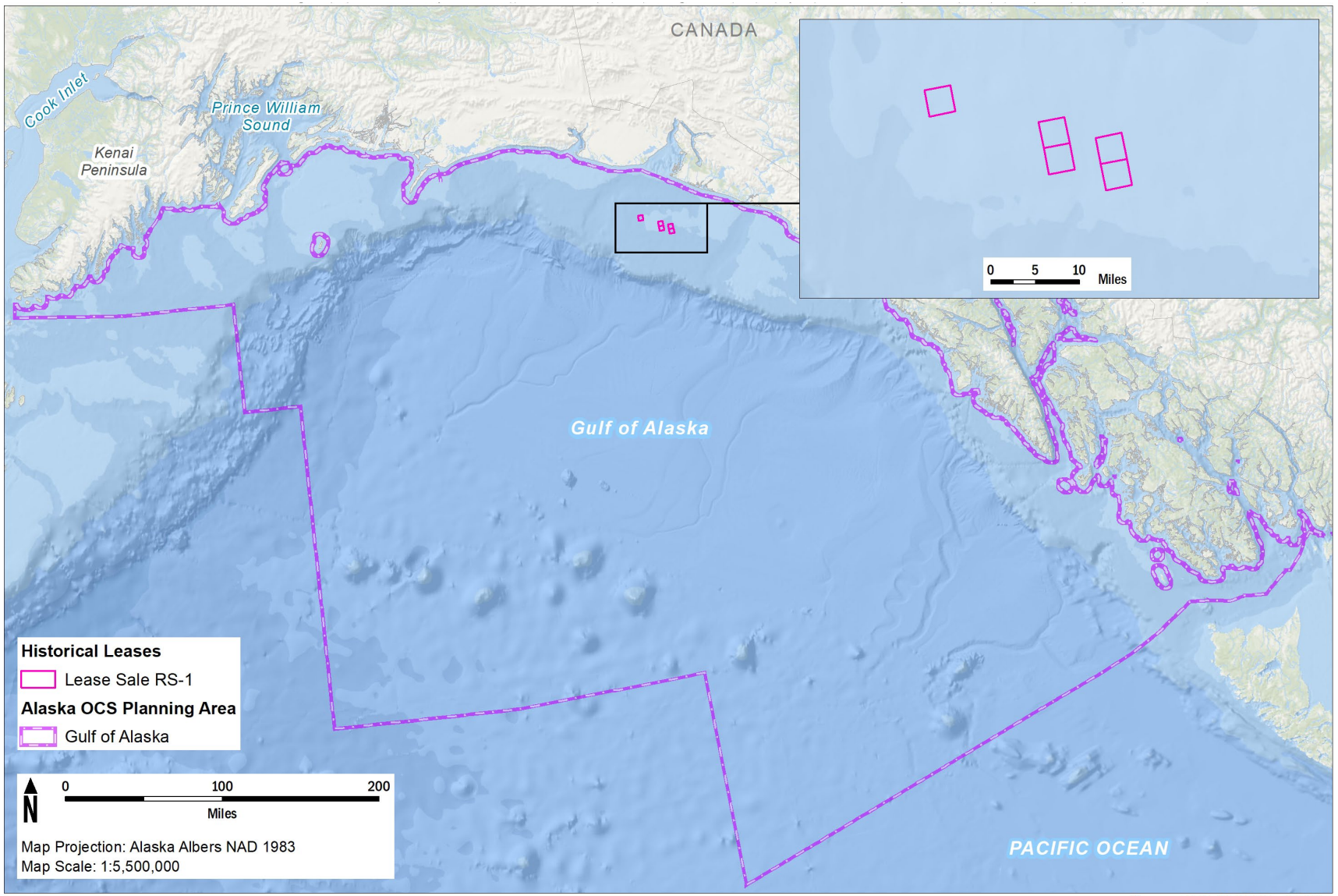
Notes: -- = no data provided; Bcf = billion cubic feet; cf = cubic feet; E&D = Exploration and Development; MMbbl = million barrels; MMcf = million cubic feet; N/A = not applicable

6.2.3 Lease Sale RS-1 (1981)

Lease Sale RS-1 is shown in Figure 6-10.

6.2.3.1 Leasing

As shown in Table 6.2-1 and Figure 6-10, as a result of Lease Sale RS-1, there were 175 tracts offered and 1 lease issued. There were 996,300 acres offered and 5,693 acres leased. There are no active leases from Lease Sale RS-1. Table 6.2.3-1 summarizes documented information associated with the leasing as a result of Lease Sale RS-1.



Source: BOEM 2022b, 2023b.

Figure 6-10. Historical leases associated with Lease Sale RS-1, 1981

Table 6.2.3-1. Lease information as a result of Lease Sale RS-1

Lease No.	Company	Effective Date	Status	Expiration Date	Protraction Name	Tract Number	Block Number
Y00236	Chevron	8/1/1981	Relinquished	7/26/1985	Yakutat	75	798
Y00237	ARCO Alaska Inc.	None	Rejected	None	Yakutat	131	890
Y00238	ARCO Alaska Inc.	None	Rejected	None	Yakutat	152	934
Y00239	ARCO Alaska Inc.	None	Rejected	None	Yakutat	154	936
Y00240	ARCO Alaska Inc.	None	Rejected	None	Yakutat	177	980

Source: BOEM 2023b

6.2.3.2 Surveys

No surveys were documented as a result of Lease Sale RS-1.

6.2.3.3 Well Drilling

No wells were drilled as a result of Lease Sale RS-1.

6.2.3.4 Oil-and-Gas-Supporting Activities

There were no oil-and-gas-supporting activities identified as a result of Lease Sale RS-1.

6.2.3.5 E&D Scenario Summary

The E&D scenario for Lease Sale RS-1 is the same scenario summarized in Section 6.2.2.5 for Lease Sale 55 (BLM 1980).

6.2.3.6 Comparison of Exploration and Development Scenario and Historical Activities

A comparison of the E&D scenario and the historical activities are provided in Table 6.2.3-2, using available information.

Table 6.2.3-2. Comparison of E&D and historical activities

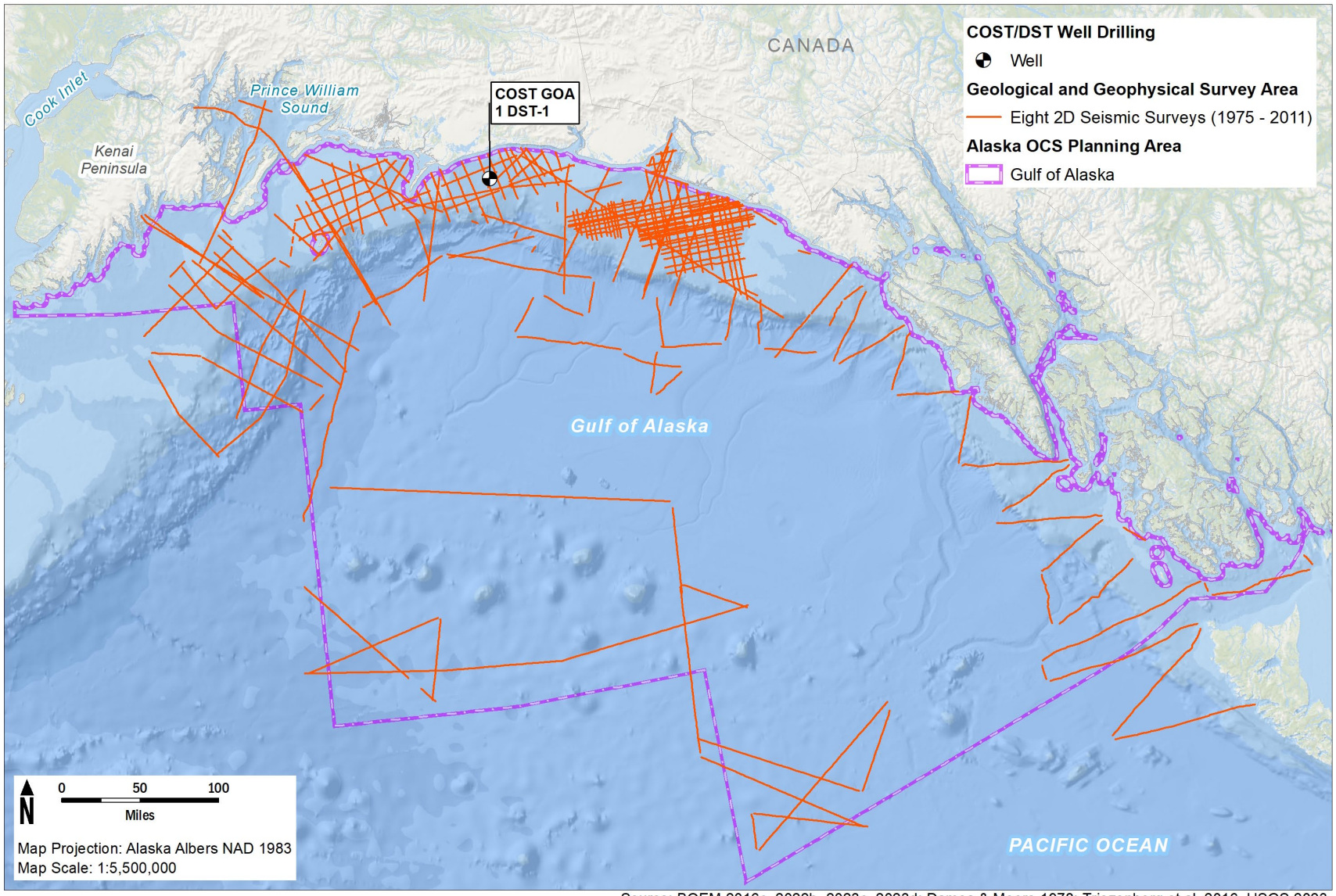
Activity	E&D Scenario	Actual Activities
Sale acreage offering	1,957,242 acres	996,300 acres offered
Sale	--	5,693 acres leased
Recoverable oil	450 MMbbl	--
Recoverable gas	1250 Bcf	--
Peak production oil	140.3 Mbbl per day	N/A
Peak production gas	198 MMcf per year	N/A
Platforms	2	0
Number of drill rigs	2	0
Number of wells – exploration and delineation	14	0
Number of wells – production and service	70	0
Number of wells – workover	150	0
Well depth average	--	0
Pipelines – oil	1	0
Pipelines – gas	1	0
Total pipeline miles – oil	60 miles	0
Total pipeline miles – gas	60 miles	0
Pipeline burial excavation volume – onshore	600 acres	N/A
Pipeline burial excavation volume – offshore	1,460 acres	N/A

Activity	E&D Scenario	Actual Activities
Onshore oil terminal facilities number	1	0
Support / supply facilities number and acreage required	1	0
Total direct land requirements	115 acres	--
Annual crude shipped by tanker – oil	51.2 MMbbl	0
Annual crude shipped by tanker – gas	72.3 Bcf	0

Notes: -- = no data provided; Bcf = billion cubic feet; cf = cubic feet; E&D = Exploration and Development; MMbbl = million barrels; MMcf = million cubic feet; N/A = not applicable

6.2.4 Activities Not Associated with a Lease Sale

Activities that could not be directly associated with a lease sale are shown in Figure 6-11, such as the location of the COST/DST well and survey areas.



Source: BOEM 2016c, 2022b, 2023c, 2023d; Dames & Moore 1978; Triezenberg et al. 2016, USGS 2023.

Figure 6-11. Historical oil and gas activities not associated with a lease sale in the Gulf of Alaska Planning Area

6.2.4.1 Surveys

Between 1975 and 2011, there were eight 2D seismic surveys documented that could not be associated with a lease sale, as summarized in Table 6.2.4-1.

Table 6.2.4-1. Survey activity summary

Activity Start Date	Activity End Date	Year	Activity Name	Description	Vessel Name(s)	Operator and/or Contractor
1/1/1975	1/2/1975	1975	2D multichannel seismic survey	2D multichannel seismic survey using an airgun and streamer. A total of 5,410 km were shot with 124 tracklines. This survey occurred in the Gulf of Alaska Planning Area, Kodiak Planning Area, and Shumagin Planning Area.	--	USGS
6/4/1977	6/9/1977	1977	2D multichannel seismic survey	2D multichannel seismic survey using an airgun and streamer. A total of 777 km were shot with 8 tracklines.	Samuel Phillips Lee	Pacific Coastal and Marine Science Center
6/13/1977	6/30/1977	1977	2D multichannel seismic survey	2D multichannel seismic survey using an airgun and streamer. A total of 342 km were shot with 12 tracklines.	Samuel Phillips Lee	Pacific Coastal and Marine Science Center
6/22/1978	7/4/1978	1978	2D multichannel seismic survey	2D multichannel seismic survey using an airgun and streamer. A total of 2,003 km were shot using 28 tracklines.	Samuel Phillips Lee	Pacific Coastal and Marine Science Center
6/1/1979	7/31/1979	1979	2D multichannel seismic survey	2D multichannel seismic survey using an airgun and streamer. A total of 5,125 km were shot with 73 tracklines.	--	WesternGeco
6/11/1981	6/30/1981	1981	2D multichannel seismic survey	2D multichannel seismic survey using an airgun and streamer. A total of 2,691 km were shot with 33 tracklines. The survey was conducted in the Cook Inlet Planning Area, Gulf of Alaska Planning Area, and Kodiak Planning Area.	Samuel Phillips Lee	Pacific Coastal and Marine Science Center
8/12/1988	10/31/1988	1988	2D multichannel seismic survey	2D multichannel seismic survey using an airgun and streamer. A total of 1,096 km were shot with 12 tracklines.	--	USGS
6/5/2011	6/25/2011	2011	2D multichannel seismic survey	2D multichannel seismic survey using a bolt airgun and sentry solid streamer. A total of 3,042 km were shot with 20 tracklines. The survey occurred in the	R/V Marcus G. Langseth	USGS

Activity Start Date	Activity End Date	Year	Activity Name	Description	Vessel Name(s)	Operator and/or Contractor
				Kodiak Planning Area and the Gulf of Alaska Planning Area.		

Notes: -- = no data provided; 2D = two-dimensional; km = kilometers; R/V = research vessel; USGS = U.S. Geological Survey
Sources: Triezenberg et al. 2016; USGS 2023

6.2.4.2 Well Drilling

One COST/DST well was drilled that was not associated with a lease sale, as summarized in Table 6.2.4-2.

Table 6.2.4-2. Well drilling summary

Activity Start Date	Activity End Date	Well Name (includes API no. and bottom hole lease number)	Well Type	Well Depth (feet)	Drill Rig Name
7/22/1975	10/9/1975	API no. 551300000100 (COST GOA 1 DST-1)	COST/DST	5,148	Glomar Conception

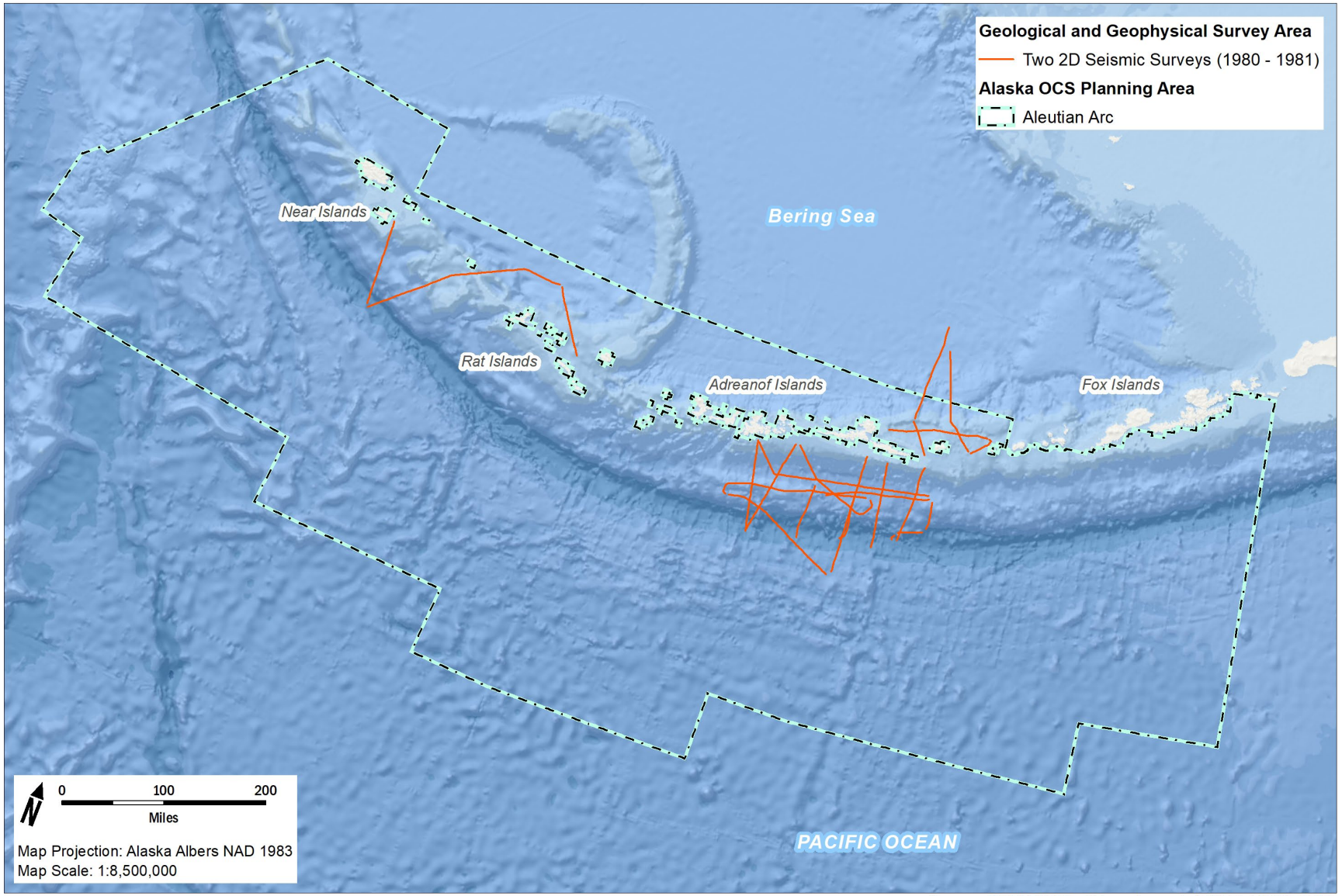
Notes: API = American Petroleum Institute; COST = continental offshore stratigraphic test; DST = deep stratigraphic test
Sources: BOEM 2005a, 2022b, 2023c, 2023d; Dames & Moore 1978

6.3 Aleutian Arc Planning Area

The Aleutian Arc Planning Area comprises the federal offshore lands on the continental shelf and slope surrounding the Pacific coastline of the Aleutian Islands. The OCS planning area extends from its eastern boundary with the Shumagin Planning Area at the western edge of the Alaska Peninsula. The area extends from the 3-mile limit of State of Alaska waters seaward to approximately the 2,000-meter isobath on the northern (continental) side of the Aleutian Trench. No leases were sold in this OCS planning area, but there were some activities not associated with a lease sale, as described below.

6.3.1 Activities Not Associated with a Lease Sale

Activities that could not be directly associated with a lease sale are shown in Figure 6-12, such as survey areas.



Source: BOEM 2022c; Triezenberg et al. 2016; USGS 2023.

Figure 6-12. Historical oil and gas activities not associated with a lease sale in the Aleutian Arc Planning Area

6.3.1.1 Surveys

Between 1980 and 1981, there were two 2D seismic surveys documented that were not associated with a lease sale, as summarized in Table 6.3.1-1.

Table 6.3.1-1. Survey activity summary

Activity Start Date	Activity End Date	Year	Activity Name	Description	Vessel Name(s)	Operator and/or Contractor
6/23/1980	7/5/1980	1980	2D multichannel seismic survey	2D multichannel seismic survey using an airgun and streamer. A total of 750 km were shot with nine tracklines.	Samuel Phillips Lee	Pacific Coastal and Marine Science Center
7/19/1981	8/13/1981	1981	2D multichannel seismic survey	2D multichannel seismic survey using an airgun and streamer. A total of 2,484 km were shot with 15 tracklines.	Samuel Phillips Lee	Pacific Coastal and Marine Science Center

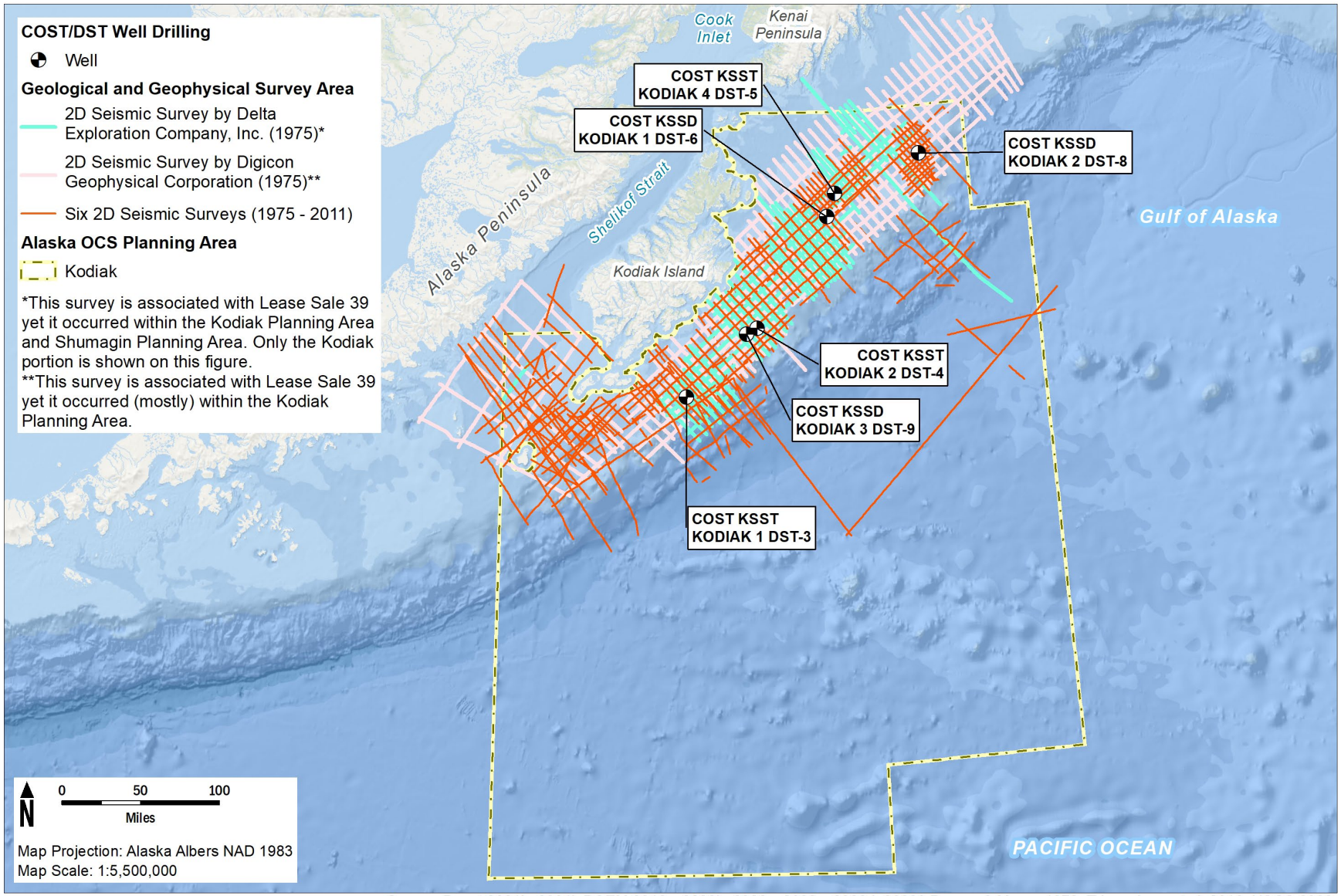
Notes: 2D = two-dimensional; km = kilometers
Sources: Triezenberg et al. 2016; USGS 2023

6.4 Kodiak Planning Area

The Kodiak Planning Area comprises the federal offshore lands on the continental shelf and slope surrounding the Pacific coastline of the Kodiak archipelago, landward of the Aleutian Trench. The OCS planning area extends from its northeastern boundary with the Gulf of Alaska Planning Area, along the coastline of the Kodiak archipelago and along the Aleutian Trench to the boundary with the Shumagin Planning Area (156°W longitude). The boundary of the area extends from the 3-mile limit of State of Alaska waters seaward to approximately the 2,000-meter isobath on the northern (continental) side of the Aleutian Trench. No leases were sold in this OCS planning area, but there were some activities not associated with a lease sale, as described below.

6.4.1 Activities Not Associated with a Lease Sale

Activities that could not be directly associated with a lease sale are shown in Figure 6-13, such as the location of the COST/DST well and survey areas.



Source: Banet 2001h, 2001j; BOEM 2016c, 2022b, 2022c, 2023c, 2023d, 2023f; Dames & Moore 1978; Triezenberg et al. 2016; USGS 2023.

Figure 6-13. Historical oil and gas activities not associated with a lease sale in the Kodiak Planning Area

6.4.1.1 Surveys

Between 1975 and 2011, there were six 2D seismic surveys documented that were not associated with a lease sale, as summarized in Table 6.4.1-1. Two surveys were conducted in this OCS planning area that were associated with Lease Sale 39, and those are summarized in that section.

Table 6.4.1-1. Survey activity summary

Activity Start Date	Activity End Date	Year	Activity Name	Description	Vessel Name(s)	Operator and/or Contractor
1/1/1975	1/2/1975	1975	2D multichannel seismic survey	2D multichannel seismic survey using an airgun and streamer. A total of 5,410 km were shot with 124 tracklines. This survey occurred in the Gulf of Alaska Planning Area, Kodiak Planning Area, and Shumagin Planning Area.	--	USGS
7/1/1976	9/1/1976	1976	2D multichannel seismic survey	2D multichannel seismic survey using a 22-airgun array. A total of 6,772.81 miles of multichannel seismic reflection data in an almost even split between both the Alaska OCS Shumagin Planning Area and the Kodiak Planning Area.	M/V Indian Seal	Digicon, Inc.
7/3/1977	7/22/1977	1977	2D multichannel seismic survey	2D multichannel seismic survey using an airgun and streamer. A total of 2,364 km were shot with 33 tracklines. The survey occurred mostly in the Cook Inlet Planning Area and Kodiak Planning Area.	The Samuel Phillips Lee	Pacific Coastal and Marine Science Center
6/11/1981	6/30/1981	1981	2D multichannel seismic survey	2D multichannel seismic survey using an airgun and streamer. A total of 2,691 km were shot with 33 tracklines. The survey was conducted in the Cook Inlet Planning Area, Gulf of Alaska Planning Area, and Kodiak Planning Area.	Samuel Phillips Lee	Pacific Coastal and Marine Science Center
6/1/1983	11/1/1983	1983	2D multichannel seismic survey	2D multichannel seismic survey using an airgun and streamer. A total of 2,828 km were shot with a total of 26 tracklines. The survey occurred in the Cook Inlet Planning Area, Kodiak Planning Area, and Shumagin Planning Area.	--	Western Geophysical Corporation
6/5/2011	6/25/2011	2011	2D multichannel seismic survey	2D multichannel seismic survey using a bolt airgun and sentry solid streamer. A total of 3,042 km were shot	R/V Marcus G. Langseth	USGS

Activity Start Date	Activity End Date	Year	Activity Name	Description	Vessel Name(s)	Operator and/or Contractor
				with 20 tracklines. The survey occurred in the Kodiak Planning Area and the Gulf of Alaska Planning Area.		

Notes: 2D = two-dimensional; km = kilometers; OCS = Outer Continental Shelf; USGS = United States Geological Survey
Sources: Banet 2001h; BOEM 2023f; Triezenberg et al. 2016; USGS 2023

6.4.1.2 Well Drilling

Six COST/DST wells were drilled that were not associated with a lease sale, as summarized in Table 6.4.1-2.

Table 6.4.1-2. Well drilling summary

Activity Start Date	Activity End Date	Well Name (includes API no. and bottom hole lease number)	Well Type	Well Depth (feet)	Drill Rig Name
7/13/1976	8/1/1976	API no. 552170000100 (COST KSST KODIAK 1 DST-3)	COST/DST	4,225	Zapata Trader
8/4/1976	8/23/1976	API no. 552180000100 (COST KSST KODIAK 2 DST-4)	COST/DST	4,307	Zapata Trader
8/28/1976	9/19/1976	API no. 552190000100 (COST KSST KODIAK 4 DST-5)	COST/DST	1,391	Zapata Trader
5/27/1977	7/17/1977	API no. 552190000200 (COST KSSD KODIAK 1 DST-6)	COST/DST	8,515	SEDCO 708
7/22/1977	9/8/1977	API no. 5518900001000(COST KSSD KODIAK 2 DST-8)	COST/DST	10,460	SEDCO 708
9/13/1977	10/25/1977	API no. 552170000200 (COST KSSD KODIAK 3 DST-9)	COST/DST	9,357	SEDCO 708

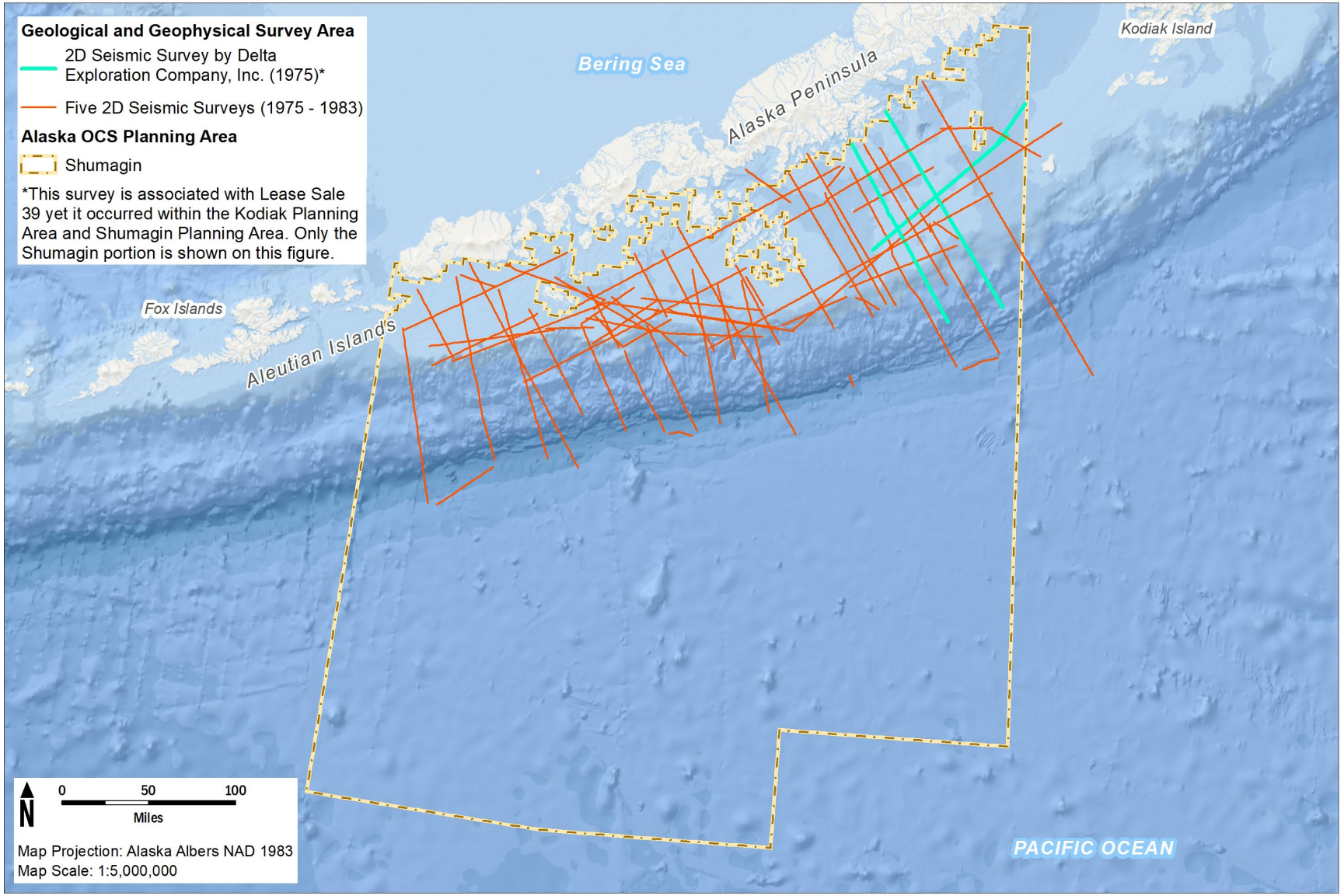
Notes: API = American Petroleum Institute; COST = continental offshore stratigraphic test; DST = deep stratigraphic test
Sources: BOEM 2005a, 2022b, 2023c, 2023d; Dames & Moore 1978

6.5 Shumagin Planning Area

The Shumagin Planning Area extends from the Kodiak Planning Area in the northeast (156°W longitude) to just past the Sanak Islands near the end of the Alaska Peninsula. The area extends from the 3-mile limit of State of Alaska waters seaward to approximately the 2,000-meter isobath on the northern (continental) side of the Aleutian Trench. No leases were sold in this OCS planning area, but there were some activities not associated with a lease sale, as described below.

6.5.1 Activities Not Associated with a Lease Sale

Activities that could not be directly associated with a lease sale are shown in Figure 6-14, such as survey areas.



Source: Banet 2001j; BOEM 2022c; Dames & Moore 1978; Triezenberg et al. 2016; USGS 2023.

Figure 6-14. Historical oil and gas activities not associated with a lease sale in the Shumagin Planning Area

6.5.1.1 Surveys

Between 1975 and 1983, there were five 2D seismic surveys documented that were not associated with a lease sale, as summarized in Table 6.5.1-1. One survey was conducted in this OCS planning area that was associated by Dames and Moore (1978) with Lease Sale 39, and it is summarized in that section.

Table 6.5.1-1. Survey activity summary

Activity Start Date	Activity End Date	Year	Activity Name	Description	Vessel Name(s)	Operator and/or Contractor
1/1/1975	1/2/1975	1975	2D multichannel seismic survey	2D multichannel seismic survey using an airgun and streamer. A total of 5,410 km were shot with 124 tracklines. This survey occurred in the Gulf of Alaska Planning Area, Kodiak Planning Area, and Shumagin Planning Area.	--	USGS
7/1/1976	9/1/1976	1976	2D multichannel seismic survey	2D multichannel seismic survey using a 22-airgun array. A total of 6,772.81 miles of multichannel seismic reflection data in an almost even split between both the Alaska OCS Shumagin Planning Area and the Kodiak Planning Area.	M/V Indian Seal	Digicon, Inc.
7/4/1981	7/16/1981	1981	2D multichannel seismic survey	2D multichannel seismic survey using an airgun and streamer. A total of 1,214 km were shot with 18 tracklines.	Samuel Phillips Lee	Pacific Coastal and Marine Science Center
9/22/1982	10/5/1982	1982	2D multichannel seismic survey	2D multichannel seismic survey using an airgun and streamer. A total of 1,535 km were shot with 16 tracklines.	--	USGS
6/1/1983	11/1/1983	1983	2D multichannel seismic survey	2D multichannel seismic survey using an airgun and streamer. A total of 2,828 km were shot with a total of 26 tracklines. The survey occurred in the Cook Inlet Planning Area, Kodiak Planning Area, and Shumagin Planning Area.	--	Western Geophysical Corporation

Notes: 2D = two-dimensional; km = kilometers; M/V = motor vessel; OCS = Outer Continental Shelf; USGS = United States Geological Survey
Sources: Banet 2001h; BOEM 2023f; Triezenberg et al. 2016; USGS 2023

7 Summary

7.1 Conclusions

For this synthesis report, we extracted relevant information for Alaska OCS oil and gas activities for 25 lease sales (excluding RS-2 and 191 as these did not have leases sold, and excluding S65 as it was a court case and not a lease sale), summarized and compared 24 E&D scenarios (RS-1 had the same E&D Scenario as Lease Sale 55) against historical retrieved activities, and compiled 25 comparison summary tables. Of the 25 lease sales that had an associated E&D scenario, 18 Alaska OCS lease sales had historical oil and gas activities retrieved in this study from publicly available information. Seven lease sales did not result in historical retrieved activities, which were Lease Sales 92, 126, 170, 186, 202, 258, and RS-1. Lease Sale 258 was completed on December 30, 2022, and it is possible activities may occur later in the future as the resulting single lease is active. The other six lease sales did not result in wells or documented G&G surveys; therefore, it is not unexpected that other supporting oil and gas activities such as shorebases or transportation were not retrieved.

Upon completing the estimated versus historical comparisons, a key trend throughout the study was that generally, the E&D scenarios estimated a much larger set of resulting activities than what occurred. Specifically, the E&D scenarios estimated more exploration and delineation wells; the recorded number of exploration and delineation wells was generally much lower than anticipated, by around 60–80 percent. The E&D scenarios also estimated more development and production wells to be developed, as well as pipelines. The exception was the Northstar development under Lease Sale BF, which did move from exploration activities to production over the span of more than 20 years from date of lease sale to oil and gas production (December 1979–October 2001). However, as shown in Section 4.1.1.9, the assumptions for numbers of exploration and production wells were still over-assumed (a total of 148 wells assumed and 15 drilled). Pipeline miles deviated from the general trend of overestimating and were under-assumed in the Lease Sale BF scenario (20 miles assumed and 33 constructed).

Other discoveries specific to the E&D scenario for Lease Sale BF included an estimated exploratory drilling period beginning in 1981, which did actually begin in 1981 with the drilling of exploration well American Petroleum Institute (API) no. 552010000100 (OCS Y-0191 BEECHY PT 1). Production platform construction was estimated to begin in 1985 and continue for 2 to 4 years. The construction of Northstar, a reconstruction of the artificial Seal Island (originally constructed for supporting exploration well drilling between 1982 and 1983), occurred instead in early- to mid-2000. Development drilling was estimated to begin in 1986 and to be completed in 8 to 12 years. The first development well, API no. 500292305200 (NS-09), was actually drilled between December 2001 and January 2002, and the last development well drilled to date (between March and May 2008) was API no. 500292330101 (NS-34A), resulting in a 15 year difference between estimation and activity, and 7 years of development drilling instead of 8 to 12. Further comparisons may be made in the future when development and production activities end at Northstar for a full project life cycle comparison against the Lease Sale BF E&D scenario.

In general, there was no consistency in the E&D scenario estimations among the number of acres offered for sale verses the E&D scenario—some were close (within 2 or 3 million acres), and some were much higher or lower. The maximum difference between the estimated and actual acres was 9,426,553 acres from Lease Sale 87, and the minimum difference was 5,706 acres from Lease Sale 92, with the estimate being higher than actual in both cases. In general, E&D scenarios accurately estimated that the start dates for exploration and were within a year or two of the completed lease sale. The number of exploration and delineation wells was generally much lower than anticipated, by around 60–80 percent. The assumptions for the number of production wells were generally between 100 and 200, with outliers on either end. Average well depths, when estimated in E&D scenarios and where average well depths could be

calculated, were frequently overestimated in a range between 1,200 feet to over 10,000 feet deeper than actual. Platforms, shorebases, and other facilities for exploration were lower than assumed, in proportion to the number of wells assumed and drilled. To date only Lease Sale BF progressed to development and production phases; all other lease sale E&D scenario estimates for the production phases were moot because exploration drilling was unsuccessful, leases were relinquished or expired, or the lease owner decided not to pursue development.

Table 7.1-1 summarizes the estimated and actual total wells in E&D scenarios. This metric was used as an example for this table of how much the E&D scenarios overestimated well drilling activities, as it was consistent across all E&D scenarios and the total wells drilled were successfully retrieved in all cases.

Table 7.1-1. Summary of E&D scenario comparisons

Subregion	OCS Planning Area	Lease Sale	Year	Historical activities retrieved?	Estimated Wells Drilled	Actual Wells Drilled	Other Notable Differences (if any)
Arctic	**Beaufort Sea**	**BF**	1979	Yes	142	14[1, 2]	There was a 13.4 pipeline mile difference in favor of actual.
Arctic	**Beaufort Sea**	**71**	1982	Yes	494	8	For average well depth, the actual 9,717 feet was within the E&D scenario estimated range of 9,000–13,000 feet.
Arctic	**Beaufort Sea**	**87**	1984	Yes	231	10	There was a 9,426,553 sale offering acre difference in favor of estimation. This E&D scenario estimated 600 miles of pipeline, more than any other E&D scenario (the actual was 0 miles). For average well depth, the E&D scenario underestimated 2,665 feet below actual (10,129 feet).
Arctic	**Beaufort Sea**	**97**	1988	Yes	54	2	--
Arctic	**Beaufort Sea**	**124**	1991	Yes	134	2[1]	--
Arctic	**Beaufort Sea**	**144**	1996	Yes	32	2[1]	For average well depth, the E&D scenario overestimated 3,154 feet above the actual (9,846 feet).
Arctic	**Beaufort Sea**	**170**	1998	No	127	0	--
Arctic	**Beaufort Sea**	**186**	2003	No	114	0	--
Arctic	**Beaufort Sea**	**195**	2005	Yes	114	1.5[3]	--
Arctic	**Beaufort Sea**	**202**	2007	No	113	0[1]	--
Arctic	**Chukchi Sea**	**109**	1988	Yes	196	4	--
Arctic	**Chukchi Sea**	**126**	1991	No	253	0	--
Arctic	**Chukchi Sea**	**193**	2007	Yes	589	1.5[3]	For average well depth, the E&D scenario overestimated 1,200 feet above the actual (6,800 feet) for exploration wells.
Bering Sea	**Navarin Basin**	**83**	1984	Yes	266	8	For average well depth, the actual 10,455 feet was within the E&D scenario estimated range of 10,000–15,000 feet.

Subregion	OCS Planning Area	Lease Sale	Year	Historical activities retrieved?	Estimated Wells Drilled	Actual Wells Drilled	Other Notable Differences (if any)
Bering Sea	**North Aleutian**	**92**	1988	No	39	0	There was a 5,706 sale offering acre difference in favor of estimation.
Bering Sea	**Norton Basin**	**57**	1983	Yes	217	6	For average well depth, the E&D scenario overestimated 2,971 feet above the actual (6,729 feet) for exploration wells.
Bering Sea	**St. George Basin**	**70**	1983	Yes	306	10	The acres of sale offering were the same in both estimated and actual, but this may have been a result of the sale acreage offering being known during the time of the E&D scenario.
Gulf of Alaska	**Cook Inlet Planning Area**	**CI**	1977	Yes	604	10	--
Gulf of Alaska	**Cook Inlet Planning Area**	**60**	1981	Yes	835	3	For average well depth, the E&D scenario overestimated 10,168 feet above the actual (5,832 feet) for exploration wells. This is the largest documented difference between estimated and actual for average well depth.
Gulf of Alaska	**Cook Inlet Planning Area**	**149**	1997	Yes	89	0	--
Gulf of Alaska	**Cook Inlet Planning Area**	**244**	2017	Yes	89	0[1]	--
Gulf of Alaska	**Cook Inlet Planning Area**	**258**	2022	No	116	0[1]	--
Gulf of Alaska	**Gulf of Alaska**	**39**	1976	Yes	900	11	--
Gulf of Alaska	**Gulf of Alaska**	**55**	1980	Yes	234	1	--
Gulf of Alaska	**Gulf of Alaska**	**RS-1**	1981	No	234	0	--

Notes: -- = no notable differences; (Lease Sale) BF = Beaufort Sea; (Lease Sale) CI = Cook Inlet; E&D scenario = Exploration and Development scenario; OCS = Outer Continental Shelf

[1]Subject to change due to active leases.

[2]For the purpose of total well counts in the Alaska OCS, BOEM and BSEE consider API no. 500292330100 (NS-34) and API no. 500292330101 (NS-34A) to be counted as the same well.

[3]0.5 represents a top hole drilled.

Retrieval of all data elements in an E&D scenario was not possible. For elements estimating volume of available oil and gas resources estimated to be within the area of lease sale, these would only be confirmed in the event of successful oil or gas drilling.

There were activities that were unable to be connected to lease sales, such as COST/DST wells, by program design, and other activities, mainly G&G surveys. As a result, activities that were not attributed to a lease sale were not included in any of the E&D scenario comparisons. As the majority of these activities were either related to transportation for COST/DST wells, or for G&G surveys, these did not impact the E&D scenario comparison, as these were not typical data elements of an E&D scenario.

Data elements such as helicopter or airplane trips, or vessel trips, were difficult to quantify. In E&D scenarios these were often mentioned, and units for reporting these metrics differed (weekly trips versus a generic number of trips). In historical documentation a type of aircraft was often mentioned, or a type of vessel used for carrying employees to a drill rig, but often a documented number of roundtrips was not recoverable (exceptions being Kim et al. 2016, 2020a, 2020b, and Richardson 2010a). These references were applicable to Lease Sale BF for Northstar; however, that E&D scenario did not estimate the number of trips associated with the lease sale.

There were three E&D scenarios that included estimates for G&G and other surveys (Lease Sale 92 in 1988, Lease Sale 244 in 2017, and Lease Sale 258 in 2022). This appeared to be a useful metric in the E&D scenarios, considering surveys were the most frequently retrieved activity in this study. However, only Lease Sale 244 had a successful comparison, as no surveys occurred under Lease Sale 92 or Lease Sale 258. Note that there is one active lease under Lease Sale 258 and this could change in the future.

In all cases, some data elements from an E&D scenario were not documented in publicly available sources retrieved from this study. Information on transportation, such as frequency of trips and number of vehicles or vessels, was often not documented and may be lost to time. Other data were not generally in the E&D scenarios, such as number and types of surveys, support facility and shorebase locations, and other sites used in transportation networks of materials and personnel. Drill cutting volumes are reported in National Pollutant Discharge Elimination System permits but were not included in this study, as this fact was determined after October 25, 2023, outside of the appropriate time frame for inclusion.

The OCS planning area with the most retrieved historical activities was the Beaufort Sea Planning Area with 181 activities retrieved and recorded. The Cook Inlet Planning Area was the next most active, with 131 activities. The OCS planning areas with the least retrieved historical activities were the Aleutian Arc, Aleutian Basin, Bowers Basin, and St. Matthew-Hall, each with two records of activity.

The decade with the most documented activity was 1980–1990, which is consistent with BOEM's knowledge that oil and gas activities peaked in the early 1980s. This involved 187 recorded activities (99 records, with 1 of those records summarizing 89 additional surveys in the Bering Sea), 58 wells drilled (including 5 COST/DST wells), artificial islands created at Seal Island, Tern Island, and Unnamed Island/BF-37 Gravel Island, shorebases and facilities at Prudhoe Bay East Dock and West Dock, Captains Bay, Cold Bay, Nome, Deadhorse, and transportation sites used in multiple subregions through the entire state of Alaska. This decade favored the Beaufort Sea Planning Area, with 116 documented activities, and the Bering Sea subregion (89 surveys could not be attributed to any single OCS planning area due to the lack of information from the source data). The only OCS planning areas not represented with activities retrieved in this decade were for the Aleutian Basin and Bowers Basin which had two surveys each documented for the entire study.

The time period with the least activities retrieved was 2020–2023. The Hilcorp shallow hazard surveys occurred in 2021 for Lease Sale 244 in the Cook Inlet Planning Area. No additional surveys were retrieved after this 2021 survey, although BOEM (2023a) documented a total of 1,474 and 253 2D

seismic trackline miles purchased in 2021 and 2022 respectively, 23,600 miles of gravity/magnetic survey data purchased in 2021, and 174 OCS blocks of 3D seismic data purchased in 2022. These activities were not available for this study.

7.2 Recommendations

The data collected and synthesized for this project demonstrate the utility and benefit of collating long term OCS activity information for ease of retrieval. We identified recommendations based on the background research conducted as part of the study and database development including E&D scenarios, further data collation, and maintenance for future research.

This study could be used to document that the full E&D scenarios used to evaluate potential impacts in National Environmental Policy Act (NEPA) assessments rarely occur in a frontier region like the Alaska OCS which in general takes a long time to develop, as evidenced by the fact that only one development has taken place over the last 50 years. NEPA assessments must document the full range of potential impacts that could occur if all oil and gas resources were to be developed. While it is appropriate to be conservative when analyzing impacts under NEPA, the E&D scenarios used to prepare environmental analyses overestimated oil and gas activities by a substantial margin and may overstate potential impacts. We recommend taking these E&D scenario comparisons into consideration when developing future E&D scenarios to aide in developing appropriate estimations. This study will not result in a change to the way E&D scenarios are developed; however, the results from this study may inform the scaling of E&D scenario elements. E&D scenarios are predicated on detailed geologic resource and economic models. Oil and gas activities quantified in this study at Northstar, particularly for annual roundtrips of varying vessels, vehicles, and aircraft, may be used as a proxy for informing E&D scenario elements and resource evaluation for the Liberty Project, if it is developed, or other nearshore Beaufort Sea developments.

The study also collated information on shorebases and transportation sites that were not ever previously compiled. Historically, the transportation network for well drilling and conducting G&G surveys was larger than expected. Notably, in the Arctic, vessels frequently traveled through the Bering Sea to reach their destinations to conduct oil and gas activities, and roadways and airports in interior Alaska were utilized to transport equipment and supplies, which resulted in a larger transportation footprint than the Arctic region. We recommend using this information to assess potential impacts for future Arctic region lease sales.

We recommend capitalizing on opportunities to expand on additional attribution that were not retrieved in this study. For example, collaboration with U.S. Environmental Protection Agency on National Pollution Discharge Elimination System operator permits and discharge monitoring reports to determine the best methods to easily compile muds and cuttings information, which are typical data elements in an E&D scenario could be beneficial. Also, operators have changed names over time as a result of company acquisitions or business renaming. We recommend compiling a cross reference to historical operators and company names in order to identify current lease holders, operators, and companies that have merged or been sold over time. This would allow for improved tracking of leases and oil and gas activities over time.

For future data gathering efforts, we recommend reviewing E&D scenario elements and prioritize precise data capture at the time of the oil and gas activities. New data could be collected, or existing data collection forms could be reformatted, for operators to provide public information. Capture of an associated G&G permit number for future data gathering efforts may also prove useful for a comparison of the permitted activity versus the activity as completed.

The full scale of transportation activities is still unquantifiable in most of the Alaska OCS even after this study. This information may be lost to the past, but modification of existing data collection forms to

include future retrieval of data elements such as dates of activity occurrence, a date range for travel, a summary of resulting transportation including locations of travel and coordinates or addresses for specific shorebases, names and types of vessels, aircraft, and vehicles, and documented roundtrips in the travel timeframe (which may precede and/or end after the relevant oil and gas activity that the transportation supports).

Some E&D scenario element comparisons to historical data are limited both in terms of information publicly available as well as information lost to time. Proprietary G&G data and information are releasable after 10–50 years due to regulations at 30 CFR § 551.14(b)(1) and § 550.197, and as such, when this data becomes publicly available it is dated and some information may be lost. The National Archive of Marine Seismic Surveys releases this data periodically as G&G surveys become releasable, and we recommend performing an annual check with the archive to determine if additional G&G surveys and their tracklines or study areas have been released and import them into this study's compiled GIS geodatabase. This type of routine data review and inclusion would allow for a more robust comparison of the estimated activities to actual activities in the future and expand upon the framework compiled in this study.

We recommend considering routinely importing permitted oil and gas activities in future data collation efforts, but this strategy would be less informative than determining a method for capturing data at the time of the activity's occurrence as permitted activities may differ from actual. This is suggested only if updating data collection methods from operators at the time of the oil and gas activity is not possible, but the current framework allows for the data investigator to make the distinction that the source information is from a G&G permit application, and this option should not be overlooked.

Data are rapidly becoming digital, and older, hard copy documents are becoming lost to time which may impede any efforts to do a retrospective synthesis similar to this one. This study provides the framework for continuously updating oil and gas activities as they relate to the Alaska OCS. We recommend that the tables, feature classes, and metadata resulting from this study are updated and maintained, so that they continue to reflect the most up-to-date information about Alaska OCS oil and gas activities and their usefulness is extended to inform future lease sales by comparison of the now compiled historical public record.

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