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Outer Continental Shelf Oil & Gas Activities

By

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28

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Minerals Management Service
OCS Information Program

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Preface

The Outer Continental Shelf Information Program (OCSIP) was mandated by the 1978 Amendments to the OCS Lands Act (43 U.S.C. 1352). To meet the requirements of this mandate, the OCSIP has made available two types of documents (summary reports and indexes) that have described oil- and gas-related activities in each of the four MMS OCS Regions: the Alaska, the Atlantic, the Gulf of Mexico, and the Pacific.

Many facets of the Federal oil and gas leasing program have changed significantly in the 10 years since inception of the OCSIP. In recognition of these changes, and in an attempt to reduce administrative costs, the OCSIP has recently modified its publication program and now produces the following documents:

- a streamlined, annual *Update* report for each of the four MMS OCS Regions (in lieu of the *Summary Reports* published formerly);
- a biennial *National OCS Compendium* that presents historical information on all of the OCS Regions;
- a map plate series detailing regional offshore and onshore information for the Alaska and Pacific OCS Regions;
- a biennial *OCS Directory* of Federal and State agencies and their OCS responsibilities.

To order any of these documents, or for more information about them, contact the OCSIP at the following address and telephone number:

OCS Information Program
Offshore Information & Publications
Minerals Management Service, MS 4610
381 Elden St.
Herndon, VA 22070-4817
(703) 787-1080 or (FTS) 393-1080

Abbreviations and Acronyms

A

- APD - Application for Permit to Drill
API - American Petroleum Institute

B

- bbl - barrel(s)

C

- CER - categorical exclusion review
CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act (also known as "Superfund")
CFR - Code of Federal Regulations
COST - continental offshore stratigraphic test (well)
CZM - Coastal Zone Management

D

- DOI - U.S. Department of the Interior
DST - deep stratigraphic test

E

- EA - environmental assessment
EIS - environmental impact statement
EP - exploration plan
EPA - Environmental Protection Agency
ER - environmental report
ESSO - Eastern Seaboard Standard Oil (Exxon Corporation)

F

- FR - *Federal Register*
FTS - Federal Telephone System

G

- G&G - geological and geophysical
GOMA - Georgia Offshore Minerals Assessment

H

- ha - hectares

J

- JOIDES - Joint Oceanographic Institution for Deep Earth Sampling

K

- km - kilometer

M

- m - meters
Mbbl - thousand barrels
Mbpd - thousand barrels per day
Mcf - thousand cubic feet
Mgal - thousand gallons
MMbbl - million barrels
MMBO - million barrels of oil
MMbpd - million barrels of oil per day

MMS

- Mobil - Minerals Management Service
Mobil - Mobil Oil Exploration & Producing Southeast, Inc.
MOU - Memorandum of Understanding
MS - Mail Stop

N

- NAS - National Academy of Science
NCP - National (Oil and Hazardous Substances Pollution) Contingency Plan
NEPA - National Environmental Policy Act
NERR - National Estuarine Research Reserves
NOAA - National Oceanic & Atmospheric Administration
NOS - National Ocean Service
NPDES - National Pollutant Discharge Elimination System
NRT - National Response Team

O

- OCRM - Office of Ocean & Coastal Resource Management
OCS - Outer Continental Shelf
OCSIP - Outer Continental Shelf Information Program
OCSLA - Outer Continental Shelf Lands Act
OHMSETT - oil and hazardous materials simulated environmental test tank
OPD - official protraction diagram
OSC - On-Scene Coordinator
OSCP - oil spill contingency plan
OSIM - Office of Strategic & International Minerals

P

- PARS - Port Access Route Study
PFER - preliminary final environmental report
PIRO - Petroleum Industry Response Organization
P.L. - public law
PRESTO - Probabilistic Resource Estimator - Offshore

R

- RCP - Regional Contingency Plan
RRT - Regional Response Team
RS - resale

T

- TACTS - Tactical Air Command Test Site
Tcf - trillion cubic feet (of gas)
TSS - traffic-separation scheme

U

- U.S.C. - United States Code
USCG - United States Coast Guard

English-Metric Conversion

Measurements in this document are reported in the format that reflects the most common usage. The following table provides the factors for converting measurements to either U.S. Customary units or the International System (SI) of metric units.

U.S. Customary unit	(multiply by to obtain)	SI Metric unit
inches	.254	centimeters
feet	.3048	meters
statute miles	1.609	kilometers
nautical (geographic) miles	1.852	kilometers
acres	.4047	hectares
barrels (U.S.) petroleum	.15897	cubic meter
gallons	.3785	liters
cubic feet	.02832	cubic meters
tons, long (deadweight)	1.016	metric tons

SI Metric unit	(multiply by to obtain)	U.S. Customary unit
centimeters	.03937	inches
meters	.3281	feet
kilometers	.6214	miles, statute
kilometers	.5400	miles, geographic (nautical)
hectares	2.47105	acres
cubic meters	.6290	barrels (petroleum, 1 bbl = 42 gal)
liters	.2642	gallons
metric tons	.9842	tons, long (deadweight)(2,240 lb)

NOTE: Distances on the Federal Outer Continental Shelf and on land are measured in statute miles.

Distances on the offshore State lands are measured in nautical (geographic) miles.

Generally, coastal States were granted jurisdiction over offshore lands to a distance of 3 nautical miles from their coasts by the Submerged Lands Act (43 U.S.C. 1301, et seq.). The offshore jurisdiction of Texas and Florida (on its gulf coast side only) extends to 3 marine leagues (approximately 10.35 statute miles) for historic reasons.

Contents

Preface	iii
Abbreviations and Acronyms	iv
English-Metric Conversion	v
Introduction	1
1. Offshore Oil and Gas Resources of the Atlantic Region	5
Geologic Overview of the Mid-Atlantic Planning Area	5
Summary of the Geology of the Manteo Prospect Offshore North Carolina	9
Geological and Geophysical Permit Data	10
Estimated Offshore Oil and Gas Resources and Reserves	11
Additional Readings	13
2. OCS Leasing and Exploration Activities	15
July 1987 Final 5-Year OCS Oil and Gas Leasing Program	15
Federal OCS Oil and Gas Leasing in the Atlantic OCS Region	15
Development of the 5-Year OCS Oil and Gas Leasing Program - Fall 1991 to Fall 1996	15
Atlantic OCS Region Environmental Studies Program	18
Exploratory Drilling in the Atlantic OCS Region	20
Recent Presidential OCS Leasing Decisions	22
Chronology and Status of the Mobil Oil Company Exploration Well Offshore North Carolina	22
Brief History of Manteo Block 467 and the Project Scenarios	22
Chronology of Recent Events Relating to the Mobil Exploration Well Plan	25
Chronology of Events to be Completed Before Mobil Commences Drilling	26
Overall Summary List of Major Environmental Issues of Concern	26
Additional Readings	27
3. Issues Related to OCS Activities	29
Marine Vessel Transportation	29
Shipping Safety Fairways and Anchorages	29
U.S. Coast Guard Port Access Route Studies	29
Onshore Support Facilities	29
Offshore Strategic and International Minerals Program	30
North Carolina Phosphorites Task Force	30
Georgia Placers and Phosphorites Task Force	31
Coastal Zone Management Program	32
National Marine Sanctuaries and Estuarine Research Reserves	32
Regulation of Offshore Drilling Discharges	33

Oil Spills and Cleanup Capabilities on the East Coast	33
OHMSETT Facility	35
Petroleum Industry Response Organization	36
Appendix A: Bibliography of OCS Information Reports	37
Alaska Region	37
Arctic Subregion Summary Reports and Updates	37
Bering Sea Subregion Summary Reports and Updates	37
Gulf of Alaska Subregion Summary Reports and Updates	37
Regionwide Alaska Summary Reports and Updates	38
Alaska Indexes	38
Alaska Summary/Index	38
Atlantic Region	38
North Atlantic Summary Reports and Updates	38
Mid-Atlantic Summary Reports and Updates	38
South Atlantic Summary Reports and Updates	38
Regionwide Atlantic Summary Report	39
Atlantic Indexes	39
Atlantic Summary/Index	39
Gulf of Mexico Region	39
Gulf of Mexico Summary Reports and Updates	39
Gulf of Mexico Indexes	39
Pacific Region	40
Pacific Summary Reports and Updates	40
Pacific Indexes	40
Pacific Summary/Index	40
Other Documents of Interest	40
Other Items of Interest	41
Appendix B. Atlantic OCS Region Environmental Studies	43
Ongoing Studies With Brief Descriptions	43
Studies Completed Since July 1986	46
Appendix C. Memorandum of Understanding Regarding Exploration of OCS Leases	
Offshore North Carolina	49
Appendix D. Updated Timeline for the Exploration of OCS Leases Offshore	
North Carolina	57

Contents continued

Figures

1. Atlantic OCS Region planning areas and official protraction diagrams 2
2. Physiographic features of the Mid-Atlantic OCS Planning Area 6
3. Generalized cross section of the U.S. Atlantic continental margin 7
4. The prelease phase of the OCS oil and gas leasing process 16
5. July 1987 Final 5-Year OCS Oil and Gas Leasing Program milestone chart 17
6. Major Atlantic OCS leaseholders, by percentage of acreage held as of June 30, 1990 20

Tables

1. Geological and geophysical data acquisition and permits issued 11
2. Estimates of undiscovered economically recoverable oil and gas resources
in the Atlantic OCS Region as of January 1987 12
3. Lease sale history of the Atlantic OCS Region through June 1990 18
4. Dates of Federal Register notices for significant prelease steps for
Atlantic OCS lease sales through June 1990 19
5. Atlantic OCS Region Studies Program annual funding levels 20
6. Exploratory wells drilled in the Atlantic OCS Region through June 1990 21
7. COST wells drilled on the Atlantic OCS 22
8. Summary of OCS oil and gas onshore support facilities needed for the Mobil project 24

Introduction

The Federal offshore oil and gas program in the Atlantic Outer Continental Shelf Region dates back to 1976. Detailed information on the history of Federal offshore oil and gas activities has been compiled into an *OCS National Compendium*, and is available from the OCS Information Program (OCSIP) at the address and telephone number below. For other OCSIP documents summarizing oil and gas activities in the Atlantic OCS Region, see Appendix A (p. 38).

Offshore Information & Publications
Minerals Management Service, MS 4610
381 Elden St.
Herndon, VA 22070-4817
(703) 787-1080 or (FTS) 393-1080

In addition to these documents, the Atlantic OCS Region Environmental Studies Program has released two publications that list Atlantic OCS Region reports and peer reviewed papers: "Atlantic OCS Region Environmental Studies Index" (second edition) and "Atlantic OCS Region Final Report Publications and Presentations" (second edition). For information regarding the reports and papers in these publications, contact the Atlantic OCS Region at the address listed below. This Atlantic Update includes a discussion of current Atlantic Region environmental studies (see Chapter 2, p. 19) and completed studies (see Appendix B, p. 43).

Minerals Management Service
Branch of Environmental Studies
381 Elden St.
Herndon, VA 22070-4817
(703) 787-1063 or (FTS) 393-1063

The Atlantic OCS Region comprises the offshore lands of the continental shelf beginning 3 miles from shore (the States have jurisdiction out to 3 miles) and extending generally 200 miles out to sea, the limit of the Exclusive Economic Zone (EEZ). For

administrative purposes, the Minerals Management Service (MMS) divided the Atlantic OCS Region into four OCS planning areas: the **North Atlantic**, which encompasses Federal offshore lands from Maine to Massachusetts; the **Mid-Atlantic** from Rhode Island to Cape Hatteras, North Carolina; the **South Atlantic** from Cape Hatteras to Cape Kennedy, Florida; and the **Straits of Florida** from Cape Kennedy on the mid-Florida Atlantic coast to the Dry Tortugas just inside the Gulf of Mexico (including the Florida Keys). The OCS planning areas are further subdivided into official protraction diagrams (OPD's) (see fig. 1 on the next page and the sidebar on OPD's below).

To date, the Atlantic OCS Region has conducted nine offshore oil and gas lease sales between 1976 and 1983: one in the North Atlantic Planning Area (Sale 42); five in the Mid-Atlantic Planning Area (Sales 40, 49, 59, RS-2, 76); and four in the South Atlantic Planning Area (43, 56, RS-2, 78).

Official Protraction Diagrams

The Atlantic OCS Region planning areas are portrayed on official protraction diagrams (OPD's). The OPD's are based on the Universal Transverse Mercator Grid/Projection System. Atlantic OPD's bear a unique numerical designator. Each OPD covers an area of 1° latitude by 3° longitude that is divided into blocks. Individual blocks, the basic leasing units, are properly referenced by citing both the OPD and block numbers.

An index to Atlantic OCS Region OPD's, as well as individual OPD's, can be ordered from the following office at a cost of \$2 each:

Atlantic OCS Region
Minerals Management Service, MS 6300
381 Elden St.
Herndon, VA 22070-4817
(703) 787-1118 or (FTS) 393-1118

Figure 1. *Atlantic OCS Region planning areas and official protraction diagrams.*

See Chapter 2 (p. 15) for a complete leasing history of the Atlantic. Forty-six exploratory wells and five cost wells have been drilled, with no commercial finds. There has not been any development or production.

There have been no lease sales since 1983. The only industry activity has been the submission of a draft Exploration Plan (EP) by Mobil Oil Exploration & Producing Southeast, Inc. (Mobil) to drill one well off the coast of North Carolina, in the Manteo Prospect. There has been much local opposition to the project, and it is not clear at this point if Mobil will receive the necessary permits to proceed. This project is described in detail at the end of Chapter 2 (p. 22), and more fully in the MMS Environmental Report (ER) and the Mobil Draft Exploration Plan (September 1, 1989) for the Manteo Area, Block 467, offshore the Atlantic coast. Extensive negotiations between Mobil, MMS, and the State of North Carolina have resulted in the signing of a Memorandum of Understanding (MOU), included as Appendix C (p. 49) of this report, including a timeline. The MOU timeline has since been updated and is included as Appendix D (p. 57).

On June 26, 1990, President Bush announced a series of decisions on the OCS leasing program. These included the cancellation of Sale 96 (North Atlantic) and Sale 116, Part II (Eastern Gulf of Mexico). These decisions are discussed briefly in Chapter 2 (p. 22).

1. Offshore Oil and Gas Resources of the Atlantic Region

Previous Summary/Index reports have provided information about the Atlantic OCS Region. Please refer to these reports, listed in Appendix B, for additional information related to the Atlantic OCS Region. This edition of the *Atlantic Update* includes an overview of the Mid-Atlantic Planning Area and a summary of the Manteo Prospect offshore North Carolina. Information for this section was extracted from the following reports: *Description of the Mid-Atlantic Environment* and the *Draft Environmental Report on Proposed Exploratory Drilling Offshore North Carolina*. Both of these reports were prepared by the Atlantic OCS Region and can be obtained from the Minerals Management Service (MMS) at the address listed in the Preface of this document. These reports are listed in the "Additional Readings" section at the end of this chapter. Please refer to these documents for more detailed information.

Geologic Overview of the Mid-Atlantic Planning Area

The Mid-Atlantic Planning Area extends from Rhode Island to Cape Hatteras, North Carolina, and encompasses the three major physiographic provinces of the continental margin: the continental shelf, continental slope, and continental rise (see figs. 2 and 3, p. 6 and 7).

The continental shelf extends from mean low tide to the shelf break, which is in approximately 200 m (656 ft) of water. Within the Planning Area, the shelf is about 750 km (466 mi) long and varies in width from about 30 km (19 mi) at Cape Hatteras to 190 km (118 mi) along Long Island, New York. Low-relief erosional and depositional bathymetric features are common on the

shelf. These include ridge and swale topography, relict barrier-beach deposits, Pleistocene shorelines and terraces, buried channels, and both relict and mobile sand waves. Surficial sediments on the shelf are mostly sand.

The continental slope is a steep, narrow area about 20-35 km (12-22 mi) wide seaward of the shelf extending down to depths of about 2,000 m (6,562 ft). The slope is intensely dissected by submarine canyons. Slumps, slide scars, and debris flows locally modify the slope areas between the canyons. Fine-grained Pleistocene silts and clays occur on the upper parts of the slope. Lower on the slope, where the Pleistocene sediments are thin to absent, older (Tertiary) rock outcrops are exposed.

The continental rise, in marked contrast to the deeply eroded slope, is topographically subdued. The rise extends from the base of the continental slope, which it onlaps, to the Hatteras Abyssal Plain, which lies in water depths greater than 5,000 m (16,405 ft). The upper rise wedge has been interpreted as a contourite deposit consisting predominantly of fine-grained sediments. Submarine channels locally incise the rise. These features are essentially deep-sea extensions of the larger continental slope canyons.

The sediments of the physiographic provinces are associated with four major structural features: the Long Island Platform, the Baltimore Canyon Trough, the Carolina Platform, and the northern tip of the Carolina Trough.

Development of the continental margin within the Mid-Atlantic Planning Area was initiated during the Late Triassic or Early Jurassic Epoch by rifting of the megacon-

Figure 2. Physiographic features of the Mid-Atlantic OCS Planning Area.

Figure 3. Generalized cross section of the U.S. Atlantic continental margin.

continent of Pangea. This extensional phase of margin development, which started about 200 million years ago, was followed by postrift continental separation of the North American and African crustal plates and by seafloor spreading. The postrift phase of margin development (e.g., plate separation and seafloor spreading) is thought to have begun during early Middle Jurassic time, or about 175 million years ago.

During the rifting phase, continental-crustal rocks in the planning area were extensively ruptured, block-faulted, and block-rotated into graben and half-graben structures. These downfaulted rift basins are filled with inferred continental-clastic (synrift) rocks consisting of red arkosic sandstones, lacustrine deposits, volcanic rocks, and evaporites perhaps as much as 4-5 km (2-3 mi) thick.

During the postrift phase, cooling of the crust caused rapid subsidence of rifted basement blocks and led to formation of the Baltimore Canyon Trough, a large basin 500 km (311 mi) long and up to 150 km (93 mi) wide, trending northeast-southwest. This offshore Mesozoic basin is bounded on its landward edges by two stable, block-faulted platforms (the Long Island Platform on the north and the Carolina Platform on the south), where basement rocks are shallow. Sediments on the platforms are 1-3.5 km (0.6-2 mi) thick. Locally, Triassic-age synrift sediments fill downfaulted (graben) structures. In the areas along the platforms, sediment thicknesses range from 5 to 8 km (3-5 mi). A prominent hinge zone separates the platforms from the Baltimore Canyon Trough. The seaward edge of the trough generally is defined by the East Coast Magnetic Anomaly, which is thought to represent the boundary between continental and oceanic crust.

The deepest part of the trough is located off New Jersey where up to 13 km (8 mi) of Jurassic and younger-age sedimentary rocks have accumulated. These postrift

rocks are mostly of shallow-water marine and terrestrial origin and consist of sandstones, shales, carbonates, and evaporites. A prominent seismic unconformity, the postrift unconformity, separates postrift sediments from underlying synrift sediments. Trough sediments are intruded locally by diapirs cored by igneous rock or salt. Jurassic-age rocks make up the bulk of the sedimentary section occupying the trough, locally up to 9 km (6 mi) thick. These rocks, in turn, are overlain by 4 km (2 mi) of Cretaceous and Cenozoic sediments.

The Baltimore Canyon Trough has been the most actively explored basin along the Atlantic Outer Continental Shelf (OCS). From 1976 through 1984, a total of 32 exploratory wells and 2 Continental Offshore Stratigraphic Test (COST) wells were drilled in the Baltimore Canyon Trough. Five wells drilled on one structure near the shelf edge tested significant flows of gas and condensate. One of the wells also tested a flow of oil. However, proven resource levels were inadequate to justify infrastructure costs. The other wells were classified dry, although a number of them had significant shows. Exploratory wells have not been drilled on the Long Island and Carolina Platforms to test the older Upper Triassic/Lower Jurassic synrift (graben) depositional sequence. Geochemical data from wells drilled in the Baltimore Canyon Trough indicate that potential source rocks are gas-prone. Thus, petroleum accumulations throughout the Mid-Atlantic Planning Area are more likely to be gas than oil.

The petroleum plays in the Mid-Atlantic Planning Area are located in the sedimentary rocks accumulated during the extensional (synrift) phase and postrift phase of margin development. (A play is a group of geologically related prospects having similar conditions of source, reservoir, and trap.) The Late Triassic/Early Jurassic graben play includes both stratigraphic and structural traps that are thought to contain nonmarine

synrift sediments deposited in both grabens and half grabens. (Basins formed by normal faults on opposite sides are grabens; basins formed by a normal fault on only one side are half-grabens.) These basins occur in a zone about 15 km (24 mi) or further offshore. Lacustrine shales, deposited in lakes in these basins, could serve as rich source rocks. In other parts of the world (such as Brazil, Australia, and West Africa), lacustrine shales in similar grabens are highly productive hydrocarbon sources. Grabens, similar to those in the planning area, occur onshore beneath the coastal plains of North Carolina, Virginia, Maryland, Delaware, and New Jersey. An additional graben occurs in Connecticut and extends below Long Island, New York. Previous drilling in the onshore grabens has resulted in hydrocarbon shows. The offshore grabens are buried deeper than their onshore counterparts and, therefore, are more likely to have been buried deep enough, at high enough temperatures, and long enough to reach thermal maturity for hydrocarbon generation.

On the continental shelf, petroleum plays in the postrift sediments include anticlines, growth-faulted anticlines, and traps associated with a large igneous diapir (Great Stone Dome).

Along the outermost part of the Baltimore Canyon Trough, a major carbonate bank complex developed during the Middle Jurassic Epoch. Growth of this carbonate complex persisted into the Early Cretaceous, at which time it was buried by terrigenous siliciclastic sediments. The seaward edge of this buried Middle Jurassic/Lower Cretaceous carbonate bank complex is located in deep water beneath the present day continental slope. Petroleum plays associated with the seaward portion of the carbonate complex include reefs, reefal debris accumulations, reefal highs with overlying drape structures, fault traps, and pinchouts against the carbonate buildup. Shell Offshore, Inc. tested the seaward portion of the

Baltimore Canyon carbonate complex with three exploratory wells in 1983 and 1984. A fourth exploration well penetrated continental-clastic rocks that are the same age and on trend with the carbonate buildup complex.

The Upper Jurassic/Lower Cretaceous sedimentary section of the seaward portion of the Baltimore Canyon Trough is considered most prospective. Source rock potential ranges from poor to fair for the Cretaceous and moderate to good for the Jurassic. The Jurassic, Cretaceous, and Cenozoic sections have marginal to excellent organic richness; however, in the Mid-Atlantic Planning Area, burial depths below 3,500 m (11,484 ft) usually are required for hydrocarbon generation. Generally, Cretaceous and Cenozoic rocks are considered thermally immature. The best potential reservoirs are within Lower Cretaceous and Upper Jurassic sandstones and limestones. Likely source rocks contain mostly hydrogen-poor, gas-prone kerogens. Hydrocarbons could migrate from deeper, more mature rocks into some structural and stratigraphic traps that may exist within the immature Upper Cretaceous and Tertiary sections.

The hydrocarbon potential of the continental rise is speculative. Potential hydrocarbon source rocks are the Middle Cretaceous organic-rich black shales of the Hatteras Formation, which may have achieved sufficient burial depths for maturation.

Summary of the Geology of the Manteo Prospect Offshore North Carolina

On September 1, 1989, Mobil Oil Exploration & Producing Southeast, Inc. filed a draft Exploration Plan (EP) with the MMS for Manteo Block 467. Mobil proposed to drill a single exploratory well approximately 72 km (45 mi) east-northeast of Cape Hatteras, North Carolina, in 820 m (2,690 ft) of water (see fig. 2, p. 6).

Mobil indicated the well would test the crest of an Upper Jurassic/Lower Cretaceous carbonate buildup along an 8- by 48-km (5- by 30-mi) structure that has been named the Manteo Prospect. Mobil plans to drill to 4,268 m (14,000 ft) subsea. Mobil estimates that the Manteo Prospect may contain as much as 5 trillion cubic feet (Tcf) of natural gas. See Chapter 2 for additional information on the status of this project.

The Manteo Prospect includes part of the thick Mesozoic (Jurassic and perhaps Lower Cretaceous) carbonate buildup and reef previously described. Mobil's exploration target is the crest of the buildup near the ancient continental shelf edge, where the thickness of the carbonate complex is thought to be nearly 1,000 m (3,300 ft). A seismic horizon (near top Jurassic) was tied to the nearest well, ESSO's (Eastern Seaboard Standard Oil) No. 1 Hatteras Light, located onshore at Cape Hatteras approximately 72 km (45 mi) west-southwest of the proposed well. This horizon marks the top of the prospective interval, which is expected to contain reservoir rock composed of reefal boundstones and grainstones. Mobil proposes to drill the well at the highest point of the structure, and plans to drill to 4,268 m (14,000 ft) subsea.

Porosity within the reef target may have been increased by subaerial weathering during Early Cretaceous sea level lowstands. Following this exposure, the reef was buried by Cretaceous to Recent fine-grained sediments that may have formed an effective seal, which would allow hydrocarbons to accumulate. Within equivalent-age sediments, an organic-rich Neocomian shale was encountered in the JOIDES (Joint Oceanographic Institution for Deep Earth Sampling) No. 105 well, drilled approximately 500 km (310 mi) to the east (Mobil, 1989). Geochemical analyses of this shale and other shales encountered in other Atlantic OCS exploration wells indicate that hydrocarbon source rocks for the Manteo Prospect would more likely generate gas, not oil.

Geological and Geophysical Permit Data

Geological and geophysical (G&G) surveys and analyses provide most of the resource and hazards information used by the Federal Government and industry on the oil and gas potential of offshore areas. G&G data collection begins prior to the leasing of Federal land and continues throughout the term of offshore mineral leases. Table 1 on the next page presents data collected on the Federal G&G exploration permits issued for the Atlantic OCS Region. Title 30, Part 251, of the Code of Federal Regulations (CFR) contains the regulations regarding acquisition of G&G information on the OCS. The MMS administers data acquisition through these regulations. These regulations prescribe (1) when a permit or the filing of a notice is required in order to conduct G&G exploration on the OCS, as well as the operating procedures for conducting exploration, (2) the disclosure of data and information, and (3) the conditions for reimbursement of certain costs.

Permit applications for G&G activity must be submitted to MMS in accordance with the requirements outlined in these regulations and must be explained further in Letter(s) to Permittee(s). The coastal States along the Atlantic are not involved in the review process for specific G&G applications prior to issuance of the permit, except for deep stratigraphic tests (DST's). Environmental reports are required in accordance with 30 CFR 251.6-2(6) for DST's.

After receiving a G&G permit application, MMS either determines that the G&G activities are included under a categorical exclusion review (CER) or prepares an environmental assessment (EA) in accordance with National Environmental Policy Act (NEPA) and other applicable MMS policies and regulations. Most G&G activities are included under a CER. Activities that (1) include the drilling of DST holes, (2) involve the use of solid or liquid

explosives, or (3) have the potential to significantly affect the quality of the human environment require the preparation of an EA.

Estimated Offshore Oil and Gas Resources and Reserves

Section 606(d) of the OCS Lands Act Amendments (43 U.S.C. 1865(d)) requires that the Department of the Interior conduct a continuing investigation to determine the availability of all oil and natural gas produced or located on the OCS. This investigation includes both estimates of the total discovered crude oil and natural gas reserves and undiscovered economically recoverable resources on the OCS. The estimates that MMS prepares are made primarily on the basis of geologic and geophysical data collected by staff geologists and geophysicists and of related information gathered from the oil industry.

Currently, within Federal waters in the Atlantic OCS Region, there are no economic reserves. Table 2 on the next page presents the current undiscovered economically recoverable oil and gas resource estimates for Atlantic OCS planning areas. For a discussion on how these resource estimates are derived, refer to the report *Estimates of Undiscovered Conventional Oil and Gas Resources in the United States -- A Part of the Nation's Energy Endowment*. This report is available free from the address listed below.

Document Distribution Center
Offshore Information & Publications
Minerals Management Service, MS 4610
381 Elden St.
Herndon, VA 22070-4817
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Table 1. Geological and geophysical data acquisition and permits issued

Planning area	Federal mileage acquired (1)					Total
	Through 1985	Fiscal years			1989	
		1986	1987	1988		
North Atlantic	68,050	0	0	540	640	69,230
Mid-Atlantic	54,830	110	152	81	1,610	56,783
South Atlantic	51,930	314	594	206	480	53,524
Straits of Florida	5,261	0	1,610	0	0	6,871
Total	180,071	424	2,356	827	2,730	186,408

Planning area	Federal permits issued (2)					Total
	Through 1985 (3)	Calendar years			1989	
		1986	1987	1988		
North Atlantic		0	1 *	1	0	
Mid-Atlantic		1	0	1	0	
South Atlantic		2	0	2	0	
Straits of Florida		0	1	0	0	
Total	241	3	2	4	0	250

(1) Mileages include deep penetration CDP seismic in and adjacent to the planning areas.

(2) Total number of geological and geophysical permits (including COST wells).

(3) Permit tabulation by planning area is not available.

* One permit issued included both the North Atlantic and Mid-Atlantic Planning Areas.

NOTE: Mileage acquired in 1 year may be a result of permits issued in previous years.

Table 2. Estimates of undiscovered economically recoverable oil and gas resources in the Atlantic OCS Region as of January 1987

[Oil and BOE in billion barrels; gas in trillion cubic feet]

Planning area	Conditional oil(1)			Conditional gas			MPHC (2)	Risked mean oil(3)	Risked mean gas	Risked BOE(4)
	95% case	Mean case	5% case	95% case	Mean case	5% case				
North Atlantic										
Leased and unleased	0.05	0.11	0.27	1.12	2.54	6.06	0.39	0.04	1.00	0.22
Unleased	0.05	0.11	0.27	1.12	2.54	6.06	0.39	0.04	1.00	0.22
Leased	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mid-Atlantic										
Leased and unleased	0.08	0.22	0.47	2.36	5.35	11.46	0.44	0.10	2.36	0.52
Unleased	0.04	0.17	0.38	2.08	4.40	9.05	0.44	0.08	1.95	0.43
Leased	0.02	0.08	0.22	0.29	1.61	4.16	0.32	0.03	0.51	0.12
South Atlantic										
Leased and unleased	0.07	0.21	0.52	1.69	4.60	10.38	0.23	0.05	1.06	0.24
Unleased	0.07	0.20	0.49	1.69	4.39	9.68	0.23	0.05	1.01	0.23
Leased	**	0.01	0.02	0.15	0.26	0.52	0.09	**	0.02	**
Straits of Florida										
Leased and unleased	0.18	0.34	0.63	0.24	0.57	1.47	0.19	0.06	0.11	0.08
Unleased	0.18	0.34	0.63	0.24	0.57	1.47	0.19	0.06	0.11	0.08
Leased	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Atlantic Region										
Leased and unleased	0.02	0.32	1.17	2.63	5.65	10.22	0.80	0.25	4.51	1.05

* Negligible

(1) Conditional resource estimates are predicated upon the assumption that economically recoverable quantities of hydrocarbons actually exist in the area under consideration.

(2) The marginal probability of hydrocarbons - the probability that economically recoverable hydrocarbons exist in the area under study.

(3) Risked (unconditional) resource estimates reflect the probability that commercial accumulations of hydrocarbons may not exist in the area under consideration.

(4) Barrel of oil equivalent (energy basis): the sum of the risked mean gas divided by 5.62 Mcf/bbl and the oil volume. A barrel of oil has an average Btu content equivalent to 5.62 Mcf of gas.

Note: Three categories of resources (unleased, leased, and total) required three separate PRESTO computer runs for each planning area. In some cases, splitting of prospects into leased and unleased caused portions of the prospects to be subeconomic. Therefore, adding the risked mean quantities for the unleased acreage to risked mean quantities for the leased acreage may not result in the risked mean quantities for the total acreage. However, the total estimate was properly derived by running the PRESTO program for all prospects.

Additional Readings

Minerals Management Service, Atlantic OCS Region.
1989. Description of the Mid-Atlantic Environment.
OCS EIS/EA, MMS 89-0064, 167 p. Available
from Atlantic OCS Region, Minerals Management
Service, 381 Elden St., Herndon, VA 22070-4817;
telephone (703) 787-1050 or FTS 393-1050.

Minerals Management Service, Atlantic OCS Region.
1989. Draft Environmental Report on Proposed
Exploratory Drilling Offshore North Carolina. 860 p.
Available from Atlantic OCS Region, Minerals
Management Service, 381 Elden St., Herndon,
VA 22070-4817; telephone (703) 787-1050 or FTS
393-1050.

Mobil Oil Exploration & Producing Southeast, Inc.,
1989. *Mobil Draft Exploration Plan, Manteo Area,
Block 467, Offshore Atlantic (September, 1989)*, 310
p., plus appendixes. Available from Mobil
Exploration & Producing Division, Mobile Place,
3000 Pegasus Park Drive, Dallas, TX 75247;
telephone (214) 951-2473.

2. OCS Leasing and Exploration Activities

The Secretary of the Interior has the statutory authority and responsibility to plan for and conduct the offering of leases for OCS acreage as directed in the OCS Lands Act, as amended in 1978 (43 U.S.C. 1331, et seq.). The Secretary delegated many of his pre- and postlease responsibilities under this authority to MMS. The procedures that MMS employs in administering each lease sale are depicted in figure 4 (p. 16).

July 1987 Final 5-Year OCS Oil and Gas Leasing Program

On July 2, 1987, the third 5-year program developed under section 18 of the OCS Lands Act was given final approval by the Secretary of the Interior. This program, currently in effect, scheduled five sales in the four Atlantic OCS planning areas between mid-1987 and mid-1992. The MMS periodically prepares a leasing milestone chart that projects tentative dates for the various steps for each of the OCS lease sales scheduled under the current 5-year program. The most recent revision of this July 1987 milestone chart is dated April 1988 (see fig. 5, p. 17). For more information on the development of this and other 5-year programs, please refer to the *OCS National Compendium*. Copies are available free from the OCSIP at the address listed in the Preface of this document.

Federal OCS Oil and Gas Leasing in the Atlantic OCS Region

There have been nine OCS lease sales in the Atlantic OCS Region: the first, Sale 40, was held in 1976, and the last, Sale 78, was held in 1983. The nine sales offered over 51 million acres (9,160 blocks), leased

over 2 million acres (410 blocks), and received over \$2.8 billion in high bonus bids. One of the nine sales, Lease Sale RS-2 reoffered acreage from two previous Atlantic sales: South Atlantic Lease Sale 56 and Mid-Atlantic Lease Sale 59. Detailed information on Atlantic lease sales is presented in tables 3 (p. 18) and 4 (p. 19). As of June 30, 1990, 13 offshore operators owned 63 leases on the Atlantic OCS. Figure 6 (p. 20) shows the major Atlantic OCS leaseholders by percentage of acreage held.

Industry interest in the Atlantic has been limited recently because of (1) congressional prohibitions, which have resulted in both North and Mid-Atlantic leasing moratoria; (2) failure to locate commercial quantities of oil or natural gas; and (3) uncertainty over the direction of oil and gas prices. The current 5-year program had originally scheduled five sales for the Atlantic OCS Region. However, as figure 5 (p. 17) and table 4 (p. 19) show, three sales, (Sale 140, in the Straits of Florida Planning Area and Sales 96 and 134 in the North Atlantic Planning Area) were canceled and two sales (Sale 121, in the Mid-Atlantic Planning Area, and Sale 108 in the South Atlantic Planning Area) are delayed.

Development of the 5-Year OCS Oil and Gas Leasing Program - Fall 1991 to Fall 1996

On July 14, 1989, the MMS published a Notice of Request for Comments on the Development of a new 5-Year OCS Oil and Gas Leasing Program in the *Federal Register* (54 FR 29833). As stated in section 18 of the OCS Lands Act, the Department of the Interior is required to solicit suggestions from Federal agencies, coastal

Figure 4. The prelease phase of the OCS oil and gas leasing process.

U.S. DEPARTMENT OF THE INTERIOR 5-YEAR OCS OIL AND GAS LEASING SCHEDULE

APRIL 1988

SALE#	OCS PLANNING AREA	SALE DATE	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120	2121	2122	2123	2124	2125	2126	2127	2128	2129	2130	2131	2132	2133	2134	2135	2136	2137	2138	2139	2140	2141	2142	2143	2144	2145	2146	2147	2148	2149	2150	2151	2152	2153	2154	2155	2156	2157	2158	2159	2160	2161	2162	2163	2164	2165	2166	2167	2168	2169	2170	2171	2172	2173	2174	2175	2176	2177	2178	2179	2180	2181	2182	2183	2184	2185	2186	2187	2188	2189	2190	2191	2192	2193	2194	2195	2196	2197	2198	2199	2200	2201	2202	2203	2204	2205	2206	2207	2208	2209	2210	2211	2212	2213	2214	2215	2216	2217	2218	2219	2220	2221	2222	2223	2224	2225	2226	2227	2228	2229	2230	2231	2232	2233	2234	2235	2236	2237	2238	2239	2240	2241	2242	2243	2244	2245	2246	2247	2248	2249	2250	2251	2252	2253	2254	2255	2256	2257	2258	2259	2260	2261	2262	2263	2264	2265	2266	2267	2268	2269	2270	2271	2272	2273	2274	2275	2276	2277	2278	2279	2280	2281	2282	2283	2284	2285	2286	2287	2288	2289	2290	2291	2292	2293	2294	2295	2296	2297	2298	2299	2300	2301	2302	2303	2304	2305	2306	2307	2308	2309	2310	2311	2312	2313	2314	2315	2316	2317	2318	2319	2320	2321	2322	2323	2324	2325	2326	2327	2328	2329	2330	2331	2332	2333	2334	2335	2336	2337	2338	2339	2340	2341	2342	2343	2344	2345	2346	2347	2348	2349	2350	2351	2352	2353	2354	2355	2356	2357	2358	2359	2360	2361	2362	2363	2364	2365	2366	2367	2368	2369	2370	2371	2372	2373	2374	2375	2376	2377	2378	2379	2380	2381	2382	2383	2384	2385	2386	2387	2388	2389	2390	2391	2392	2393	2394	2395	2396	2397	2398	2399	2400	2401	2402	2403	2404	2405	2406	2407	2408	2409	2410	2411	2412	2413	2414	2415	2416	2417	2418	2419	2420	2421	2422	2423	2424	2425	2426	2427	2428	2429	2430	2431	2432	2433	2434	2435	2436	2437	2438	2439	2440	2441	2442	2443	2444	2445	2446	2447	2448	2449	2450	2451	2452	2453	2454	2455	2456	2457	2458	2459	2460	2461	2462	2463	2464	2465	2466	2467	2468	2469	2470	2471	2472	2473	2474	2475	2476	2477	2478	2479	2480	2481	2482	2483	2484	2485	2486	2487	2488	2489	2490	2491	2492	2493	2494	2495	2496	2497	2498	2499	2500	2501	2502	2503	2504	2505	2506	2507	2508	2509	2510	2511	2512	2513	2514	2515	2516	2517	2518	2519	2520	2521	2522	2523	2524	2525	2526	2527	2528	2529	2530	2531	2532	2533	2534	2535	2536	2537	2538	2539	2540	2541	2542	2543	2544	2545	2546	2547	2548	2549	2550	2551	2552	2553	2554	2555	2556	2557	2558	2559	2560	2561	2562	2563	2564	2565	2566	2567	2568	2569	2570	2571	2572	2573	2574	2575	2576	2577	2578	2579	2580	2581	2582	2583	2584	2585	2586	2587	2588	2589	2590	2591	2592	2593	2594	2595	2596	2597	2598	2599	2600	2601	2602	2603	2604	2605	2606	2607	2608	2609	2610	2611	2612	2613	2614	2615	2616	2617	2618	2619	2620	2621	2622	2623	2624	2625	2626	2627	2628	2629	2630	2631	2632	2633	2634	2635	2636	2637	2638	2639	2640	2641	2642	2643	2644	2645	2646	2647	2648	2649	2650	2651	2652	2653	2654	2655	2656	2657	2658	2659	2660	2661	2662	2663	2664	2665	2666	2667	2668	2669	2670	2671	2672	2673	2674	2675	2676	2677	2678	2679	2680	2681	2682	2683	2684	2685	2686	2687	2688	2689	2690	2691	2692	2693	2694	2695	2696	2697	2698	2699	2700	2701	2702	2703	2704	2705	2706	2707	2708	2709	2710	2711	2712	2713	2714	2715	2716	2717	2718	2719	2720	2721	2722	2723	2724	2725	2726	2727	2728	2729	2730	2731	2732	2733	2734	2735	2736	2737	2738	2739	2740	2741	2742	2743	2744	2745	2746	2747	2748	2749	2750	2751	2752	2753	2754	2755	2756	2757	2758	2759	2760	2761	2762	2763	2764	2765	2766	2767	2768	2769	2770	2771	2772	2773	2774	2775	2776	2777	2778	2779	2780	2781	2782	2783	2784	2785	2786	2787	2788	2789	2790	2791	2792	2793	2794	2795	2796	2797	2798	2799	2800	2801	2802	2803	2804	2805	2806	2807	2808	2809	2810	2811	2812	2813	2814	2815	2816	2817	2818	2819	2820	2821	2822	2823	2824	2825	2826	2827	2828	2829	2830	2831	2832	2833	2834	2835	2836	2837	2838	2839	2840	2841	2842	2843	2844	2845	2846	2847	2848	2849	2850	2851	2852	2853	2854	2855	2856	2857	2858	2859	2860	2861	2862	2863	2864	2865	2866	2867	2868	2869	2870	2871	2872	2873	2874	2875	2876	2877	2878	2879	2880	2881	2882	2883	2884	2885	2886	2887	2888	2889	2890	2891	2892	2893	2894	2895	2896	2897	2898	2899	2900	2901	2902	2903	2904	2905	2906	2907	2908	2909	2910	2911	2912	2913	2914	2915	2916	2917	2918	2919	2920	2921	2922	2923	2924	2925	2926	2927	2928	2929	2930	2931	2932	2933	2934	2935	2936	2937	2938	2939	2940	2941	2942	2943	2944	2945	2946	2947	2948	2949	2950	2951	2952	2953	2954	2955	2956	2957	2958	2959	2960	2961	2962	2963	2964	2965	2966	2967	2968	2969	2970	2971	2972	2973	2974	2975	2976	2977	2978	2979	2980	2981	2982	2983	2984	2985	2986	2987	2988	2989	2990	2991	2992	2993	2994	2995	2996	2997	2998	2999	3000	3001	3002	3003	3004	3005	3006	3007	3008	3009	3010	3011	3012	3013	3014	3015	3016	3017	3018	3019	3020	3021	3022	3023	3024	3025	3026	3027	3028	3029	3030	3031	3032	3033	3034	3035	3036	3037	3038	3039	3040	3041	3042	3043	3044	3045	3046	3047	3048	3049	3050	3051	3052	3053	3054	3055	3056	3057	3058	3059	3060	3061	3062	3063	3064	3065	3066	3067	3068	3069	3070	3071	3072	3073	3074	3075	3076	3077	3078	3079	3080	3081	3082	3083	3084	3085	3086	3087	3088	3089	3090	3091	3092	3093	3094	3095	3096	3097	3098	3099	3100	3101	3102	3103	3104	3105	3106	3107	3108	3109	3110	3111	3112	3113	3114	3115	3116	3117	3118	3119	3120	3121	3122	3123	3124	3125	3126	3127	3128	3129	3130	3131	3132	3133	3134	3135	3136	3137	3138	3139	3140	3141	3142	3143	3144	3145	3146	3147	3148	3149	3150	3151	3152	3153	3154	3155	3156	3157	3158	3159	3160	3161	3162	3163	3164	3165	3166	3167	3168	3169	3170	3171	3172	3173	3174	3175	3176	3177	3178	3179	3180	3181	3182	3183	3184	3185	3186	3187	3188	3189	3190	3191	3192	3193	3194	3195	3196	3197	3198	3199	3200	3201	3202	3203	3204	3205	3206	3207	3208	3209	3210	3211	3212	3213	3214	3215	3216	3217	3218	3219	3220	3221	3222	3223	3224	3225	3226	3227	3228	3229	3230	3231	3232	3233	3234	3235	3236	3237	3238	3239	3240	3241	3242	3243	3244	3245	3246	3247	3248	3249	3250	3251	3252	3253	3254	3255	3256	3257	3258	3259	3260	3261	3262	3263	3264	3265	3266	3267	3268	3269	3270	3271	3272	3273	3274	3275	3276	3277	3278	3279	3280	3281	3282	3283	3284	3285	3286	3287	3288	3289	3290	3291	3292	3293	3294	3295	3296	3297	3298	3299	3300	3301	3302	3303	3304	3305	3306	3307	3308	3309	3310	3311	3312	3313	3314	3315	3316	3317	3318	3319	3320	3321	3322	3323	3324	3325	3326	3327	3328	3329	3330	3331	3332	3333	3334	3335	3336	3337	3338	3339
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Table 3. Lease sale history of the Atlantic OCS Region through June 1990

Lease sale	Sale date	Tracts offered	Acres offered (1)	No. of bids rec'd	Tracts leased	Acres leased (1)	Total bonus leased tracts (2)	Average bonus per acre (2)(3)	Existing leases*	Exploratory wells drilled
North Atlantic										
42	12/18/79	116	660,409	189	63	358,671	\$816,516,546	\$2,277	0	8
	Subtotal	116	660,409	189	63	358,671	\$816,516,546	\$2,277	0	8
Mid-Atlantic										
40	08/17/76	154	876,750	410	93	529,466	\$1,127,936,425	\$2,130	0	27
49	02/28/79	109	620,557	74	39	222,034	\$40,001,631	\$180	0	1
59	12/08/81	253	1,440,376	240	51	290,352	\$323,659,000	\$1,115	0	4
RS-2	08/05/82	155	882,444	19	18	101,477	\$3,920,828	\$38	2	0
76	04/26/83	4,050	22,664,991	53	37	210,641	\$68,410,240	\$325	8	0
	Subtotal	4,721	26,485,118	796	238	1,354,970	\$1,563,928,124	\$1,154	10	32
South Atlantic										
43	03/28/78	224	1,275,273	99	43	244,807	\$100,743,443	\$412	0	6
56*	08/04/81	285	1,621,901	120	47	267,580	\$342,766,174	\$1,281	40	0
RS-2*	08/05/82	232	1,320,819	9	8	45,545	\$2,859,150	\$63	2	0
78*	07/26/83	3,582	20,156,426	12	11	62,625	\$13,362,040	\$213	11	0
	Subtotal	4,323	24,374,419	240	109	620,557	\$459,730,807	\$741	53	6
Total All Sales		9,160	51,519,946	1,225	410	2,334,198	\$2,840,175,477	\$1,217	63	46

(1) Amounts are rounded to nearest acre.

(2) Amounts are rounded to nearest dollar.

(3) Sum of the total bonus for all sales divided by the total acreage of all blocks leased.

* As of March 19, 1982, the boundary between the Mid- and South Atlantic Planning Area changed from lat. 36 deg. 30 min. N. to lat. 35 deg. 00 min. N., resulting in 34 leases being shifted from the South to the Mid-Atlantic Planning Area and affecting previous data for OCS Lease Sales 56 and 78. As a result, active Mid-Atlantic leases total 44 and active South Atlantic leases total 19.

States, and others during the preparation of a new 5-year OCS oil and gas leasing program. The current leasing program, approved in July 1987, scheduled lease sales through June 1992. The July 14, 1989, *Federal Register* notice announced that MMS intends to prepare a new program for the period fall 1991 to fall 1996.

Statutorily required steps in the program development process, following the initial Notice of Request for Comments, include the development of a draft proposed program, a proposed program, a proposed final program, and a final program. An environmental impact statement (EIS) will also be prepared. Initiation of the EIS process was announced in the *Federal Register* on July 14, 1989 (54 FR 29832).

The program preparation effort is expected to take over 2 years to complete. Approval of the new program in fall 1991 will help provide a smooth transition from the ex-

isting program to the new one. The draft proposed program is scheduled to be issued in late 1990.

Atlantic OCS Region Environmental Studies Program

Since 1986, the Atlantic OCS Region Environmental Studies Program has focused on synthesis studies in physical oceanography, submarine geology, marine ecology/biology, and socioeconomics. It is anticipated that synthesis studies will continue in the future. Synthesis studies provide a detailed review of existing information on a given topic and identify information gaps relevant to the Federal offshore oil and gas leasing program. Once information needs are identified, they can be pursued in additional studies.

It is anticipated that only two studies will be funded in 1991, both of which are con-

Table 4. Dates of Federal Register notices for significant prelease steps for Atlantic OCS lease sales through June 1990

Lease sale number/area	Prelease steps(1)							
	R	C	A	E	F	P	N	S
40, Mid		40 FR 29 02/11/75 40 FR 59 03/26/75	08/20/75	40 FR 238 12/10/75	41 FR 103 05/26/76		41 FR 138 07/16/76	08/17/76
43, South		40 FR 178 09/22/75	04/27/76	42 FR 32 02/16/77	42 FR 209 10/31/77	42 FR 240 12/14/77 43 FR 13 01/19/78	43 FR 36 02/22/78 43 FR 38 02/24/78	03/28/78
49, Mid		41 FR 226 11/22/76	09/23/77	43 FR 93 05/12/78	43 FR 190 09/29/78	43 FR 223 11/17/78	44 FR 20 01/29/79	02/28/79
42, North		40 FR 117 06/17/75	01/02/76	41 FR 198 10/12/76	42 FR 167 08/29/77 44 FR 100 05/22/79 44 FR 151 08/03/79	42 FR 251 12/30/77 44 FR 145 07/26/79	44 FR 190 09/28/79 44 FR 195 10/05/79 44 FR 223 11/16/79	12/18/79
54, South								Canceled
56, South		44 FR 63 03/30/79	08/02/79	45 FR 134 07/10/80	46 FR 21 02/02/81	46 FR 61 03/31/81	46 FR 127 07/02/81	08/04/81
59, Mid		44 FR 135 07/12/79	12/31/79	45 FR 227 11/21/80	46 FR 99 05/22/81	46 FR 151 08/06/81	46 FR 214 11/05/81	12/08/81
RS-2, South and Mid (2)						47 FR 13984 04/01/82	47 FR 29152 07/02/82	08/05/82
52, North		43 FR 248 12/26/78 44 FR 118 01/02/79 44 FR 151 01/02/79	07/01/80	46 FR 47017 09/25/81	47 FR 18186 04/28/82	47 FR 84 04/30/82	48 FR 39 02/25/83	Injunction 03/28/83 Canceled 48 FR 225 11/21/83
76, Mid		46 FR 185 09/24/81	04/12/82	47 FR 128 07/02/82	47 FR 241 12/15/82	47 FR 247 12/23/82 48 FR 8863 03/02/83	48 FR 59 03/25/83 48 FR 64 04/01/83	04/26/83
78, South		46 FR 19804 03/31/81	04/08/82	47 FR 47470 10/26/82	48 FR 12599 03/25/83	48 FR 12978 03/28/83	48 FR 28946 06/23/83	07/26/83
82, North		47 FR 52786 11/23/82	03/09/83	48 FR 28557 06/22/83	48 FR 52776 11/11/83	49 FR 20408 05/14/84 49 FR 33731 08/24/84	49 FR 33976 08/27/84	Part I - Canceled 09/28/84 Part II - Canceled 01/04/85
90, South		48 FR 23723 05/26/83 49 FR 12761 03/30/84	08/11/83	49 FR 17823 04/25/84	50 FR 3846 01/28/85	11/08/85 sale deferred to 11/86		Canceled
111, Mid		48 FR 48721 10/20/83 50 FR 23081 05/30/85	03/26/84	49 FR 45270 11/15/84	50 FR 23080 05/30/85	11/08/85 sale deferred to 11/86		Canceled
96, North		51 FR 40114 11/04/86 52 FR 5598 02/25/87	05/26/87	53 FR 5471 02/24/88				Canceled (06/90)
121, Mid	52 FR 20166 5/29/87	52 FR 36724 09/30/87	01/15/88					Proposed (07/91)
108, South	53 FR 17767 05/18/88	53 FR 34688 09/07/88						Proposed (06/93)
134, North								Canceled (06/90)
140, Straits of Florida								Canceled

(1) R - Request for Interest
 C - Call for Information and Nominations and Notice of Intent to Prepare an EIS
 A - Area Identification/Tentative Tract Selection (Public Announcement)
 E - Draft EIS (Notice of Availability)
 F - Final EIS (Notice of Availability)
 P - Proposed Notice of Sale
 N - Notice of Sale
 S - Sale

(2) Public notification began at P for Sale RS-2.

Figure 6. Major Atlantic OCS leaseholders, by percentage of acreage held as of June 30, 1990.

tinuations of existing studies. These are described briefly below.

- **Endangered Right Whales of the South Atlantic.**—The purpose of this study is to provide adequate information on the distribution, abundance, and behavior patterns of the right whale in the South Atlantic. A requirement was added that radio or satellite trackable tags be used to determine the migratory path of the right whale.
- **Physical Oceanographic Field Study of the Straits of Florida.**—This study is a field program designed to acquire the necessary temperature, salinity, and transport data in order to (1) set initial conditions, (2) define model boundaries, and (3) assess the skill of an enhanced ocean circulation model of the Straits of Florida.

Table 5 lists the annual funding levels for the Atlantic OCS Region Environmental Studies Program. For a complete listing of all other Atlantic OCS Region environmental studies, by discipline category (e.g., biology, physical oceanography) and status (ongoing or completed), see Appendix B, p. 43.

Exploratory Drilling in the Atlantic OCS Region

Exploration of the Atlantic OCS Region resulted in 46 exploratory wells and 5 COST (continental offshore stratigraphic test) wells (see tables 6 and 7, p. 21 and 22). None of the exploratory wells drilled resulted in the discovery of commercial quantities of oil or gas. Of the wells drilled in this region, 32 were in the Mid-Atlantic, 8 were in the North Atlantic, and 6 were in the South Atlantic.

No exploratory wells have been drilled on the Atlantic OCS since November 1984.

Table 5. Atlantic OCS Region Studies Program annual funding levels

Year	\$ Funded
1986	2,505,881
1987	1,916,887
1988	896,012
1989	892,753
1990	2,746,497*

* Estimated if proposed studies are funded. As of June 18, 1990, \$317,611 have been obligated for FY 1990.

Table 6. Exploratory wells drilled in the Atlantic OCS Region through June 1990

Lease number	Block number	OPD number	Status (1)	Operator	POE approval date	Well number	APD date	Spud date	Completion date	Depth drilled (ft)	Well report number
NORTH ATLANTIC											
170	133	NK 19-12	R	Exxon	01/15/81	133-1	01/12/81	07/24/81	11/24/81	14,118	89-0007
218	410	NK 19-12	R	Shell	03/11/81	410-1	05/10/81	07/27/81	03/31/82	15,568	
153	975	NK 19-9	R	Exxon	08/12/81	975-1	09/02/81	11/25/81	03/10/82	14,605	
200	312	NK 19-12	R	Mobil	02/06/81	312-1	10/27/81	12/08/81	06/27/82	20,000	
182	187	NK 19-12	R	Tenneco	06/19/81	187-1	06/08/81	03/12/82	08/21/82	18,127	
210	357	NK 19-12	R	Shell	08/26/81	357-1	11/27/81	04/14/82	09/27/82	19,427	
179	145	NK 19-12	R	Conoco	11/27/81	145-1	04/05/82	05/13/82	08/24/82	14,500	
196	273	NK 19-12	E	Mobil	06/11/81	273-1	03/26/82	06/30/82	09/13/82	15,580	
MID-ATLANTIC											
46	684	NJ 18-3	R	Exxon	06/01/79	684-1	01/24/77	03/29/78	12/23/78	17,620	
28	598	NJ 18-3	R	Texaco	11/09/77	598-1	05/19/77	04/16/78	08/26/78	15,025	
24	590	NJ 18-3	R	Conoco	12/21/77	590-1	09/27/77	04/17/78	06/07/78	12,000	
32	632	NJ 18-3	R	Shell	12/21/77	632-1	09/22/77	04/24/78	07/14/78	14,000	
42	676	NJ 18-3	R	Houston Oil	12/21/78	676-1	12/06/78	06/02/78	09/22/78	12,500	
59	857	NJ 18-3	E	Gulf	11/09/77	857-1	07/26/77	06/10/78	01/29/79	18,554	
15	544	NJ 18-3	E	Mobil	11/09/77	544-1	02/15/77	06/23/78	12/29/78	17,449	
97	273	NJ 18-6	R	Shell	11/09/77	273-1	05/18/77	07/15/78	12/16/78	17,500	
28	598	NJ 18-3	R	Texaco	11/09/77	598-2	08/28/78	09/03/78	03/20/79	17,708	
57	855	NJ 18-3	R	Houston Oil	09/08/78	855-1	04/24/78	09/24/78	02/08/79	17,505	
65	902	NJ 18-3	R	Exxon	04/20/78	902-1	12/27/77	11/01/78	04/15/79	15,968	
96	272	NJ 18-6	R	Shell	11/09/77	272-1	01/10/78	12/30/78	02/19/79	13,500	
43	684	NJ 18-3	R	Exxon	11/09/77	684-2	06/13/78	01/05/79	07/15/79	16,800	
75	17	NJ 18-6	E	Mobil	12/14/78	17-1	08/03/78	01/06/79	01/24/79	1,200	
48	718	NJ 18-3	R	Gulf	11/09/77	718-1	07/26/77	01/19/79	03/31/79	12,813	
38	642	NJ 18-3	R	Tenneco	12/19/78	642-2	11/15/78	01/20/79	06/10/79	18,400	86-0077
75	17	NJ 18-6	E	Mobil	12/14/78	17-2	01/19/79	01/26/79	05/14/79	13,992	
38	642	NJ 18-3	R	Texaco	12/19/78	642-1	11/22/78	03/23/79	12/01/79	17,807	89-0027
131	495	NJ 18-6	R	Tenneco	06/12/79	495-1	05/09/79	06/12/79	10/11/79	18,300	
9	500	NJ 18-3	R	Exxon	03/22/78	500-1	12/30/76	07/18/79	09/28/79	12,253	
28	598	NJ 18-3	R	Texaco	11/09/77	598-3	10/09/79	12/04/79	05/25/80	16,103	86-0129
29	599	NJ 18-3	R	Exxon	06/01/79	599-1	03/24/80	04/25/80	11/02/80	17,121	
38	642	NJ 18-3	R	Tenneco	12/19/78	642-3	02/12/80	05/27/80	10/14/80	16,475	
81	106	NJ 18-6	E	Murphy	10/02/79	106-1	10/29/79	12/27/79	05/29/80	18,405	86-0177
28	598	NJ 18-3	R	Texaco	11/09/77	598-4	07/11/80	10/21/80	03/24/81	16,050	
55	816	NJ 18-3	R	Exxon	08/10/79	816-1	06/02/80	11/04/80	05/07/81	17,753	
52	728	NJ 18-3	R	Exxon	06/01/79	728-1	01/21/81	05/09/81	07/04/81	15,205	
15	544	NJ 18-3	E	Mobil	05/28/81	544-2	08/06/81	08/28/81	10/01/81	8,312	
337	587	NJ 18-6	R	Shell	01/28/83	587-1	05/06/83	08/02/83	12/26/83	14,500	87-0074
336	586	NJ 18-6	R	Shell	07/22/83	586-1	10/20/83	12/30/83	05/24/84	16,000	86-0099
317	372	NJ 18-6	R	Shell	07/22/83	372-1	04/18/84	05/26/84	07/11/84	11,631	87-0118
370	93	NJ 18-9	R	Shell	12/02/83	93-1	06/22/84	07/14/84	11/07/84	17,740	86-0128
SOUTH ATLANTIC											
3686	208	NH 17-5	R	Tenneco	11/20/78	208-1	10/30/78	05/29/79	07/09/79	7,754	
3695	427	NH 17-5	R	Tenneco	04/02/79	427-1	04/27/79	07/13/79	08/15/79	7,472	
3664	913	NH 17-2	R	Getty	03/21/79	913-1	01/05/79	08/17/79	09/14/79	7,000	
3671	1005	NH 17-2	R	Transco	05/25/79	1005-1	04/12/79	09/19/79	12/14/79	11,635	
3699	472	NH 17-5	R	Exxon	05/04/79	472-1	05/03/79	10/08/79	11/18/79	7,578	
3705	564	NH 17-5	E	Exxon	09/21/79	564-1	08/20/79	11/19/79	02/12/80	12,863	
STRAITS OF FLORIDA											
44	NG 17-10	R	Gulf-Chevron		44-1	10/11/60			03/14/61	4,686	
46	NG 17-10	R	Gulf-Chevron		46-1	05/02/61			09/26/61	7,871	
28	NG 17-10	R	Gulf-Chevron		28-1	01/12/60			05/24/60	15,294	

(1) R = Relinquished; E = Expired

Table 7. COST wells drilled on the Atlantic OCS

Planning area/ well number	Lease/block number	Operator	Spud date	Total depth (ft)	Completion date	Report number
North Atlantic G-1	NK 19-11 Block 79	Ocean Production	04/06/76	16,071	07/27/76	OCS-0003 OCS-0059
North Atlantic G-2	NK 19-12 Block 141	Ocean Production	01/06/77	21,872	08/06/77	OCS-0004 OCS-0059
Mid-Atlantic B-2	NJ 18-3 Block 594	Ocean Production	12/14/75	16,043	03/28/76	OCS-0001 OCS-0053
Mid-Atlantic B-3	NJ 18-6 Block 66	Chevron	10/09/78	15,820	01/24/79	OCS-0002 OCS-0058
South Atlantic GE-1	NH 17-5 Block 387	Ocean Production	02/24/77	13,254	06/15/77	OCS-0005 OCS-0006

However, Mobil Oil Exploration & Producing Southeast, Inc. has submitted a draft Exploration Plan for a well in the Mid-Atlantic Planning Area. More information on this plan follows.

Recent Presidential OCS Leasing Decisions

On June 26, 1990, President Bush announced a series of decisions regarding the OCS Oil and Gas Leasing Program. One was to cancel Sale 96 in the Georges Bank area, part of the North Atlantic OCS Planning Area. Georges Bank is considered one of the most productive commercial fishing areas in the nation. Environmental studies will continue, but no leasing will occur in the area before the year 2000.

In addition, the 5-Year Oil & Gas Leasing Program that is currently being developed will reflect these decisions for all the OCS planning areas. The Draft Proposed Program for the 5-Year Program is currently scheduled to be released for public review at the end of 1990.

Chronology and Status of the Mobil Oil Company Exploration Well Offshore North Carolina

Brief History of Manteo Block 467 and the Project Scenarios

Manteo Block 467 was leased as part of Atlantic OCS Region Offshore Oil and Gas Lease Sale 56, held August 4, 1981. The high bid for that block was \$103,775,000, offered by three partners with equal interests, Mobil Oil Exploration & Producing Southeast, Inc. (Mobil), Marathon Oil Company, and Amerada Hess Corporation. Block 467 is part of the prospective 21-block Manteo Exploration Unit. The royalty rate is 12.5 percent and the lease term is 10 years, which runs from September 1, 1981, through August 31, 1991.

The basic project scenario identified by Mobil calls for one exploratory well to be drilled in 1991. Based on the results of that well, as many as six delineation wells may be drilled. The first of these delineation wells would be drilled in 1994, with the remaining wells drilled one per year until 1999. The initial well will be drilled by the SONAT drillship *Discoverer 534*. The location of the initial exploratory well will be 38.7 miles east of Salvo, North Carolina,

and 44.8 miles east northeast of Cape Hatteras, North Carolina, to be drilled in a water depth of 820 m (2,690 ft), and will extend approximately 14,000 ft (4,267 m) below the seafloor. The drilling is expected to take 114 days. The depths and locations of any wells that follow will be determined by the results of the initial well. Table 8 (p. 24) summarizes the onshore facilities and scenario assumptions discussed below, as well as employment requirements for support activities.

The MMS draft environmental report (ER) (Nov. 1989) and the preliminary final ER (June 1990) on the exploratory well detail the hypothetical development and transportation scenarios and their associated potential environmental impacts. It is considered most likely that only natural gas may be found in commercial quantities, and not oil. Nonetheless, scenarios considering the discovery of both gas and oil, the drilling of exploration/delineation wells, and the development/production of oil and gas have been evaluated along with the drilling of the exploration well only. Even though this project involves drilling only one exploration well, in order to do a complete environmental impact analysis, MMS developed and evaluated *hypothetical* oil spills, development/production and transportation scenarios. No such scenarios were actually part of the draft Mobil Exploration Plan. If Mobil later submits a development and production plan (after making a commercial discovery), a full NEPA review will be conducted (i.e., an EIS by MMS, public hearings, etc.), as well as a State coastal zone consistency review. At that time, Mobil will have developed non-hypothetical, site-specific, detailed development/production and transportation scenarios. The MMS scenario assumptions are discussed briefly below.

Pipelines to shore have been assumed as the transportation mode if any economically producible gas/oil is discovered. Pipelines are generally more cost-effective than other modes of transport because the other modes

either (1) are not fully developed technologically, (2) have not been used on the OCS, (3) are not preferred environmentally, or (4) are too costly. Mobil has indicated that regardless of the type and amount of hydrocarbons discovered, tanker transport would seem inappropriate. Therefore, it is assumed that commercial discoveries offshore North Carolina would use small-diameter gathering pipelines that would tie into a larger-diameter trunkline to be transported to shore. The offshore pipelines to the hypothetical landfalls (discussed below) would be the following approximate lengths: to Morehead City, North Carolina, 150 miles, and to Cape Henry, Virginia, 118 miles.

Landfall sites, the locations where pipelines come ashore, are critical both environmentally and economically. For the hypothetical production scenarios evaluated in the November 1989 draft ER and the June 1990 preliminary final ER, two sites were studied: Morehead City, North Carolina, and Cape Henry, Virginia. These locations allowed for a review of effects for both bringing the pipeline ashore within the State of North Carolina and outside the State.

Hypothetical onshore pipeline routes to onshore processing facilities have not been identified for analysis purposes at this time because (1) there is a tremendous uncertainty associated with onshore pipeline siting and (2) it is felt that any onshore pipeline scenario reviewed at this early stage of the development/production sequence may be meaningless and more than likely inapplicable at a later stage.

Any gas production operations would likely require processing, dehydrating, and treating the gas (unless it is dry and clean of sulphur), before it could be put into existing commercial gas lines for usage. Currently, there are no such facilities in coastal North Carolina. It is therefore assumed, as part of the hypothetical production scenario, that two such plants would have to be built.

Table 8. Summary of OCS oil and gas onshore support facilities needed for the Mobil project

OCS-related onshore facility or activity	Site/Size	Site location		Employment requirements		Comments*
		Waterfront	Other	Construction	Operational	
1. Support Services Base:						
a. Temporary (normally uses or modifies existing facilities for needs on short-term basis)	2 - 6.1 ha (5 - 15 a), or about 2 ha (5 a) per rig supported	Yes (all-weather harbor)	Road and rail access	5 to 10 workers, 1 to 3 months minimal	45 workers/ drilling rig	About 61 m (200 ft) of dock space needed per rig supported. Draft of vessels 4.6 to 6.1 m (15 to 20 ft) with maximum of about 9.1 m (30 ft)
b. Permanent (designed and constructed to specific exclusive needs to reduce turn around time on long-term basis)	10 - 40 ha (25 - 100 a)	Yes (all-weather harbor)	Road and rail access	20 to 90 workers for about 12 months (if not phased)	50 to 60 workers/ drilling platform	Modified to platform instead of rig. Also, noise 24 hrs for 7 days/week may influence site location.
2. Gas Processing and Treatment Plants (1 Bcf dry)	20 - 30 ha (50 - 75 a)	No	Between landfill and commercial gas transmission line	Approximately 550 workers, 12 to 18 months construction site	45 to 55 workers	Noise 24 hrs for 7 days/ week, emissions (hydrogen sulfide, sulfur oxides, hydrocarbons, particulates, carbon monoxide, and fire-nitrogen oxides) and fire-hazard considerations may influence site location. Pipeline landfill from shore also will influence location of site.
3. Compressor Station (1,000 Mcf/d)	4 - 10 ha (10 - 25 a)	No	Between landfill and gas processing and treatment plant	30 to 40 workers	10 workers	

* These comments are "causes" of impacts, not actual impacts.

Sources: Mobil Oil Exploration & Producing Inc. 1989. Mobil Draft Exploration Plan, Manteo Area, Block 467, Offshore Atlantic.

Their location would depend on the local zoning ordinances and coastal plans, but they would be as close as possible to the pipeline landfall. In all likelihood, the gas-processing facilities would be at least a few miles inland. The details of what type and size plants might be necessary cannot be known until gas samples are collected and volumes and quality are better known.

It is assumed that pipeline coating and platform fabrication activities would be accomplished at existing facilities most likely in the Gulf of Mexico area (Texas and Louisiana). There are currently no such facilities on the east coast of the United States.

Onshore support bases (i.e., crew and supply and helicopter) are critical for any offshore operations. For the exploration and exploration/delineation well scenarios, only temporary facilities would be required. It is assumed that Morehead City would be the location of the temporary support base. For the development/production scenarios, the assumed location is also Morehead City, but it would be a more permanent installation, lasting at least the commercial life of the field. The helicopter service base assumed for this project is the Michael J. Smith Field, located in Beaufort, North Carolina.

Chronology of Recent Events Relating to the Mobil Exploration Well Plan

July 1988.—Mobil and MMS meet to discuss the potential exploration of Manteo Block 467.

November 1988-July 1989.—The State of North Carolina, Mobil, and MMS negotiate the project. A Memorandum of Understanding (MOU) is signed by all interested parties in July 1989. See Appendix C for a copy of the MOU. A project timeline is included as part of the MOU.

August 7-11, 1989.—Public scoping meetings are held in seven sessions at Manteo,

Beaufort, Washington, and Raleigh, North Carolina. The main issues identified at the meetings included the following:

- fisheries;
- socioeconomics;
- oil spills/oil-spill modeling;
- muds and cuttings;
- frontier area;
- deep water, strong currents, storms, high waves;
- environmental studies; and
- environmental report (ER) versus environmental impact statement (EIS).

September 1, 1989.—Mobil submitted the draft Exploration Plan (EP) to MMS, and MMS began formal preparation of the draft ER.

November 1, 1989.—MMS delivered the draft ER to the State of North Carolina, as per the MOU. The draft ER was distributed to 1,200 requesters. The 45-day public comment period ended December 15, 1989.

December 4-7, 1989.—Eight public hearing sessions were held on the draft ER in North Carolina at Manteo, Beaufort, Washington, and Raleigh.

The major issues raised at these public hearings included fisheries, conservation, socioeconomics, oil spills, National Academy of Sciences (NAS) report, marine mammals, birds, turtles, onshore development, environmental studies, site-specific information, and water quality.

MMS announced that it is seeking suspension of the MOU timeline.

January 9-10, 1990.—Technical meetings were held between North Carolina and MMS, and additional agreements were reached, especially on oil-spill information

needs. The timeline for completion of the ER was revised. See Appendix D (p. 57) for the new timeline. The additional agreements resulted in assignments to both MMS and North Carolina, as well as joint efforts.

The MMS agreed to prepare analyses of the following:

- a "reasonably foreseeable" oil spill in the seven-well scenario,
- a diesel spill from a drillship,
- spilled oil contacting sensitive resources,
- development/production/transportation scenarios, including no oil to North Carolina, dry gas to North Carolina, a pipeline through the Beaufort Inlet and/or across the Outer Banks near Cape Lookout.

January 31, 1990.—The Environmental Protection Agency (EPA) conducted public hearings on the NPDES permit for the project in Manteo, North Carolina.

February 14 - March 8, 1990.—The MMS and North Carolina conducted technical staff-to-staff meetings. The responses to the State's comments on MMS's draft ER were discussed in detail. North Carolina agreed (1) to supply additional information for the preliminary final ER, (2) to provide MMS with an updated list of technical contacts, and (3) to hold a public hearing. The MMS agreed to have North Carolina review draft sections of the report, to extend the public comment period to 60 days, and to send the preliminary final ER to North Carolina by June 1, 1990.

June 1, 1990.—The preliminary final ER completed and sent to North Carolina.

Chronology of Events to be Completed Before Mobil Commences Drilling

July 30, 1990.—North Carolina comments on the preliminary final ER are due to MMS.

August 20, 1990.—The final exploration plan (EP) is due from Mobil.

August 30, 1990.—The MMS EP completeness review is due. The EP is to be distributed to North Carolina and others for review. The MMS will prepare an environmental assessment (EA) for the proposal to drill one exploration well offshore North Carolina. The final ER is due from MMS.

September 21, 1990.—North Carolina's Governor's comments are due to MMS for inclusion into the EA.

September 28, 1990.—The completed EA is due from MMS. The Mobil exploration plan will be either approved, disapproved, or returned to Mobil for modification.

November 14, 1990.—The decision by North Carolina on the Coastal Zone Management Act consistency review on the project is due. The MMS will sign off on the Application for Permit to Drill (APD) after North Carolina makes a positive consistency determination, a negative consistency determination, or no decision in the allotted time period. Mobil may appeal a negative consistency determination to the Secretary of Commerce. Mobil must also secure a discharge permit from the EPA and an offshore drillship placement permit from the Army Corps of Engineers.

Overall Summary List of Major Environmental Issues of Concern

The following issues were identified as significant through public hearings, written comments, and research efforts. Many other issues were also identified and are discussed in the ER.

- **Impacts on water quality.**—Concerns were expressed that drilling operations will result in the discharge of harmful materials such as drilling muds, cuttings, and formation waters, causing both short- and long-term negative effects. All discharges from drilling operations must meet EPA's National Pollutant Discharge Elimination System (NPDES) effluent limitation standards. Onshore disposal is also being considered.
- **Impacts on benthos.**—Concerns were expressed that benthos are at risk from drilling, and therefore, detailed scientific studies should be completed prior to any offshore activities. Potential effects are discussed in the ER for the various scenarios, including exploration, exploration/delineation, and production/development.
- **Impacts on commercial and recreational fisheries.**—Concern was expressed that a detailed scientific study examining the effects of drilling operations on the eggs and early life stages of those fishes spawning nearby should be completed before drilling. The study should include the following types of fish, among others: swordfish, tunas, mackerals, tilefish, groupers, snappers, and grunts. The ER reviews the potential effects on all the significant local fish species.
- **Impacts on birds (endangered and non-endangered).**—Concerns were expressed that the ER should provide a description of bird populations, their habitats, migration routes, and any potential impacts

from drilling operations. This information is included in the ER.

- **Impacts on estuaries, wetlands, and sensitive coastal habitats.**—Concerns were expressed that the ER should evaluate the effects of drilling operations and onshore support activities on areas of special concern, such as estuaries, wetlands, and sensitive coastal habitats. These potential effects are described in the ER.
- **Socioeconomics: Impacts on employment, population, community infrastructure, coastal land use, and recreation and tourism.**—Concerns were expressed that the ER should address "downstream" effects of full development and production of offshore oil and gas resources on the environmental, cultural, and socioeconomic environments of eastern North Carolina. The ER does describe the total regional/site-specific environments, including eastern North Carolina, under the various scenarios, including full development.

Additional Readings

Minerals Management Service. 1989. *Draft Environmental Report on Proposed Drilling Offshore North Carolina*. 860 p. Available from Atlantic OCS Region, Minerals Management Service, 381 Elden St., Herndon, VA 22070-4817; telephone (703) 787-1050 or (FTS) 393-1050.

Minerals Management Service. 1990. *Preliminary Final Environmental Report on Proposed Drilling Offshore North Carolina*. 1,700 p. Available from Atlantic OCS Region, Minerals Management Service, 381 Elden St., Herndon, VA 22070-4817; telephone (703) 787-1050 or (FTS) 393-1050.

3. Issues Related to OCS Activities

Marine Vessel Transportation

Shipping Safety Fairways and Anchorages

The U.S. Coast Guard (USCG) regulates all marine vessel traffic in the United States under the authority of the Ports and Waterways Safety Act as amended (86 Stat. 424 (1970), 33 U.S.C. 1221-1232). For most major ports, a system of controlled access has been developed. This control is in the form of traffic separation schemes, traffic lanes, precautionary areas, separation zones, or other such designations. Traffic control areas exist at the approaches to Narragansett, Buzzards, Raritan, Delaware, and Chesapeake Bays, and New York and Boston Harbors. Additional control areas have been recommended by the USCG for the areas between Boston and New York (see discussion below). On the east coast, there are no such controlled areas south of Cape Henry, near Norfolk, Virginia, at the mouth of the Chesapeake Bay. If offshore oil and gas drilling occurred near a port area, the USCG could reopen the Port Access Route Study (PARS) and possibly recommend a control designation to preclude drilling.

U.S. Coast Guard Port Access Route Studies

The USCG regularly conducts PARS. The studies examine potential vessel traffic density and the safety of proposed and existing access routes, traffic separation schemes (TSS's), safety fairways, and precautionary areas adjacent to major ports. Implementing the findings of these studies often affects which OCS areas can be considered for leasing and subsequent development.

The results of a USCG PARS focusing on the approaches to the Port of New York were announced on December 13, 1985 (50

FR 50925). The study examined the potential conflicts between oil and gas activities and other vessel traffic within the offshore area between two existing TSS's in the approach to the port. The USCG concluded that leasing and development of the area would interfere with the safe transit of vessels to and from the Port of New York. As a result of the study, the USCG has proposed establishing two 2-mile-wide parallel fairways to connect to the existing TSS's. The proposed fairways would run generally east-west and, at their termini, would funnel to a width of 5 miles, matching the dimensions of the TSS's.

Onshore Support Facilities

Currently, there is no offshore oil and gas activity off the east coast. As a result, no permanent onshore support facilities have been developed. For each lease sale, hypothetical exploration/development support scenarios have been developed and are discussed in detail in environmental impact statements (EIS's). The hypothetical scenarios for the Mobil North Carolina exploration well (production scenario) assume the gas will be transported to shore by pipeline, with landfalls at Morehead City, North Carolina, and Cape Henry, Virginia. The scenarios also call for a permanent support base at Morehead City should development of any resources occur. An airport in Beaufort, North Carolina, would be used for helicopter transport and support.

The Mid-Atlantic coastal region contains 12 refineries, with a total capacity of approximately 1.3 MMBO per day. The Delaware Bay area (near Philadelphia, Pennsylvania) has the greatest concentration of capacity with approximately 1 MMbpd. The Raritan Bay area (New Jersey) has ap-

proximately 200 Mbpd capacity; Albany, New York, has a capacity of 43 Mbpd; and the Chesapeake Bay has a refining capacity of approximately 51 Mbpd. Along the remainder of the east coast, Georgia adds another 37 Mbpd of refining capacity. There are no natural gas processing facilities on the east coast, with natural gas delivered by pipelines from the gulf coast.

Offshore Strategic and International Minerals Program

The Office of Strategic and International Minerals (OSIM) is responsible for developing policy and coordinating the exploration, development, and recovery of nonenergy minerals from the U.S. Outer Continental Shelf. The OSIM was established (1) to provide overall programmatic direction and policy guidance to Federal offshore non-energy-mineral activities and (2) to facilitate coordination between the Department of the Interior, coastal States, local governments, and the public sector for timely resolution of issues. Nonenergy-mineral activities and support are currently focused in two Atlantic OCS Region areas: (1) phosphorites, offshore North Carolina, and (2) heavy-mineral placers and phosphorites, offshore Georgia.

Leasing potential is being evaluated by joint Federal-State task forces in cooperation with the adjacent coastal States. If leasing is determined to be economically feasible, it will then be followed by further resource and environmental studies, as applicable. The task forces recommend appropriate actions to the Secretary of the Interior and the State Governor(s). Federal decisions to proceed to lease sales are made by the Secretary, with review and comment from the Governor(s). To ensure protection of the environment, a case-by-case approach is pursued with environmental reviews and opportunities for public involvement. The following is a summary of the two Atlantic OCS Region task forces.

North Carolina Phosphorites Task Force

In March 1986, a joint Federal-State task force was formed by MMS and the State of North Carolina to study the resource potential of offshore phosphorites. A cooperative agreement was signed on September 26, 1986, with the North Carolina Department of Natural Resources and Community Development calling for the State to provide an economic feasibility report to the MMS.

A final report entitled *The Economic Feasibility of Mining Phosphorite Deposits of the Continental Shelf Adjacent to North Carolina* was released May 11, 1988. East Carolina University researchers estimate that deposits at the principal site of investigation, southern Onslow Bay near Wilmington, North Carolina, contain at least 3.75 billion metric tons of phosphorites, which is about 29.2 percent of the total amount of in-place ore. This percentage, or grade, makes the Onslow Bay deposits comparable to actively mined deposits onshore. Larger, and perhaps richer, phosphorite deposits may lie further offshore. However, a comprehensive drilling program would be required before definitive resource estimates can be made.

A *Federal Register* notice was published concurrent with the release of the economic feasibility study asking for public comments. The study and the notice were sent to the American Mining Congress and all phosphate companies urging their review. These comments were reviewed in a public meeting of the task force on June 15, 1988, and summarized in a report to the MMS Director on August 15, 1988.

The task force met on February 16, 1989, to review the results of two studies approved for creation of a fisheries database and a geographic information system. In addition, Western Gold Exploration and Mining Company (Westgold) made a presentation on their gold placer mining activities in Norton Sound, Alaska, and discussed their inter-

est in phosphorite deposits offshore North Carolina. In view of the expression of industry interest, the State on March 3, 1989, requested that the task force be continued. The MMS and North Carolina agreed to a no-cost extension through December 1990.

A separate but related MMS initiative is to secure public and industry access to an extensive offshore phosphorite database held by East Carolina University. Included will be an archiving/atlas project, which will be published as an American Association of Petroleum Geologists special publication.

Georgia Placers and Phosphorites Task Force

A joint Federal-State of Georgia task force was established in October 1986 to study heavy mineral placers, phosphorites, and other strategic minerals offshore Georgia. The task force released a Request for Proposals in April 1987 and contracted with the Zellars-Williams Company in June, 1987, for a resource assessment of heavy minerals and phosphorites offshore Georgia. The study was summarized in a final report entitled *Georgia Offshore Minerals Assessment* (GOMA), delivered on July 20, 1988, and a *Federal Register* notice requesting public comments on the assessment was published on December 20, 1988. As was done with the North Carolina report, copies of the report and notice were sent to industry soliciting their review.

On March 30, 1989, the task force met to assess comments received on the GOMA and to discuss the future direction of the project. A letter to MMS and Georgia summarized the comments received and work completed by the task force to date. The letter included recommendations for future tasks to further knowledge of the near-term commercial viability of developing phosphorites and heavy minerals offshore.

A workshop sponsored by the task force was held at Skidaway Island, Georgia, on

May 10-12, 1989, to present and discuss results of recent geologic and geophysical studies of offshore minerals in the South Atlantic. Academia, industry, members of the North Carolina Task Force, other Atlantic coastal States, and the public attended. The workshop served as a forum for participants to exchange ideas and transfer information on a number of marine mineral investigations.

In September 1989, MMS and Georgia signed a cooperative agreement to acquire four to six cores on Tybee and Skidaway Islands, to conduct seismic surveys to tie offshore and onshore cores, to identify buried channels, to acquire and analyze vibracore samples, to complete the analysis of eight U.S. Navy Tactical Air Command Test Site (TACTS) cores, to conduct a radioactive sled survey, and to sponsor a second workshop and present results of these studies.

A task force meeting and workshop was held on February 1, 1990, at the Skidaway Oceanographic Institute to observe the onshore core drilling activity and to coordinate data collection and processing needs for the remaining field work. The Georgia Geological Survey completed drilling four cores on Tybee and Skidaway Islands during February.

On April 19, 1990, the task force met to review the status of ongoing tasks and to discuss a bulk sample collection program scheduled for May and June 1990. The new resource assessment work will provide (1) a 2-ton sample of phosphorite for commercial-scale processing tests, (2) deep coring to define the vertical and lateral extent of the offshore resource, and (3) a pilot bore-hole mining test for technologic and environmental data. The work is being cofunded and conducted for the task force by the Continental Shelf Division of the Marine Minerals Technology Center.

Upon completion of the scheduled field work and associated analyses, the State and MMS will be more knowledgeable on the

mineral resource potential offshore Georgia. This will enhance planning for future stages of work.

Coastal Zone Management Program

The U.S. Congress enacted the Coastal Zone Management (CZM) Act (16 U.S.C. 1458) in 1972 and established goals to enhance the wise use and management of the Nation's coastal resources. Each coastal State was encouraged to develop a State program to address these goals through local coastal programs. As incentive to participate in the program, States are given Federal dollars to develop and maintain the State program on a cost-sharing basis, and the authority to veto Federal activities "directly affecting" the coastal zone if the project is ruled not consistent with the State CZM program. Each coastal State CZM program is submitted for approval as part of the national program. The national program is administered by the National Oceanographic & Atmospheric Administration's (NOAA's) Office of Ocean and Coastal Resource Management (OCRM) within the Department of Commerce. The CZM Act requires that NOAA conduct a continuing review of the performance of each of the approved State CZM programs and that the evaluations be made available to the public. All the States on the east coast currently have federally approved coastal zone management programs. Congress is currently working on the reauthorization bill for the CZM Act, introduced into the House of Representatives as H.R. 4030.

National Marine Sanctuaries and Estuarine Research Reserves

The Marine Protection, Research, and Sanctuaries Act (16 U.S.C. 1431, et seq.) of 1972, as amended, established the national marine sanctuary program. The Act

authorizes the Secretary of Commerce to designate areas of special national significance as marine sanctuaries to provide comprehensive, protective management of their conservation, recreational, ecological, historical, research, educational, or aesthetic values. The program is administered by NOAA within the Department of Commerce. To attain sanctuary status, a rigorous designation process is followed, including approval by the President of the United States, and where State jurisdiction is involved, approval by the Governor.

In 1975, the first national marine sanctuary along the Atlantic coast was designated at the site of the wreckage of the Civil War ironclad *USS Monitor*. Additional designated marine sanctuaries off the east coast include Gray's Reef (adjacent to Georgia), Key Largo, Looe Key, and American Shoals (adjacent to Florida). Sites currently proposed for sanctuary designation include Norfolk Canyon, at the mouth of the Chesapeake Bay (adjacent to Virginia) and Stellwagen Bank, near Cape Cod (adjacent to Massachusetts). Additional sites under consideration for proposal along the east coast include Alligator Reef and Sombrero Reef, along the Florida Keys. Legislation has also been introduced to designate the entire Florida Keys area as a national marine sanctuary.

The NOAA also manages the National Estuarine Research Reserves (NERR) Program, as authorized by the Coastal Zone Management Act of 1972. The program provides matching funds to States to develop areas as estuarine research reserves. The following areas are designated as NERR's on the east coast: Chesapeake Bay in Maryland; Great Bay in New Hampshire; Hudson River in New York; Narragansett Bay in Rhode Island; North Carolina (a portion of the coast); Waquoit Bay in Massachusetts; Sapelo Island in Georgia; and Wells in Maine. The following areas are proposed for NERR designation on the east coast: Chesapeake Bay in Virginia;

Delaware (a portion of the coast); and South Carolina (a portion of the coast).

For further information contact the following address and telephone number:

Marine & Estuarine Management Division
NOS/NOAA/OCRM
1825 Connecticut Ave., NW.
Washington, D.C. 20235
(202) 673-5126

Regulation of Offshore Drilling Discharges

The Federal Government regulates all offshore discharges through the Clean Water Act of 1977 and the OCS Lands Act, as amended in 1978. The lead regulatory agency is the EPA, which has established effluent limitations through the National Pollutant Discharge Elimination System (NPDES), as authorized by the Clean Water Act. The limitations are for the various OCS activities and facilities, such as exploratory drillships, semisubmersible vessels, and jack-up rigs, and are based on "best practicable control technology." Through its NPDES program, EPA issues permits for the discharge of drilling material and wastewater from exploratory vessels and production platforms. Normal offshore oil and gas operations (nonaccidental events) typically result in the legal, controlled discharge of drilling muds and cuttings, formation waters, deck drainage, and small amounts of oil and wastewater.

In addition to EPA's NPDES program, MMS regulates offshore discharges through lease stipulations and the OCS operating regulations as authorized by the OCS Lands Act. A typical exploratory well on the Atlantic OCS is estimated to result in the discharge of 5-30 thousand barrels (Mbbl) of drilling mud and 3-6 Mbbl of wet solids (mostly cuttings) during the lifetime of the well. Development wells typically result in a much smaller volume of discharges.

Oil Spills and Cleanup Capabilities on the East Coast

Oil spills and the potential damage they cause are probably the single greatest concern regarding offshore oil exploration, development, and transportation. The EPA and the USCG have developed a Memorandum of Understanding (MOU) regarding oil and hazardous spills. The USCG is the Federal agency with the lead responsibility for dealing with offshore oil spills. The EPA is responsible for inland spills. With the enactment of the Port and Tanker Safety Act in 1978 (P.L. 95-474) and the Act to Prevent Pollution from Ships in 1980 (P.L. 96-478, effective October 2, 1983), the USCG has developed stringent requirements (33 CFR 151-157 and 46 CFR 30) designed to prevent marine pollution from accidental and operational discharges by tank vessels and bulk carriers. These regulations include requirements regarding vessel construction standards, navigational procedures, and limitations on operational discharges.

An ongoing effort by both the oil industry and the Federal Government has existed for approximately two decades (since the 1969 Santa Barbara oil spill) to prevent oil spills and develop the best methods to clean them up if they occur. If an oil spill does occur during any phase of OCS activity, OCS regulations and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) and Regional Contingency Plan (RCP) provide assurance and a means of a rapid and coordinated Federal response. The NCP and RCP are requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA, also known as "Superfund") and are developed by the EPA and the USCG, with input from numerous other Federal and State agencies. The NCP provides guidelines for an integrated Federal response by various agencies, outlining the division of responsibilities among the Federal, State, and local governments. The NCP also calls for establishment of the National Response

Team (NRT) and Regional Response Teams (RRT's), consisting of local representatives of the government agencies called for in the NCP that would commit resources in the event of an environmental emergency, such as an oil spill. RRT responsibilities include regionwide planning for maximum preparedness, coordination, and advice during spill responses.

Title III of the OCS Lands Act, as amended, also established the Offshore Oil Pollution Compensation Fund. It is a spill liability fund that provides compensation for economic losses resulting from an oil spill from oil produced on OCS leases. The fund is generated from fees on OCS-produced oil. Congress is currently considering a more comprehensive oil-spill compensation bill that would supersede this measure.

As stated above, the USCG has the responsibility for oil-spill cleanups on the OCS. A Memorandum of Understanding (MOU) between the USCG and MMS outlines the respective responsibilities of the USCG and the MMS regarding cleanup efforts. The USCG directs all cleanup activity and has the authority to take control of the cleanup activities if the polluter's efforts are inadequate or if the polluter has not been identified. The MMS is responsible for the coordination and direction of abatement measures. The USCG provides On-Scene Coordinators (OSC's) who specifically direct the Federal response and determine if the spiller's response is appropriate.

Oil-spill cleanup and prevention measures are also found in the OCS regulations. Oil company lessees are required to submit oil-spill contingency plans (OSCP's) along with any exploration or development and production plans. The MMS has review and approval authority over the plans, as does the USCG and the adjacent State. Using various spill scenarios, the OSCP details the actions that would be taken during a spill to assure maximum oil-spill cleanup response. The OSCP lists the location of available

equipment, deployment methods of various types of equipment, various cleanup strategies and the circumstances when they are appropriate, personnel contacts, and estimated response times. Additionally, ecologically and economically sensitive areas are mapped out with site-specific protective strategies and priorities.

The MMS has the authority to specify the type, location, and amount of cleanup equipment to be maintained during the offshore operations. As a result, oil-spill booms, skimmers, chemical dispersants and collecting agents, oil storage tanks and barges, sorbent materials, and the means for deploying them, are located on-site at oil rigs, nearby at other rigs, or along the coast at major oil-spill cleanup co-op yards, as well as at various pre-staged onshore locations for easy coastal access. Such facilities have not permanently operated in the Atlantic OCS Region because currently there is no drilling or production activity. When drilling did occur in the Atlantic Region, such equipment was available. If such activity were proposed, such as the Mobil exploration well offshore North Carolina, on-site and nearby dedicated oil-spill cleanup equipment and capabilities would be required as part of an OSCP. See the last section of Chapter 2 (p. 22) for a discussion of the Mobil project.

Operation technology has advanced tremendously since the Santa Barbara blowout. This is attributed to the heightened sensitivity and subsequent public outcry of the dangers of oil spills following such spills as the Santa Barbara, *Amoco Cadiz*, and others, and the additional regulations imposed on the oil industry. There is also an economic incentive for the oil industry to not spill oil, because of (1) the actual loss of product, (2) the high cost of the cleanups, (3) the numerous lawsuits that invariably follow a large spill, (4) the loss of company reputation, and (5) the penalties imposed for polluting.

The actual success of any oil-spill cleanup operation will depend on many factors, beginning with the technological limitations of the equipment, the physical conditions and circumstances at the time of the spill, the weather, the rate of the spill, the type of oil spilled, the location of the spill, and how soon the spill is reported. Many cleanup techniques exist, and the most appropriate one will depend on the immediate nature of the specific spill. Three distinct methods of cleaning are as follows:

- Mechanical cleanup includes oil spill booms, skimmers, and sorbent materials for physical recovery of the spilled oil.
- Chemical cleanup includes spraying chemical dispersants from ships, boats, planes, or helicopters, for dispersal of the oil as droplets into the environment, or using chemical collecting agents that collect or "herd" the spilled oil into relatively contained areas for recovery.
- No action alternative, in which case, weather conditions may make it unsafe for personnel to be out at sea, or natural processes such as rough winds and waves and natural evaporation and dissipation are adequately breaking up the oil slick.

The decision on the best strategy is made at the spill site by the OSC and the party responsible for the spill. If the responsible party is either not identified or incapable of handling the response adequately, the USCG will make the decision. Chemical cleanup approval is made onsite on a case-by-case basis.

OHMSETT Facility

The Oil and Hazardous Materials Simulated Environmental Test Tank (OHMSETT) facility located in Leonardo, New Jersey, was built in 1974 for the EPA. The facility is owned by the Navy, and until 1987, was operated by the EPA. The facility is the only one of its kind in the United States where full-scale oil-spill recovery equipment

can be tested. Approximately 95 percent of all performance data for equipment such as booms and skimmers was generated at the OHMSETT facility. All operations at the facility ceased in 1987 when EPA withdrew its support. In April 1990, MMS completed negotiations with the Navy to resume oil-spill cleanup research at the facility.

In 1988, MMS and Environment Canada began reviewing other sites for OHMSETT-type research projects. No suitable alternatives were found. A letter dated December 8, 1989, from the Secretary of Defense to the Department of the Interior indicated that at Interior's request, activities at OHMSETT could be reactivated.

The facility is an open-air saltwater test tank located on the Naval Weapons Station. The tank is 675 ft by 65 ft by 11 ft and holds 2.6 MMgal of water. It can be used for full-scale tow tests in a range of wave and wind conditions. An advantage of such a facility is that oil can actually be spilled in the tank simulating real conditions and, thereby allowing equipment effectiveness to be studied. The MMS proposes to provide the \$162,000 required to reactivate the facility and then to contract for research and technology evaluations. The USCG and Environment Canada would also contribute funding to the facility.

Research at the facility is expected to resume in early 1991. The types of research that will be conducted include the following:

- evaluation of new skimmer technologies,
- evaluation of nondispersant chemical additives,
- evaluation of subsurface oil detection and collection ideas, and
- development of standardized offshore skimmer test protocol.

Petroleum Industry Response Organization

As a result of the *Exxon Valdez* tanker spill in March 1989, the oil industry through the American Petroleum Institute (API), proposed creating a nationwide oil-spill response network, the Petroleum Industry Response Organization (PIRO). PIRO would include oil-spill experts and equipment that can quickly respond to a major spill anywhere in the United States. The proposed organization would be headquartered in Washington, D.C., with regional response centers in New York, New York; Norfolk, Virginia; New Orleans, Louisiana; Long Beach, California; and Seattle, Washington. Each center would be staffed 24 hours a day and would be capable of handling a 30,000-ton (260,000 bbl) oil spill, about the size of the *Exxon Valdez* spill. For further information, contact the following agency:

American Petroleum Institute
1220 L St., NW.
Washington, D.C. 20005
(202) 682-8128

Appendix A: Bibliography of OCS Information Reports

The following is a regional listing of documents published by the OCS Information Program. Entries are arranged by title in reverse chronological order, listing the most recent publication first. Requests for copies of these publications should be directed to the following office:

Document Distribution Center
Offshore Information & Publications
Minerals Management Service, MS 4610
381 Elden St.
Herndon, VA 22070-4817
(703) 787-1080 or (FTS) 393-1080

Alaska Region

Arctic Subregion Summary Reports and Updates

- Arctic Summary Report, January 1985, Outer Continental Shelf Oil and Gas Activities in the Arctic and their Onshore Impacts. Christopher W. Lynch, Douglas L. Slitor, and Robert W. Rudolph. 1985. OCS Information Report, MMS 85-0022, U.S. DOI, 84 p.
- Arctic Summary Report Update, September 1983, Outer Continental Shelf Oil and Gas Activities in the Arctic and their Onshore Impacts. Jeffrey L. Deis and Robert Pierson. 1983. U.S. DOI, 58 p.
- Arctic Summary Report, January 1983, Outer Continental Shelf Oil and Gas Activities in the Arctic and their Onshore Impacts. Joanne Barnes Jackson and Frederick N. Kurz. 1983. U.S. DOI, 81 p.
- Update 1, May 1982, Outer Continental Shelf and Onshore Oil and Gas Activities and Impacts in the Arctic: A Summary Report, October 1981. Joanne Barnes Jackson and Barbara Cushmore Pretz. 1982. USGS Open-File Report 82-19, U.S. DOI, 76 p.
- Outer Continental Shelf and Onshore Oil and Gas Activities and Impacts in the Arctic: A Summary Report, October 1981. Joanne Barnes Jackson, B. Fritts Golden, Anne Stadnychenko, and Sharon Kolasinski. 1981. USGS Open-File Report 81-621, U.S. DOI, 137 p.

Bering Sea Subregion Summary Reports and Updates

- Bering Sea Summary Report, September 1984, Outer Continental Shelf Oil and Gas Activities in the Bering Sea and their Onshore Impacts. Jeffrey Deis. 1984. OCS Information Report, MMS 84-0076, U.S. DOI, 84 p.
- Bering Sea Summary Report, September 1983, Outer Continental Shelf Oil and Gas Activities in the Bering Sea and their Onshore Impacts. Jeffrey Deis, Robert Pierson, and Frederick N. Kurz. 1983. U.S. DOI, 81 p.

Gulf of Alaska Subregion Summary Reports and Updates

- Gulf of Alaska Summary Report Update, May 1984, Outer Continental Shelf Oil and Gas Activities in the Gulf of Alaska and their Onshore Impacts. Jeffrey D. Wiese. 1984. OCS Information Report, MMS 84-0030, U.S. DOI, 27 p.
- Gulf of Alaska Summary Report Update, April 1983, Outer Continental Shelf Oil and Gas Activities in the Gulf of Alaska and their Onshore Impacts. Joanne Barnes Jackson. 1983. U.S. DOI, 29 p.
- Gulf of Alaska and Lower Cook Inlet Summary Report 3, June 1982, Second Revision of Outer Continental Shelf Oil and Gas Activities in the Gulf of Alaska (including Lower Cook Inlet) and their Onshore Impacts: A Summary Report, September 1980. Joanne Barnes Jackson and Frederick N. Kurz. 1982. USGS Open-File Report 82-20, U.S. DOI, 79 p.
- Gulf of Alaska and Lower Cook Inlet Summary Report 2, June 1981, A Revision of Outer Continental Shelf Oil and Gas Activities in the Gulf of Alaska (including Lower Cook Inlet) and their Onshore Impacts: A Summary Report, September 1980. Karen M. Collins and Anne Stadnychenko. 1981. USGS File Report 81-607, U.S. DOI, 49 p.
- Outer Continental Shelf Oil and Gas Activities in the Gulf of Alaska (including Lower Cook Inlet) and their Onshore Impacts: A Summary Report, September 1980. Joanne Barnes Jackson and Richard T. Dorrier. 1980. USGS Open-File Report 80-1028, U.S. DOI, 78 p.

Regionwide Alaska Summary Reports and Updates

- Alaska Update: September 1988-January 1990, Outer Continental Shelf Oil & Gas Activities. Gregory J. Gould, Robert M. Karpas, and Douglas L. Slitor. 1990. OCS Information Report MMS 90-0012, 81 p.
- Alaska Update: January 1987-August 1988, Outer Continental Shelf Oil and Gas Activities. 1988. OCS Information Report MMS 88-0073, 44 p.
- Alaska Summary Report (June 1984-December 1985) Outer Continental Shelf Oil and Gas Activities in Alaska and their Onshore Impacts. James H. Collins and Christopher W. Lynch. 1986. OCS Information Report, MMS 86-0023, U.S. DOI, 114 p.

Alaska Indexes

- Alaska Index (May 1983-January 1985). Denise D. Molajo. 1985. OCS Information Report, MMS 84-0037, U.S. DOI, 84 p.
- Alaska Index (December 1981-April 1983). Mary Ann Collignon. 1983. U.S. DOI, 74 p.
- Alaska Index (December 1980-November 1981). Mary Ann Collignon. 1982. USGS Open-File Report 82-18, U.S. DOI, 81 p.
- Alaska Index (December 1974-November 1980). Richard T. Dorrier. 1981. USGS Open-File Report 81-20, U.S. DOI, 85 p.

Alaska Summary/Index

- Alaska Summary/Index: January 1986-December 1986. D. L. Slitor and J. D. Wiese. 1987. OCS Information Report, MMS 87-0016, 102 p.

Atlantic Region

North Atlantic Summary Reports and Updates

- North Atlantic Summary Report Update, June 1983, Outer Continental Shelf Oil and Gas Activities in the North Atlantic and their Onshore Impacts. Alan S. Kurtz and Jeffrey L. Deis. 1983. U.S. DOI, 23 p.
- North Atlantic Summary Report Update, February 1983, Outer Continental Shelf Oil and Gas Activities in the North Atlantic and their Onshore Impacts. Jeffrey L. Deis. 1983. U.S. DOI, 33 p.
- Update 1, April 1982, Outer Continental Shelf Oil and Gas Activities in the North Atlantic and their Onshore Impacts: A Summary Report. Jeffrey L. Deis and Elizabeth O. Porter. USGS Open-File Report 82-16, U.S. DOI, 42 p.

- Outer Continental Shelf Oil and Gas Activities in the North Atlantic and their Onshore Impacts: A Summary Report, July 1981. Richard T. Dorrier. 1981. USGS Open-File Report 81-601, U.S. DOI, 65 p.

Mid-Atlantic Summary Reports and Updates

- Mid-Atlantic Summary Report, October 1983, Outer Continental Shelf Oil and Gas Activities in the Mid-Atlantic and their Onshore Impacts. Alan S. Kurtz and Jeffrey L. Deis. 1983. U.S. DOI, 44 p.
- Mid-Atlantic Summary Report 2, October 1982, Outer Continental Shelf Oil and Gas Activities in the Mid-Atlantic and their Onshore Impacts. Jeffrey L. Deis and Frederick N. Kurz. 1982. U.S. DOI, 63 p.
- Update 3, August 1981, Outer Continental Shelf Oil and Gas Activities in the Mid-Atlantic and their Onshore Impacts. Catherine A. McCord. 1981. USGS Open-File Report 81-619, U.S. DOI, 12 p.
- Update 2, February 1981, Outer Continental Shelf Oil and Gas Activities in the Mid-Atlantic and their Onshore Impacts. Richard T. Dorrier. 1981. USGS Open-File Report 81-603, U.S. DOI, 18 p.
- Update 1, June 1980, Outer Continental Shelf Oil and Gas Activities in the Mid-Atlantic and their Onshore Impacts. Jeffrey L. Deis. 1980. Update to USGS Open-File Report 80-17, U.S. DOI, 18 p.
- Outer Continental Shelf Oil and Gas Activities in the Mid-Atlantic and their Onshore Impacts: A Summary Report, November 1979. George S. Macpherson and Charles A. Bookman. 1980. USGS Open-File Report 80-17, U.S. DOI, 63 p.

South Atlantic Summary Reports and Updates

- South Atlantic Summary Report, December 1983, Outer Continental Shelf Oil and Gas Activities in the South Atlantic and their Onshore Impacts. Kenneth J. Havran and Jeffrey D. Wiese. 1984. U.S. DOI, 34 p.
- South Atlantic Summary Report Update, February 1983, Outer Continental Shelf Oil and Gas Activities in the South Atlantic and their Onshore Impacts. Kenneth J. Havran. 1983. U.S. DOI, 20 p.
- South Atlantic Summary Report 2, May 1982, Outer Continental Shelf Oil and Gas Activities in the South Atlantic and their Onshore Impacts. Jeffrey L. Deis, Frederick N. Kurz, and Elizabeth O. Porter. 1982. USGS Open-File Report 82-15, U.S. DOI, 50 p.
- Update 2, August 1981, Outer Continental Shelf Oil and Gas Activities in the South Atlantic (U.S.) and their Onshore Impacts: A Summary Report, July 1980. Catherine A. McCord. 1981. USGS Open-File Report 81-616, U.S. DOI, 13 p.

- Update 1, February 1981, Outer Continental Shelf Oil and Gas Activities in the South Atlantic (U.S.) and their Onshore Impacts: A Summary Report, July 1980. Kenneth J. Havran. 1981. USGS Open-File Report 81-25, U.S. DOI, 14 p.
- Outer Continental Shelf Oil and Gas Activities in the South Atlantic (U.S.) and their Onshore Impacts: A Summary Report, July 1980. Joanne Barnes Jackson. 1980. USGS Open-File Report 80-626, U.S. DOI, 62 p.

Regionwide Atlantic Summary Report

- Atlantic Summary Report, December 1984, Outer Continental Shelf Oil and Gas Activities in the Atlantic Region and their Onshore Impacts. Robert W. Rudolph and Kenneth J. Havran. 1985. OCS Information Report, MMS 85-0021, U.S. DOI, 74 p.

Atlantic Indexes

- Atlantic Index (June 1984-January 1985). Christopher W. Lynch and Denise D. Molajo. 1985. OCS Information Report, MMS 85-0036, U.S. DOI, 114 p.
- Atlantic Index (June 1983-May 1984). Mary Ann Collignon. 1984. MMS 84-0050, U.S. DOI, 113 p.
- Atlantic Index (June 1981-May 1983). Catherine A. McCord. 1983. U.S. DOI, 120 p.
- Atlantic Index (December 1980-June 1981). Mary Ann Collignon. 1981. USGS Open-File Report 81-705, U.S. DOI, 173 p.
- Atlantic Index (January 1975-November 1980). Martha Alison Salzmänn. 1981. USGS Open-File Report 80-1202, U.S. DOI, 193 p.

Atlantic Summary/Index

- Atlantic Summary/Index: January 1985-June 1986, Outer Continental Shelf Oil and Gas Activities. Jeffrey D. Wiese. 1986. OCS Information Report, MMS 86-0071, 38 p.

Gulf of Mexico Region

Gulf of Mexico Summary Reports and Updates

- Gulf of Mexico Update: May 1988-July 1989, Outer Continental Shelf Oil and Gas Activities. Gregory J. Gould. 1989. OCS Information Report, MMS 89-0079, 51p.
- Gulf of Mexico Update: July 1986-April 1988, Outer Continental Shelf Oil and Gas Activities. 1988. OCS Information Report, MMS 88-0038, 39 p.

- Gulf of Mexico Summary Report/Index, November 1984-June 1986, Outer Continental Shelf Oil and Gas Activities in the Gulf of Mexico and their Onshore Impacts. Stephen P. Risotto and James H. Collins. 1986. OCS Information Report, MMS 86-0084, 102 p.
- Gulf of Mexico Summary Report, October 1984-June 1985, Outer Continental Shelf Oil and Gas Activities in the Gulf of Mexico Region and their Onshore Impacts. Christopher W. Lynch and Stephen P. Risotto. 1985. OCS Information Report, MMS 85-0083, U.S. DOI, 108 p.
- Gulf of Mexico Summary Report, September 1984, Outer Continental Shelf Oil and Gas Activities in the Gulf of Mexico Region and their Onshore Impacts. Christopher W. Lynch and Robert W. Rudolph. 1984. OCS Information Report, MMS 84-0073, U.S. DOI, 108 p.
- Gulf of Mexico Summary Report, September 1983, Outer Continental Shelf Oil and Gas Activities in the Gulf of Mexico Region and their Onshore Impacts. Jeffrey D. Wiese, Douglas L. Slitor, and Catherine A. McCord. 1983. U.S. DOI, 106 p.
- Gulf of Mexico Summary Report 3, August 1982, Outer Continental Shelf Oil and Gas Activities in the Gulf of Mexico Region and their Onshore Impacts. Kenneth J. Havran, Jeffrey D. Wiese, Karen M. Collins, and Frederick N. Kurz. 1982. USGS Open-File Report 82-242, U.S. DOI, 99 p.
- Gulf of Mexico Summary Report 2, August 1981, Outer Continental Shelf Oil and Gas Activities in the Gulf of Mexico Region and their Onshore Impacts. Kenneth J. Havran. 1981. USGS Open-File Report 81-620, U.S. DOI, 79 p.
- Outer Continental Shelf Oil and Gas Activities in the Gulf of Mexico and their Onshore Impacts: A Summary Report, September 1980. Kenneth J. Havran and Karen M. Collins. 1980. USGS Open-File Report 80-864, U.S. DOI, 102 p.

Gulf of Mexico Indexes

- Gulf of Mexico Index (August 1983-October 1984). Denise D. Molajo, Stephen P. Risotto, and Virginia A. Farris. 1984. OCS Information Report, MMS 85-0043, U.S. DOI, 86 p.
- Gulf of Mexico Index (September 1982-July 1983). Mary Ann Collignon. 1983. U.S. DOI, 125 p.
- Gulf of Mexico Index (December 1980-August 1982). Mary Ann Collignon. 1982. U.S. DOI, 157 p.
- Gulf of Mexico Index (January 1978-November 1980). Kenneth J. Havran, Karen M. Collins, Richard T. Dorrier, and Mary Ann Collignon. 1981. USGS Open-File Report 81-313, U.S. DOI, 181 p.

Pacific Region

Pacific Summary Reports and Updates

- Pacific Update: August 1987-November 1989, Outer Continental Shelf Oil and Gas Activities. Douglas L. Slitor, Jeffrey D. Wiese, and Robert M. Karpas. 1990. OCS Information Report, MMS 90-0013, 102 p.
- Pacific Summary Report, April 1985, Outer Continental Shelf Oil and Gas Activities in the Pacific and their Onshore Impacts. Robert W. Rudolph and Paul M. Nikituk. 1985. OCS Information Report, MMS 85-0040, U.S. DOI, 90 p.
- Pacific Summary Report, July 1984, Outer Continental Shelf Oil and Gas Activities in the Pacific and their Onshore Impacts. Kenneth J. Havran and Christopher W. Lynch. 1984. OCS Information Report, MMS 84-0075, U.S. DOI, 80 p.
- Pacific Summary Report, September 1983, Outer Continental Shelf Oil and Gas Activities in the Pacific and their Onshore Impacts. Kenneth J. Havran. 1983. U.S. DOI, 103 p.
- Pacific Summary Report, December 1982, Outer Continental Shelf Oil and Gas Activities in the Pacific and their Onshore Impacts. 1983. Anne Stadnychenko and Catherine McCord. U.S. DOI, 109 p.
- Pacific Summary Report 2, May 1982, A Revision of Outer Continental Shelf Oil and Gas Activities in the Pacific (Southern California) and their Onshore Impacts: A Summary Report, May 1980. Karen M. Collins, Catherine A. McCord, Anne Stadnychenko, and Peter Yoskin. 1982. USGS Open-File Report 82-21, U.S. DOI, 121 p.
- Outer Continental Shelf Oil and Gas Activities in the Pacific (Southern California) and their Onshore Impacts: A Summary Report, May 1980. George S. Macpherson and Janis Bernstein. 1980. USGS Open-File Report 80-645, U.S. DOI, 134 p.

Pacific Indexes

- Pacific Index (April 1983-October 1984). Denise D. Molajo. 1985. OCS Information Report, MMS 85-0004, U.S. DOI, 84 p.
- Pacific Index (July 1981-March 1983). Jeffrey D. Wiese and Mary Ann Collignon. 1983. U.S. DOI, 86 p.
- Pacific Index (November 1980-June 1981). Mary Ann Collignon. 1981. USGS Open-File Report 81-708, U.S. DOI, 89 p.
- Pacific Index (January 1962-October 1980). Sharon L. Kolasinski. 1980. USGS Open-File Report 80-1201, U.S. DOI, 111 p.

Pacific Summary/Index

- Pacific Summary Report/Index: June 1, 1986- July 31, 1987. Jeffrey D. Wiese and Douglas L. Slitor. 1987. OCS Information Report, MMS 87-0078, 143 p.
- Pacific Summary Report/Index: November 1984-May 1986. Stephen Risotto and Robert Rudolph. 1986. OCS Information Report, MMS 86-0060, 117 p.

National

- OCS National Compendium, Outer Continental Shelf Oil and Gas Information Through September 1988. Gregory J. Gould. 1989. OCS Information Report, MMS 89-0043, 131 p.
- OCS National Compendium, Outer Continental Shelf Oil and Gas Information Through 1984. Paul M. Nikituk and Virginia A. Farris. 1986. OCS Information Report, MMS 86-0017, 172 p.
- OCS Directory, Federal and State Agencies and Their OCS-Related Responsibilities. 1988. OCS Information Report, MMS 88-0058, 149 p.

Other Documents of Interest

The Office of Offshore Information & Publications publishes these documents that may be of interest to you.

- Federal Offshore Statistics: 1988, Leasing, Exploration, Production, & Revenues. 1987 Annual. OCS Report MMS 89-0082, 102 p.
- Oil and Gas Leasing/Production Program: Annual Report/FY 1987. 1988 Annual. OCS Report MMS 88-0009, 36 p.
- Offshore Scientific and Technical Publications, Spring 1989 Quarterly. Offshore Information & Publications, 32 p.
- Offshore Scientific and Technical Publications. 1984 Annual. OCS Report MMS 86-0010, 15 p.
- Offshore Scientific and Technical Publications. 1985 Annual. OCS Report MMS 87-0081, 16 p.
- Offshore Scientific and Technical Publications. 1986 Annual. OCS Report MMS 88-0055, 20 p.
- Offshore Scientific and Technical Publications. 1987 Annual. OCS Report MMS 90-0004, 20 p.
- OCS Laws, Related to Mineral Resource Activities on the Outer Continental Shelf. 1985. Offshore Information Services, OCS Report MMS 85-0069, one volume.

- OCS Regulations Related to Mineral Resource Activities on the Outer Continental Shelf. 1989. Offshore Information & Publications. MMS 88-0026, one volume.

Other Items of Interest

The OCS Information Program is now producing a map series. The following oversized plates have already been published.

- Alaska Map Series. OCS Map, MMS 89-0101 (3 plates: Arctic, Bering, Chukchi).
- Pacific Map Series. OCS Map, MMS 89-0100 (1 plate).

Appendix B. Atlantic OCS Region Environmental Studies

An integral part of the OCS leasing program has been the Environmental Studies Program. The MMS has supported many environmental studies that further our general knowledge of the environment where OCS leasing and operations are being considered, as well as answer specific scientific questions regarding the potential of environmental and economic impacts resulting from OCS oil and gas activities. The studies conducted or that are being conducted by the Atlantic OCS Region are briefly described in this appendix. Refer to chapter 2 (p. 20) for a table showing annual funding levels for 1986-1990 for the Atlantic OCS Region Studies Program. It is anticipated that only two of the studies listed in this appendix will be funded for 1991: (1) Endangered Right Whales of the South Atlantic and (2) Physical Oceanographic Field Study of the Straits of Florida. For further information on the Atlantic OCS Region Environmental Studies Program, contact the following address or telephone numbers:

Atlantic OCS Region
Minerals Management Service
381 Elden St.
Herndon, VA 22070-4817
(703) 787-1063 or (FTS) 393-1063

Ongoing Studies With Brief Descriptions

Biology/Ecology

- **The West Falmouth or "Florida" Oil Spill 20 Years Later.**--The contract was awarded to Woods Hole Oceanographic Institution on August 17, 1989. Sediment cores are to be analyzed for hydrocarbons. The hydrocarbon analyses will be compared with previously analyzed sedi-

ment cores collected 20 years ago at the West Falmouth, or "Florida," oil-spill site. The study will examine the microbial biodegradation processes that affect petroleum hydrocarbons in salt marsh environments.

- **Synthesis of Knowledge of the Potential Outer Continental Shelf Impacts from Oil and Gas Activities on Fisheries.**--The contract was awarded to Technical Resources, Inc. on September 30, 1986. The report includes annotated bibliographies and database descriptions for target species distribution and abundance studies and for OCS oil and gas impact studies.

Endangered Species

- **Pelagic Distribution and Abundances of Sea Turtles Off the Northeastern U.S. Coast.**--The contract was awarded to the University of Rhode Island on September 22, 1989, to support publication in the refereed literature of the sea turtle distribution and abundance data collected during the MMS funded Cetacean and Turtle Assessment Program (CETAP).
- **Publication of Scientific Results on Aspects of CETAP.**--The contract was awarded to Associated Scientists at Woods Hole Oceanographic Institute in Massachusetts on September 28, 1989, for the preparation of four manuscripts on aspects of the Cetacean and Turtle Assessment Program (CETAP). The publications in the refereed literature will focus on interpretation of the cetacean data.
- **Site-specific Monitoring of Marine Mammals.**--The contract was cofunded with the National Science Foundation

and awarded to the University of Rhode Island on June 15, 1987. The abundance and distribution of zooplankton (principally, *Calanus finmarchicus*) and Right Whales (*Eubalaena glacialis*) in the Great South Channel are correlated with hydrography and current regime. Additional information will be gathered to refine energy budget and estimates of Right Whale food requirements. The study will also determine the regional abundance and distribution of other cetacean species in the Great South Channel and whether they are related to the physical and biological features observed during Right Whale studies.

- **Synthesis of Information of the Effects of Noise on Marine Mammals and Production of a Manuscript.**--The contract was awarded to LGL Ecological Research Associates, Inc. on September 25, 1987. All existing information and on-going research concerning potential and demonstrated effects of noise resulting from OCS oil and gas development activities on marine mammals is to be synthesized. Any gaps and weaknesses in the existing literature are also to be identified. A manuscript is to be produced suitable for publication by the U.S. Government Printing Office.
- **Endangered Right Whales of the South Atlantic.**--The contract was awarded to Edgerton Research Laboratory of the New England Aquarium in Boston, Massachusetts, on September 19, 1989. The purpose of the study is to determine the distribution and abundance of Right Whales (*Eubalaena glacialis*) in U.S. coastal waters of the South Atlantic Planning Area.
- **Synthesis of Information on the Effects of Oil on Marine Mammals and Production of a Manuscript.**--The contract was awarded to Battelle in Ventura, California, on August 18, 1986. This study synthesizes all existing information

on the effects of oil, dispersed oil, oil dispersants, and oil cleaning agents on marine mammals that migrate through, or inhabit, U.S. Outer Continental Shelf planning areas. The final manuscript is to be published in book format by Academic Press.

Physical Oceanography/ Meteorology

- **Ocean Circulation Model for U.S. Atlantic Coast and Florida Straits.**--The contract was awarded to Dynalysis of Princeton, in Princeton, New Jersey, on September 30, 1986. The purpose of this study is to develop a three-dimensional, numerical, time-dependent circulation model to simulate mesoscale features along the U.S. Atlantic coast. All relevant surface and subsurface circulation data for the Atlantic OCS planning areas will be compiled and formatted for use in the circulation model. The formatted data will be used to analyze the model and evaluate it for interfacing with the existing MMS Oil Spill Risk Analysis model.
- **Gulf Stream Frontal Dynamics Study Offshore North Carolina.**--The contract was awarded to Evans Hamilton, Inc. on March 30, 1987. This is a comprehensive study of slope currents and the flow and temperature fields within Gulf Stream frontal eddies. The size and frequency of occurrence of these frontal events are estimated. The significance of frontal events to shelf circulation is evaluated.
- **Summary of U.S. Atlantic and Southeastern Gulf of Mexico Physical Oceanographic Processes Relevant to Offshore Oil and Gas Activities.**--The contract was awarded to Battelle, Inc. on September 30, 1987. This study is a review and synthesis of available literature on all relevant physical oceanographic processes in the U.S. Exclusive Economic Zone from Tampa, Florida, to the Gulf of Maine. The physical

oceanographic characteristics of the study region are summarized. Time and length scales and associated velocity ranges of water motions associated with wind forcing, celestial tides, inertia, and mesoscale features are analyzed. The study will result in a peer reviewed manuscript.

- **Use of Satellite-Tracked Surface Drifting Buoys to Simulate the Movement of Spilled Oil in the Marine Environment.--**

The contract was awarded to Applied Science Associates, Inc. on September 30, 1989. This study is phase 2 of a three-phase project designed to acquire satellite-tracked drifter buoys that will simulate the movement of spilled oil on the sea surface. Phase 2 compared the movement of the two top rated drifters (recommended in phase 1) to the movement of an actual controlled oil spill in the North Sea, off the Norwegian coast.

Program Support/Other

- **Synthesis of Available Biological, Geological, Chemical, Socioeconomic and Cultural Resource Information for the South Florida Area.--**

The contract was awarded to Continental Shelf Associates, Inc. on September 27, 1988. This study compiles and synthesizes all the available information and ongoing research pertaining to the biological, geological, chemical, socioeconomic, and cultural resource information in the South Florida area. Any gaps in the information needed to prepare an EIS will be identified and recommendations for additional research will be made. Analysis of the existing data will indicate how environmentally sensitive the area is. The study will also address potential impacts of OCS oil and gas activities on the South Florida environment.

- **Third Atlantic Outer Continental Shelf Information Transfer Meeting (ITM).--**

The contract was awarded to Walcoff and Associates, Inc. on March 24, 1989. The

third ITM included a review of active and recently completed studies in biological sciences, physical oceanography and meteorology, and the hard minerals program. Presentations were made by invited scientists showcasing their research relevant to the Environmental Studies Program objectives. Presentations were also made by invited State representatives on the concerns of coastal States over possible effects and impacts of oil and gas activities. The proceedings were then compiled and published for distribution.

Social and Economic Studies

- **Impacts of Oil and Gas Development on the Recreation and Tourism off the Florida Straits.--**

The contract was awarded to A.T. Kerney, Inc. on September 15, 1989. An input/output computer model is to be developed to estimate what the levels of impacts are from scenario driven oil and gas development on the recreation and tourism industry and local/regional government revenues in South Florida. The model will use relevant income, expenditure, recreation, and tourism visitation data.

- **Onshore Impacts of Offshore Oil and Gas Exploration, Development, and Production on the Atlantic Outer Continental Shelf (OCS).--**

The contract was awarded to A. T. Kearney, Inc. on September 22, 1989. The methodology, assumptions, and sources of information used in the 1978 Weston Environmental Consultants-Designers study are reviewed and analyzed. Through use of an input/output Economic Model, the study will update the employment multipliers and research done in estimating employment and population impacts from oil and gas development for the Atlantic OCS Region planning areas.

Studies Completed Since July 1986

- **Study of Biological Processes (Part A - U.S. North and Mid-Atlantic Continental Slope and Rise), and (Part B - South Atlantic Continental Slope and Rise).**--This study characterized predrilling biological, geological, and chemical properties of benthic environments in each of the North, Mid-, and South Atlantic Planning Areas. Potential changes in these properties were monitored with time. Recovery rates of potentially affected communities were estimated.
- **Analysis of Trace Metals In Bottom Sediments in Support of Deepwater Biological Processes Studies on the U.S. Atlantic Continental Slope and Rise.**--This study is part of a multidisciplinary program conducted along the entire Atlantic continental slope and rise. Twelve trace metals (aluminum, barium, cadmium, chromium, copper, iron, mercury, manganese, nickel, lead, vanadium, and zinc) from bottom samples were analyzed. Changes in these properties were monitored with time.
- **Assessment of Satellite Tracked Surface Drifting Buoys in Simulating the Movement of Spilled Oil in the Marine Environment.**--The purpose of this study was to evaluate satellite-tracked surface drifters for use in simulating the movement of spilled crude oil. This involved a literature review and synthesis pertaining to the physical factors influencing the movement of spilled oil. A recommendation was made for candidate drifters to be used in future field trials.
- **Submarine Canyon Workshop for the North Atlantic.**--The workshop summarized the existing knowledge on sediment transport and depositional processes within and adjacent to submarine canyons of the North Atlantic continental slope through invited presentations by scientists and other professionals. Special emphasis was placed on assessing the impact, if any, that potentially toxic metals and hydrocarbons associated with suspended sediments may have on benthic epifauna and evaluating the influence of operational discharges of oil on benthic communities.
- **North Atlantic Slope and Canyon Study.**--This study continued field measurements made by the U.S. Geological Survey on shelf, slope, and canyon currents in the North Atlantic. Time-series data were analyzed, with emphasis on long-term processes and low frequency fluctuations critical to understanding sediment (and pollutant) pathways. Data from the Canyon Dynamics Experiments (IA No. 29196 FY 1980-82) were interpreted and verified or modified. Conclusions highlighted the significance of oil and gas activities in the North Atlantic slope and rise.
- **Mid-Atlantic Slope and Rise Study (MASARS)--Physical Processes.**--Broad-scale, general circulation features on the continental slope and rise from New Jersey to Cape Hatteras, North Carolina, were determined on a seasonal basis. The variability in these areas were described and quantified. The degree to which the slope/rise circulation features influence the physical oceanography of the Mid-Atlantic continental shelf was also determined.
- **Gulf Stream Frontal Dynamics Study Offshore North Carolina.**--During a 6-month period from May to November oceanographic measurements were made off North Carolina in order to examine the effects of Gulf Stream frontal eddies on the circulation of water over the continental shelf.
- **South Atlantic OCS Area Living Marine Resources Study, Years 2 and 3.**--Three tasks were designed to aid in a better understanding of the possible effects of

energy or mineral related activities on hard-bottom communities in the South Atlantic Bight. Task I involved a study of short-term and long-term colonization patterns by invertebrates and fish on artificial hard substrata. Task II involved a study of the distribution of sponges and corals in relation to sediment depth over hard substrata. Task III was a study of food habits of hard bottom fish.

- **Workshop to Facilitate Efforts to Develop Effective Systems for Tracking Endangered Whales.**--The workshop was set up to determine what if any problems must be overcome to develop a safe and effective system for long-term tracking and/or relocating large cetaceans. Once problems were identified, it was determined whether or not, and if so how, the problems might be overcome. Estimates were made of time, money, special equipment, and logistical support that would be needed to accomplish the identified tasks.
- **Study of the Effects of Oil on Marine Turtles.**--The purposes of this study were to determine the behavioral responses of green (*Chelonia mydas*) and loggerhead (*Caretta caretta*) turtles to oil slicks and tarballs; determine the effects of exposure to oil (ingestion and surface contact), and to perform clinical examination of stranded marine turtles. Gathering this information would facilitate the prediction of possible impacts of oil on turtle nesting sites and on hatchlings, juveniles, and adults in an oil contaminated nearshore and open environment.

- **Florida Atlantic Coast Transport Study (FACTS).**--The purpose of this study was to determine the frequencies and location of filament structures on the western edge of the Gulf Stream between 31° and 27° N. latitude along the Atlantic coast of Florida. That data was formatted to be compatible with the South Atlantic circulation model prepared by Dynalysis of Princeton. The results of this study were synthesized with other Florida Atlantic physical oceanographic studies information.

Appendix C. Memorandum of Understanding Regarding Exploration of OCS Leases Offshore North Carolina

The following pages represent a copy of a Memorandum of Understanding by and between the State of North Carolina, Mobil Oil Corporation, and the Minerals Management Service regarding exploration of OCS leases offshore North Carolina.

MEMORANDUM OF UNDERSTANDING
BY AND BETWEEN
THE STATE OF NORTH CAROLINA, MOBIL OIL CORPORATION,
AND THE MINERALS MANAGEMENT SERVICE
REGARDING EXPLORATION OF OUTER CONTINENTAL SHELF LEASES
OFFSHORE NORTH CAROLINA

This memorandum of understanding is entered into on July 12, 1989, by the State of North Carolina (the State), Mobil Oil Corporation (Mobil), and the United States Department of the Interior's Minerals Management Service (MMS), in order to satisfy the statutory requirements of the Outer Continental Shelf Lands Act (OCSLA), 43 U.S.C. 1331 et seq., and the Coastal Zone Management Act (CZMA), 16 U.S.C. 1451 et seq., and to satisfy the State's needs for information and analysis concerning the environmental impacts of exploration activities conducted by Mobil on leases held by Mobil and others located on the federal Outer Continental Shelf offshore the State, including leases on block numbers 204, 246, 247, 290, 291, 334, 335, 378, 379, 422, 423, 466, 467, 510, 511, 553, 554, 555, 597, 598, 599, 640, 641, or 642.

The following agreement provisions are graphically presented in the Environmental Action Plan Timeline attached hereto and made a part of this memorandum as Attachment A. The timeline is intended to illustrate the text of the agreement; if there is an inconsistency between the timeline and the text, the text controls.

I

WHEREAS, Mobil is a lessee in whole or in part of certain Outer Continental Shelf oil and gas leases offshore the State of North Carolina including blocks 423, 467, 511, and 554 on protraction diagram NI 18-2; and,

WHEREAS, Mobil intends to explore these leases pursuant to section 11 of the OCSLA, as amended, 43 U.S.C. 1340; and,

WHEREAS, Mobil has negotiated with and may unitize its lease interests with the interests of some or all of the following lessees including Amerada Hess, Marathon, Chevron, Conoco, Occidental, Shell, and Union for lease blocks in the same general area as Mobil's leases, thereby becoming the unit operator; and

WHEREAS, Mobil must submit to the MMS for review and approval an Exploration Plan (EP) pursuant to section 11(c)(1) of the OCSLA, 43 U.S.C. 1340(c)(1) prior to conducting its exploration activities; and,

-2-

WHEREAS, the MMS must review the environmental impacts of Mobil's EP pursuant to section 11(c)(1) of the OCSLA, 43 U.S.C. 1340(c)(1), and the National Environmental Policy Act (NEPA), prior to approving, disapproving, or requiring modification of the EP; and,

WHEREAS, pursuant to section 11(c)(1) of the OCSLA, 43 U.S.C. 1340(c)(1), the MMS must approve, disapprove, or require modification of Mobil's EP within thirty days of the date on which Mobil's EP is deemed submitted; and,

WHEREAS, Mobil must submit its certification that the activities described in detail in its EP are consistent with the State's coastal management program (CMP) pursuant to section 307(c)(3)(B) of the Coastal Zone Management Act (CZMA), 16 U.S.C. 1456(c)(3)(B); and,

WHEREAS, the State must review the activities described in detail in Mobil's EP for consistency with the State's CMP pursuant to section 307(c)(3)(B) of the CZMA, 16 U.S.C. 1456(c)(3)(B); and,

WHEREAS, the MMS may not issue permits for any exploration activities contained in Mobil's EP prior to receiving the State's concurrence with Mobil's consistency certification or until such concurrence may be conclusively presumed, or until the Secretary of Commerce makes the findings set forth in section 307(c)(3)(B) of the CZMA, 16 U.S.C. 1456(c)(3)(B); and,

WHEREAS, the Environmental Report which MMS will prepare under this agreement will address a broader range of State concerns than MMS could consider in an environmental impact statement prepared under NEPA;

THEREFORE, the State, Mobil, and the MMS hereby agree to the following.

II

THE MMS agrees to:

1. Use the draft outline of the Environmental Report (ER), which is attached hereto and made a part of this memorandum as Attachment B, as the starting point for the consultation process in which the State and MMS will participate and by which the contents of the ER will be determined to meet the specific needs of the State or MMS;

2. Prepare an ER which will assess, as a minimum, the environmental impacts of Mobil's EP and the potential 21-block unit as described in Part I, the report from the oil spill risk analysis modeling for mid-Atlantic Lease Sale 121, the potentially affected coastal environment, the effects associated with exploratory drilling for the initial well and all reasonably foreseeable delineation wells, the potential impacts of spills of

-3-

oil or gas during drilling operations on the North Carolina coastal environment, and such additional issues as may be agreed to by the State and MMS;

3. Submit to the State on July 17, 1989, the report from the oil spill risk analysis modeling for mid-Atlantic Lease Sale 121, a description of the potentially affected coastal environment, and a generic description of the effects associated with exploratory drilling;

4. Participate in at least three public meetings concerning the information submitted to the State in August 1989 at a location or locations to be determined by agreement of MMS and the State;

5. According to the outline submitted to the State, prepare a draft ER for publication and review and comment by the State and the public on November 1, 1989;

6. Participate in at least three public hearings concerning the draft ER during the week of December 4, 1989, at a location or locations to be determined by agreement of MMS and the State;

7. After consideration of comments on the draft ER, prepare a final ER for submission to the State by February 1, 1990;

8. Determine pursuant to 30 C.F.R. 250.33(e) whether Mobil's final EP should be deemed submitted, transmit the EP to the State on the date the EP is deemed submitted, and begin preparation of the Environmental Assessment (EA);

9. Review comments on the EP submitted by the Governor after his 20-day review;

10. Complete the EA, and approve, disapprove, or require modification of Mobil's EP within 30 days of the date the EP is deemed submitted, if no other NEPA document is required;

11. Prepare an ER with the scope and process described above on the first EP to be submitted on any of the lease blocks listed in the opening paragraph of this memorandum of understanding if the Mobil EP is not the first EP, for the listed lease blocks, to be reviewed by MMS. However, if the lessee submitting the EP does not agree to the process set forth in Article IV of this agreement, then MMS and the State will consult immediately to identify a mutually agreeable alternative process;

12. Issue a suspension of operations for any of those nineteen leases due to expire on August 31, 1991, which are included in the draft EP. The suspension will not prevent the conduct of preliminary activities as defined in 30 C.F.R. 250.31 (1988). The suspension will be directed by the Regional Supervisor under 30 C.F.R. 250.10(b)(4). It will be effective on

-4-

the date Mobil submits the draft EP under this agreement and will expire on February 1, 1990, or on the date MMS submits the final ER to the State, whichever is later;

13. If the State objects to Mobil's certification of consistency, or if any other administrative or judicial challenges or appeals arise, or if the issuance of the permits for Mobil's exploration activities is delayed due to any of the other circumstances contemplated by 30 C.F.R. § 250.10, upon Mobil's application, issue additional suspensions of operations, pursuant to 30 C.F.R. § 250.10, to allow for the resolution of such matters and to allow Mobil two drilling seasons under the EP thereafter. For the purpose of this paragraph, a drilling season is the period of May 1 through October 31.

III

THE STATE agrees to:

1. Provide data agreed to in a timely manner;
2. Participate in public meetings concerning the information submitted to the State in August 1989 at a location or locations to be determined by agreement of MMS and the State;
3. Participate in public hearings concerning the draft ER and draft EP during the week of December 4, 1989, at a location or locations to be determined by agreement of MMS and the State;
4. Begin its CZMA consistency review of Mobil's final EP on the date of receipt of the final EP from the MMS; and,
5. Complete its CZMA consistency review within seventy-five (75) days of receipt of the EP, and on that day issue its concurrence with or objection to Mobil's consistency certification.

IV

MOBIL agrees:

1. To submit a non-binding draft EP on September 1, 1989, including all documentation required by law and such additional supporting information and documentation as shall be hereafter agreed to by the parties to this agreement; and,
2. Not to submit a final EP to the MMS before January 18, 1990.

-5-

V

GENERAL AGREEMENT OF THE PARTIES:

1. Time being of the essence, all dates contained in the foregoing sections II-IV are subject to change only pursuant to subsequent written agreement of the parties, provided, however, that the time between each step depicted in Attachment A shall remain constant.

2. By entering into this agreement, the State of North Carolina has not waived any legal remedies it may have to challenge the approval of Mobil's EP or related permits and approvals for activities described in the plan. The Department of the Interior has not waived any defenses or remedies it may have if the State files such a challenge. Mobil Oil Corporation and the co-lessees of the leases included in the EP or unit have not waived any rights, defenses, or remedies they may have with respect to their exploration of their leases.

APPROVED:

Minerals Management Service

State of North Carolina

Acting Director

Governor

Date: 7-11-89

Date: 7-11-89

Mobil Oil Corporation

Secretary,
Department of Administration

Date: 7-12-89

Date: 7-11-89

Attorney General

Date: 7-12-89

ENVIRONMENTAL ACTION PLAN TIMELINE

Attachment A

Appendix D. Updated Timeline for the Exploration of OCS Leases Offshore North Carolina

The project timeline below was updated and agreed to by MMS, Mobil, and North Carolina in January 1990, for the exploration of OCS leases offshore North Carolina.

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