OCS Report
MMS 97-0035

Resource Evaluation
Program Report

Geological & Geophysical Data Acquisition

A 20-year Retrospective 1976-1996

U.S. Department of the Interior
Minerals Management Service
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U.S. Department of the Interior
Minerals Management Service
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Herndon, VA
1997

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Acronyms and Abbreviations

CDP	Common depth point seismic data
CFR	Code of Federal Regulations
COST	Continental Offshore Stratigraphic Test
DOI	Department of the Interior
DST	Deep stratigraphic test (well)
FY	Fiscal Year
G&G	Geological and geophysical
GOM	Gulf of Mexico
GRAV	Gravity data
HRD	High-resolution seismic data
MAG	Magnetics data
MMS	Minerals Management Service
OCS	Outer Continental Shelf
OCSLA	Outer Continental Shelf Lands Act
RE	Resource Evaluation
REP	Resource Evaluation Program
SEG	Society of Exploration Geophysicists
3-D	Three-dimensional seismic data

Introduction

Responsibilities of the Minerals Management Service

The Minerals Management Service (MMS) has the major responsibility for administering the Department of the Interior's (DOI) role in activities associated with mineral resource development on the Federal Outer Continental Shelf (OCS). These activities relate to the assessment, leasing, exploration, development, production, and royalty management of these mineral resources.

This report addresses the general role of the MMS Resource Evaluation Program (REP) in geological and geophysical (G&G) data acquisition and permitting activities. A brief description of the uses of G&G data in the REP is included in the report.

Regulatory Authority

The MMS administers the provisions of the OCS Lands Act through regulations found at Title 30 of the Code of Federal Regulations (CFR). The regulations govern permitting, data acquisitions and release, leasing, and postlease operations on the OCS. The OCS is divided into planning areas for administrative purposes as shown in figure 1.

With regard to the REP, authority has been vested in the Secretary of the Interior under 30 CFR Part 251 to regulate prelease G&G exploration for oil, gas, and sulphur resources on the OCS. Part 251 applies not only to G&G exploration but to scientific research as well. The purpose of these regulations is to prescribe (1) when a permit or the filing of a notice is required to conduct G&G activities on the OCS and (2) operating procedures for conducting exploration, as well as requirements for disclosing data and information, conditions for reimbursing permittees for certain costs, and other conditions under which exploration shall be conducted. Similar regulations addressing prelease prospecting activities can be found in 30 CFR Part 280.

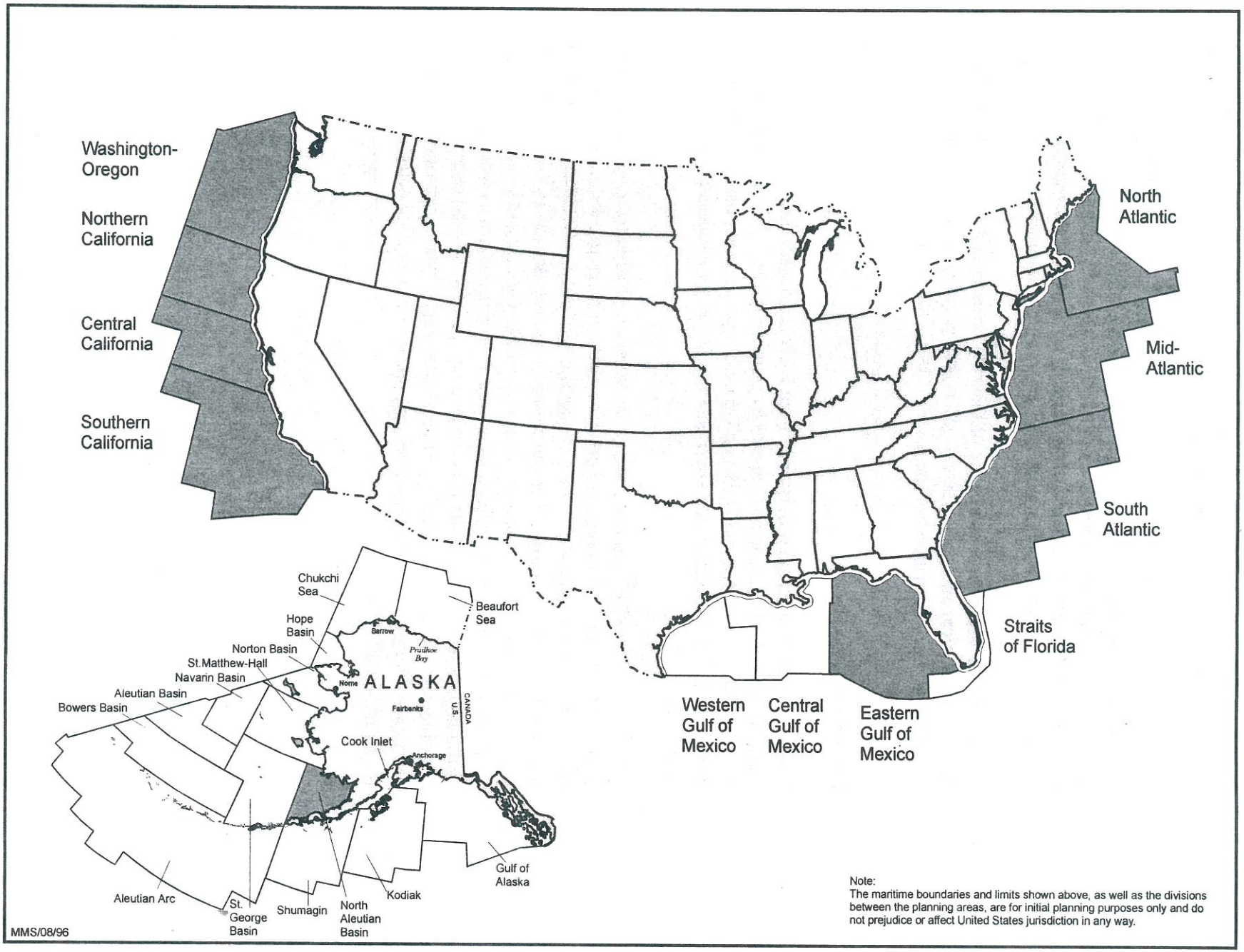

Figure 1. Federal Outer Continental Shelf Planning Areas

Resource Evaluation Program Geological & Geophysical Data Components

Regulation of Geological & Geophysical Data Collection

The objective of this component of the REP involves the development and implementation of the regulations, rules, and procedures that must be followed by any non-Federal party that collects prelease G&G data and information on the OCS for purposes related to mineral exploration, development, or production. The regulations governing prelease G&G exploration activities for oil, gas, and sulphur are set forth at 30 CFR Part 251 and those governing prospecting for minerals other than oil, gas, and sulphur are at 30 CFR Part 280. They govern the permitting, data acquisition, and release of information by MMS. The regulations prescribe when a permit or a notice is required, operating procedures, and conditions for release of data and information. They also prescribe reimbursement to permittees for reproduction costs of any data and information submitted to MMS.

The general purpose of the regulations is to ensure that prelease exploration, prospecting, and scientific research operations in Federal waters do not interfere with each other, with lease operations, or with other uses of the area. Adherence to these regulations will ensure that exploration and research activities will be conducted in an environmentally safe manner.

The permits, issued by the Resource Evaluation (RE) Regional Supervisors, set forth the specific details for each data gathering activity, which include the area where the data are collected, the timing of the data gathering activity, approved equipment and methods, and other similar detailed information relevant to each specific permit.

Geological & Geophysical Data Acquisition and Analysis

The primary source of the G&G data and information used by the REP is the oil and gas industry, which conducts exploration, development, and production activities on OCS lands. While the MMS does not perform any direct data collection activities, it does issue permits to industry for collecting prelease G&G data. Lessees and operators are also required by regulations to provide data from their leases to MMS. The MMS has access to the permitted data and information as a condition set forth in the permit. The MMS selectively obtains copies from these activities. Data from prelease permits constitute approximately 90 percent of the MMS database. Data collected by permittees and lessees in their normal

conduct of business are reimbursed for only the cost of data reproduction. However, if industry has collected data in areas not under MMS jurisdiction, e.g., State waters or adjacent foreign waters, and MMS selects such data, MMS pays the significantly higher "market price" for obtaining such data.

The extensive amount of data and information acquired by MMS is used by RE geologists, geophysicists, and engineers to perform a variety of analyses including (1) regional geologic studies to determine major areas of hydrocarbon potential on the OCS, (2) detailed evaluation of individual OCS tracts to determine the potential fair market value of the tract for bid evaluation purposes, and (3) estimation of the known discoveries of oil and gas as well as the development of resource estimates of possible occurrences of oil and gas yet to be discovered.

Geophysical Data Surveys

Common Depth Point, Gravity, and Magnetic Surveys

A large percentage of the geophysical data in the MMS inventory is two-dimensional (2-D) common depth point (CDP) seismic information. Also known as common midpoint or common reflection point data, it is derived from a common location in the ocean subbottom where sound waves originating from various positions of the seismic (sound) source near the ocean surface are reflected back toward the surface. The traces from different seismic profiles corresponding to the same reflection point are mathematically summed (stacked) for reflection points beneath the survey line. Simply, it measures the two-way travel time of the energy source from the ocean bottom or land surface to various formations within the earth strata. As in the past, 2-D data will continue to be the critical data tool for the prelease prospect selection and resource estimation by both industry and MMS. Present-day 2-D acquisitions, using digital recording and processing techniques, will be the basis for most of the prelease exploration judgments.

Magnetic surveys measure the magnetic field or its component (such as the vertical component) at a series of different locations over an area of interest usually to locate concentrations of magnetic anomalies or to determine depth to basement. Aeromagnetic data consist of magnetic measurements made from an aircraft, and they offer measurements of larger areas. Magnetic and aeromagnetic acquisitions delineate anomalies caused by the changes in physical properties of the subsurface that lie beneath a thick layer of sediments.

Gravity surveys produce measurements of the gravitational field at a series of different locations over an area of interest. The objective in exploration work is to map density differences that may indicate different rock types. Gravity data usually are displayed as anomaly maps.

3-D Seismic Data and Information

While the main use of three-dimensional (3-D) seismic data and information may still be in reservoir development, the evolution of 3-D seismic data and information, in conjunction with interactive computer workstations, has made it possible to more closely define and assess the potential for oil and gas occurrence on the OCS, especially with regard to subsalt prospects. The 3-D information is used to delineate, in greater detail than that of traditional 2-D information, subsurface geologic conditions associated with the occurrence of natural gas and oil. This use directly results in a better ability to do the following:

- Accurately determine fair market value for the OCS tracts being offered for lease, including tracts containing subsalt prospects;
- Assess undiscovered amounts of natural gas and oil;
- Quantify reserves of natural gas and oil on the OCS; and
- Perform postlease comparative analyses of company submitted bids for acceptance or rejection.

Workstations are essential to fully take advantage of the 3-D information as the use of it has become more sophisticated, evolving from a data tool to delineate reservoirs for development and production wells to that of an exploration tool. The role of 3-D seismic data has expanded in recent years. As a result of speculative surveys over much of the Gulf of Mexico shelf, acquisition costs to natural gas and oil companies have been decreasing. Recent innovations have made this information usable on workstations; whereas, in the past, supercomputers were needed. This "cutting edge" technology is rapidly affecting exploration techniques and success rates. Moreover, these innovations have made 3-D information more accessible to the smaller independent companies rather than only the majors. For example, the independents have been better able to participate in the Gulf of Mexico because 3-D seismic technology now makes it easier and less costly to identify very small prospects.

The products of a 3-D survey are three-dimensional data volumes (somewhat like cubes) as opposed to two-dimensional data slices of the subbottom. In addition, the 3-D data are precisely located and more dense. As a result, displays are used to determine structures and stratigraphy, delineate faults, tie wells to each other, and

correlate seismic data with well logs. A 3-D representation of the subsurface yields superior resolution of seismic indicators, accuracy of data location, and the ability to obtain seismic cross sections oriented in any direction desired. Geological and engineering information is also enhanced by 3-D visualization, and economic analyses are also improved.

By using a workstation, map-style (areal) views of subsurface geology, small faults and "bright spots" (indicators of natural gas), and structural detail are better visualized. The 3-D model of the subsurface can be rotated to reveal intersecting faults and surfaces of formations. Three-dimensional visualization and color allow the interpreter to measure seismic attributes, pick horizons of interest, and reveal structures previously unknown, even in areas with nearby wells.

Sophisticated software available only on a workstation can perform volume analysis, fluid flow, and other reservoir analyses. Other software can yield better information when looking at deeper structures, stratigraphic traps, velocity gradients, time-to-depth conversion of seismic sections, and for mapping and 2-D and 3-D modeling.

Improved processing techniques in displaying 3-D seismic information make it extremely valuable in identifying new exploration plays such as subsalt prospects and structures. For many years, it has been known that significant salt structures exist in the offshore Gulf of Mexico, not only as domes, but as salt sheets covering much of the Gulf. The more traditional 2-D seismic information has problems imaging structures below these salt bodies. However, specific processing techniques involved with 3-D seismic information are used to enhance and identify prospects below the salt.

Bottom Sampling and Shallow Coring

Bottom samples are obtained by dropping a weighted tube to the ocean floor and recovering it with an attached wire line. Depending upon the nature of the ocean floor, penetration is normally limited to a few tens of feet. Bottom samples can also be obtained from dredging.

Shallow coring is performed by conventional rotary drilling equipment to obtain a near-surface sample of the rocks of the seabed. Choice of location is carefully controlled to avoid any shallow (geologic and manmade) hazards, for example, faults or environmentally sensitive areas. Penetration is limited to 50 feet of consolidated rock.

Deep Stratigraphic Tests

A deep stratigraphic test, as defined in 30 CFR 251, "means drilling which involves the penetration into the sea bottom of more than 50 feet (15.2 meters) of consolidated rock or a total of more than 300 feet (91.4 meters)." These wells are also known as Continental Offshore Stratigraphic Test (COST) wells. Conversely, shallow test drilling, as defined in the same regulations, "means drilling into the sea bottom to depths less than those specified in the definition of a deep stratigraphic test."

Since 1974, the DOI has permitted deep stratigraphic test drilling at industry initiative on the OCS prior to Federal leasing. These deep stratigraphic tests are not necessarily designed to discover oil and gas, but rather to obtain information about the nature of the subsurface rock layers, which will improve geologic interpretations of the potential for hydrocarbons in a particular offshore area.

Originally, deep stratigraphic tests were only allowed to be drilled offstructure. In November 1978, the Secretary announced his intention to allow the drilling of prelease test wells onstructure or offstructure, citing the ability to obtain substantially better information to improve the estimation of the potential of offshore oil and gas provinces. Regulations governing onstructure drilling became effective in January 1980. To date, however, no onstructure deep stratigraphic tests have been drilled. One possible explanation might be that in a frontier area where industry is trying to determine drilling conditions and costs, an onstructure test may not provide better information on variables such as porosity, permeability,

water saturation if the stratigraphic section has been deformed by the geologic structure.

Twenty-four deep stratigraphic test wells have been drilled to date. The breakout is as follows: Alaska (14), Atlantic (5), Gulf of Mexico (3), Pacific (2). Hydrocarbon shows have been announced for three wells: the COST B-3 well in the Atlantic, the Point Conception No. 1 well in the Pacific, and the Norton COST No. 2 well in Alaska.

Analysis of Present MMS Data Coverage on the OCS

Mileage

A leading indicator of the amount of OCS oil and gas activity is the number and associated mileage of prelease exploration permits that MMS issues to industry each year. Between 1968 and the early 1990's, industry has shot and recorded approximately 500,000 line miles of CDP data each year on the OCS. Of that data, the MMS has selected and acquired approximately 50,000 line miles of those CDP data each year for the REP. Since the early 1990's, and in parallel with industry, the MMS has increased its acquisition of 3-D seismic data in concert with the development and use of interactive workstations. Table 1 shows the CDP seismic data coverage, by Region and planning area, that MMS has in its inventory. The grid coverage is not uniform over the planning areas. Tables 2, 3, and 4 summarize MMS data acquisitions through 1996.

The MMS has not acquired all of the permit data shot and recorded by industry because of budget restrictions on reimbursing the permittees for data reproduction and some processing; the lack of the necessary personnel to manage, interpret, and analyze this large volume of data; and, primarily, the redundancy of data shot on the OCS by different companies.

Table 1. Summary of Estimates of CDP Seismic Miles in MMS Inventory Through FY 1996 by Planning Area (Rounded off to Nearest 1,000 Miles)

Planning Area	Estimated Mileage
Alaska	
Gulf of Alaska	36,000
Cook Inlet	21,000
Kodiak	23,000
Shumagin	10,000
North Aleutian Basin	43,000
St. George Basin	50,000
Aleutian Arc	< 500
Bowers Basin	<1,000
Aleutian Basin	<1,000
St. Matthew-Hall Basin	10,000
Norton Basin	25,000
Navarin Basin	55,000
Hope Basin	9,000
Chukchi Sea	96,000
Beaufort Sea	60,000
Total	439,000
Atlantic	
North Atlantic	69,000
Mid-Atlantic	60,000
South Atlantic	54,000
Straits of Florida	7,000
Total	190,000
Gulf of Mexico	
Eastern Gulf of Mexico	121,000
Central Gulf of Mexico	353,000
Western Gulf of Mexico	266,000
Total	740,000
Pacific	
Southern California	85,000
Central California	21,000
Northern California	19,000
Washington-Oregon	8,000
Total	133,000

Figures may vary by 1-2%.

Table 2. Summary of CDP Seismic Data Acquisition for FY 1968-1996

FY	Total Miles
1968-1975	269,814
1976	108,922
1977	42,808
1978	54,426
1979	31,489
1980	19,400
1981	69,904
1982	79,961
1983	120,743
1984	89,853
1985	71,521
1986	47,287
1987	113,680
1988	78,920
1989	53,494
1990	85,280
1991	40,513
1992	49,191
1993	25,482
1994	7,138
1995	8,930
1996	33,296
Total	1,502,052

Figures may vary by 1-2%.

Table 3. Summary of 3-D Seismic Data Acquisition for FY 1968-1996

FY	Total Blocks
1968-1992	0
1993	1,563
1994	1,420
1995	1,826
1996	1,470
Total	6,279

Figures may vary by 1-2%.

Table 4. Summary of Geological and Geophysical Data Acquisition by Data Type and Region, FY 1968-1996

Data Type	Region	Mileage *
CDP	Alaska	439,524
	Atlantic	189,858
	Gulf of Mexico	739,829
	Pacific	132,841
	Total	1,502,052
High Resolution	Alaska	9,855
	Atlantic	49,509
	Gulf of Mexico	145,768
	Pacific	30,582
	Total	285,714
CDP Interpretations	Alaska	84,683
	Atlantic	44,801
	Gulf of Mexico	139,418
	Pacific	42,365
	Total	311,267
Gravity and Magnetics	Alaska	370,849
	Atlantic	15,783
	Gulf of Mexico	75,942
	Pacific	110,150
	Total	572,724
3-D Seismic	Alaska	0
	Atlantic	0
	Gulf of Mexico	6,267 bl
	Pacific	12
	Total	6,279 bl
Deep Stratigraphic Tests	Alaska	14
	Atlantic	5
	Gulf of Mexico	3
	Pacific	2
	Total	24

* 3-D seismic is measured in blocks and Deep Stratigraphic Test units are wells drilled.
bl = Blocks

Figures may vary 1-2%.

Each of the Regions has acquired more CDP data than any other type of geophysical data. The Regions formerly spent funds on prelease high-resolution data (HRD), as these data were acquired under exclusive contract rather than under permit. A change in policy in 1982 altered this situation. Under the previous program, MMS directly acquired prelease, tract-specific, shallow hazards data. Under the areawide leasing program, the detailed shallow hazards analysis function was shifted to the postsale phase, and the responsibility for site-specific hazards data collection was placed on the lessee as a condition to obtain a drilling permit. If industry chooses to conduct prelease hazards surveys, G&G permits must be obtained from the MMS. Shallow hazards survey data and information are available to the MMS under terms of permit or lease and regulations. This practice has continued under the focused leasing approach adopted in 1984.

Geological and/or Geophysical Exploration Permits

As mentioned, the number of permits issued by the MMS and the areas for which the permits are issued are leading indicators of oil and gas activity on the OCS. Table 5 presents the statistics of G&G exploration permitting for the OCS since 1960, with a differentiation between geological permits and geophysical permits from 1969 to 1995.

The MMS tracks G&G permits by calendar year. (Tables A-2, A-6, A-10, and A-14 show total permits per Region.) They demonstrate that most OCS oil and gas activity has been in the Gulf of Mexico. The Gulf of Mexico has issued 80 percent of all permits and is followed by the Alaska Region with 10 percent. The Pacific Region has issued 7 percent of the permits, followed by the now defunct Atlantic Region with about 3 percent. These statistics correlate extremely well with the dominant position of the Central and Western Gulf of Mexico Planning Areas in OCS oil and gas activities.

It should be noted that since 1969, over 95 percent of the permits issued were for geophysical exploration and that geological exploration permits accounted for only 5 percent. While the total number of 3-D permits issued is rather small (7 percent) when compared with the total geophysical permits issued, over the past 10 years, 3-D permits have averaged 25 percent of all geophysical permits, and by 1995 made up 54 percent of the total geophysical permits issued bureauwide. Permits for deep stratigraphic test wells or COST wells account for about 6 percent of the geological permits.

Table 5. Total Number of Permits Issued for Geological and Geophysical Exploration

Year	A	B	C	D	E	F
1960-1968	2,353	---	---	---	---	---
1969	258	249	9	0	0	0
1970	213	203	10	0	0	0
1971	210	205	5	0	0	0
1972	220	210	10	0	0	0
1973	339	321	18	0	0	0
1974	357	345	12	2	0	0
1975	510	487	23	3	0	0
1976	420	400	20	7	0	0
1977	452	436	16	4	0	0
1978	342	329	13	2	0	0
1979	276	265	11	0	0	0
1980	318	302	16	1	0	0
1981	394	383	11	0	0	0
1982	502	490	12	3	0	0
1983	574	542	32	1	16	0
1984	543	518	25	0	18	0
1985	398	382	16	0	38	0
1986	211	207	4	0	32	0
1987	298	282	16	0	42	0
1988	313	289	24	0	45	0
1989	249	237	12	1	47	0
1990	251	241	9	0	57	1
1991	170	156	12	0	45	2
1992	141	137	3	0	53	1
1993	147	135	11	0	70	1
1994	133	117	16	0	53	0
1995	104	92	11	0	50	1
1996	136	120	16	0	59	0
Total	10,832	8,080	393	24	625	6

A=Total Number of Geological and Geophysical Permits
B=Number of Geophysical Permits
C=Number of Geological Permits
D=Number of Geological Permits Issued for Deep Stratigraphic Tests
E=Number of Geophysical Permits Issued for 3-D Seismic Data
F=Number of Permits Issued for Strategic (Nonenergy) Minerals
Dashed lines = Individual breakouts not established

Figures may vary 1-2%.

The overall trends in permitting for all the Regions are similar and reflect fluctuations in the price and supply of petroleum. Some regional differences can be detected that are related to leasing moratoria, operating conditions, and hydrocarbon discoveries. Leasing moratoria and adverse weather conditions decrease exploration activity; moderate weather and hydrocarbon discoveries increase permitting activity.

Expenditures

The MMS records financial and procurement transactions by fiscal year. All figures and tables involving MMS data acquisition from permittees are based on a fiscal year that begins on October 1 and extends through the following September 30.

Tables 6 and 7 show the total expenditures for G&G data since 1968 for those data presented in table 4. Tables 6 and 7 show the distribution of G&G expenditures by Region. Alaska had the largest portion of the expenditures, 40 percent, followed closely by the Gulf of Mexico with 36 percent. Alaska has over twice the offshore area of the other three Regions combined, thus Alaska has the largest portion of the expenditures. On the other hand, the Gulf of Mexico with over 95 percent of OCS production possesses the largest database. The Atlantic Region (13 percent of the expenditures) and the Pacific (11 percent) are comparable. The Pacific Region has the smallest slice of the expenditures for G&G data because parts of the California OCS have been under moratoria for much of the 1980's and because of the lack of industry interest in the past offshore Washington and Oregon.

The Gulf of Mexico Region's dominant role in establishing the offshore industry is apparent by its acquisition of the majority of the data before 1976 and since 1990. Between 1976 and 1989, a significant portion of the MMS geological and geophysical data acquisition budget has been expended by the Alaska Region, which oversees most of the OCS lands. However, in the 1990's, most of the MMS geological and geophysical data acquisition budget has been allocated for data in the Gulf of Mexico.

Table 6. Summary of Total Annual Expenditures by MMS for Geological and Geophysical Data Acquisition by Region, FY 1968-1996 (in dollars)

FY	Alaska	Atlantic	Gulf of Mexico	Pacific	Total
1968-1975	3,162,548	361,686	9,414,042	1,443,987	14,891,780*
1976	3,496,607	2,504,710	3,281,698	581,670	9,914,882*
1977	450,161	2,287,390	3,764,678	1,147,968	7,719,974*
1978	3,421,269	906,989	1,842,701	416,463	6,587,422
1979	6,240,687	232,085	1,573,094	2,272,407	11,020,298*
1980	6,972,885	4,469,762	4,388,508	1,412,062	17,243,217
1981	6,842,045	1,530,898	1,168,618	866,656	10,408,217
1982	1,864,661	1,945,270	2,943,602	1,996,271	8,749,804
1983	5,673,514	1,738,427	3,802,409	1,312,596	12,526,946
1984	4,751,354	1,580,008	4,246,742	1,286,598	11,864,702
1985	3,676,375	318,261	2,959,989	861,687	7,816,312
1986	2,904,246	87,307	1,834,553	363,564	5,189,670
1987	2,579,190	438,792	1,840,609	939,558	5,798,149
1988	1,382,560	71,510	1,078,713	114,168	2,646,951
1989	389,960	259,629	913,481	96,354	1,659,424
1990	886,402	150	865,083	0	1,751,635
1991	539,986	2,790	1,003,066	31,000	1,576,842
1992	99,797	1,932	794,104	0	1,490,798**
1993	322,410	0	1,014,853	26,700	1,363,963
1994	582,132	0	760,245	11,806	1,454,183**
1995	379,395	0	628,752	21,125	1,142,817**
1996	283,764	0	1,697,494	40,867	2,022,125
Total	56,901,948	18,737,596	51,817,034	15,243,507	144,840,111

* Included in the budget for these years were General Account funds that were transferred to the U.S. Geological Survey, Branch of Marine Geology, for G&G data acquisition. These accounts included $509,517 in the interval between FY 1968-1975, $50,197 in FY 1976, $69,777 in FY 1977, and $702,025 in FY 1979.

**Included in the budget for these years were funds that were used for special projects related to G&G activities. In FY 1992, $494,965 was obligated toward the purchase of geologic interpretive workstations and $100,000 was obligated toward the initiation of the Offshore Northern Gulf of Mexico Oil and Gas Atlas Series. In FY 1994, $100,000 was again obligated toward the preparation of the Offshore Northern Gulf of Mexico Oil and Gas Atlas and in FY 1995, $100,000 was obligated toward the completion of the Atlas, and $13,545 was obligated toward finalization of a well log data conversion contract in the Gulf of Mexico. All figures have been rounded.

Figures may vary 1-2%.

Table 7. Summary of Geological and Geophysical Data Acquisition Expenditures by Data Type and Region, FY 1968-1996

Data Type	Expenditures ($)*
Alaska	
CDP Seismic	40,555,456
High Resolution	11,125,798
CDP Interpretations	439,793
Gravity and Magnetics	1,026,956
3-D Seismic	0
Total	53,148,003
Atlantic	
CDP Seismic	7,791,438
High Resolution	9,751,232
CDP Interpretations	55,274
Gravity and Magnetics	2,902
3-D Seismic	0
Total	17,600,846
Gulf of Mexico	
CDP Seismic	31,015,469
High Resolution	12,729,139
CDP Interpretations	856,526
Gravity and Magnetics	514,734
3-D Seismic	2,304,194
Total	47,420,062
Pacific	
CDP Seismic	9,553,194
High Resolution	3,696,394
CDP Interpretations	72,175
Gravity and Magnetics	534,363
3-D Seismic	10,452
Total	13,866,578

*MMS has had additional expenditures through its G&G data acquisition budget for other general purchases such as field tapes, special processing, navigation tapes, interpretive hardware and software for evaluation purposes, geological studies.

Figures may vary 1-2%.

There was a dramatic increase in the average cost per mile for data in the Alaska Region in 1979 and for the Atlantic Region in 1980. In 1979, the Alaska Region purchased a great deal of data shot in State waters, where a Federal permit is not applicable. Thus, the reimbursement did not fall under the provisions of the OCSLA, and MMS was required to pay full market price for these data. The price varied from $1,500 to $6,000 per mile and is reflected in the unusually high average cost per mile shown in table 8.

In 1980, the Atlantic Region contracted for several sets of exclusive high-resolution data that were used for sales and hazards studies. The high price of exclusive high-resolution data, some well over $450 per mile, increased the average cost per mile in the Atlantic Region that year. Overall, the early to mid-1980's saw a dramatic increase in expenditures by MMS as more reprocessed data were acquired to address areawide leasing and a more aggressively proposed 5-year OCS leasing schedule.

Comparisons to Industry

Industry acquires substantially more data than MMS. This is particularly true for the Gulf of Mexico and Pacific Regions. However, of the data shot by industry in the Alaska OCS, MMS has acquired approximately 90 percent. Alaska is a large frontier area with limited data coverage by industry, a fact that necessitates MMS to acquire as much of these data as feasible.

The MMS acquired more data in the Atlantic Region than industry in 1976 and 1983. Before 1976, the MMS database was limited because industry had shown very little interest in leasing this frontier area, although industry had been acquiring geophysical data. During the period 1976 to 1984, MMS not only acquired most of the industry data, but purchased much of the pre-1976 data. Since 1985, there has been less activity, reflecting a decrease in industry interest.

Some of the reasons MMS does not acquire all the data held by industry are as follows:

- Redundancy of data, because industry does not share it
- Difference in data quality
- Budgetary constraints
- Personnel limitations for data reduction and interpretations
- Data storage, retrieval, and display limitations

In conclusion, totals for mileage acquired, permits issued, and expenditures reflect the overall trends of oil and gas pricing, limitations of areas due to offshore moratoria, and shift of industry emphasis to foreign theaters.

Table 8. Summary of Average Cost Per Mile by MMS for CDP Seismic Data, FY 1968-1996

FY	Average Cost ($/Mile)
1968-1975	33.60
1976	34.90
1977	30.00
1978	73.60
1979	99.70
1980	91.50
1981	100.70
1982	107.00
1983	102.50
1984	121.10
1985	105.90
1986	102.00
1987	48.30
1988	32.70
1989	26.10
1990	18.00
1991	19.86
1992	7.49
1993	13.33
1994	75.84
1995	22.02
1996	39.04

Note: Totals reflect average cost per mile for all CDP information acquired, both State and Federal. Average costs reflect only those dollars assigned to the bureauwide G&G budget and do not reflect monies allocated from Regional funds.

Figures may vary 1-2%.

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Appendix

Pacific

Table A-1. Summary of Geological and Geophysical Data Acquisition by Fiscal Year for Alaska

Year	CDP	HRD	Interpretations	Grav/Mag	3-D	DST
1968-1975	70,306	5,500	32,819	55,710	0	1
1976	37,785	19,163	30,164	0	0	4
1977	11,952	5,606	21,700	23,470	0	4
1978	28,524	0	0	36,625	0	0
1979	8,538	5,412	0	25,465	0	0
1980	10,109	7,703	0	0	0	1
1981	35,430	4,590	0	14,969	0	0
1082	16,624	0	0	0	0	2
1983	51,903	0	0	0	0	2
1984	30,961	7,904	0	5,850	0	0
1985	30,270	0	0	0	0	0
1986	21,603	1,600	0	0	0	0
1987	49,532	470	0	80,826	0	0
1988	14,963	1,741	0	0	0	0
1989	3,136	166	0	9,543	0	0
1990	8,557	0	0	11,046	0	0
1991	3,964	0	0	1,500	0	0
1992	0	0	0	0	0	0
1993	1,893	0	0	0	0	0
1994	2,422	0	0	102,845	0	0
1995	737	0	0	3,000	0	0
1996	315	0	0	0	0	0
Total	439,524	59,855	84,683	370,849	0	14

Note: DST dates are assigned based upon completion dates and are measured in terms of wells completed. All other data are measured in terms of miles.

Table A-2. Number of Permits Issued for Geological and Geophysical Exploration in Alaska

Year	A	B	C	D	E	F
1960-1968	75	---	---	---	---	---
1969	31	28	3	0	0	0
1970	40	36	4	0	0	0
1971	27	26	1	0	0	0
1972	17	17	0	0	0	0
1973	33	32	1	0	0	0
1974	47	44	3	0	0	0
1975	82	74	8	1	0	0
1976	69	61	8	4	0	0
1977	33	29	4	4	0	0
1978	9	8	1	0	0	0
1979	32	30	2	0	0	0
1980	41	36	5	1	0	0
1981	54	49	5	0	0	0
1082	85	79	6	3	0	0
1983	103	80	23	1	0	0
1984	70	62	8	0	0	0
1985	63	56	7	0	0	0
1986	18	17	1	0	0	0
1987	18	14	4	0	0	0
1988	13	9	4	0	0	0
1989	17	14	3	0	0	0
1990	19	15	3	0	0	1
1991	7	4	1	0	0	2
1992	7	6	0	0	0	1
1993	11	10	0	0	2	1
1994	3	3	0	0	1	0
1995	1	1	0	0	1	0
1996	6	6	0	0	5	0
Total	1,031	846	105	14	9	5

A=Total Number of Geological and Geophysical Permits
B=Number of Geophysical Permits
C=Number of Geological Permits
D=Number of Geological Permits Issued for Deep Stratigraphic Tests
E=Number of Geophysical Permits Issued for 3-D Seismic Data
F=Number of Permits Issued for Strategic (Nonenergy) Minerals
Dashed lines = Individual breakouts not established

Table A-3. Summary of Expenditures by MMS for Geological and Geophysical Data Acquisition by Fiscal Year for Alaska (in dollars)

Year	CDP	HRD	Interpretations	Grav/Mag	3-D	DST
1968-1975	2,803,939	119,700	160,832	7,515	0	NA
1976	1,628,153	1,598,789	268,961	0	0	NA
1977	271,035	36,473	10,000	49,450	0	NA
1978	2,956,280	0	0	408,679	0	0
1979	2,180,700	2,019,512	0	125,148	0	0
1980	1,086,423	5,789,936	0	0	0	NA
1981	5,231,130	1,531,458	0	69,286	0	0
1082	1,817,736	0	0	0	0	NA
1983	5,673,514	0	0	0	0	NA
1984	4,118,626	19,238	0	27,072	0	0
1985	3,669,129	0	0	0	0	0
1986	2,780,556	950	0	0	0	0
1987	2,301,780	400	0	249,951	0	0
1988	1,339,007	3,425	0	0	0	0
1989	347,872	5,917	0	21,851	0	0
1990	832,476	0	0	51,681	0	0
1991	518,613	0	0	15,573	0	0
1992	0*	0	0	0	0	0
1993	139,117	0	0	0	0	0
1994	579,129	0	0	0	0	0
1995	167,170	0	0	750	0	0
1996	113,071	0	0	0	0	0
Total	40,555,456	11,125,798	439,793	1,026,956	0	---

*In FY 1992, the Alaska Region spent funds from the G&G budget and Regional funds to acquire digital copies of data already in their inventory and did not acquire any new or additional data.

Note: NA represents "not applicable" as no G&G funds are used to acquire information from a DST. Where no DST was completed, a zero is entered into the expenditure column.

Table A-4. Summary of Average Cost Per Mile by MMS for CDP Seismic Data by Fiscal Year for Alaska (in dollars)

Year	Average Cost ($/Mile)
1968-1975	39.88
1976	43.09
1977	22.68
1978	103.64
1979	255.41
1980	107.47
1981	147.65
1982	109.34
1983	109.31
1984	133.03
1985	121.21
1986	128.71
1987	46.47
1988	89.49
1989	110.93
1990	97.29
1991	130.85
1992	0
1993	73.48
1994	239.18
1995	475.85
1996	358.96

Note: Totals reflect average cost per mile for all CDP information acquired, both State and Federal. Average costs reflect only those dollars assigned to the bureauwide G&G budget and do not reflect monies allocated from Regional funds.

Zero indicates G&G dollars were not spent on CDP information.

Table A-5. Summary of Geological and Geophysical Data Acquisition by Fiscal Year for the Atlantic

Year	CDP	HRD	Interpretations	Grav/Mag	3-D	DST
1968-1975	41,958	1,740	11,802	14,267	0	0
1976	25,211	23,867	29,822	1,076	0	2
1977	21,032	6,100	3,177	440	0	2
1978	14,281	0	0	0	0	0
1979	6,877	0	0	0	0	1
1980	585	10,660	0	0	0	0
1981	9,950	7,142	0	0	0	0
1082	19,074	0	0	0	0	0
1983	30,077	0	0	0	0	0
1984	9,386	0	0	0	0	0
1985	1,640	0	0	0	0	0
1986	424	0	0	0	0	0
1987	2,356	0	0	0	0	0
1988	827	0	0	0	0	0
1989	2,730	0	0	0	0	0
1990	31	0	0	0	0	0
1991	1,042	0	0	0	0	0
1992	2,377	0	0	0	0	0
1993	0	0	0	0	0	0
1994	0	0	0	0	0	0
1995	0	0	0	0	0	0
1996	0	0	0	0	0	0
Total	189,858	49,509	44,801	15,783	0	5

Note: DST dates are assigned based upon completion dates and are measured in terms of wells completed. All other data are measured in terms of miles.

Table A-6. Number of Permits Issued for Geological and Geophysical Exploration in the Atlantic

Year	A	B	C	D	E	F
1960-1968	45	---	---	---	---	---
1969	7	7	0	0	0	0
1970	4	3	1	0	0	0
1971	4	4	0	0	0	0
1972	4	4	0	0	0	0
1973	4	4	0	0	0	0
1974	2	2	0	0	0	0
1975	29	23	6	1	0	0
1976	35	28	7	3	0	0
1977	20	20	0	0	0	0
1978	17	13	4	1	0	0
1979	9	9	0	0	0	0
1980	15	15	0	0	0	0
1981	17	16	1	0	0	0
1082	11	11	0	0	0	0
1983	10	10	0	0	0	0
1984	6	6	0	0	0	0
1985	2	1	1	0	0	0
1986	3	2	1	0	0	0
1987	2	0	2	0	0	0
1988	4	4	0	0	0	0
1989	0	0	0	0	0	0
1990	1	1	0	0	0	0
1991	0	0	0	0	0	0
1992	0	0	0	0	0	0
1993	0	0	0	0	0	0
1994	0	0	0	0	0	0
1995	1	0	0	0	0	1
1996	0	0	0	0	0	0
Total	252	183	23	5	0	1

A=Total Number of Geological and Geophysical Permits
B=Number of Geophysical Permits
C=Number of Geological Permits
D=Number of Geological Permits Issued for Deep Stratigraphic Tests
E=Number of Geophysical Permits Issued for 3-D Seismic Data
F=Number of Permits Issued for Strategic (Nonenergy) Minerals
Dashed lines = Individual breakouts not established

Table A-7. Summary of Expenditures by MMS for Geological and Geophysical Data Acquisition by Fiscal Year for the Atlantic (in dollars)

Year	CDP	HRD	Interpretations	Grav/Mag	3-D	DST
1968-1975	309,029	4,900	---	---	0	0
1976	196,687	2,256,167	45,282	2,902	0	NA
1977	242,868	1,968,513	9,992	0	0	NA
1978	581,562	0	0	0	0	0
1979	119,250	0	0	0	0	NA
1980	51,096	4,278,448	0	0	0	0
1981	179,682	1,243,204	0	0	0	0
1082	1,882,723	0	0	0	0	0
1983	1,718,584	0	0	0	0	0
1984	1,500,298	0	0	0	0	0
1985	287,135	0	0	0	0	0
1986	87,307	0	0	0	0	0
1987	438,792	0	0	0	0	0
1988	71,510	0	0	0	0	0
1989	120,042	0	0	0	0	0
1990	150	0	0	0	0	0
1991	2,790	0	0	0	0	0
1992	1,933	0	0	0	0	0
1993	0	0	0	0	0	0
1994	0	0	0	0	0	0
1995	0	0	0	0	0	0
1996	0	0	0	0	0	0
Total	7.791,438	9,751,232	55,274	2,902	0	---

Note: NA represents "not applicable" as no G&G funds are used to acquire information from a DST. Where no DST was completed, a zero is entered into the expenditure column.

No expenditures are available for CDP interpretations or gravity and magnetic data for 1968-1975.

Table A-8. Summary of Average Cost Per Mile by MMS for CDP Seismic Data by Fiscal Year for the Atlantic (in dollars)

Year	Average Cost ($/Mile)
1968-1975	7.37
1976	7.80
1977	11.55
1978	40.72
1979	17.34
1980	87.34
1981	18.06
1982	98.70
1983	57.14
1984	159.85
1985	175.08
1986	205.91
1987	186.24
1988	86.47
1989	43.97
1990	4.84
1991	2.68
1992	.81
1993	---
1994	---
1995	---
1996	---

Note: Totals reflect average cost per mile for all CDP information acquired, both State and Federal. Average costs reflect only those dollars assigned to the bureauwide G&G budget and do not reflect monies allocated from Regional funds.

Dashed lines indicate no funding for that year.

Gulf of Mexico Tables

Table A-9. Summary of Geological and Geophysical Data Acquisition by Fiscal Year for the Gulf of Mexico

Year	CDP	HRD	Interpretations	Grav/Mag	3-D	DST
1968-1975	143,458	88,549	120,038	19,670	0	2
1976	31,474	9,367	19,380	56,272	0	0
1977	4,485	18,119	0	0	0	0
1978	7,188	8,275	0	0	0	0
1979	11,681	5,018	0	0	0	0
1980	4,758	15,940	0	0	0	0
1981	16,454	500	0	0	0	0
1082	28,700	0	0	0	0	0
1983	26,290	0	0	0	0	0
1984	40,828	0	0	0	0	0
1985	31,430	0	0	0	0	0
1986	22,616	0	0	0	0	0
1987	43,073	0	0	0	0	0
1988	56,265	0	0	0	0	0
1989	43,121	0	0	0	0	1
1990	76,692	0	0	0	0	0
1991	35,507	0	0	0	0	0
1992	46,814	0	0	0	0	0
1993	23,589	0	0	0	1,563*	0
1994	4,416	0	0	0	1,420*	0
1995	8,193	0	0	0	1,826*	0
1996	32,797	0	0	0	1,458*	0
Total	739,829	145,768	139,418	75,942	6,267*	3

Note: *Acquisitions for 3-D seismic data are measured in blocks; all other acquisitions in this table are measured in miles.

DST dates are assigned based upon completion dates and are measured in terms of wells completed.

Figures may vary by 1-2%.

Table A-10. Number of Permits Issued for Geological and Geophysical Exploration in the Gulf of Mexico

Year	A	B	C	D	E	F
1960-1968	2,071	---	---	---	---	---
1969	207	204	3	0	0	0
1970	166	162	4	0	0	0
1971	179	175	4	0	0	0
1972	198	188	10	0	0	0
1973	272	264	8	0	0	0
1974	284	275	9	2	0	0
1975	353	348	5	0	0	0
1976	292	289	3	0	0	0
1977	368	361	7	0	0	0
1978	278	278	0	0	0	0
1979	211	204	7	0	0	0
1980	231	225	6	0	0	0
1981	283	280	3	0	0	0
1082	344	341	3	0	0	0
1983	416	416	0	0	16	0
1984	411	408	3	0	18	0
1985	300	295	5	0	38	0
1986	170	169	1	0	32	0
1987	258	252	6	0	42	0
1988	263	251	12	0	45	0
1989	232	223	9	1	47	0
1990	227	222	5	0	57	0
1991	163	152	11	0	45	0
1992	134	131	3	0	53	0
1993	136	125	11	0	68	0
1994	130	114	16	0	52	0
1995	102	91	11	0	49	0
1996	130	114	16	0	54	0
Total	8,809	6,557	181	3	616	0

A=Total Number of Geological and Geophysical Permits
B=Number of Geophysical Permits
C=Number of Geological Permits
D=Number of Geological Permits Issued for Deep Stratigraphic Tests
E=Number of Geophysical Permits Issued for 3-D Seismic Data
F=Number of Permits Issued for Strategic (Nonenergy) Minerals
Dashed lines = Individual breakouts not established

Figures may vary by 1-2%.

Table A-11. Summary of Expenditures by MMS for Geological and Geophysical Data Acquisition by Fiscal Year for the Gulf of Mexico (in dollars)

Year	CDP	HRD	Interpretations	Grav/Mag	3-D	DST
1968-1975	5,255,068	2,795,562	722,442	129,500	0	NA
1976	1,489,665	514,141	134,084	385,234	0	0
1977	579,583	3,072,088	0	0	0	0
1978	330,183	1,438,856	0	0	0	0
1979	492,299	949,697	0	0	0	0
1980	388,329	3,926,990	0	0	0	0
1981	939,506	31,805	0	0	0	0
1082	2,936,727	0	0	0	0	0
1983	3,678,684	0	0	0	0	0
1984	3,999,326	0	0	0	0	0
1985	2,768,574	0	0	0	0	0
1986	1,600,031	0	0	0	0	0
1987	1,824,927	0	0	0	0	0
1988	1,075,515	0	0	0	0	0
1989	885,748	0	0	0	0	NA
1990	704,670	0	0	0	0	0
1991	289,266	0	0	0	0	0
1992	376,893	0	0	0	0	0
1993	200,407	0	0	0	537,908	0
1994	26,946	0	0	0	647,592	0
1995	21,535	0	0	0	592,223	0
1996	1,151,587	0	0	0	526,471	0
Total	31,015,469	12,729,139	856,526	514,734	2,304,194	---

Note: NA represents "not applicable" as no G&G funds are used to acquire information from a DST. Where no DST was completed, a zero is entered into the expenditure column.

Figures may vary by 1-2%.

Table A-12. Summary of Average Cost Per Mile by MMS for CDP Seismic Data by Fiscal Year for the Gulf of Mexico (in dollars)

Year	Average Cost ($/Mile)
1968-1975	36.63
1976	47.33
1977	129.23
1978	45.94
1979	42.15
1980	81.62
1981	57.10
1982	102.33
1983	139.93
1984	97.96
1985	88.09
1986	70.75
1987	42.37
1988	19.12
1989	20.54
1990	9.19
1991	8.14
1992	8.05
1993	8.49
1994	6.10
1995	2.63
1996	35.11

Note: Totals reflect average cost per mile for all CDP information acquired, both State and Federal. Average costs reflect only those dollars assigned to the bureauwide G&G budget and do not reflect monies allocated from Regional funds.

Figures may vary by 1-2-%.

Table A-13. Summary of Geological and Geophysical Data Acquisition by Fiscal Year for the Pacific

Year	CDP	HRD	Interpretations	Grav/Mag	3-D	DST
1968-1975	14,092	9,971	15,552	87,637	0	1
1976	14,452	2,429	2,288	1,851	0	0
1977	5,339	5,979	24,525	3,950	0	0
1978	4,433	1,155	0	0	0	1
1979	4,393	6,578	0	0	0	0
1980	3,948	4,470	0	0	0	0
1981	8,070	0	0	3,662	0	0
1082	15,563	0	0	13,050	0	0
1983	12,473	0	0	0	0	0
1984	8,678	0	0	0	0	0
1985	8,181	0	0	0	0	0
1986	2,644	0	0	0	0	0
1987	18,719	0	0	0	0	0
1988	6,865	0	0	0	0	0
1989	4,507	0	0	0	0	0
1990	0	0	0	0	0	0
1991	0	0	0	0	0	0
1992	0	0	0	0	0	0
1993	0	0	0	0	0	0
1994	300	0	0	0	0	0
1995	0	0	0	0	0	0
1996	184	0	0	0	12*	0
Total	132,841	30,582	42,365	110,150	12*	2

Note: *Acquisitions for 3-D seismic data are measured in blocks; all other acquisitions in this table are measured in miles.

DST dates are assigned based upon completion dates and are measured in terms of wells completed.

Table A-14. Number of Permits Issued for Geological and Geophysical Exploration in the Pacific

Year	A	B	C	D	E	F
1960-1968	162	---	---	---	---	---
1969	13	10	3	0	0	0
1970	3	2	1	0	0	0
1971	0	0	0	0	0	0
1972	1	1	0	0	0	0
1973	30	21	9	0	0	0
1974	24	24	0	0	0	0
1975	46	42	4	1	0	0
1976	24	22	2	0	0	0
1977	31	26	5	0	0	0
1978	38	30	8	1	0	0
1979	24	22	2	0	0	0
1980	31	26	5	0	0	0
1981	40	38	2	0	0	0
1082	62	59	3	0	0	0
1983	45	36	9	0	0	0
1984	56	42	14	0	0	0
1985	33	30	3	0	0	0
1986	20	19	1	0	0	0
1987	20	16	4	0	0	0
1988	33	25	8	0	0	0
1989	0	0	0	0	0	0
1990	4	3	1	0	0	0
1991	0	0	0	0	0	0
1992	0	0	0	0	0	0
1993	0	0	0	0	0	0
1994	0	0	0	0	0	0
1995	0	0	0	0	0	0
1996	0	0	0	0	0	0
Total	740	494	84	2	0	0

A=Total Number of Geological and Geophysical Permits
B=Number of Geophysical Permits
C=Number of Geological Permits
D=Number of Geological Permits Issued for Deep Stratigraphic Tests
E=Number of Geophysical Permits Issued for 3-D Seismic Data
F=Number of Permits Issued for Strategic (Nonenergy) Minerals
Dashed lines = Individual breakouts not established

Table A-15. Summary of Expenditures by MMS for Geological and Geophysical Data Acquisition by Fiscal Year for the Pacific (in dollars)

Year	CDP	HRD	Interpretations	Grav/Mag	3-D	DST
1968-1975	697,733	175,000	49,617	415,913	0	NA
1976	486,139	57,660	20,596	17,275	0	0
1977	188,930	752,400	1,962	11,796	0	0
1978	137,754	23,685	0	0	0	NA
1979	346,612	1,588,695	0	0	0	0
1980	249,048	1,098,954	0	0	0	0
1981	689,372	0	0	20,029	0	0
1082	1,918,891	0	0	69,350	0	0
1983	1,309,608	0	0	0	0	0
1984	1,262,030	0	0	0	0	0
1985	848,777	0	0	0	0	0
1986	356,700	0	0	0	0	0
1987	921,422	0	0	00	0	0
1988	93,748	0	0	0	0	0
1989	44,273	0	0	0	0	0
1990	0	0	0	0	0	0
1991	0	0	0	0	0	0
1992	0	0	0	0	0	0
1993	0	0	0	0	0	0
1994	443	0	0	0	0	0
1995	0	0	0	0	0	0
1996	1,714	0	0	0	10,452	0
Total	9,553,194	3,696,394	72,175	534,363	10,452	---

Note: NA represents "not applicable" as no G&G funds are used to acquire information from a DST. Where no DST was completed, a zero is entered into the expenditure column.

Table A-16. Summary of Average Cost Per Mile by MMS for CDP Seismic Data by Fiscal Year for the Pacific (in dollars)

Year	Average Cost ($/Mile)
1968-1975	49.51
1976	33.64
1977	35.39
1978	31.08
1979	78.90
1980	63.08
1981	85.42
1982	123.30
1983	105.00
1984	145.43
1985	103.75
1986	134.91
1987	49.22
1988	13.66
1989	9.82
1990	0
1991	0
1992	---
1993	0
1994	1.48
1995	0
1996	9.32

Note: Totals reflect average cost per mile for all CDP information acquired, both State and Federal. Average costs reflect only those dollars assigned to the bureauwide G&G budget and do not reflect monies allocated from Regional funds.

Dashed line indicates no funding for that year. Zero indicates G&G dollars were not spent on CDP information.

Glossary

Area of Hydrocarbon Potential - that part of a planning area that has the primary geologic characteristics favorable for the generation and the accumulation of hydrocarbons.

Block - a geographically defined section of the Outer Continental Shelf (OCS) designated by a number on an Official Protraction Diagram or Leasing Map prepared by the Minerals Management Service (MMS). A block normally is a 9-square-mile area (3 miles x 3 miles) consisting of 5,760 acres. A single block is the smallest unit that can be leased for oil and gas exploration on the OCS.

Common Depth Point - a common location in the ocean subbottom where sound waves originating from various positions of the seismic (sound) source near the ocean surface are reflected back toward the surface. The traces from different seismic profiles corresponding to the same reflection point are mathematically summed (stacked) for reflection points beneath the survey line. Also known as common midpoint or common reflection point.

COST Wells - Continental Offshore Stratigraphic Test Wells - deep stratigraphic wells drilled to determine the geological character or stratigraphy of rock strata. These wells, which may be more than 20,000 feet deep, provide information that can be used by Government and industry to evaluate tracts to be offered in a lease sale.

Fair Market Value - the amount in cash, or on terms reasonably equivalent to cash, for which in all probability the property would be sold by a knowledgeable purchaser who desired, but is not obligated, to buy. This market value that is sought is not merely theoretical or hypothetical but represents, insofar as it is possible to estimate, the actual selling price.

High-Resolution - a range of seismic frequencies above the normal range of frequencies used in exploration, with an improvement in resolution in the shallow portions of the subbottom but with less total penetration into the subbottom.

Lease - any form of authorization that is used under section 8 or maintained under section 6 of the Outer Continental Shelf Lands Act and that authorizes exploration for and development and production of minerals or the area covered by that authorization, whichever is required of the context.

Lease Sale - an MMS proceeding by which leases for certain OCS tracts are offered for sale by competitive bidding and during which bids are received, publicly announced, and recorded.

Outer Continental Shelf - all submerged lands lying seaward and outside of the area of lands beneath navigable waters as defined in section 2 of the Submerged Lands Act and of which the subsoil and seabed appertain to the United States and are subject to its jurisdiction and control.

Outer Continental Shelf Lands Act - law passed by Congress on August 7, 1953, and amended in 1975, 1978, and 1985.

Permit - the contract or agreement, other than a lease, approved for a specified period of not more than 1 year under which a person acquires the right to conduct (1) geological exploration for mineral resources, (2) geophysical exploration for mineral resources, (3) geological scientific research, or (4) geophysical scientific research.

Planning Area - a subdivision of an offshore area used as the initial basis for considering blocks to be offered for lease in the DOI's offshore oil and gas leasing program.

Shallow Hazards - potential geological and manmade hazards to exploration on the OCS that are in the shallow portion of the subbottom. Examples include seismicity, active faults, shallow gas deposits, steep slopes, unstable soil conditions, pipelines, anchors, and sunken ships. Shallow hazards may occur in shallow or deep waters.

The Department of the Interior Mission

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The Department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

The Minerals Management Service Mission

As a bureau of the Department of the Interior, the Minerals Management Service's (MMS) primary responsibilities are to manage the mineral resources located on the Nation's Outer Continental Shelf (OCS), collect revenue from the Federal OCS and onshore Federal and Indian lands, and distribute those revenues.

Moreover, in working to meet its responsibilities, the **Offshore Minerals Management Program** administers the OCS competitive leasing program and oversees the safe and environmentally sound exploration and production of our Nation's offshore natural gas, oil and other mineral resources. The MMS **Royalty Management Program** meets its responsibilities by ensuring the efficient, timely and accurate collection and disbursement of revenue from mineral leasing and production due to Indian tribes and allottees, States and the U.S. Treasury.

The MMS strives to fulfill its responsibilities through the general guiding principles of: (1) being responsive to the public's concerns and interests by maintaining a dialogue with all potentially affected parties and (2) carrying out its programs with an emphasis on working to enhance the quality of life for all Americans by lending MMS assistance and expertise to economic development and environmental protection.