

International Oil and Gas Exploration and Development Activities

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Preface

This report is part of a series of quarterly publications prepared by the Energy Information Administration (EIA) in response to the world's rapidly changing oil supply. The series began with the fourth quarter of 1988. It was developed to provide interested analysts with a single source for monitoring international oil and gas exploration and development activities. The systematic compilation of oil industry activities provides a means for tracking the location and magnitude of significant discoveries which will yield our future supplies of oil and natural gas. Specific information regarding the preparation or contents of this publication may be obtained from John H. Wood or Gary R. Long of the EIA Dallas Field Office, telephone 214/767-2200.

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Introduction

This report is part of an ongoing series of quarterly publications that monitors discoveries of oil and natural gas in foreign countries and provides an analysis of the reserve additions that result. The report is prepared by the Energy Information Administration (EIA) of the U.S. Department of Energy (DOE) under the Foreign Energy Supply Assessment Program (FESAP). It presents a summary of discoveries and reserve additions that result from recent international exploration and development activities. It is intended for use by petroleum industry analysts, various government agencies, and political leaders in the development, implementation, and evaluation of energy plans, policy, and legislation.

A discovery, as used in this publication, is a published estimate of the ultimately recoverable reserves for either a new field, reservoir, or well. This ultimate recovery is defined in this report as cumulative production plus remaining reserves. These discoveries are obtained from various oil industry periodicals and company annual or quarterly reports. The discoveries are not verified by EIA but simply restated in this publication. The reported reserves do not necessarily follow the EIA definition of proved reserves. Each reserve entry follows the defining criteria of the originator. These reserve definitions may be less restrictive than the definition used by EIA. It is important to keep in mind that not all discoveries are announced and not all announced discoveries are published. Some discoveries may be exaggerated or understated for political or other reasons. Therefore, the data in this report should be used with caution.

There are 4 tables and 3 figures showing oil production, oil and gas reserve additions, active rotary rigs, and crude oil prices. The data are given by country or group of countries such as the Organization of Petroleum Exporting Countries (OPEC), the Non-OPEC Market Economies (Non-OPEC ME), and the Centrally Planned Economies (CPE). A few of the more significant discoveries are discussed in this report, and their approximate locations are shown on four continental maps. The appendices list discoveries reported in industry periodicals and company reports, Petroconsultants oil and gas reserve additions, remaining oil and gas reserves, and a glossary of abbreviations.

Note: The information in this report was compiled as of the end of June 1990, about a month prior to the Iraqi invasion of Kuwait. Since that time, the United Nations has imposed an embargo on imports and exports of Iraq and Kuwait, and world oil prices have soared.

Overview

Oil Reserve Additions

World oil reserve additions have more than replaced production for the last 12-month and 36-month periods ending in June 1990. For the last 12 months, the Non-OPEC Market Economies (Non-OPEC ME) and Centrally Planned Economies (CPE) each added more oil reserves than were produced while OPEC was even. World reserve additions were 32.2 billion barrels and production was 22.2 billion barrels of oil, a replacement ratio of 1.5:1 (Table 1). Similarly, reserve additions for the Non-OPEC ME were 9.8 billion barrels while production was 8.2 billion barrels of oil which yielded a replacement ratio of 1.2:1. The reserve replacement ratio for OPEC was 1.0:1 for the last 12 months. The CPE had a replacement ratio of 2.7:1. The CPE replacement ratio would have been 1.9:1 except for the upward revision of 4 billion barrels in the past 12 months for the Tengiz field in the U.S.S.R. (Appendix A). For the last 36 months, world reserve additions were 243 billion barrels and production was 65 billion barrels of oil, a replacement ratio of 3.7:1. Also, for the last 36 months, the Non-OPEC ME had a replacement ratio of 2.3:1, while OPEC and CPE countries had ratios of 6.4:1 and 1.9:1, respectively.

Compared to last quarter's report for the last 12 months, reserve additions are lower for the world, OPEC, and Non-OPEC ME. Reserve additions are higher for the CPE. Production for the last 12 months is slightly higher for the world, OPEC, and Non-OPEC ME, but lower for the CPE. Replacement ratios are the same for the world, lower for OPEC and Non-OPEC ME, and higher for the CPE. The U.S.S.R. has the highest reserve additions in the last 12 months at 8.7 billion barrels of oil (Table 4).

Compared to last quarter's report for the last 36 months, reserve additions are lower for the world and OPEC, and higher for Non-OPEC ME and CPE. Production is higher for the world and OPEC, but lower for the Non-OPEC ME and CPE. Replacement ratios are lower for the world and OPEC, and steady for the Non-OPEC ME and CPE. Countries with reserve additions over 10 billion barrels in the last 36 months are: Mexico (19.2), Venezuela (21.3), U.S.S.R. (19.4), Abu Dhabi (27.9), Iran (25.7), Iraq (49.6), Kuwait (17.9), Saudi Arabia (11.8), and China (12.7) (Table 4).

Table 1. World Oil Reserve Additions, Production, and Replacement Ratios

Category	World	Non-OPEC ME		
		OPEC	ME	CPE
Last 36 Months				
7/87-6/90				
Reported Reserve Additions (MMbbls)	242,557	153,597	57,790	31,170
Production (MMbbls)	64,772	24,010	24,727	16,034
Net Reserve Additions (MMbbls) ¹	177,785	129,587	33,063	15,136
Replacement Ratio ²	3.7	6.4	2.3	1.9
Last 12 Months				
7/89-6/90				
Reported Reserve Additions (MMbbls)	32,186	8,493	9,803	13,890
Production (MMbbls)	22,162	8,730	8,195	5,236
Net Reserve Additions (MMbbls) ¹	10,024	-237	1,608	8,654
Replacement Ratio ²	1.5	1.0	1.2	2.7

¹Net Reserve Additions = Reported reserve additions minus production.

²Replacement Ratio = Reported reserve additions divided by production.

Note: A listing of OPEC, CPE, and ME countries is contained in the Glossary.

Source: Reserve additions are derived from Table 4. Production is derived from Table 2.

Production

OPEC oil production for the second quarter of 1990 is estimated at 24.3 million barrels per day (Table 2.). This estimate is 2.1 million barrels per day more than was produced in the second quarter of 1989, slightly more than was produced in the first quarter 1990, and 1.6 million barrels per day above the new OPEC crude oil quota of 22.6 million barrels of crude oil per day. The new quota was in effect from May through July 1990. Non-OPEC ME production increased 384,000 barrels of oil per day compared to the second quarter of 1989 and dropped 184,000 barrels per day (0.8 percent) compared to the first quarter 1990. CPE production has been declining through 1989 and the first half of 1990. Compared to the second quarter of 1989, CPE production is 345,000 barrels of oil per day less. CPE oil production is 190,000 barrels per day less than in the first quarter of 1990. Compared to 1 year earlier, production in the second quarter of 1990 is 3.7 percent higher for the world, 9.5 percent higher for OPEC, 1.7 percent higher for the Non-OPEC ME, and 2.4 percent lower for the CPE.

**Table 2. World Quarterly Crude Oil Production Including Lease Condensate
(Million Barrels per Day)**

Qtr/Year	World	OPEC	Non-OPEC ME	CPE
1st/1987	54.581	17.150	22.664	14.767
2nd/1987	54.969	17.798	22.404	14.767
3rd/1987	57.924	20.452	22.601	14.870
4th/1987	57.699	19.935	22.974	14.790
Annual Average	56.306	18.846	22.661	14.799
1st/1988	57.043	18.984	23.249	14.811
2nd/1988	57.333	19.783	22.769	14.782
3rd/1988	58.349	21.123	22.420	14.806
4th/1988	61.105	23.674	22.551	14.880
Annual Average	58.464	20.899	22.746	14.820
1st/1989	58.181	21.101	22.347	14.733
2nd/1989	58.668	22.155	22.010	14.503
3rd/1989	59.814	23.012	22.300	14.502
4th/1989	61.143	24.231	22.542	14.370
Annual Average	59.461	22.634	22.300	14.526
1st/1990	61.105	24.179	22.578	14.348
2nd/1990 ¹	60.815	24.263	22.394	14.158

¹Production data for the second quarter 1990 are EIA estimates.

Note: A listing of OPEC, CPE, and ME countries is contained in the Glossary. Data for 1989 and 1990 have been revised.

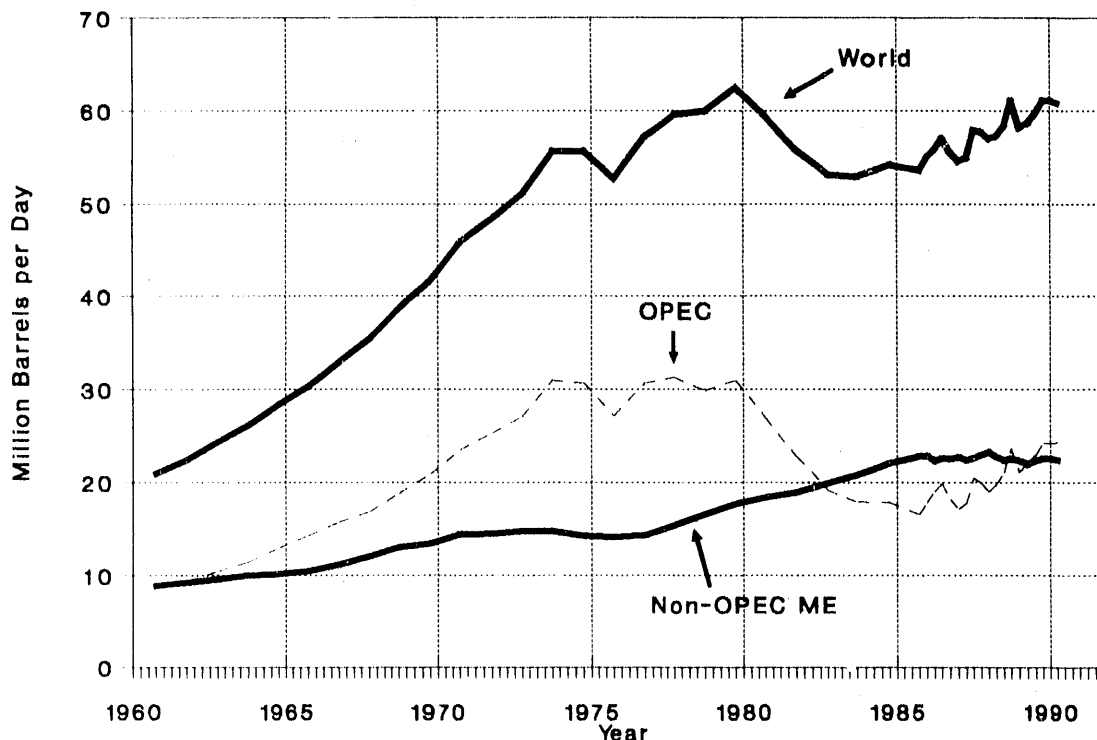
Source: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(90/04).

Beginning in 1986, Non-OPEC ME production leveled off while OPEC production, and thus world production, rose (Figure 1). OPEC production exceeded Non-OPEC ME production in the fourth quarter of 1988 and from the second quarter of 1989 forward. OPEC's share of world production peaked in 1973 at 55.6 percent. The OPEC share then declined to 31 percent in 1985 and increased to 38.1 percent in 1989 and 39.9 percent in the second quarter of 1990.

New Production Quotas

The OPEC crude oil production quota at the start of 1990 was 22.086 million barrels of crude oil per day. Beginning in May, OPEC adopted new production guidelines to be in effect through July 1990.¹ Seven OPEC members agreed to adhere to their first half quotas (Ecuador, Gabon, Kuwait, Libya, Nigeria, Saudi Arabia, and Venezuela). Five members agreed to production limits slightly below their first half quotas (Algeria, Indonesia, Iran, Iraq, and Qatar). The U.A.E. agreed to cut production

Figure 1. World Average Daily Crude Oil Production Including Lease Condensate (1st Qtr 1960 - 2nd Qtr 1990)



Note: Data prior to 1986 are annual averages.
Sources: Table 2 and EIA Annual Energy Review 1988.

to 1.9 million barrels of crude oil per day, still well above its first half quota. Strict adherence to the new production limits should limit total OPEC crude oil production to 22.6 million barrels per day for May, June, and July 1990. The OPEC crude oil production quota for the second half of 1990 will be 22.491 million barrels per day. Individual quotas will be the same as first half quotas except for the U.A.E. The U.A.E. quota will increase from 1.1 to 1.5 million barrels of crude oil per day.

Norway reduced its production curtailment from 7.5 to 5 percent of capacity for the first half of 1990 and may completely eliminate it in the second half of 1990. Eliminating the production curtailment could add 90,000 barrels of oil per day to Norwegian production in the second half of 1990.²

Active Rotary Drilling Rigs and World Oil Prices

The total number of active rigs in the ME countries increased by 9 percent from the second quarter 1987 to the second quarter 1990 (Table 3). Rig counts have declined by 50 percent or more since the second quarter 1989 in: Ecuador, Peru, Greece, Spain, Kuwait, Kenya, and New Zealand. Countries where rig counts have declined by 50 percent or more since the second quarter 1987 are: Brazil, Peru, Austria, Greece, Spain, Kuwait, North Yemen, New Zealand, and Taiwan. Compared to the second quarter 1989, Oman, Papua New Guinea, and Congo were able to at least double their rig counts. Denmark, the Netherlands, Iraq, Saudi Arabia, Gabon, Papua New Guinea, and the Philippines have at least doubled their rig counts compared to the second quarter 1987.

Table 3. Quarterly Active Rotary Rigs for the Market Economies

Region/Country	1987			1988				1989				1990	
	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd
North America													
Canada	81	196	248	271	146	206	158	177	90	103	148	197	78
Mexico	137	145	154	156	156	155	152	145	91	89	88	87	87
United States	768	1,001	1,146	1,002	902	923	922	786	773	890	1,030	939	965
Total	986	1,342	1,549	1,429	1,204	1,284	1,232	1,108	954	1,083	1,265	1,223	1,130
South America													
Argentina	62	67	64	69	64	61	59	56	55	53	54	63	73
Bolivia	8	6	6	6	5	5	6	6	6	5	5	5	5
Brazil	62	55	53	42	43	32	39	35	34	22	20	22	24
Chile	7	7	6	6	5	5	5	4	4	5	6	6	6
Colombia	13	13	16	16	21	20	17	16	17	15	13	11	9
Costa Rica	0	1	1	1	0	0	0	0	0	0	0	0	0
Ecuador	2	4	5	5	5	5	7	7	5	5	4	2	2
Peru	18	12	12	10	11	11	11	10	10	9	9	6	5
Trinidad	9	7	8	8	8	7	6	6	6	6	7	9	8
Venezuela	17	18	21	23	23	27	28	28	27	28	29	29	29
Other	0	1	1	1	0	0	0	1	0	0	0	0	0
Total	196	191	193	186	184	173	178	168	164	148	146	153	162
Western Europe													
Austria	4	3	4	5	5	5	3	3	2	2	1	2	2
Denmark	1	4	5	3	1	2	2	2	3	2	1	2	2
France	6	8	12	9	8	8	9	4	8	9	7	8	7
Greece	1	2	2	2	2	2	2	2	2	0	0	0	0
Netherlands	8	10	11	14	13	17	10	9	10	14	16	17	16
Italy	25	26	25	23	23	24	26	28	25	19	17	20	20
Norway	12	12	16	15	16	15	14	11	13	13	13	10	12
Spain	3	2	2	2	2	2	3	3	3	4	1	2	1
United Kingdom	36	45	61	64	57	56	50	51	50	42	43	47	47
West Germany	9	12	16	12	10	10	5	7	8	9	9	9	11
Other	2	0	0	0	2	1	0	0	1	0	0	0	0
Total	108	125	154	148	140	141	124	120	124	114	109	116	118
Middle East													
Abu Dhabi	10	8	7	7	7	7	8	7	5	6	7	7	9
Dubai	2	1	2	3	4	3	4	3	2	3	2	3	3
Iran	15	20	19	18	18	18	18	19	18	18	25	20	20
Iraq	7	10	17	21	23	22	24	25	27	25	23	31	38
Jordan	2	2	3	3	2	2	2	3	3	3	3	2	2
Kuwait	6	6	6	5	6	6	5	5	4	3	4	3	1
North Yemen	4	4	5	4	3	3	3	2	2	1	3	3	2
Oman	11	9	10	10	9	8	10	11	9	14	18	19	18
Qatar	2	1	1	2	3	3	3	4	3	3	3	3	2
Saudi Arabia	5	5	4	4	4	5	5	6	6	5	4	6	10
Syria	20	23	25	22	21	26	29	24	23	26	22	21	18
Turkey	29	25	23	22	21	24	18	25	19	18	17	17	17
Other	1	1	0	0	0	0	0	2	1	1	2	2	1
Total	114	114	120	122	122	126	129	136	122	126	134	136	142

See footnotes at end of table.

Table 3. Quarterly Active Rotary Rigs for the Market Economies (Continued)

Region/Country	1987			1988				1989				1990	
	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd
Africa													
Algeria	46	39	34	34	33	33	28	19	19	25	33	35	37
Angola	9	10	10	9	13	10	10	9	8	8	8	8	8
Congo	3	3	2	2	2	2	2	1	0	0	3	1	3
Egypt	26	21	19	22	22	19	21	20	19	19	15	17	17
Gabon	2	4	4	3	3	7	8	8	5	6	5	6	5
Kenya	0	0	1	2	1	0	1	3	2	2	3	2	0
Libya	11	13	15	16	17	15	17	19	18	16	15	15	15
Nigeria	12	9	11	10	12	14	16	14	15	14	13	16	17
South Africa	3	3	4	5	5	4	3	3	3	3	3	3	3
Tunisia	3	5	4	2	5	3	3	5	3	3	2	3	3
Other	4	6	4	4	7	5	5	5	4	3	3	3	2
Total	119	114	108	108	120	113	113	107	96	98	102	109	110
Asia-Pacific													
Australia	12	21	20	13	14	22	26	15	13	15	14	14	12
Bangladesh	6	4	2	2	2	3	3	5	5	5	5	5	5
Brunei	3	3	3	3	4	4	4	5	4	4	4	4	4
Burma	32	28	26	26	26	26	24	24	24	24	20	18	19
India	118	119	121	131	128	130	134	135	135	133	139	137	138
Indonesia	38	31	36	43	42	46	45	45	46	46	47	50	52
Japan	7	14	12	11	9	11	11	6	4	6	6	7	7
Malaysia	9	9	9	8	8	9	10	11	11	11	13	14	15
New Zealand	4	1	3	3	2	2	2	3	2	1	1	0	0
Pakistan	15	14	12	12	13	14	14	13	15	13	12	13	9
Papua New Guinea	2	2	2	2	3	2	4	3	2	3	4	4	4
Philippines	1	1	4	4	3	3	3	5	6	7	7	6	5
Taiwan	6	3	4	4	5	4	4	5	5	4	5	5	3
Thailand	5	7	7	6	5	5	6	7	5	5	6	5	6
Other	0	0	1	0	1	1	1	1	1	0	1	1	1
Total	258	257	261	267	265	285	291	282	278	278	284	283	280
Total OPEC ¹	176	170	181	194	201	211	215	210	201	203	217	228	242
Total Non-OPEC ME	1,604	1,973	2,204	2,065	1,833	1,911	1,852	1,711	1,537	1,644	1,823	1,791	1,701
Non-OPEC ME w/o U.S.	836	973	1,058	1,063	932	988	930	925	764	754	793	852	736
Total ME w/o U.S.	1,011	1,142	1,239	1,257	1,133	1,199	1,145	1,134	965	956	1,010	1,080	978
Total ME	1,780	2,143	2,385	2,259	2,034	2,122	2,067	1,920	1,738	1,847	2,040	2,019	1,943

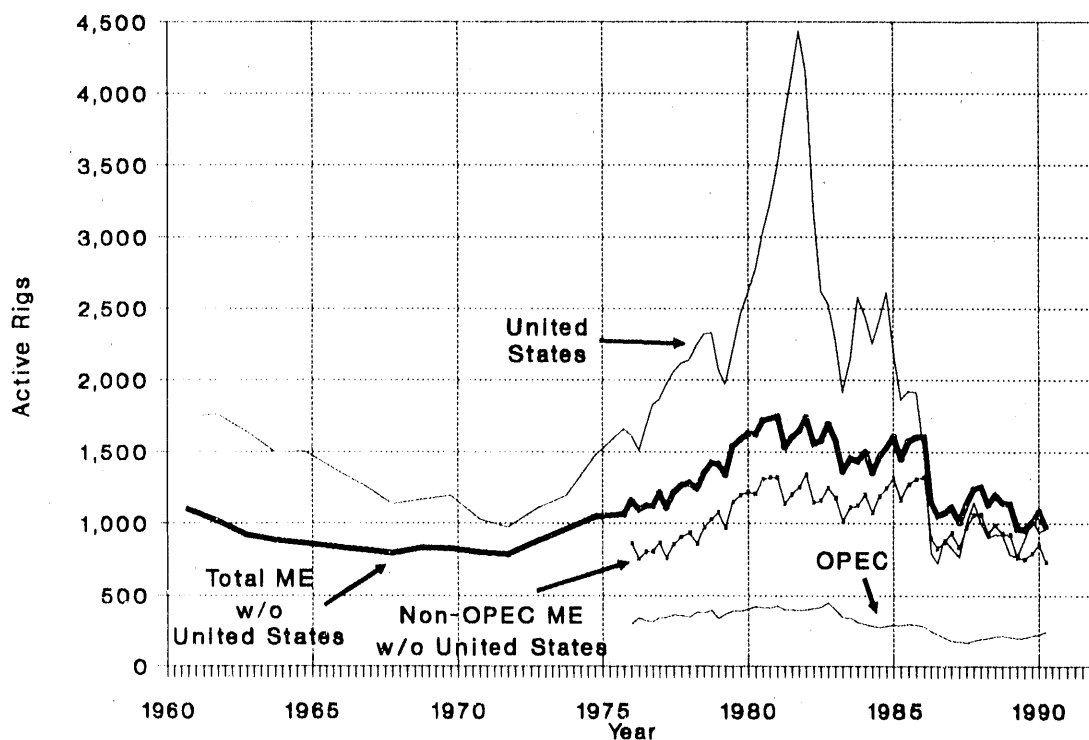
¹Includes Middle East Other.

Note: Rotary rigs are average for each quarter. A listing of OPEC, CPE, and ME countries is contained in the Glossary. ME denotes Market Economies. Column totals may not add due to independent rounding.

Source: Baker Hughes Inc. and Oil and Gas Journal Energy Database

A sharp drop in rig counts occurred in 1986 (Figure 2). The drop correlates with the oil price collapse of 1986, and the rig counts have remained below pre-1986 levels. Due to its large number of drilling rigs, the United States is not included in the Non-OPEC ME and Total ME curves because it would mask the trends for these countries. Compared to 1 year ago, rig counts are 20.4 percent higher for OPEC, 3.7 percent lower for Non-OPEC ME excluding the United States, and 1.3 percent higher for the ME excluding the United States. Compared to 3 years ago, rig counts are 37.5 percent higher for OPEC, 12.0 percent lower for Non-OPEC ME excluding the United States, and 3.3 percent lower for the ME excluding the United States.

Figure 2. Quarterly Active Rotary Rigs for the Market Economies (ME)
(1st Qtr 1960 - 2nd Qtr 1990)



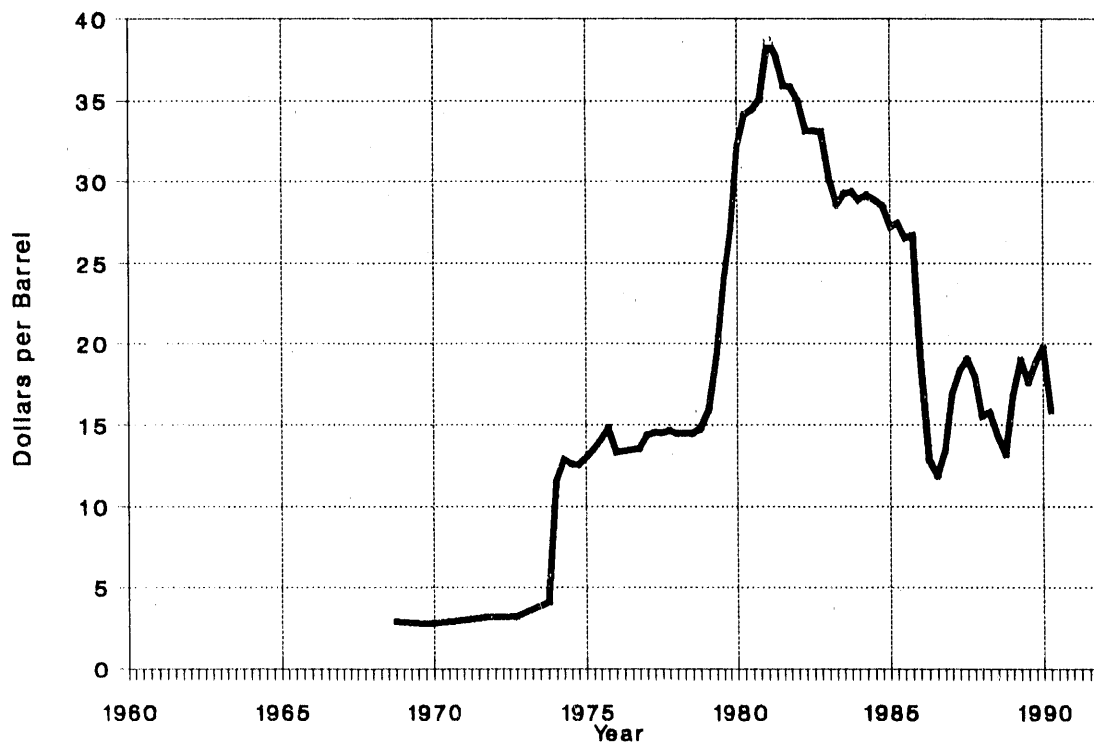
Note: Data prior to 1978 are annual averages.
Source: Baker Hughes Inc. and Oil and Gas Journal.

The price of imported crude oil paid by U.S. refiners reflects the trends in world oil prices (Figure 3). Three sharp changes in historical oil prices coincide with three events in the Persian Gulf. In 1973, oil prices increased due to the Arab oil embargo. Oil prices increased again in 1979 due to the Iranian revolution and the start of the Iran-Iraq war. Then in 1986, OPEC increased production beyond demand and oil prices collapsed.

Highlights

Selected items taken from industry trade journals considered to be important to future supplies of oil and gas are discussed briefly. Although significant, some activities and their expected results may be highly speculative. Reserve figures mentioned here that are considered to be unrealistic are not included in data or calculations contained elsewhere in this report. Conversely, reserve estimates considered to be realistic are included in the tables and appendices of this report.

**Figure 3. U.S. Refiner Acquisition Cost of Imported Crude Oil
(1st Qtr 1968 - 2nd Qtr 1990)**



Note: Data prior to 1974 are annual averages.
Source: 1968-1986, EIA Annual Energy Review 1989;
1987-1990, EIA Weekly Petroleum Status Report 8/10/90.

Countries in the **Middle East** are beginning production capacity expansion programs in anticipation of increasing world demand for their oil.³ **Saudi Arabia** plans an increase to 10 million barrels of oil per day (close to peak Saudi production achieved in 1980-81) by the year 2000.⁴ Included in the Saudi program is a \$1.7-billion project to increase capacity of the east-west crude oil pipeline to Yanbu from 3.2 to 5 million barrels per day. This involves expansion of the 11 pump stations along the line as well as the export facilities on the Red Sea. Four large gas oil separation plants for the offshore Safaniya field are planned at a cost of \$400 million for a gain of 270,000 barrels per day. Also planned is a \$120-million expenditure for two gas oil separation plants in Uthmaniyah field to increase production to 300,000 barrels per day. Development of the remote Shaybah field, located close to the borders of the U.A.E. and Oman, should be completed by 2003 at a cost of \$2.96 billion. Productive capacity of the field will be 500,000 barrels of oil per day. Saudi Arabia and other Middle East countries are starting to reactivate production facilities that have been mothballed for 6 to 7 years.

Iraq's current productive capacity is 4.5 million barrels of oil per day, and according to Iraq's Oil Minister, another 1.5 to 2 million barrels per day will be added through the exploitation of proved undeveloped reserves.³ Suba field has added 60,000 barrels per day this year, and Khabbaz and Saddam fields are expected to add a combined 80,000 barrels per day later in the year. Work in the Zubair field should increase production from 70,000 to 230,000 barrels per day. Development of West Qurma field is expected to add 200,000 barrels per day this year and another 400,000 barrels per day before the end of the decade. Iraq's oil export capacity is just under 4 million barrels per day. Capacity of the pipeline through Saudi Arabia to Muajjiz on the Red Sea is 1.65 million barrels per day with 10 million barrels of storage on the coast. Iraq's pipeline capacity to the Mediterranean through Turkey is 1.5 million barrels per day and the Mina al-Bakr terminal on the Persian Gulf has

an export capacity of 800,000 barrels per day. Plans are being made to expand export capacity at Mina al-Bakr to the prewar (Iran-Iraq war) level of 1.6 million barrels per day and to repair the Khor al-Amaya offshore facility.

Oman plans to increase oil production this year to 700,000 barrels per day from 640,000 barrels per day in 1989.³ Two-thirds of the net increase will be from the development of 25 to 30 fields. Oman's Oil Minister said Oman found 300 million barrels of oil reserves in '89 and now has remaining reserves of 4.3 billion barrels of oil.

Abu Dhabi has a \$500-million program to increase onshore oil productive capacity by 360,000 to 1.125 million barrels per day by 1995.⁵ Already underway is a program to increase offshore oil productive capacity by 200,000 to 1 million barrels per day. Asab field capacity should increase from 60,000 to 280,000 barrels per day. Infill drilling in Bab field should increase production by 170,000 to 210,000 barrels per day by 1995. In Bu Hasa field, water injection will be upgraded to increase capacity by 100,000 to 550,000 barrels per day. Shah and Sahil fields are expected to add a combined 15,000 to a total of 45,000 barrels per day.

Kuwait signed an exploration agreement with the **Soviet Union** allowing their oil companies to operate in the other's country.⁶ Kuwait can now explore for oil in the Turkmenian Republic of the U.S.S.R. The Soviet's Technoexport is working on a \$60-million project for Kuwait Oil Co. for desalting and dehydration.⁷ This work was previously done by U.S. and Japanese firms. The Soviets are also considering developing Bahrah oil field in northern Kuwait.

After an 11 year suspension, **Iran** has resumed gas exports to the Soviet Union from its southern gas fields.⁸ The 15-year contract is for sales of 94 billion cubic feet per year, but could climb to 313 billion cubic feet per year.

The two countries of **North and South Yemen** merged into the **Republic of Yemen** on May 22, 1990.⁹ The government reported estimated reserves for the new country of 4.75 billion barrels of oil, 3.75 billion in the south and 1 billion in the north.¹⁰

Nigeria may increase drilling this year by 30 percent to 155 wells.¹¹ Shell, Nigeria's busiest operator, is planning 94 wells. Shell added more than 700 million barrels of oil to Nigeria's reserves in the last 4 years.¹² During the next 4 years, Nigeria plans to add 6 billion barrels of oil reserves from 16 to 22 billion barrels. Also planned is a production increase from 1.85 to 2.4 million barrels per day.

Enhanced oil recovery is expected to add 21 billion barrels of oil to **Libya's** reserves according to Libya's Oil Minister.¹³ He said, of Libya's 180 billion barrel resource, only 45 billion barrels are recoverable by primary and secondary means (without enhanced recovery methods).

The main producing nations of **West Africa** contain at least 359 undeveloped oil and gas discoveries.¹⁴ **Nigeria** has the largest number, but half of the fields are in **Angola, Gabon, Congo, and Cameroon**. Two-thirds of the fields are offshore in easily accessible coastal waters, and three-fourths of the undeveloped discoveries are oil fields.

The **U.S.S.R.'s** Tengiz field may be added to a proposed joint venture between Chevron and the Soviet Union.¹⁵ Recoverable reserves in Tengiz are currently estimated at 10 to 11 billion barrels of oil from 25 billion barrels in place. Some estimates of in-place resources are as high as 40 billion barrels of oil and 46 trillion cubic feet of gas. Tengiz production is highly corrosive and must be processed through an oil and gas processing plant which is currently under construction. When finished, the plant will have expected production of 180,000 barrels per day of oil, 230 million cubic feet per day of dry gas, and 3,700 metric tons per day of sulfur. The Soviet Union exported 21 percent of its oil production and 12.7 percent of its gas production in 1989.¹⁶ Oil and refined product exports for 1989 were 3.694 million barrels per day, down from 4.104 million barrels per day in 1988. Gas exports, however, increased in 1989 to about 3.57 trillion cubic feet compared to 3.07 trillion cubic feet in 1988. The increased gas sales did not offset the loss of revenue from the lower oil and product sales.

The **United Kingdom's** oil production is expected to drop by 300,000 barrels per day this summer.¹⁷ The drop is due to the installation and relocation of emergency shutdown valves on offshore platforms which requires the platforms to be shutdown to perform the work. The installation must be completed by the end of the year. There are 57 oil and gas fields in the U.K. North Sea waiting to be developed that could be approved in the next 2 to 3 years.¹⁸ The 57 projects have combined reserves of 3.8 billion barrels of oil and 14.4 trillion cubic feet of gas. Liquid production from the group may peak

in 1996 at 1.2 million barrels per day, about half of total U.K. production in that year. Gas production is expected to peak later at 3.1 billion cubic feet per day. Of the 57 fields, 31 are in the central North Sea, 14 in the northern North Sea, 11 in the southern gas province, and 1 in the Irish Sea.

Norway has announced the results of its 1990 report that doubles the estimate of Norwegian North Sea undiscovered oil and gas resources compared to a 1989 report.¹⁹ Resources that are still to be found are now estimated at 5.9 billion barrels of oil and 31.95 trillion cubic feet of gas.

Permission has been granted to develop the Ballycotton gas field off Ireland in the Celtic Sea.²⁰ The small gas field will be the second operating offshore field and the first subsea development in Irish waters. The field is expected to extend Irish reserves about one year.

The Duri field steamflood project in Indonesia has added 2 billion barrels of oil to the country's reserves.²¹ Current oil production from Duri field is 160,000 barrels per day. Peak production of 330,000 barrels per day should be reached in the mid-1990's and will begin declining in the next decade. There is another 1 billion barrels of tertiary oil potentially recoverable from other reservoirs in the field. Also, a change from a peripheral waterflood to a pattern waterflood in the Minas field is expected to increase recovery by 500 million barrels. Exploratory drilling is on the rise from 82 wells in 1987 to an expected 120 wells in 1990 to a projected peak of 190 in 1995.²² Indonesian oil production is expected to increase through 1991 and then decline to less than 1.3 million barrels per day in 1998 when the country will become a net importer of oil.

Oil India Ltd. of India has requested approval to develop the Disang oil shales in the northeast.²³ The 3,860 square mile area is estimated to contain a resource of 438 billion barrels of oil equivalent.

Brazil estimates the development cost of the deep water Albacora and Marlim fields at \$10 billion over the next 10 years.²⁴ For the Marlim field, the plan includes a tension leg platform in 3,280 feet of water with a production capacity of 100,000 barrels of oil per day.

Argentina announced an oil policy that will enable foreign companies to purchase production rights in and operate major fields.²⁵ The foreign contractors can dispose of their share of production or sell it to the Argentina state oil company at world oil prices.

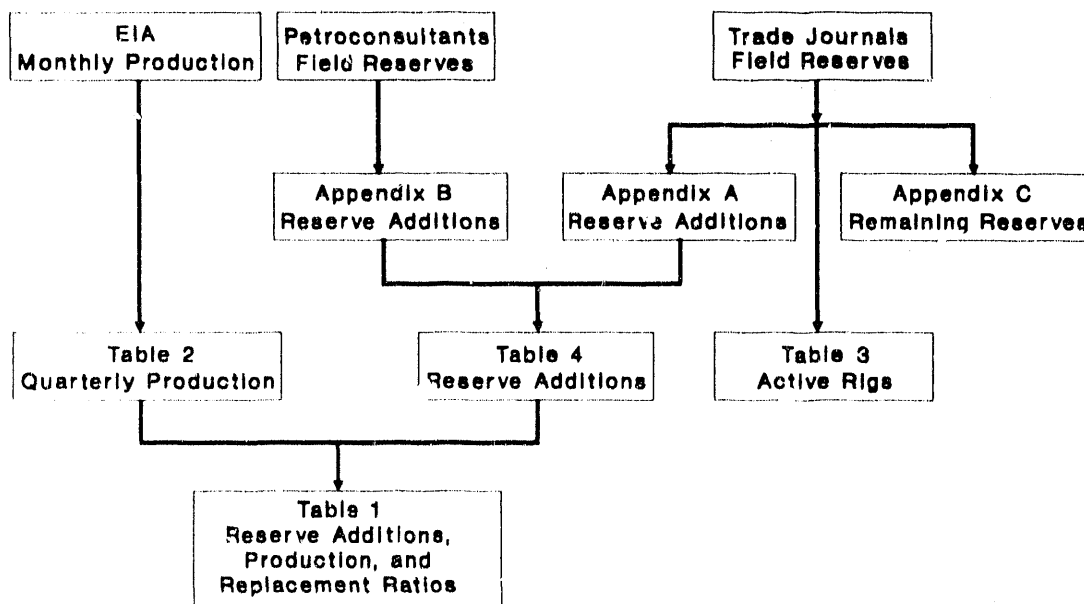
Data Sources and Analysis

There are three main sources of information used in this report: 1) Petroconsultants, S.A., 2) industry trade journals, and 3) the Energy Information Administration (EIA) (Figure 4).

The quarterly production in Table 2 is a summary of the monthly data presented in the EIA *Monthly Energy Review*. The average quarterly drilling rig counts of Table 3 are derived from Baker Hughes' data published monthly and weekly in industry trade journals. Also, remaining reserves by country shown in Appendix C, "World Oil and Natural Gas Reserves," are taken directly from industry trade journals. Subtotals at the ends of Table 3 and Appendix C are added for the readers' convenience.

Petroconsultants provides an updated data base each quarter containing field level estimates of ultimate recovery. Field ultimate recovery estimates are summed to the country level and then compared to country totals of previous editions of the data base to get the changes in ultimate recovery over time. These changes are the reserve additions shown in Appendix B, "Modified Petroconsultants Reserve Additions," for the last 3 months, 12 months, and 36 months. For example, reserve additions for the last 12 months are calculated by subtracting the ultimate recovery values of the second quarter 1989 from the ultimate recovery values of the second quarter 1990. The reserve additions for any given time period are the latest ultimate recovery estimates in that time period minus the ultimate recovery estimates prior to that time period. The modification of Petroconsultants data occurs when a field which has a reserve history in Appendix A, appears for the first time in the Petroconsultants data base. The reserve history of the field from Appendix A is then entered into the previous editions of the Petroconsultants data to smooth the transition from one source to another. (Petroconsultants is the primary source for reserve additions in this report.)

Figure 4. Data Sources and Flow



Source: Energy Information Administration, Office of Oil and Gas.

It is impractical for Petroconsultants to include every field for every country in its data base. Reserve additions calculated for a particular country from Petroconsultants data may not include reserve revisions for every field in that country. In fact, Petroconsultants does not include the United States and Canada in its data base because of the large number of fields in these two countries. Also, not every country is updated every quarter. Several years may elapse between updates for some countries. The result is that these countries may show larger reserve revisions occasionally rather than smaller more frequent reserve revisions. It should be kept in mind when drawing conclusions from the data presented in this report that a large change in reserves reported in a given quarter for a country could represent changes that actually occurred over several years.

Petroconsultants second quarter 1990 data contain 11,061 field entries, 1,732 more entries than in the second quarter 1987 data. Most of the reserve additions are from revisions to old fields and not from the 1,732 new entries. Many of the new entries are for fields discovered before the second quarter 1987 and some may have been discovered 15 or 20 years ago (that is, the discovery well was drilled 15 or 20 years ago). In most areas of the world, a field is not considered as having reserves until it is feasible to develop. A field may become feasible for development many years after discovery due to changes in economics, technology, infrastructure, etc. The Petroconsultants data base has two categories for its reserves, **fields** and **discoveries**. A **field** is defined as having commercial production or a firm commitment to develop it for production. Petroconsultants defines a **discovery** as having no commercial production or commitment to develop, but has tested substantial quantities of oil and gas as determined by local economics. The reserves of both discoveries and fields are used in this report (both fields and discoveries are referred to as fields).

Reports of field reserves published in industry trade journals and some company annual or quarterly reports are listed in Appendix A, "Foreign Oil and Gas Discoveries." The data are organized by country and field with the new entries shaded. The more significant new entries are discussed briefly and located on maps in the "Reserve Additions" section of this report.

Unlike Petroconsultants data, the entries in Appendix A are not simply replaced when new data become available. Updates of a field's reserves are added to the appendix and do not replace previous entries so it is possible to note reserve estimate changes over time. Also, reserve ranges, when available, are entered to give the reader a sense of the field's additional potential.

Reserve additions for a field in Appendix A for any time period are the latest ultimate recovery estimate in the time period minus the latest ultimate recovery estimate prior to the time period. For example, a new field first reported in July 1987 with a 200-million-barrel ultimate recovery estimate, an upward revision to 400 million barrels reported in July 1989, and a further upward revision to 600 million barrels in April 1990, would yield reserve additions of 200 million barrels in the last 3 months, 400 million barrels in the last 12 months, and 600 million barrels of oil in the last 36 months. Fields in Appendix A marked with an asterisk (*) are also present in the Petroconsultants data base. Reserve additions for fields not marked with an asterisk were added to the reserve additions of Appendix B, along with U.S. and Canadian reserve additions, to form Table 4, "World Oil and Gas Reserve Additions."

The path to Table 4, illustrated in Figure 4, has been from Petroconsultants field level reserves to Appendix B's reserve additions and from published field reserves in trade journals to Appendix A. Reserve additions from fields in Appendix A which are not in Appendix B (no asterisk) were added to Appendix B along with U.S. and Canadian reserve additions to form Table 4. Table 4 lists the oil and gas reserve additions for the last 3 months, last 12 months, and last 36 months by country through June 1990. For the last 12 months, oil reserve additions for the world are 32.2 billion barrels of oil. OPEC's reserve additions are 8.5 billion barrels of oil, 26 percent of the world total. The Non-OPEC ME reserve additions are 9.8 billion barrels of oil, 30 percent of the world total. CPE reserve additions are 13.9 billion barrels of oil, 43 percent of the world total. If the Soviet Union's Tengiz field is excluded, then OPEC would have 30 percent of world reserve additions, Non-OPEC ME would have 35 percent, and the CPE would have 35 percent for the last 12 months. For the last 36 months, world reserve additions are 243 billion barrels of oil. OPEC's reserve additions are 154 billion barrels of oil, 63 percent of the world total. The Non-OPEC ME and CPE reserve additions contribute about 24 and 13 percent, respectively, to the world total. The major portion of world oil reserve additions came from OPEC. Once again, most of these reserve additions are due to revisions for older fields, not new discoveries. In Table 4 and Appendix B for Saudi Arabia there is a decrease in gas reserves of about 400 trillion cubic feet. Petroconsultants has corrected an error that indicated a reserve increase of the same magnitude in the fourth quarter 1989 report.

It is not surprising that OPEC has most of the oil reserve additions when the remaining reserves listed in Appendix C are considered. OPEC has 76 percent of the world's remaining oil reserves while the Non-OPEC ME have 16 percent and the CPE have 9 percent (*World Oil* figures). Based on the production rates for the last 12 months, OPEC has an 81-year supply of oil. The Non-OPEC ME have an 18-year supply, and the CPE have a 16-year supply of oil. Given 75 percent of the world's remaining oil reserves with an 81-year supply at current production rates, OPEC has the potential for ongoing upward reserve revisions for many years.

Finally, the reserve additions data of Table 4 are divided by the production data of Table 2 to yield the reserve replacement ratios of Table 1. For the last 36 and 12 months the world, OPEC, Non-OPEC ME, and CPE replacement ratios are shown. The replacement ratios in the table are equal to reported reserve additions divided by production. Also shown are net reserve additions which are equal to reported reserve additions minus the production. A replacement ratio greater than 1:1 means that gross reserve additions are greater than production. A ratio of 5.0:1 would indicate that gross reserve additions are 5 times the produced volume.

Compared to last quarter's report, the world replacement ratio dropped from 3.8:1 to 3.7:1 for the last 36 months. OPEC dropped from 6.7:1 to 6.4:1; Non-OPEC ME and CPE remained steady at 2.3:1 and 1.9:1, respectively. All groups added substantially more oil reserves than they produced in the last 36 months. For the last 12 months the world replacement ratio was steady at 1.5:1. OPEC dropped from 2.4:1 to 1.0:1. Non-OPEC ME dropped from 1.5:1 to 1.2:1; and CPE increased from 0.3:1 to 2.7:1 due to the Tengiz field in the U.S.S.R. (Appendix A). All groups except OPEC added more oil than they produced in the last 12 months; OPEC stayed even.

The oil production volumes listed in Table 1 for the last 12 months indicate that OPEC and Non-OPEC ME produced approximately 39 and 37 percent of the world oil supply while the CPE produced 24 percent of the world supply. In the last 36 months, OPEC produced 37 percent of the world oil supply while the Non-OPEC ME produced 38 percent of the world

Table 4. World Oil and Gas Reserve Additions

Country	Oil, MMbbbls			Natural Gas, Bcf		
	Last 3 Months 4/90-6/90	Last 12 Months 7/89-6/90	Last 36 Months 7/87-6/90	Last 3 Months 4/90-6/90	Last 12 Months 7/89-6/90	Last 36 Months 7/87-6/90
North America						
Canada	190	199	1,309	300	5,790	9,533
Cuba	0	59	60	0	139	139
Guatemala	0	-8	21	0	-4	-4
Mexico	0	840	19,225	0	3,899	24,229
United States	0	2,427	8,324	0	16,075	25,297
Total	190	3,517	28,939	300	25,899	59,194
South America						
Argentina	141	339	3,009	410	-3,479	25,117
Barbados	0	-2	-3	0	-3	8
Bolivia	1	2	41	0	245	562
Brazil	410	2,091	5,211	290	1,509	5,316
Chile	0	24	168	0	99	7,274
Colombia	50	513	1,285	1,248	1,700	2,192
Ecuador	23	52	492	37	179	-284
Peru	0	32	20	0	0	11,636
Suriname	0	0	9	0	0	0
Trinidad	45	135	273	300	102	332
Venezuela	196	-146	21,334	3,242	5,802	16,352
Total	866	3,040	31,839	5,527	6,154	68,505
Western Europe						
Austria	5	2	29	-4	75	350
Denmark	32	76	357	123	241	118
France	-3	14	139	0	498	2,333
Greece	0	0	-46	0	0	-15
Ireland	1	1	11	2	302	349
Italy	-32	-24	163	298	2,998	2,047
Netherlands	10	4	156	1,953	4,985	4,711
Norway	-219	1,271	3,592	660	5,365	5,465
Spain	0	-8	12	0	-40	-18
Svalbard	0	0	0	500	500	500
Sweden	0	0	64	0	0	0
Switzerland	0	0	0	0	0	4
United Kingdom	-208	47	4,043	1,033	1,245	14,534
West Germany	70	71	268	-847	-4	-1,292
Total	-344	1,454	8,788	3,718	16,165	29,086
Eastern Europe						
Bulgaria	0	0	0	0	0	-350
Poland	0	0	0	0	25	27
Romania	0	75	213	0	0	282
U.S.S.R.	1,000	8,735	19,355	35,000	303,487	364,847
Yugoslavia	0	53	764	45	873	3,272
Total	1,000	8,863	20,332	35,045	304,385	368,078

See footnotes at end of table.

Table 4. World Oil and Gas Reserve Additions (Continued)

Country	Oil, MMbbls			Natural Gas, Bcf		
	Last 3 Months 4/90-6/90	Last 12 Months 7/89-6/90	Last 36 Months 7/87-6/90	Last 3 Months 4/90-6/90	Last 12 Months 7/89-6/90	Last 36 Months 7/87-6/90
Middle East						
Abu Dhabi	0	594	27,879	190	2,150	33,965
Bahrain	0	0	-50	0	500	2,000
Dubai	0	70	70	0	0	250
Iran	450	1,007	25,717	1,000	201,221	271,420
Iraq	1,700	4,100	49,641	500	10,900	27,338
Israel	0	0	25	0	-6	-6
Jordan	0	-2	-47	0	0	1,000
Kuwait ¹	0	500	17,926	0	500	12,814
Oman	0	921	2,090	0	605	2,934
Qatar	0	50	460	0	25	148,535
Ras Al Khaimah	0	0	0	0	-3,900	-3,900
Saudi Arabia ¹	-3,187	-88	11,821	-416,146	-1,646	8,389
Sharjah	0	0	14	0	0	493
Syria	0	370	298	0	250	1,150
Turkey	2	162	135	0	-39	329
Umm Al Qaiwain	0	0	0	0	0	250
Yemen	0	850	1,303	0	7,800	11,300
Total	-1,035	8,537	137,282	-414,456	218,360	221,190
Africa						
Algeria	30	1,057	966	3	-1,535	24,770
Angola	28	568	822	10	3,420	3,454
Benin	0	3	-80	0	0	0
Cameroon	0	0	29	0	0	-1,157
Chad	10	15	94	0	0	0
Congo	62	134	502	96	127	-945
Cote D'Ivoire	0	1	-74	0	-344	486
Egypt	121	481	846	116	3,278	8,744
Ethiopia	0	0	0	0	0	850
Gabon	22	181	-140	5	97	-436
Ghana	0	0	5	0	1	2
Guinea Equatorial	0	0	0	0	0	802
Libya	1,367	892	-3,644	146	3,318	4,004
Morocco	0	0	10	0	-9	28
Namibia	0	0	0	0	0	1,700
Nigeria	-80	111	-885	1,137	13,145	66,655
Senegal	0	0	-90	0	0	15
So. Africa	0	19	20	90	636	636
Sudan	0	0	327	0	0	839
Tanzania	0	0	0	0	-6,090	-6,090
Tunisia	-140	-183	-299	0	-61	-1,048
Zaire	0	11	-42	0	1	2
Total	1,420	3,290	-1,633	1,603	15,984	103,311

See footnotes at end of table.

Table 4. World Oil and Gas Reserve Additions (Continued)

Country	Oil, MMbbls			Natural Gas, Bcf		
	Last 3 Months 4/90-6/90	Last 12 Months 7/89-6/90	Last 36 Months 7/87-6/90	Last 3 Months 4/90-6/90	Last 12 Months 7/89-6/90	Last 36 Months 7/87-6/90
Asia-Pacific						
Australia	-109	411	951	565	1,760	6,044
Bangladesh	0	0	42	0	800	3,053
Brunei	20	37	876	100	-520	4,331
China	2,109	4,929	12,683	2,482	7,486	14,687
India	-161	181	593	200	-19	1,418
Indonesia	-119	113	1,946	-1,726	-1,747	66,552
Japan	5	18	73	0	81	396
Malaysia	7	495	1,077	-1,790	-2,370	-7,064
Myanmar (Burma)	1	-3,006	81	0	-538	1,234
New Zealand	0	17	92	567	640	823
Pakistan	14	119	256	178	2,225	4,785
Papua New Guinea	0	120	185	550	1,030	4,406
Philippines	-1	5	39	-70	605	331
So. Korea	0	0	0	0	190	200
Taiwan	0	0	11	-97	-101	-83
Thailand	-1	7	10	167	419	4,347
Vietnam	-1	39	-1,905	-45	-5	75
Total	1,764	3,485	17,010	1,081	9,936	105,535
Total OPEC	402	8,493	153,597	-411,612	228,509	380,096
Total Non-OPEC ME	351	9,803	57,790	6,948	56,369	191,824
Total CPE	3,108	13,890	31,170	37,482	312,005	382,979
Total	3,861	32,186	242,557	-367,182	596,883	954,899

¹Includes one-half of the reserve additions in the Neutral Zone.

Notes: The mid-point values of reserve ranges listed in Appendix A are used in calculating the supplemental reserve additions. The entries in this table are the net of upward and downward reserve revisions and additions. These volumes for a given period are the difference between what was reported in that period and what was reported in prior periods. A listing of OPEC, CPE, and ME countries is contained in the Glossary. Column totals may not add due to independent rounding.

MMbbls = Million barrels of oil.

Bcf = Billion cubic feet of natural gas.

Sources: United States data are based on reserve additions from the Energy Information Administration *U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves, 1989, 1988, 1987, and 1986 Annual Reports* (DOE/EIA-0216), excluding natural gas liquids. Canadian data are taken from Appendix A for the last 3 months, and Statistics Canada *The Crude Petroleum and Natural Gas Industry, 1989, 1988, and 1987*, excluding pentanes plus, for the last 12 and 36 months. All other foreign data are from the commercial information services of Petroconsultants, S.A., and supplemented with Appendix A.

supply. CPE countries supplied 25 percent of the world's oil in the last 36 months. Comparing the last 12 months with the last 36 months of production, OPEC's percentage of the world production has increased, while the Non-OPEC ME and CPE percentages have decreased slightly.

Reserve Additions for the 2nd Quarter 1990

The following is a list of significant discoveries with reserve information reported in the second quarter of 1990. The location and ultimate recovery estimate for each entry are depicted in Figures 5 through 8. Entries in the list are grouped geographically.

Europe (Figure 5.)

- **United Kingdom** - Conoco intends to have the results of six additional appraisal wells in Murdoch gas field and other prospects in the area by the end of 1990 to aid in the development decision for Murdoch. Reserves are currently estimated at 200 to 300 billion cubic feet of gas.
- **Norway** - Saga will submit a development plan by the end of 1990 to install a subsea production system for the Tordis field. The 100-million-barrel oil field is located south of Snorre field in the North Sea.
- **Netherlands** - Ranger Oil has completed appraisal of the Markham gas field in the North Sea. Production of the 500-billion-cubic-foot gas field is scheduled to begin in 1992.

Asia, U.S.S.R., and Middle East (Figure 6.)

- **India** - ONGC discovered the Mori oil field in the Krishna-Godavari basin onshore in Andhra Pradesh. Reserves are estimated at 22 million barrels of oil.
- **India** - OIL has found commercial oil in Assam Pradesh. Reserves for the new find in the Dikom structure are estimated to be 22 million barrels of oil.

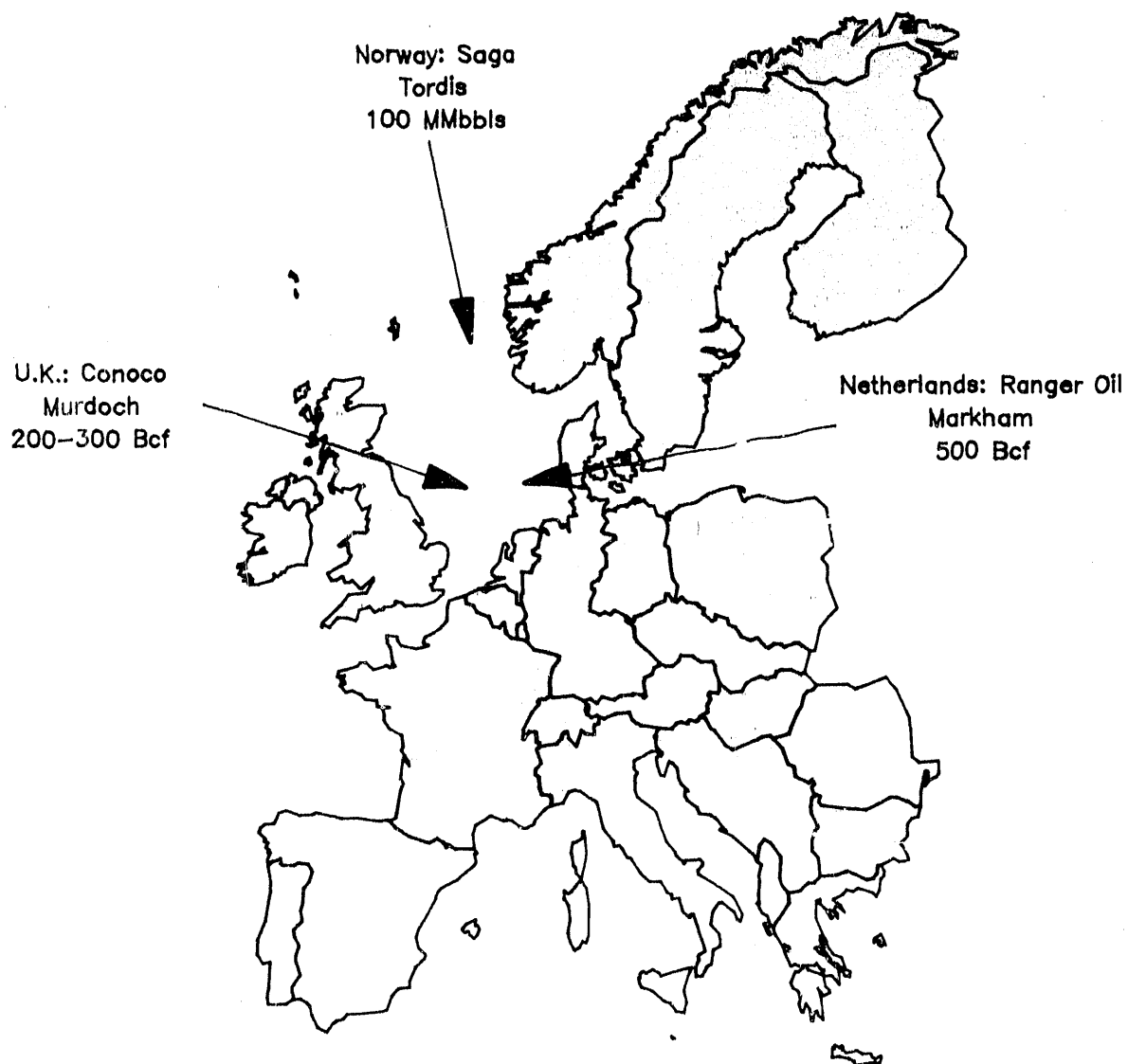
Africa (Figure 7.)

- **Tunisia** - British Gas will decide later this year on development of the offshore Miskar gas field. Negotiation of a gas sales agreement is of key importance to development. Field reserves are estimated at 1 trillion cubic feet of gas.
- **Libya** - Agip found a new geologic structure between Attifel and Rimal oil fields. The new field has estimated reserves of 60 to 70 million barrels of oil.
- **Egypt** - Shell plans to develop an oil discovery in Zeit Bay. The 25-million-barrel oil field will be produced through the Zeit Bay field production facilities at about 5,000 barrels per day.
- **Angola** - Elf has made a significant discovery offshore with its Cobo #1 well. Industry analysts have indicated that the field contains 140 million barrels of recoverable oil.
- **Equatorial Guinea** - Offshore acreage containing the Alba gas condensate field has been offered for license. Repsol discovered the Alba field in 1984 and relinquished the acreage after failing to find a market for the gas. Field reserves are estimated at 1.3 trillion cubic feet of gas and 68 million barrels of condensate.
- **Nigeria** - Agip has completed development and officially commissioned the offshore Agbara oil field 73 miles southwest of Port Harcourt. Field reserves are estimated at 65 million barrels of oil.

Oceania (Figure 8.)

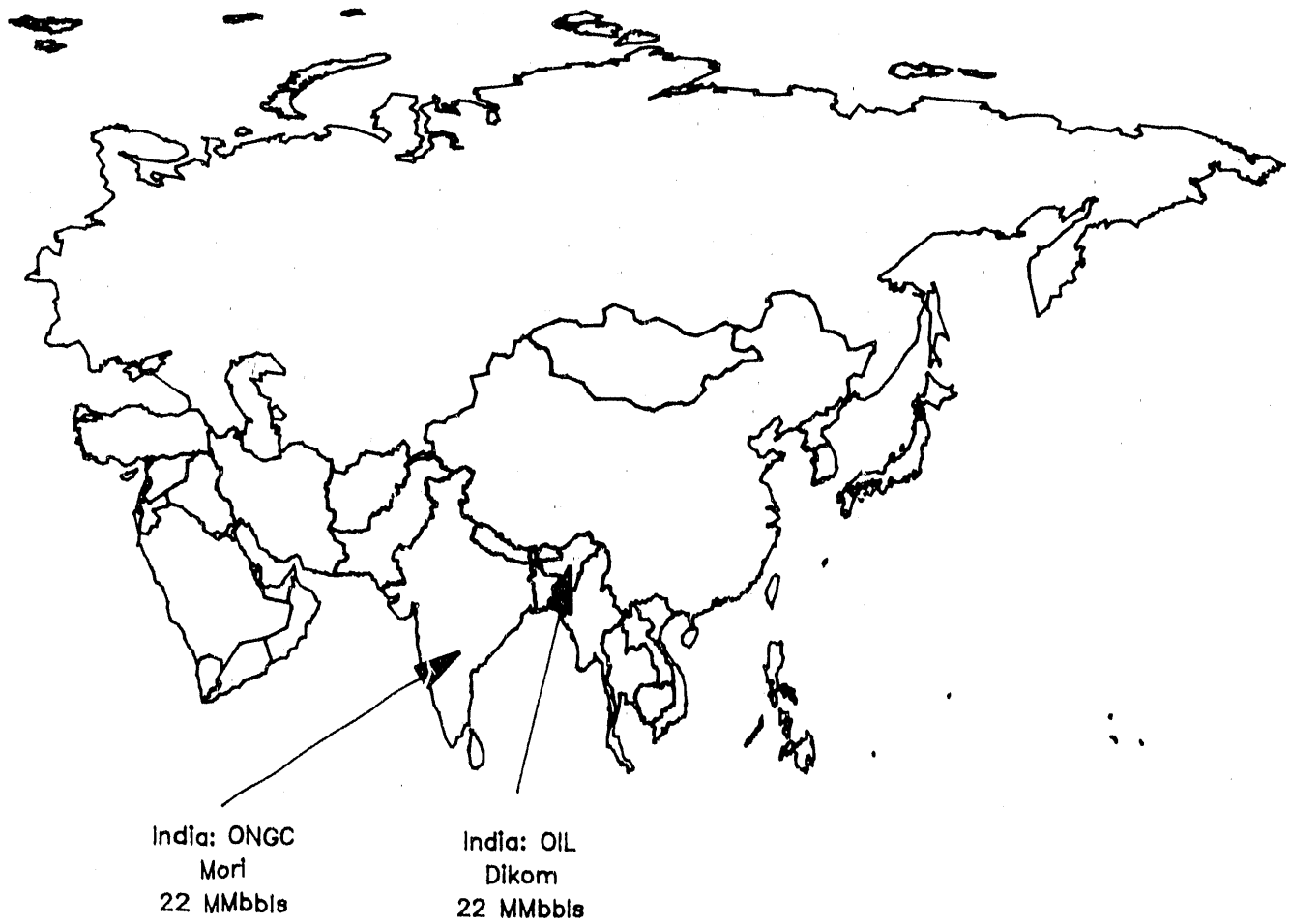
- **Australia** - Barrack Energy discovered gas with its Beharra Springs #1 well. The new field is located just over a mile from a pipeline and has estimated potential reserves of 120 billion cubic feet of gas.
- **Australia** - Wapet has declared two small fields on the Northwest Shelf commercial. Production of the Cowle and Yammaderry fields will begin in 1991. Reserves are estimated at 4 million barrels of oil for each field with a production life of 4 years.

Figure 5. European Reserve Additions for the 2nd Quarter 1990



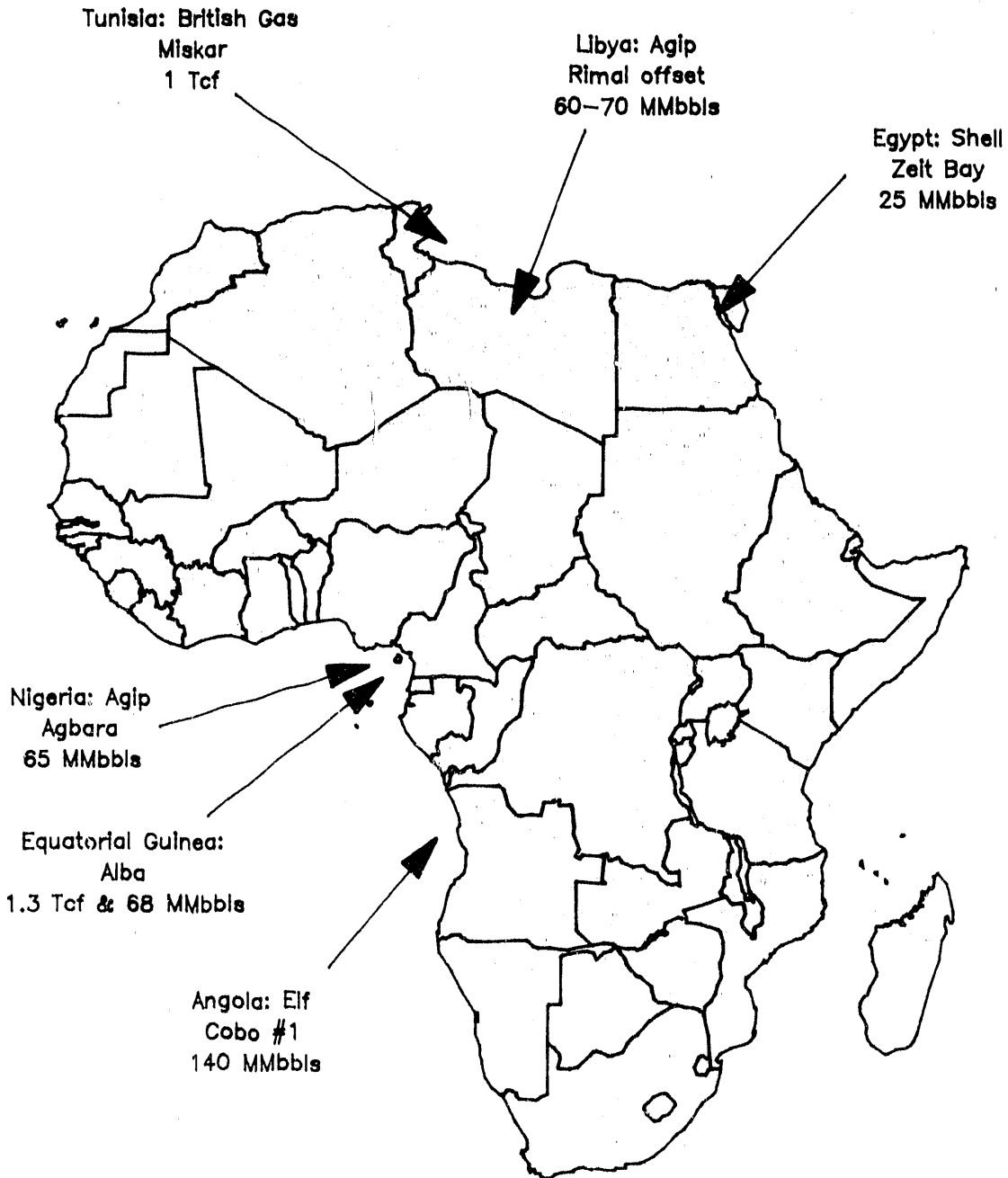
Source: Energy Information Administration, Office of Oil and Gas.

Figure 6. Asian, U.S.S.R., and Middle Eastern Reserve Additions for the 2nd Quarter 1990



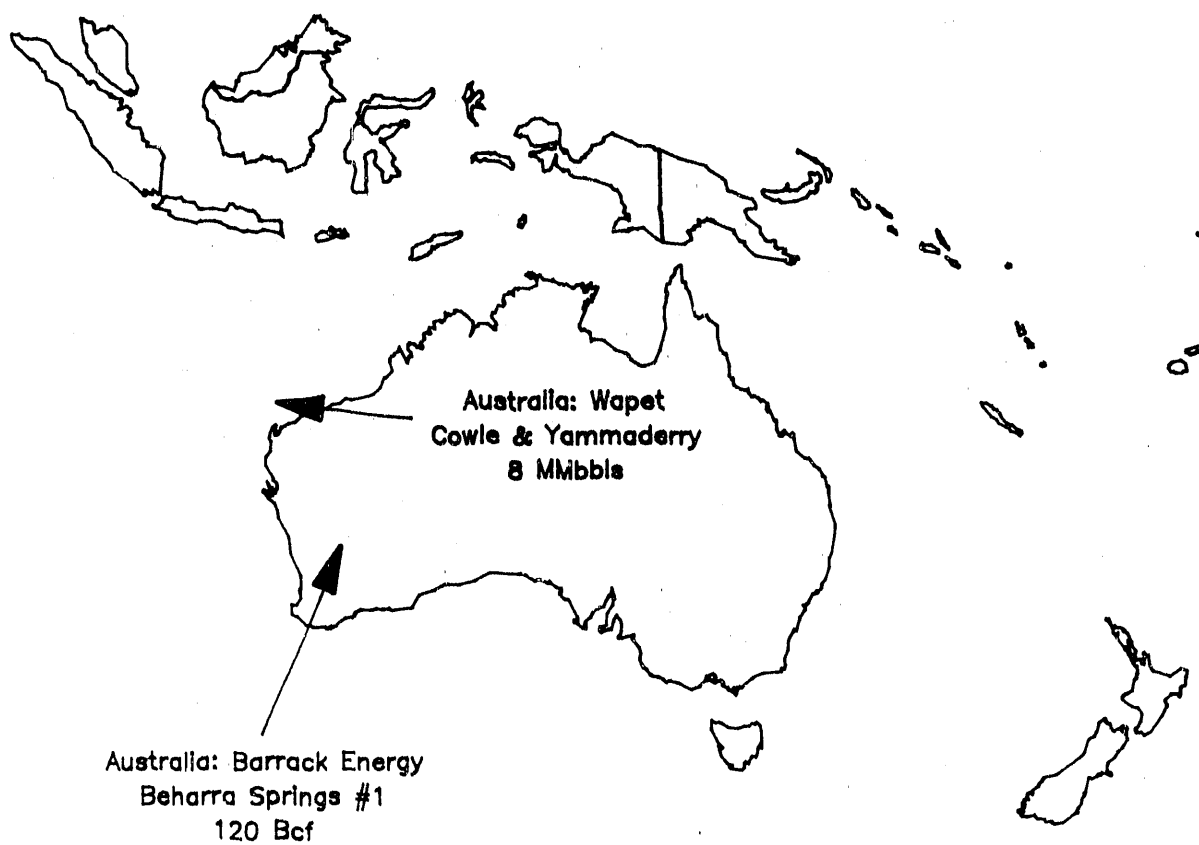
Source: Energy Information Administration, Office of Oil and Gas.

Figure 7. African Reserve Additions for the 2nd Quarter 1990



Source: Energy Information Administration, Office of Oil and Gas.

Figure 8. Oceanian Reserve Additions for the 2nd Quarter 1990



Source: Energy Information Administration, Office of Oil and Gas.

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Appendix A

**Foreign Oil and Gas
Discoveries**

Appendix A

Table A1. Foreign Oil and Gas Reserve Discoveries

Country/Field/Well	Company	Disc Date	Report Date	Source	Reserves and Comments
NEW ENTRIES ARE BOXED AND SHADED					
Angola					
*Cobo #1	Elf	1990	6/90	Pet Mngt	140 MMbbls offshore
Abu Dhabi					
*Bab & Bu Hasa fields	Adco	1987	8/88	W. Oil	3.3 Tcf deeper new gas reservoirs found
*Umm al-Anbar	Mubarraz Oil	1982	8/88	W. Oil	40 MMbbls west of Mubarraz field offshore
Australia					
*Coorroo #1	Delhi Pet	1986	1/87	Pet News	3 MMbbls
*Challis/Cassini	BHP	1984	8/87	W. Oil	20-40 MMbbls Timor Sea
			2/88	OGJ	40-50 MMbbls Timor Sea
			1/89	Ocn Ind	25-45 MMbbls Timor Sea
			8/89	OGJ	42 MMbbls Timor Sea
			8/89	W. Oil	75 MMbbls Timor Sea
			8/89	Pet News	55 MMbbls Chalkis only Timor Sea
			1/90	Pet News	42 MMbbls Timor Sea
*Jabiru	BHP	1983	8/87	W. Oil	35-40 MMbbls Timor Sea
			2/88	OGJ	30 MMbbls Timor Sea
			9/88	OGJ	50 MMbbls Timor Sea
			1/89	Ocn Ind	50-60 MMbbls Timor Sea
			8/89	OGJ	82 MMbbls Timor Sea
			10/89	OGJ	100 MMbbls Timor Sea
			1/90	Pet News	82 MMbbls Timor Sea
*Petrel	Elf Aquitaine	1969	8/87	W. Oil	6.7-15.5 Tcf Timor Sea
*Tern	Elf Aquitaine	1971	8/87	W. Oil	1.2-1.8 Tcf Timor Sea
*N. Goodwyn	Woodside	1985	8/87	W. Oil	200 MMbbls & 2 Tcf NW Shelf
			10/87	AAPG	200 MMbbls NW Shelf
*Saladin	Wapet	1985	8/87	W. Oil	20-30 MMbbls NW Shelf
			5/88	OGJ	30-40 MMbbls Carnarvon basin
			5/90	Pet Engr	20 MMbbls offshore Thevenard Island
*Skua	BHP Petroleum	1986	2/88	OGJ	20 MMbbls
			8/88	W. Oil	20-30 MMbbls Timor Sea
			1/89	Ocn Ind	40-50 MMbbls Timor Sea
			6/90	OGJ	30.5 MMbbls
*Bream	Esso-BHP	1969	8/88	W. Oil	35 MMbbls Bass Strait
*Tanwhine	Esso BHP	1982	8/88	W. Oil	7 MMbbls Bass Strait
*Seahorse	Esso-BHP	1978	8/88	W. Oil	4.4 MMbbls Bass Strait
*Whiting	Esso BHP	1983	8/88	W. Oil	21 MMbbls Bass Strait
*Talisman	Marathon	1984	9/88	OGJ	10 MMbbls NW Shelf
			1/89	Ocn Ind	10-15 MMbbls NW Shelf
*Dolphin & Perch fields	Esso	1967	12/88	Com Rpt	19 MMbbls Bass Strait
			1/89	Ocn Ind	19 MMbbls 13 MMbbls Perch, 6 MMbbls Dolphin Bass Strait
*Echo #1	Woodside	1988	1/89	Ocn Ind	1-2 Tcf 15.5 MMcf & 3858 bb/d cond Carnarvon basin
			4/89	Pet News	1 Tcf & 150 MMbbls
			1/89	Ocn Ind	6 MMbbls & 50 Bcf 262 bb/d & 2 MMcf Carnarvon basin
*Talbot	Santos	1989	1/90	Pet News	40-50 MMbbls Timor Sea
*Yolla	Sagasco	1985	2/90	Pet Engr	270 Bcf, 3 MMbbls, & 30 MMbbls LPG Bass Basin
*Cossack/Wanaea	Woodside	1989	3/90	OGJ	300 MMbbls Northwest Shelf

See footnotes at end of table.

Table A1. Foreign Oil and Gas Reserve Discoveries (Continued)

Country/Field/Well	Company	Disc Date	Report Date	Source	Reserves and Comments
*Griffin	BHP	1989	3/90	OGJ	100-150 MMbbls Northwest Shelf
Beharra Springs #1	Barrack Energy	1990	4/90	OGJ	120 Bcf southwest Australia
*Cowle	Wapet	1990	6/90	OGJ	4 MMbbls offshore Northwest Shelf
*Yammaderry	Wapet	1988	6/90	OGJ	4 MMbbls offshore Northwest Shelf

Bangladesh

*Kailashilla/Beanibazar	BOGMC	1962	8/87	W. Oil	40 MMbbls Sylhet
			2/88	Pet News	40 MMbbls Sylhet
*Fenchuganj	BOGMC	1987	2/89	Pet News	40 MMbbls
Haripur	BOGMC	1986	2/89	Pet News	40 MMbbls First oil find in country
*Jalalabad #1	Scimitar	1989	3/90	OGJ	1.5 Tcf & 30 MMbbls cond

Brazil

*RJS-345 Covina	Petrobras	1986	8/87	W. Oil	44 MMbbls Campos basin
*Marlim	Petrobras	1985	10/87	AAPG	1 Bbbls Campos basin
			4/88	OGJ	2.75 Bbbls Campos basin
			8/88	W. Oil	3.6 Bbbls & 1.2 Tcf Campos basin
*Albacora	Petrobras	1984	10/87	AAPG	500 MMbbls Campos basin
			5/88	OGJ	1.1 Bbbls Campos basin
			8/88	W. Oil	1.1 Bbbls & 2.3 Tcf Campos basin
*Urucu	Petrobras	1986	7/88	OGJ	150 MMbbls 40 API Upper Amazon
			9/88	AAPG	150 MMbbls oil, 250 MMbbls cond, & 3.5 Tcf
*Tubarao 1-PRS-4	Petrobras	1988	8/88	W. Oil	100 MMbbls 3200 bbl/d 50 API & 960 Mcfd off Parana state
*Merluza Field	Shell/Pecten	1984	9/88	AAPG	300 Bcf & 10 MMbbls cond Santos basin offshore
			8/89	W. Oil	350 Bcf & 10 MMbbls cond Santos basin offshore
*Malhado	Petrobras	1986	10/88	OGJ	30 MMbbl Campos basin
4-RJS-403	Petrobras	1989	7/89	OGJ	125 MMbbls 500 MMbbls in place west of Marlim field
3-FNS-120	Petrobras	1989	11/89	OGJ	141 Bcf & 12 MMbbls cond off NE Brazil
*1-RJS-412	Petrobras	1990	3/90	OGJ	100 MMbbls offshore Campos basin

Canada

Caroline	Shell	1986	8/87	W. Oil	2 Tcf S. Alberta sour gas
			10/87	AAPG	2 Tcf S. Alberta sour gas
			10/88	AAPG	600 Bcf, 200 MMbbls cond, & 20 million metric tons sulfur
Amuligak	Gulf	1984	8/87	W. Oil	800 MMbbls Beaufort Sea
			10/87	AAPG	700-800 MMbbls Beaufort Sea
			4/88	OGJ	500-600 MMbbls Beaufort Sea
			8/88	OGJ	500 MMbbls Beaufort Sea
			2/89	OGJ	1.5 Tcf Beaufort Sea
			8/89	OGJ	450-500 MMbbls & 2 Tcf Beaufort Sea
			3/90	OGJ	335 MMbbls & 2.2 Tcf Beaufort Sea
			6/90	Com Rpt	500 MMbbls & 2.5 Tcf
Taglu	Esso		10/87	AAPG	3 Tcf Mackenzie Delta
Terra Nova	Petro Canada	1984	12/87	AAPG	500 MMbbls Jeanne D'Arc Basin
			3/88	OGJ	130 MMbbls Jeanne D'Arc Basin
			5/88	OGJ	150 MMbbls Jeanne D'Arc Basin
			2/90	Pet Engr	400 MMbbls
Hibernia	Mobil	1979	7/88	Com Rpt	525-650 MMbbls 186 mi. east of St. John's Newfoundland
			8/89	W. Oil	500 MMbbls off St. John's, Newfoundland
			6/90	Com Rpt	525 MMbbls
Whiterose E 09	Husky	1988	10/88	OGJ	200-300 MMbbls 4999 bbl/d & 3.99 MMcfd f/9526-12086 ft

See footnotes at end of table

Table A1. Foreign Oil and Gas Reserve Discoveries (Continued)

Country/Field/Well	Company	Disc Date	Report Date	Source	Reserves and Comments
Elmworth (B.C. ext)	Canadian Hunter	1987	10/88	AAPG	3-4 Tcf Elmworth extension into British Columbia
Brassey	Canadian Hunter/BP	11/87	11/88	OGJ	20 MMbbls Northeast British Columbia
Parsons Lake	Gulf		2/89	OGJ	1.9 Tcf Mackenzie Delta
			3/90	OGJ	1.8 Tcf & 30 MMbbl cond Mackenzie Delta
			2/89	OGJ	160 Bcf Mackenzie Delta
Ya Ya			2/89	OGJ	36 MMbbls British Columbia
Inga			2/89	OGJ	36 MMbbls British Columbia
Boundary Lake	Placer CEGO		3/89	OGJ	200 Bcf & 2.5 MMbbls f/2 zones 5700 ft(sour gas) & 6900 ft
China					
*Xijiang 24-3-1	Phillips	1985	4/87	P. Times	30-60 MMbbls
			3/89	OGJ	45 MMbbls South China Sea
Nanyang		1986	10/87	AAPG	293 MMbbls Henan Province
*Huizhou 21-1	ACT	1985	2/88	Pet News	30 MMbbls South China Sea
			3/90	OGJ	127 MMbbls South China Sea Pearl River basin
*Suizhong 36-1	Bohai Oil	1986	2/88	Pet News	900 MMbbls Liadong Bay
			3/88	OGJ	1022 MMbbls Liadong Bay
			10/88	OGJ	800 MMbbls 1.2 Bbbls in place 17 API heavy oil
			1/89	Ocn Ind	900 MMbbls 17 API Liadong Bay
*BZ 34-2/4E	JCODCO	1983	2/88	Pet News	35 MMbbls Bohai
*Lufeng 13-1	JHN	1987	2/88	Pet News	30-40 MMbbls South China Sea
			4/89	Pet News	30-60 MMbbls
Dagang		1964	3/88	OGJ	730 MMbbls added Kongdian area
Bonan		1987	3/88	OGJ	1095 MMbbls Shengli basin
Xixiapo Area		1987	3/88	OGJ	2.92 Bbbls
*Huoshaoshan		1983	3/88	OGJ	730 MMbbls Xinjiang Province Junggar basin
*Liuhoa 11-1	Amoco	1987	8/88	OGJ	730 MMbbls 21 API 1000 ft of water
			4/89	Pet News	700 MMbbls
			9/88	OGJ	1.4-2.1 MMbbls added for new pay & new fields in area
Zhongyuan		1988	9/88	OGJ	1.4-2.1 MMbbls added for new pay & new fields in area
*Yacheng 13-1	ARCO/Cnooc	1983	1/89	OGJ	2.1-3.53 Tcf South of Hainan Island
			4/89	Pet News	3.5 Tcf
			8/89	OGJ	2.47-3.53 Tcf Hainan Island
Moxi		1987	2/89	Pet News	897 Bcf Sichuan Province
*Aershan			2/89	Pet News	558.3 MMbbls Erlian Basin Inner Mongolia
Gold Family	Bohai Oil	1988	2/89	Pet News	183 MMbbls near Zibo in Huantai county S side of Yellow River
*Jinzhou 20-2	Cnooc	1984	3/89	OGJ	533 MMbbls, 22 MMbbls cond, & 706 Bcf north Bohai Sea
*Bozhong 28-1	JCODCO	1981	3/89	OGJ	30 MMbbls south central Bohai Sea
*Liuhoa 4-1		1987	4/89	Pet News	30 MMbbls
Yinggehai	ARCO		1/90	OGJ	3 Tcf offshore Hainan Island
*Kekkeya		1977	1/90	OGJ	250 MMbbls & 1.02 Tcf SW Tarim basin
Colombia					
Amazonas Basin	Ecopetrol		8/87	W. Oil	40 MMbbls & 10 Bcf
*Cano Limon	Oxy	1983	8/87	W. Oil	1 Bbbls
			2/88	AAPG	1.5 Bbbls Colombia & Venezuela
			4/89	OGJ	70-100 MMbbls southern Llanos basin
*Rubiales	Tuskar Resources	1981	8/89	W. Oil	250 MMbbls heavy oil
			4/90	OGJ	350 MMbbls
			8/88	W. Oil	160 MMbbls Upper Magdalena Valley basin
*Balcon	Ecopetrol	8/88	8/89	W. Oil	160 MMbbls Upper Magdalena Valley basin
Cote d'Ivoire					
*Foxtrot	Phillips	1982	8/89	OGJ	940 Bcf gas in place offshore 50 mi sw of Abidjan

See footnotes at end of table.

Table A1. Foreign Oil and Gas Reserve Discoveries (Continued)

Country/Field/Well	Company	Disc Date	Report Date	Source	Reserves and Comments
Denmark					
*Dagmar	DUC	1983	6/89	OGJ	19 MMbbls offshore 1st Danish North Sea field with sour gas
*Gorm	DUC	1971	8/89	OGJ	20 MMbbls & 15 Tcf
*Valdemar	DUC	1977	8/89	OGJ	30 MMbbls & 210 Bcf
*Harald	DUC	1980	8/89	OGJ	900 Bcf & 50 MMbbls
*Gert	DUC	1987	8/89	OGJ	120 MMbbls 50 MMbbls on Danish side 70 MMbbls on Norwegian
Ecuador					
*Payamino	CEPE	1987	10/89	OGJ	24 MMbbls
*Cantagallo	Petro del Ecuador	1988	12/89	OGJ	45 MMbbls Oriente region
*Tiguino	Petro del Ecuador	1971	12/89	OGJ	25 MMbbls Oriente region
*Pucuna	Petro del Ecuador	1972	12/89	OGJ	20 MMbbls Oriente region
*Coca-Payamino	Petro del Ecuador	1971	12/89	OGJ	16 MMbbls Oriente region
*Paraiso	Petro del Ecuador	1987	12/89	OGJ	4 MMbbls Oriente region
*Frontera	Petro del Ecuador	1987	12/89	OGJ	3 MMbbls Oriente region
Egypt					
*Meleha Permit	Agiba	1972	8/87	OGJ	63 MMbbls Western Desert
*Sinai #1	Petrobel	1987	10/88	AAPG	20 MMbbls offshore Gulf of Suez
*Badr al-Din	Shell	1982	8/89	W. Oil	99 MMbbls Western Desert
Magawish	Total		8/89	W. Oil	55 MMbbls southern Gulf of Suez
Zeit Bay satellite	Shell	1990	5/90	OGJ	25 MMbbls offshore Zeit Bay
Equatorial Guinea					
*Alba		1984	4/90	OGJ	1.3 Tcf & 68 MMbbls offshore 22 mi north of Bioco Island
France					
*Fontaine-au-Bron	Elf	1986	10/88	Com Rpt	4.2 MMbbls
Gabon					
*Kounga #1	Shell/Elf	7/86	8/87	W. Oil	360 MMbbls
*Rabi/Kounga	Shell	1985	10/87	AAPG	500-600 MMbbls
			2/88	AAPG	1.3 Bbbls
			5/88	OGJ	500-600 MMbbls
			8/88	W. Oil	370 MMbbls to 1.2 Bbbls, 2 Bbbls possible
			11/88	OGJ	428 MMbbls
*Rabi	Shell		11/87	OGJ	370 MMbbls
*Echira & Niungo	Shell/Elf	84/88	12/89	OGJ	36.5 MMbbls
India					
*Gandhar	ONGC	1983	8/87	W. Oil	700 MMbbls Gujarat State
*Neelam	ONGC	1987	8/88	OGJ	314 MMbbls offshore western India
*Mid Tapti	ONGC	1982	2/89	Pet News	26 Bcf Gulf of Khambhat (Cambay)
*South Tapti	ONGC	1978	2/89	Pet News	230 Bcf Gulf of Khambhat (Cambay)

See footnotes at end of table.

Table A1. Foreign Oil and Gas Reserve Discoveries (Continued)

Country/Field/Well	Company	Disc Date	Report Date	Source	Reserves and Comments
*Panna	ONGC	1976	2/89	Pet News	93 MMbbls & 244 Bcf western offshore region
*Tanot #1	OIL	1988	8/89	W. Oil	27 Bcf located in Rajasthan
Mori	ONGC	1990	4/90	OGJ	22 MMbbls Krishna-Godavari basin Andhra Pradesh
Dikom	OIL	1990	5/90	OGJ	22 MMbbls Assam Pradesh
Indonesia					
*Tunu	Total	1977	10/87	AAPG	10 Tcf Mahakam Delta
*Bima	ARCO	1983	10/87	AAPG	150 MMbbls NW Java
*Intan/Widuri	Maxus	1987	6/88	OGJ	275 MMbbls SE Sumatra
			2/89	Pet News	225 MMbbls Widuri only SE Sumatra
*Pagerungan	ARCO	1985	5/89	Com Rpt	1.5 Tcf offshore Bali
			8/89	Com Rpt	1.4 Tcf
			5/90	OGJ	2.5-3.5 Tcf Pagerungan Island Java Sea
Northeast Intan	Maxus	1989	10/89	OGJ	10 MMbbls off SE Sumatra
*Belanak	Conoco	1982	12/89	OGJ	1 Tcf W of Natuna Island S China Sea Block B
*Minas	Caltex	1944	8/90	OGJ	500 MMbbls added due to palm waterflood
Iran					
Koobe Mand		1988	12/88	OGJ	10 Bbbls very heavy crude southeast of Bushire
Behbahan		1988	12/88	OGJ	200 MMbbls east of Behbahan
Lamard		1989	10/89	OGJ	8 Tcf western portion only S Fars prov. 50 x 7.5 mi reservoir
Iraq					
*East Baghdad		1979	5/89	OGJ	7 Bbbls
			8/89	W. Oil	10.8 Bbbls 22-24 API
*Khabbaz	Technip Geoproduct	1983	12/89	OGJ	2 Bbbls
Anfal			12/89	OGJ	4.5 Tcf northern Iraq near Kirkuk
Italy					
*Villafortuna	Agip	1984	6/88	OGJ	<300 MMbbls 45 API f/18700 ft River Ticino
*Irinio	Selm	1982	8/89	W. Oil	20-40 MMbbls & 10 Bcf SE Sicily
Jordan					
*Risha	NRA	7/87	10/88	AAPG	1 Tcf 15 MMcfd
			3/90	OGJ	500 Bcf
Kuwait					
*Magwa & Minagish Fields		1986	8/87	W. Oil	20 Bbbls Marat Development Program
Magwa field area well		1987	8/88	W. Oil	1 Bbbls 1 Marat outpost well
Libya					
*Bouri	Agip	1976	10/87	AAPG	420 MMbbls

See footnotes at end of table.

Table A1. Foreign Oil and Gas Reserve Discoveries (Continued)

Country/Field/Well	Company	Disc Date	Report Date	Source	Reserves and Comments
			5/88	Pet Mngt	500-700 MMbbls
			9/88	OGJ	670 MMbbls
			10/88	AAPG	500 MMbbls
			1/89	OGJ	2.5 Bbbls & 1.25 Tcf
Rimal offset	Agip	1990	6/90	OGJ	60-70 MMbbls offset to Rimal Field
Malaysia					
*Seligi	Petronas	1971	1/89	Ocn Ind	420 MMbbls 171 mi off Trengganu largest in country
*Jerneh	Esso	1969	7/89	Oil Dly	3 Tcf largest gas field in country off Trengganu
Block SB-1	Shell	1988	8/89	W. Oil	150-200 MMbbls off Kota Kinabalu, Sabah
Myanmar					
Martaban	JNOC		1/87	Pet News	4 Tcf Gulf of Martaban
			8/87	W. Oil	3-7 Tcf Gulf of Martaban
			11/89	Pet News	4.3 Tcf Gulf of Martaban
*3Da Structure	Myanma Oil Corp	1983	2/89	Pet News	4.3 Tcf Gulf of Martaban
Namibia					
*Kudu	SW African Oil Expl	1974	8/87	W. Oil	3-10 Tcf
			8/89	W. Oil	2 Tcf off Orange River mouth
Netherlands					
*F/15-4, 5	Petroland	1986	8/87	W. Oil	420 Bcf
*F/14-5	Statoil	1986	10/87	AAPG	<75 MMbbls North Sea
*K/5a	Elf Petroland	1988	10/88	OGJ	100-200 Bcf 36 MMcfd southern gas basin
*K/6	Petroland	1936	5/89	OGJ	353 Bcf
*Markham	Ranger Oil	1984	6/90	OGJ	500 Bcf Dutch North Sea
New Zealand					
*Tairiki 1/1A	Petrocorp	1986	10/87	AAPG	2.97 MMbbls & 85.4 Bcf E. Taranaki Basin
			10/88	AAPG	4.21 MMbbls & 85 Bcf
*Ahuroa 2A	Petrocorp	1986	10/87	AAPG	1.02 MMbbls & 37.2 Bcf E. Taranaki Basin
			10/88	AAPG	1.4 MMbbls cond & 39 Bcf
*Kupe South	TCPL Resources	12/86	2/88	Pet News	60 MMbbls & 300 Bcf S. Taranaki Basin
			8/88	W. Oil	60 MMbbls Taranaki Basin North Island
			2/89	Pet News	33 MMbbls, 26 MMbbls LPG, & 400 Bcf Taranaki Basin
Ngaere			2/89	Pet News	40 MMbbls onshore Taranaki Basin
*Waihapa	Petrocorp	1985	8/89	OGJ	14 MMbbls Taranaki Peninsula
Nigeria					
*Tunu #1	Shell	1988	8/88	Oil Dly	65 MMbbls
*Benin Estuary #1	Shell	1988	8/88	Oil Dly	15 MMbbls & 100 Bcf
*Ososo #1	Shell	1988	8/88	Oil Dly	150 Bcf
*Gbetiokun #1	Shell	1987	8/88	W. Oil	50 MMbbls
*Opomoyo #1	Shell	1988	8/88	W. Oil	30 MMbbls

See footnotes at end of table.

Table A1. Foreign Oil and Gas Reserve Discoveries (Continued)

Country/Field/Well	Company	Disc Date	Report Date	Source	Reserves and Comments
*Ebegoro South 1B	Agip	1987	10/88	AAPG	50 MMbbls NE delta region
*Orogbo #1	Shell-NNPC	1988	2/89	OGJ	150 MMbbls west of Sapele, Bendel state
*Orubou #2	Shell-NNPC	1989	2/89	OGJ	100 MMbbls near Benisede, Bendel state
*Akono #1	Shell-NNPC	1988	2/89	OGJ	15 MMbbls near Benisede, Bendel state
Kappa #3	Shell-NNPC		2/89	OGJ	20 MMbbls off Rivers state
*South HB #1	Shell-NNPC	1989	2/89	OGJ	1.5 Tcf off Rivers state
*Oso	Mobil	1967	2/90	OGJ	3 Tcf & 445 MMbbls cond offshore
*Iyak	Mobil	1967	2/90	OGJ	146 MMbbls
*Edop	Mobil	1981	2/90	OGJ	850 MMbbls offshore
*Sapele	Shell	1969	2/90	OGJ	700 MMbbls heavy oil Niger Delta
*Obagi/Ukpomani	Elf	1964	3/90	OGJ	100 MMbbls Rivers & Bendel states
*Agbara	Agip	1981	5/90	OGJ	65 MMbbls 73 mi SW of Port Harcourt
Norway					
*Heldrun	Conoco	1985	8/87	W. Oil	745 MMbbls & 1.3 Tcf
			4/89	W. Oil	752 MMbbls & 1.1 Tcf
			8/89	OGJ	750 MMbbls & 1.4 Tcf Haltenbanken area
			10/89	OGJ	756 MMbbls & 1.06 Tcf Haltenbanken area
			1/90	OGJ	750 MMbbls & 1-1.5 Tcf Haltenbanken area
			2/90	JPT	550 MMbbls & 1.02 Tcf
			5/90	OGJ	750 MMbbls & 1 Tcf
*Draugen		1984	8/87	W. Oil	400 MMbbls & 60 Bcf
			2/88	AAPG	1 Bbbls
			11/88	OGJ	422 MMbbls & 106 Bcf
			8/89	OGJ	400 MMbbls & 60 Bcf Haltenbanken area
*Snorre		1979	8/87	W. Oil	700 MMbbls & 250 Bcf
			4/89	W. Oil	722 MMbbls & 314 Bcf
			7/89	OGJ	667-680 MMbbls
			8/89	OGJ	680 MMbbls & 250 Bcf
Haltenbanken Area			2/88	AAPG	1.9 Bbbls
*Veslefrikk	Statoil	1981	8/88	Pet Engr	230 MMbbls block 30/3
			4/89	W. Oil	191 MMbbls & 124 Bcf
*34/7-12	Saga	1987	8/88	W. Oil	200-000 MMbbls 9385 bb/d
*34/7-13	Saga	1988	8/88	W. Oil	30-60 MMbbls 8491 bb/d
*North Statfjord 33/9-4	Statoil	1977	8/88	W. Oil	120 MMbbls 8900 bb/d
			11/88	OGJ	126 MMbbls
*East Statfjord	Statoil	1976	11/88	OGJ	95 MMbbls
*Ula	BP	1976	12/88	OGJ	80 MMbbls Upward Revision f/250-330 MMbbls
			10/89	OGJ	90 MMbbls added, 420 MMbbls total Block 7/12
*Oseberg	Norsk Hydro	1979	4/89	W. Oil	125 MMbbls
			5/89	OGJ	1.57 Bbbls 80 mi west of Bergen
			2/90	Pet Mngt	1.46 Bbbls
*Gyda	BP	1980	4/89	W. Oil	212 MMbbls & 116 Bcf
*Hod	Amoco	1974	4/89	W. Oil	37 MMbbls & 141 Bcf
*Sleipner	Statoil	1974	4/89	W. Oil	175 MMbbls & 1.75 Tcf
*East Troll	Statoil		4/89	W. Oil	13.2 Tcf & 34 MMbbls
*Troll	Statoil	1979	6/89	OGJ	43.8 Tcf includes both East & West Troll
			8/89	OGJ	45.5 Tcf
*West Flank, Troll	Statoil		6/89	OGJ	258 MMbbls western rim of Troll
			1/90	OGJ	260 MMbbls western lobe of Troll
			5/90	OGJ	411 MMbbls western province
*Brage	Norsk Hydro	1980	6/89	OGJ	243 MMbbls & 98 Bcf offshore
			2/90	OGJ	240 MMbbls & 12 Bcf
			3/90	Pet Mngt	240 MMbbls & 40 Bcf
*Njord 6407/7-1	Norsk Hydro	1986	8/89	OGJ	250 MMbbls & 300 Bcf Haltenbanken area

See footnotes at end of table.

Table A1. Foreign Oil and Gas Reserve Discoveries (Continued)

Country/Field/Well	Company	Disc Date	Report Date	Source	Reserves and Comments
6407/7-4	Norsk Hydro	1989	8/89	W. Oil	250 MMbbls & 353 Bcf
*East Sleipner		1981	8/89	W. Oil	1.8 Tcf & *06 MMbbls
*Odin	Esso	1974	8/89	Pet Engr	1.2 Tcf North Sea Block 30/10
*Froy	Elf	1988	8/89	Pet Engr	100-125 MMbbls & 200 Bcf North Sea Block 25/5
			2/90	OGJ	95-125 MMbbls
*Gulfaks	Statoil	1978	12/89	OGJ	126 MMbbls added, 1,449 Bbbls total
*Midgard	Saga	1981	1/90	Pet Engr	3-4 Tcf & 100 MMbbls cond Haltenbanken area
Froy Satellite	Elf	1989	2/90	OGJ	30-60 MMbbls North of Froy structure
*3/7/04	Shell	1990	2/90	OGJ	40-50 MMbbls & 300-400 Bcf Sojne basin
Tordis	Saga		5/90	OGJ	100 MMbbls North Sea Block 34/7

Oman

*Bukha	IPC	1979	10/87	AAPG	40 MMbbls
*Safah	Occidental	1983	4/89	Com Rpt	50 MMbbls increase /21-71 MMbbls due to development drilling
Saih Nihayda (deep)	PDO	1989	6/89	Oil Dly	353 Bcf
*Saih Nihayda (shallow)	PDO	1972	6/89	Oil Dly	1.2 Tcf

Papua New Guinea

*Juha	Niugini Gulf	1982	8/87	W. Oil	65 MMbbls & 1 Tcf Suspended Development
			2/88	Pet News	32 MMbbls & .8 Tcf
			3/89	OGJ	90 MMbbls & 1.1 Tcf
*Iagifu	Niugini Gulf	1985	8/87	W. Oil	500 MMbbls Southern Highlands
			2/88	Pet News	500 MMbbls
			10/88	AAPG	400 MMbbls 46 API
*Hides #1	BP Dev	1987	1/88	OGJ	1.5 Tcf 27.97 MMcfd & 447 bbl/d 2 zones Southern Highlands
			2/88	Pet News	1.5 Tcf
			3/89	OGJ	2 Tcf & 60 MMbbls cond
			9/89	Pet News	1.5 Tcf & 39 MMbbls cond Southern Highlands
			8/90	Pet News	2 Tcf
*Pasca A	Kelvin Energy	1968	2/88	Pet News	30 MMbbls & 300-410 Bcf
			2/89	Pet news	36 MMbbls & 300 Bcf
			9/89	Pet News	36 MMbbls & 350 Bcf offshore
*Pandora	IPC	1988	12/88	OGJ	3 Tcf offshore
			9/89	Pet News	4 Tcf proved, 1.7 Tcf probable, 2.7 Tcf possible offshore
*Iagifu & NW Hedinia			12/88	Pet News	130 MMbbls
*Iagifu-Hedinia-SE Hedinia	Chevron Niugini Gulf		2/89	Pet News	115-500 MMbbls
			8/89	W. Oil	230 MMbbls
*Iagifu & Hedinia	Chevron		3/89	OGJ	30-300 MMbbls
*Agogo	Chevron	1989	8/89	W. Oil	50 MMbbls on trend with Iagifu and Hedinia
*Iagifu, Hedinia, Agogo	Chevron		5/90	OGJ	170 MMbbls

Peru

*Cashirani	Shell	1986	10/87	AAPG	4 Tcf
*San Martin	Shell	1984	10/87	AAPG	3 Tcf
			2/88	AAPG	1.8 Bbbls eq
*San Martin/Cashirani	Shell		3/88	OGJ	12 Tcf & 650 MMbbls
			8/88	W. Oil	10 Tcf & 600 MMbbls cond
			8/89	OGJ	10 Tcf & 750 MMbbls a.k.a. Camisea south central jungle
*Chambira 123X	Petroperu	1989	8/89	OGJ	30-50 MMbbls 26 API northern jungle

See footnotes at end of table.

Table A1. Foreign Oil and Gas Reserve Discoveries (Continued)

Country/Field/Well	Company	Disc Date	Report Date	Source	Reserves and Comments
Philippines					
*Matinloc	Alcorn	1978	7/89	OGJ	1.45 MMbbls
*North Matinloc	Alcorn	1989	7/89	OGJ	4.157 MMbbls
*Galoc	Alcorn	1981	7/89	OGJ	40-50 MMbbls
*Nido	Alcorn	1978	7/89	OGJ	0.735 MMbbls
*Cadlao	Alcorn	1977	7/89	OGJ	11.2 MMbbls
Qatar					
*North Field	QGPC	1971	8/87	W. Oil	130 Tcf
			5/89	OGJ	150 Tcf
Romania					
*E. & W. Lebada		1981	8/87	W. Oil	73 MMbbls Black Sea
Saudi Arabia					
*Central Province	Saudi Aramco	1989	3/90	Pet Mngt	30 Bbbls southeast of Riyadh
			4/90	OGJ	2 Bbbls 3 wells southeast of Riyadh
South Africa					
*Mossel Bay Area	Soekor		8/87	W. Oil	1 Tcf
Sudan					
*Suakin		1976	8/89	W. Oil	123 MMbbls & 864 Bcf Red Sea 30 mi from Port Sudan
Sweden					
Klints Bank	Satellite Explor	1989	4/89	OGJ	63 MMbbls Swedish Baltic Sea off NE Gotland
Taiwan					
*CBK	CPC	1979	1/87	Pet News	5-10 MMbbls & 108 Bcf
			2/88	Pet News	5-10 MMbbls Straits of Taiwan
Thailand					
*"B" Structure	Total CFP	1973	7/88	OGJ	1.8 Tcf, 6 Tcf possible
			10/89	Pet News	3.5 Tcf
			12/89	OGJ	1.8 Tcf & 32 MMbbls cond
			1/90	OGJ	3.5 Tcf Gulf of Thailand
			4/90	OGJ	1.8 Tcf & 32 MMbbls cond
*Kaphong	Unocal	1979	7/88	OGJ	376 Bcf & 8.699 MMbbls
*Nam Phong	Esso	1982	12/88	OGJ	1.5 Tcf Kaen Province 310 mi NE of Bangkok 100 ppm H2S
*Sirikit	Shell	1981	2/89	OGJ	20 MMbbls, a 40% increase to 70 MMbbls

See footnotes at end of table.

Table A1. Foreign Oil and Gas Reserve Discoveries (Continued)

Country/Field/Well	Company	Disc Date	Report Date	Source	Reserves and Comments
*E-5 Structure	Esso	1981	10/89	Pet News	1.5 Tcf located in Khon kaen
Trinidad & Tobago					
*Pelican		1977	8/89	W. Oil	21 MMbbls & 740 Bcf
Tunisia					
*Miskar	British Gas	1975	6/90	OGJ	1 Tcf offshore
Turkey					
*Karakus	TPAO	1988	12/89	OGJ	112 MMbbls near Kahta
*Zeynel #1	Alladin Middle East	1989	2/90	JPT	10 MMbbls SE Turkey
*Nemrut #1	Alladin Middle East	1990	2/90	JPT	25 MMbbls SE Turkey
United Kingdom					
*Don	BP	1977	4/87	P. Times	50 MMbbls
			8/88	Pet Engr	56 MMbbls
*Amethyst East & West	BP	1972	4/87	P. Times	283 Bcf
			8/88	OGJ	850 Bcf
			4/89	W. Oil	850 Bcf & 9 MMbbls cond
*Forties		1970	8/87	W. Oil	319 MMbbls Upward Revision
*Magnus		1974	8/87	W. Oil	100 MMbbls Upward Revision
*Nelson	Enterprise/Shell	1987	3/88	OGJ	150-175 MMbbls 6500 bb/d 40 API
			4/89	W. Oil	320 MMbbls
			8/89	OGJ	350 MMbbls & 100 Bcf
*Gryphon	Kerr-McGee	1987	5/88	Pet Mngt	300-700 MMbbls
			8/88	Pet Engr	300-700 MMbbls
			8/88	W. Oil	175-250 MMbbls
			10/88	AAPG	250 MMbbls Block 9/18b
			8/89	OGJ	250 MMbbls
*Forth	Britoil	1988	5/88	Pet Mngt	200 MMbbls & 60 Bcf
			8/88	OGJ	200 MMbbls & 600 Bcf
*Pickering/Valkyrie area	ARCO/Conoco	1985	8/88	OGJ	850 Bcf
			2/90	OGJ	75 Bcf Pickerill only
*N & S Welland	ARCO	1984	8/88	OGJ	300 Bcf
*Venture	Conoco	1974	8/88	OGJ	60 Bcf
*Lancelot area	Mobil	1985	8/88	OGJ	600 Bcf
*Anglia	Ranger Oil	1972	8/88	OGJ	250 Bcf
			2/89	OGJ	200 Bcf Blocks 48/18b & 48/19b North Sea
*Camelot	Mobil	1967	8/88	OGJ	250 Bcf
			12/88	Com Rpt	210 Bcf
			2/89	OGJ	250 Bcf
*North Ravenspurn	Hamilton Brothers	1984	8/88	OGJ	1.3 Tcf reserves 2 Tcf in place
			4/89	W. Oil	1.2 Tcf
Sole Pits area	Shell/Esso		8/88	OGJ	3 Tcf
*Gannet Group	Shell/Esso	1973	8/88	OGJ	500 Bcf
			5/89	Pet Engr	170 MMbbls & 700 Bcf 112 mi east of Aberdeen
*Joanne & Judy	Phillips	1981	8/88	OGJ	400 Bcf & 150 MMbbls
			6/90	Pet Mngt	600 Bcf & 150 MMbbls J Block
*Tiffany & Toni	Agip	1977	8/88	OGJ	125 Bcf & 180 MMbbls T-block 16/17

See footnotes at end of table.

Table A1. Foreign Oil and Gas Reserve Discoveries (Continued)

Country/Field/Well	Company	Disc Date	Report Date	Source	Reserves and Comments
*Arbroath	Amoco	12/69	8/88	Pet Engr	103 MMbbls 5 ml f/Montrose field
*Miller	BP	1983	8/88	Pet Engr	300 MMbbls blocks 16/7 & 16/8
			10/88	OGJ	300 MMbbls & 570 Bcf
			4/89	W. Oil	326 MMbbls & 470 Bcf
			7/89	OGJ	300 MMbbls & 570 Bcf of sour gas
*Kittiwake	Shell Expro	1981	8/88	Pet Engr	70 MMbbls block 21/18
*Scott (Waverley/Brunel)	Amerada Hess	1984	8/88	Pet Engr	150-200 MMbbl blocks 15/21a & 15/22
			10/88	OGJ	250 MMbbls combined Waverley & Brunel
			12/88	OGJ	400 MMbbls combined Waverley & Brunel
			6/90	Com Rpt	450 MMbbls, 38 MMbbls NGL, 267 Bcf
16/28c-11	BP	1988	9/88	OGJ	10 MMbbls 6000 bb/d 1st horizontal well f/semi off U.K.
*Hudson Field 210/24a	Amoco	1987	10/88	AAPG	100 MMbbls
*Crawford 9/28	Hamilton Bros	1975	10/88	OGJ	14.6 MMbbls 140 ml east of Orkney Islands
*Osprey	Shell	1974	12/88	OGJ	60 MMbbls
*Wytch Farm offshore	BP	1988	12/88	OGJ	100 MMbbls offshore extension to Wytch Farm field
*Clipper & Barque fields	Shell	1971	12/88	Com Rpt	860 Bcf Sole Pit area southern North Sea
			4/89	W. Oil	874 Bcf
*Emerald	Sovereign	1978	2/89	OGJ	43 MMbbls 24 API f/5150-5600 ft 70 ml E of Shetlands
			8/89	OGJ	40 MMbbls
*Claymore	Occidental	1974	2/89	OGJ	46 MMbbls, a 31% increase to 195 MMbbls total remaining
*Chanter	Occidental	1985	4/89	W. Oil	9 MMbbls & 29 Bcf
*Cyrus	BP	1979	4/89	W. Oil	15 MMbbls
			8/89	OGJ	11.4 MMbbls
			10/89	OGJ	13 MMbbls
*Glamis/Blair	Sun	1982	4/89	W. Oil	18 MMbbls
			8/89	OGJ	17.5 MMbbls
*Ivanhoe/Rob Roy	Amerada Hess	1975	4/89	W. Oil	88 MMbbls & 30 Bcf
			5/89	OGJ	105 MMbbls & 65 Bcf Block 15/21a, 110 ml east of Aberdeen
*Tern	Shell	1975	4/89	W. Oil	175 MMbbls
*Wytch Farm	BP	1974	7/89	OGJ	230 MMbbls
			2/90	OGJ	300 MMbbls on and offshore
*Bruce	BP	1974	8/89	OGJ	2.5 Tcf & 210 MMbbls
			9/89	OGJ	2.6 Tcf & 210 MMbbls cond & NGL Blocks 9/8a, 9/9a, 9/9b
*East Brae	Marathon	1980	8/89	OGJ	300 MMbbls & 1.2 Tcf
*Alba	Chevron	8/84	8/89	OGJ	320 MMbbls
			11/89	OGJ	250 MMbbls 20 API 1 Bbbls in place Block 16/26
			4/90	OGJ	250-300 MMbbls
*Block 4/26	Ranger	1985	8/89	OGJ	150 Bcf
*Franklin	Ultramar	1986	8/89	OGJ	2 Tcf & 200 MMbbls Block 29/5 North Sea
*Elder		1976	8/89	W. Oil	88 MMbbls
*Alwyn North		1975	8/89	W. Oil	950 Bcf
*Audrey		1976	8/89	W. Oil	1 Tcf
*Cleeton & S Ravenspurn		1983	8/89	W. Oil	1.2 Tcf
*Welton		1982	8/89	W. Oil	20 MMbbls
*Saltire (East Piper)	Occidental	1988	8/89	Pet Engr	60 MMbbls
			8/89	Com Rpt	100 MMbbls Block 15/17
			6/90	Com Rpt	130 MMbbls
*Moira	Phillips	1988	9/89	OGJ	5.5 MMbbls Block 16/29a
*Linnhe	Mobil	1988	9/89	OGJ	10 MMbbls
*Block 15/20a	BP	1987	10/89	OGJ	21 MMbbls 160 ml NE of Aberdeen
*Thistle	BP	1973	11/89	OGJ	57 MMbbls added, 420 MMbbls total
*Beatrice	BP	1976	11/89	OGJ	18 MMbbls added, 130 MMbbls total
*Ninian	Chevron	1974	1/90	OGJ	55-155 MMbbl increase to 1.1-1.2 Bbbls 100 ml E of Shetland Is
*Hamish	Amerada Hess	1988	2/90	OGJ	1.5 MMbbls Block 15/21b close to Rob Roy
*Wareham	BP	1964	2/90	OGJ	6 MMbbls close to Wytch Farm
*Murdoch	Conoco	1984	5/90	OGJ	200-300 Bcf Block 44/22b southern North Sea
*Andrews		1974	6/90	Pet Mngt	75 MMbbls & 150 Bcf North Sea

See footnotes at end of table.

Table A1. Foreign Oil and Gas Reserve Discoveries (Continued)

Country/Field/Well	Company	Disc Date	Report Date	Source	Reserves and Comments
USSR					
*Bovanenko/Kharasavey Tengiz		1971	8/87	W. Oil	190 Tcf Yamal Peninsula
		1979	4/88	OGJ	18.25 Bbbls oil in place NE Caspian basin
			4/88	PIW	14-19 Bbbls oil in place
			8/88	W. Oil	18.25 Bbbls oil in place North Caspian basin
			4/89	OGJ	6-7 Bbbls 16 Bbbls oil in place
			8/89	W. Oil	9.5 Bbbls officially reported Soviet reserves
			6/90	OGJ	10-11 Bbbls in-place could be 35-40 Bbbls & 48 Tcf
*Bovanenkovskoye		1971	8/88	W. Oil	79 Tcf Yamal Peninsula
			2/89	OGJ	146 Tcf Yamal Peninsula
*Komsomolskoye		1966	2/89	OGJ	16 Tcf western Siberia proved & probable
*Yubileinoe		1969	3/89	OGJ	12.1 Tcf western Siberia proved & probable
Peltunastokskoye			4/89	OGJ	200 MMbbls off Sakhalin Island Sea of Okhotsk
Shtokmanovskoye		1988	9/89	OGJ	105-141 Tcf Barents Sea
			1/90	OGJ	106 Tcf Barents Sea 250 mi NE of Murmansk
			6/90	OGJ	141 Tcf
Russanovskoye		1989	12/89	AAPG	210 Tcf Kara Sea
*Russskoye		1968	6/90	OGJ	5 Tcf northern Tyumen province
Venezuela					
ORS-52	Lagoven	1/86	11/86	AAPG	70 MMbbls & 870 Bcf
Orinoco Heavy Oil Belt			11/86	AAPG	267 Bbbls
			8/87	W. Oil	18-200 Bbbls
			7/89	OGJ	500 Bbbls 1.25 Tbbbls in place
*El Furrial	Lagoven	12/85	11/86	AAPG	1.07 Bbbls & 3.7 Tcf
		1986	8/87	W. Oil	528 MMbbls Monagas State
		1986	10/87	AAPG	.5-1 Bbbls Monagas State
		1986	2/88	AAPG	2 Bbbls & 2.8 Tcf Monagas State
			6/88	OGJ	832 MMbbls Monagas State
			8/89	W. Oil	307 MMbbls & 542 Bcf
S. Lake Maracaibo	Lagoven	1986	8/87	W. Oil	200 MMbbls S. Lake Maracaibo
Apure Area	Corpoven	1986	8/87	W. Oil	600-700 MMbbls Apure Area
Eastern Venezuela Basin			2/88	AAPG	500 Bbbls
			3/88	OGJ	11.3 Bbbls
Monagas El Furrial-Fields			3/88	OGJ	8.6 Bbbls Monagas State Only
*Ceuta VLG 3725 X	Maraven		8/88	W. Oil	140 MMbbls
*El Carito #1X	Corpoven	1988	8/88	W. Oil	1.2 Bbbls & 2.8 Tcf 8000 bbl/d 35 API
west Lake Maracaibo	PDVSA	7/87	8/88	W. Oil	819 MMbbls western Lake Maracaibo region new field
El Furrial Norte #1	Lagoven	1988	9/88	OGJ	150 MMbbls 7057 bbl/d 23.5 API TVD 16420 ft
*Ceuta South-Southeast	Maraven	1985	9/88	AAPG	800 MMbbls south of Lake Maracaibo
*Musipan		1987	8/89	W. Oil	520 MMbbls Monagas State
*Guafita		1984	8/89	W. Oil	450 MMbbls Apure State
*Boqueron	Lagoven	1989	8/89	Oil Dly	380 MMbbls Monagas State
Vietnam					
*White Tiger (Bach Ho)	VietSovpetro	1970	2/89	Pet News	2.1 Bbbls offshore Ho Chi Minh City
			2/89	AAPG	20 MMbbls 50-100 MMbbls possible
			10/89	Pet News	80-100 MMbbls
*Great Bear (Dai Hung)	Petrovietnam	1988	2/89	Pet News	20 MMbbls Offshore Ho Chi Minh City

See footnotes at end of table.

Table A1. Foreign Oil and Gas Reserve Discoveries (Continued)

Country/Field/Well	Company	Disc Date	Report Date	Source	Reserves and Comments
West Germany					
*Mittelplate	Texaco/Wintershall	1980	8/87	W. Oil	115 MMbbls Heavy Oil
B/4	BEB	1988	4/89	W. Oil	50 Bcf offshore
Yemen					
*Alif	Yemen Hunt Oil	7/84	8/87	W. Oil	500 MMbbls Marib
*Wadi al Jawf Area	Yepco	1986	8/87	W. Oil	500 MMbbls & 6 Tcf In Addition to Alif
*Asa'ad Al-Kamil	YEPCO	12/87	8/89	OGJ	2.7 Tcf & 133 MMbbls

*Field is also in Petroconsultants data base which does not necessarily have the same reserve value.

Sources: **AAPG**: American Association of Petroleum Geologists Bulletin or Explorer. **Com Rpt**: Company Report either annual or quarterly stock holders reports. **JPT**: Journal of Petroleum Technology. **Ocn Ind**: Ocean Industries. **OGJ**: Oil and Gas Journal. **Oil Dly**: The Oil Daily. **PIW**: Petroleum Intelligence Weekly. **P. Times**: Petroleum Times. **Pet Engr**: Petroleum Engineer International. **Pet Mngt**: Petroleum Management. **Pet News**: Petroleum News. **W. Oil**: World Oil.

Appendix B

**Modified
Petroconsultants
Reserve Additions**

Appendix B

Table B1. Modified Petroconsultants Reserve Additions

Country	Oil, MMbbls			Natural Gas, Bcf		
	Last 3 Months 4/90-6/90	Last 12 Months 7/89-6/90	Last 36 Months 7/87-6/90	Last 3 Months 4/90-6/90	Last 12 Months 7/89-6/90	Last 36 Months 7/87-6/90
North America						
Cuba	0	59	60	0	139	139
Guatemala	0	-8	21	0	-4	-4
Mexico	0	840	19,225	0	3,899	24,229
Total	0	891	19,306	0	4,034	24,364
South America						
Argentina	141	339	3,009	410	-3,479	25,117
Barbados	0	-2	-3	0	-3	8
Bolivia	1	2	41	0	245	562
Brazil	410	1,954	5,074	290	1,368	5,175
Chile	0	24	168	0	99	7,274
Colombia	50	513	1,285	1,248	1,700	2,192
Ecuador	23	52	492	37	179	-284
Peru	0	32	20	0	0	11,636
Suriname	0	0	9	0	0	0
Trinidad	45	135	273	300	102	332
Venezuela	196	-146	20,165	3,242	5,802	16,352
Total	866	2,903	30,533	5,527	6,013	68,364
Western Europe						
Austria	5	2	29	-4	75	350
Denmark	32	76	357	123	241	118
France	-3	14	139	0	498	2,333
Greece	0	0	-46	0	0	-15
Ireland	1	1	11	2	302	349
Italy	-32	-24	163	298	2,998	2,047
Netherlands	10	4	156	1,953	4,985	4,711
Norway	-319	876	3,197	660	5,012	5,112
Spain	0	-8	12	0	-40	-18
Svalbard	0	0	0	500	500	500
Sweden	0	0	1	0	0	0
Switzerland	0	0	0	0	0	4
United Kingdom	-208	47	1,033	1,033	1,245	14,534
West Germany	70	71	268	-847	-4	-1,342
Total	-444	1,059	8,320	3,718	15,812	28,683
Eastern Europe						
Bulgaria	0	0	0	0	0	-350
Poland	0	0	0	0	25	27
Romania	0	75	213	0	0	282
U.S.S.R.	0	4,735	8,655	0	-47,513	13,847
Yugoslavia	0	53	764	45	873	3,272
Total	0	4,863	9,632	45	-46,615	17,078

See footnotes at end of table.

Table B1. Modified Petroconsultants Reserve Additions (Continued)

Country	Oil, MMbbls			Natural Gas, Bcf		
	Last 3 Months 4/90-6/90	Last 12 Months 7/89-6/90	Last 36 Months 7/87-6/90	Last 3 Months 4/90-6/90	Last 12 Months 7/89-6/90	Last 36 Months 7/87-6/90
Middle East						
Abu Dhabi	0	594	27,879	190	2,150	33,965
Bahrain	0	0	-50	0	500	2,000
Dubai	0	70	70	0	0	250
Iran	450	1,007	15,517	1,000	193,221	263,420
Iraq	1,700	4,100	49,641	500	6,400	22,838
Israel	0	0	25	0	-6	-6
Jordan	0	-2	-47	0	0	1,000
Kuwait ¹	0	500	16,926	0	500	12,814
Oman	0	921	2,090	0	605	2,581
Qatar	0	50	460	0	25	-148,535
Ras Al Khaimah	0	0	0	0	-3,900	-3,900
Saudi Arabia ¹	-3,187	-88	11,821	-416,146	-1,646	8,389
Sharjah	0	0	14	0	0	493
Syria	0	370	298	0	250	1,150
Turkey	2	162	135	0	-39	329
Umm Al Qaiwain	0	0	0	0	0	250
Yemen	0	853	1,303	0	7,800	11,300
Total	-1,035	8,537	126,082	-414,456	205,860	208,337
Africa						
Algeria	30	1,057	966	3	-1,535	24,770
Angola	28	568	822	10	3,420	3,454
Benin	0	3	-80	0	0	0
Cameroon	0	0	29	0	0	-1,157
Chad	10	15	94	0	0	0
Congo	62	134	502	96	127	-945
Cote D'Ivoire	0	1	-74	0	-344	486
Egypt	96	401	766	116	3,278	8,744
Ethiopia	0	0	0	0	0	850
Gabon	22	181	-140	5	97	-436
Ghana	0	0	5	0	1	2
Guinea Equatorial	0	0	0	0	0	802
Libya	1,302	827	-3,709	146	3,318	4,004
Morocco	0	0	10	0	-9	28
Namibia	0	0	0	0	0	1,700
Nigeria	-80	111	-905	1,137	13,145	66,655
Senegal	0	0	-90	0	0	15
So. Africa	0	19	20	90	636	636
Sudan	0	0	327	0	0	839
Tanzania	0	0	0	0	-6,090	-6,090
Tunisia	-140	-183	-299	0	-61	-1,048
Zaire	0	11	-42	0	1	2
Total	1,330	3,145	-1,798	1,603	15,984	103,311

See footnotes at end of table

Table B1. Modified Petroconsultants Reserve Additions (Continued)

Country	Oil, MMbbls			Natural Gas, Bcf		
	Last 3 Months 4/90-6/90	Last 12 Months 7/89-6/90	Last 36 Months 7/87-6/90	Last 3 Months 4/90-6/90	Last 12 Months 7/89-6/90	Last 36 Months 7/87-6/90
Asia-Pacific						
Australia	-109	411	951	445	1,640	5,924
Bangladesh	0	0	2	0	800	3,053
Brunei	20	37	876	100	-520	4,331
China	2,109	4,929	10,380	2,482	4,486	10,790
India	-205	137	549	200	-19	1,418
Indonesia	-119	103	1,936	-1,726	-1,747	66,552
Japan	5	18	73	0	81	396
Malaysia	7	320	902	-1,790	-2,370	-7,064
Myanmar (Burma)	1	-3,006	81	0	162	934
New Zealand	0	17	52	567	640	823
Pakistan	14	119	256	178	2,225	4,785
Papua New Guinea	0	120	185	550	1,030	4,406
Philippines	-1	5	39	-70	605	331
So. Korea	0	0	0	0	190	200
Taiwan	0	0	11	-97	-101	-83
Thailand	-1	7	10	167	419	4,347
Vietnam	-1	39	-1,905	-45	-5	75
Total	1,720	3,256	14,398	961	7,516	101,218
Total OPEC	337	8,418	141,133	-411,612	216,009	367,596
Total Non-OPEC ME	-8	6,346	47,173	6,528	34,590	155,677
Total CPE	2,108	9,890	18,167	2,482	-41,995	28,082
Total	2,437	24,654	206,473	-402,602	208,604	551,355

¹Includes one-half of the reserve additions in the Neutral Zone.

Note: A listing of OPEC, CPE, and ME countries is contained in the Glossary. Column totals may not add due to independent rounding.

Source: Petroconsultants, S.A. with some historical data from Appendix A not present in Petroconsultants.

Appendix C

World Oil and Natural Gas Reserves

Appendix C

Table C1. World Oil and Natural Gas Reserves

Region/Country	Oil (Billion Barrels)		Natural Gas (Trillion Cubic Feet)	
	Oil & Gas Journal 12/31/89	World Oil 12/31/89	Oil & Gas Journal 12/31/89	World Oil 12/31/89
North America				
Canada	6.1	6.8	94.3	97.0
Mexico	56.4	52.0	73.4	72.7
United States ¹	26.5	26.5	175.4	175.4
Other	0.0	0.2	0.0	0.0
Total	89.0	85.4	343.1	345.2
South America				
Argentina	2.3	2.2	27.3	26.9
Bolivia	0.2	0.2	5.5	5.7
Brazil	2.8	2.8	3.8	4.1
Chile	0.3	0.3	4.2	4.1
Colombia	2.1	2.0	4.0	4.0
Ecuador	1.5	1.4	4.0	4.0
Peru	0.4	0.8	0.7	0.7
Trinidad and Tobago	0.5	0.6	10.0	8.7
Venezuela	58.5	60.5	100.8	105.7
Other	0.0	0.0	0.0	0.0
Total	68.6	70.8	160.3	163.3
Western Europe				
Austria	0.1	0.1	0.4	0.4
Denmark	0.8	0.5	4.5	3.0
France	0.2	0.2	1.2	1.3
Germany, West	0.4	0.2	6.6	6.4
Greece	0.1	0.0	0.2	0.0
Italy	0.7	0.7	11.7	11.6
Netherlands	0.2	0.2	61.1	60.9
Norway	11.5	11.0	82.2	93.1
Spain	0.0	0.0	0.8	0.2
United Kingdom	4.3	3.8	20.8	19.8
Other	0.0	0.0	0.0	0.8
Total	18.3	16.8	189.5	197.6
Eastern Europe				
U.S.S.R.	58.4	57.9	1,500.0	1,550.0
Other ²	1.7	1.9	28.0	21.0
Total	60.1	59.8	1,528.0	1,571.0
Middle East				
Abu Dhabi	92.2	54.4	182.9	182.7
Bahrain	0.1	0.1	6.5	6.3
Dubai	4.0	1.3	4.9	1.7
Iran	92.9	62.5	500.0	600.0
Iraq	100.0	100.0	95.0	110.0
Jordan	0.0	0.0	0.1	0.4
Kuwait ¹	97.1	98.4	54.6	52.6
Oman	4.3	4.3	9.3	9.9
Qatar	4.5	2.6	163.1	162.0
Saudi Arabia ³	257.6	262.5	187.3	188.4
Syria	1.7	2.0	4.0	5.5
Turkey	0.5	0.3	0.7	0.7
Yemen	4.0	4.3	5.5	12.0
Other	1.9	0.0	13.0	9.0
Total	660.8	592.8	1,226.9	1,341.2

See footnotes at end of table.

Table C1. World Oil and Natural Gas Reserves (Continued)

Region/Country	Oil (Billion Barrels)		Natural Gas (Trillion Cubic Feet)	
	Oil & Gas Journal 12/31/89	World Oil 12/31/89	Oil & Gas Journal 12/31/89	World Oil 12/31/89
Africa				
Algeria	9.2	9.2	114.0	114.2
Angola	2.0	2.1	2.1	1.8
Cameroon	0.4	0.5	3.9	3.8
Congo	0.8	0.7	2.6	2.5
Egypt	4.5	4.3	11.7	11.5
Gabon	0.7	1.0	0.6	0.5
Libya	22.8	22.8	25.5	29.2
Morocco	0.0	0.0	0.1	0.1
Nigeria	16.0	16.7	87.4	47.4
South Africa	0.0	0.0	1.8	1.5
Tunisia	1.8	1.8	3.1	3.1
Other	0.6	1.7	14.0	6.0
Total	58.8	60.8	266.7	221.6
Asia-Pacific				
Australia	1.7	2.8	16.5	73.5
Brunei	1.4	1.2	11.4	12.2
China	24.0	21.5	35.3	33.0
India	7.5	4.3	23.0	20.9
Indonesia	8.2	12.0	87.0	85.7
Japan	0.1	0.0	1.1	1.3
Malaysia	3.0	3.7	51.9	53.6
Myanmar (Burma)	0.1	0.2	9.4	5.1
New Zealand	0.1	0.2	5.1	4.0
Pakistan	0.1	0.3	18.0	23.0
Taiwan	0.0	0.0	0.8	0.6
Thailand	0.2	0.3	6.9	14.5
Other	0.2	0.3	16.9	18.4
Total	46.5	46.8	283.3	345.7
Total OPEC	767.1	705.3	1,620.2	1,693.2
Total Non-OPEC ME	151.0	146.5	814.3	888.3
Total CPE	84.1	81.3	1,563.3	1,604.0
World Total	1,002.2	933.1	3,997.8	4,185.5

¹United States reserves are from Energy Information Administration, *U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves, 1989 Annual Report*.

²*Oil and Gas Journal* includes Albania, Bulgaria, Cuba, Czechoslovakia, East Germany, Hungary, Mongolia, North Korea, Poland, Romania, Yugoslavia, and Vietnam. *World Oil* includes Albania, Bulgaria, Czechoslovakia, East Germany, Hungary, Poland, Romania, and Yugoslavia.

³Includes one-half of the reserves in the Neutral Zone.

Note: Column totals may not add due to independent rounding.

Sources: PennWell Publishing Company, *Oil and Gas Journal*, December 25, 1989, pp. 44-45. Gulf Publishing Company, *World Oil*, August, 1990, p. 26. The Energy Information Administration does not certify these international reserves data but reproduces the information as a matter of convenience for the reader.

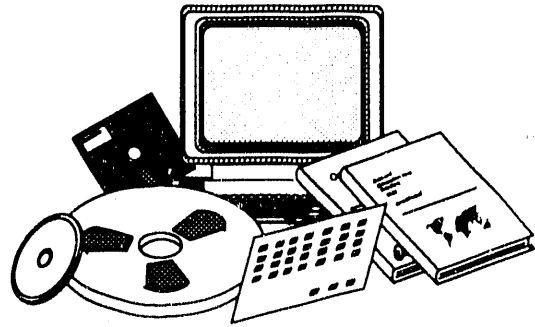
Glossary

Glossary

Abbreviations

API	American Petroleum Institute measure of specific gravity of crude oil or condensate in degrees.
Bbbls	Billion barrels of crude oil, condensate, or oil equivalent.
bbbl/d	Barrels per day of oil unless otherwise noted.
Bcf	Billion cubic feet of natural gas.
bwpd	Barrels of water per day.
cond	Condensate.
CPE	Centrally Planned Economies or Communist countries are: Albania, Bulgaria, China, Cuba, Czechoslovakia, East Germany, Hungary, Kampuchea, Laos, Mongolia, North Korea, Poland, Romania, U.S.S.R., Vietnam, and Yugoslavia.
Disc	Discovery.
E	East.
eq	Equivalent oil amount of natural gas.
f/	From.
ft	Feet or foot.
FTP	Flowing tubing pressure measured at the wellhead of a producing well.
LNG	Liquefied natural gas.
LPG	Liquefied propane gas.
Mcfd	Thousand cubic feet per day of natural gas.
ME	Market Economies, consists of the World excluding Centrally Planned Economies.
mi	Miles.
MMbbls	Million barrels of crude oil, condensate, or oil equivalent.
MMcfd	Million cubic feet per day of natural gas.
N	North.
NE	Northeast.
NGL	Natural gas liquids.
NW	Northwest.
OPEC	Organization of Petroleum Exporting Countries are: Algeria, Ecuador, Gabon, Indonesia, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, United Arab Emirates, and Venezuela.
P&A	Plugged and abandoned.
PSC	Production Sharing Contract agreement between an oil company and a host government concerning production from a particular area.
psi	Pounds per square inch, pressure.
S	South.
SE	Southeast.
SW	Southwest.
Tbbls	Trillion barrels of crude oil, condensate, or oil equivalent.
Tcf	Trillion cubic feet of natural gas.
Test	Indicates a well was flow tested and produced hydrocarbons.
TVD	True vertical depth.
W	West.

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