DOE/EIA--0523(89/2Q)

DE90 001916

International Oil and Gas Exploration and Development Activities

Quarterly Report Second Quarter 1989

Energy Information Administration
Office of Oil and Gas
U.S. Department of Energy
Washington, D.C. 20585

Preface

This is the third report in a series of quarterly publications prepared by the Energy Information Administration (EIA). The systematic compilation of international oil and gas exploration and development activities provides a means for monitoring the location and magnitude of significant new discoveries of oil and natural gas. These reports identify new sources of future oil and gas supplies. 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).

Contents

Introduction

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

A discovery, as used in this publication, is a published estimate of the ultimate recovery for 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.

Table 1 shows the relationship between oil reserve additions and production for the World, the Organization of Petroleum Exporting Countries (OPEC), Non-OPEC Market Economies (Non-OPEC ME), and Centrally Planned Economies (CPE). These reserve additions include positive and negative revisions (changes in the estimate of ultimate recovery) for known fields as well as the ultimate recovery for new discoveries. Table 2 presents quarterly World crude oil production from 1986 to the latest available quarter. World production is divided into OPEC, Non-OPEC ME, and CPE production. Figure 1 illustrates production for the World, OPEC, and Non-OPEC ME countries. Table 3 shows the average number of active drilling rigs by quarter for the last 36 months for the ME countries. Figure 2 displays the trend of active drilling rigs for OPEC, Non-OPEC ME minus the United States, and Total ME minus the United States. The U.S. rig count is shown separately. Figure 3 shows how data from the different sources are used in this report. Table 4 lists the incremental reserve additions by country for the last 3 months, the last 12 months, and the last 36 months. Information in Table 4 is obtained from the commercial information services of Petroconsultants, S.A. and supplemented with data from Appendix A, a compilation of reserve reports published in industry trade journals. The field ultimate recovery data of Petroconsultants is the primary source of data for Table 4.

A few of the more significant discoveries are discussed in this report, and their approximate locations are shown on Figures 4 through 7. Reserve reports obtained from the literature are presented in the Foreign Oil and Gas Discoveries table of Appendix A, with first time entries highlighted. Entries in this table are arranged alphabetically by country and by report date within each country. Fields marked with an asterisk are also in the Petroconsultants database. Appendix B, Petroconsultants Reserve Additions, is similar to Table 4 but contains only Petroconsultants data. Appendix C, World Crude Oil and Natural Gas Reserves, presents published oil and gas reserve estimates by country. A glossary of abbreviations used in this report is also included.

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 1989. For the last 12 months, World reserve additions were 118.6 billion barrels and production was 21.6 billion barrels of oil, a replacement ratio of 5.5:1 (Table 1). Similarly, reserve additions for the Non-OPEC Market Economies (Non-OPEC ME) were 38.9 billion barrels while production was 8.2 billion barrels of oil which yielded a replacement ratio of 4.8:1. The reserve replacement ratio for OPEC was 10.4:1 for the last 12 months. Reserve additions for the CPE countries were negative which yielded a negative replacement ratio. For the last 36 months, World reserve additions were 251 billion barrels and production was 62.7 billion barrels of oil, a ratio of 4.0:1. Also for the last 36 months, the Non-OPEC ME had a replacement ratio of 2.2:1, while OPEC and CPE countries had ratios of 6.7:1 and 3.1:1, respectively.

Using all of Petroconsultants historical data, which includes substantial portions of the recent large upward revisions for OPEC, resulted in higher reserve additions and replacement ratios than in the last quarter's report. The change in the way Petroconsultants data are utilized in this quarter's report is responsible for the significant differences from the last quarter's report. A detailed discussion of how Petroconsultants data were used in this report is contained in the Data Sources and Analysis section. Countries with large upward revisions over the last 36 months are: Abu Dhabi, Iran, Iraq, Kuwait, Mexico, Saudi Arabia, U.S.S.R., and Venezuela, according to Petroconsultants.

Table 1. World, OPEC, Non-OPEC ME, and CPE Oil Reserve Additions and Production Replacement

Category	World	OPEC	Non-OPEC ME	CPE
		Last 36 Months 7/86-6/89		
Reported Reserve Additions (MMbbls)	251,354	145,243	55,196	50,915
Production (MMbbls)	62,747	21,697	24,813	16,240
Net Reserve Additions (MMbbls)[1]	188,607	123,546	30,383	34,675
Replacement Ratio[2]	4.0	6.7	2.2	3.1
		Last 12 Months 7/88-6/89		
Reported Reserve Additions (MMbbls)	118,589	82,634	38,914	-2,959
Production (MMbbls)	21,559	7,947	8,188	5,427
Net Reserve Additions (MMbbls)[1]	97,030	74,687	30,726	-8,386
Replacement Ratio[2]	5.5	10.4	4.8	-0.5

[1]Net Reserve Additions = Reported Reserve Additions minus Production.
[2]Replacement 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

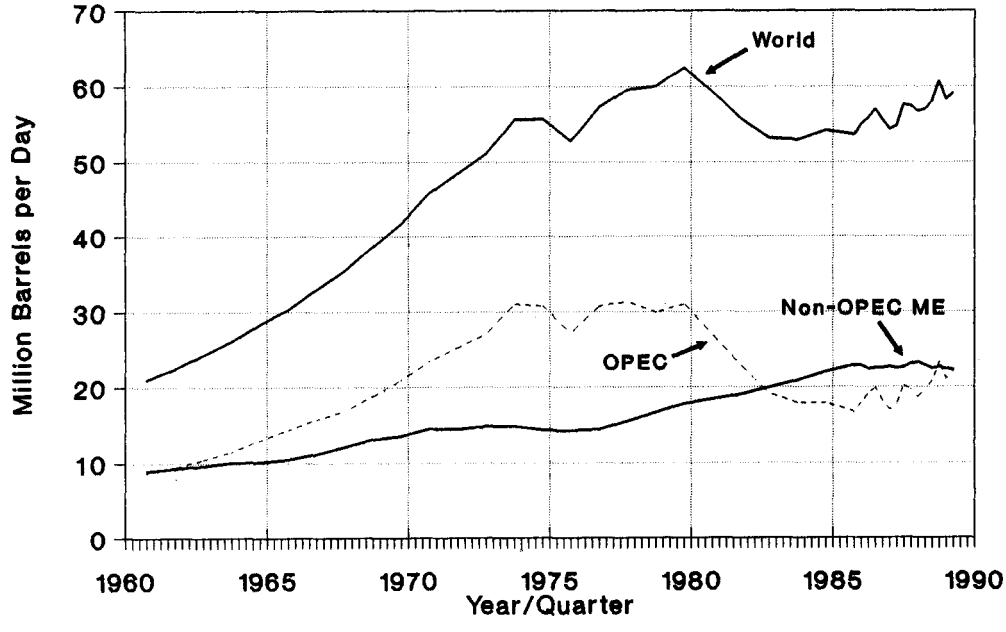
OPEC production estimated for the second quarter of 1989 is 22.1 million barrels per day (Table 2.). This is 2.6 million barrels per day more than was produced in the second quarter of 1988, 1.1 million barrels per day more than first quarter 1989, and 3.6 million barrels per day above the self-imposed OPEC quota of 18.5 million barrels per day. Some OPEC overproduction made up for other production losses. Output from Non-OPEC countries was lower for the second quarter due to accidents and maintenance in the North Sea, and from Alaska due to the Exxon Valdez accident and maintenance on the Alaskan pipeline. Accidents and maintenance in the United Kingdom's North Sea, for example, cut oil production during the second quarter from 2.5 million barrels per day to a low of 1.7 million barrels per day before it began to recover. United Kingdom production is expected to be back to 2.4 million barrels per day by September [1][2]. Both Non-OPEC ME and CPE production declined

Table 2. World, OPEC, Non-OPEC ME, and CPE Quarterly Crude Oil Production Including Lease Condensate
(Thousand Barrels per Day)

Qtr/Year	World	OPEC	Non-OPEC ME	CPE
1st/1986	55,056	17,879	22,846	14,331
2nd/1986	55,879	19,050	22,305	14,523
3rd/1986	57,036	19,887	22,507	14,641
4th/1986	55,566	18,174	22,536	14,856
Annual Average	55,889	18,752	22,548	14,589
1st/1987	54,417	16,934	22,702	14,781
2nd/1987	54,797	17,581	22,434	14,782
3rd/1987	57,635	20,116	22,633	14,885
4th/1987	57,481	19,653	23,024	14,804
Annual Average	56,095	18,583	22,699	14,813
1st/1988	56,743	18,640	23,292	14,810
2nd/1988	57,042	19,444	22,817	14,781
3rd/1988	58,039	20,763	22,471	14,805
4th/1988	60,728	23,277	22,572	14,879
Annual Average	58,145	20,539	22,787	14,819
1st/1989	58,279	20,957	22,384	14,939
2nd/1989[1]	59,200	22,075	22,300	14,850

[1]Production data for the second quarter 1989 are EIA estimates.
Note: A listing of OPEC, CPE, and ME countries is contained in the Glossary.
Source: Energy Information Administration, Monthly Energy Review, DOE/EIA-0035(89/3). Data for 1988 and 1989 have been revised.

Figure 1. World, OPEC, and Non-OPEC Market Economies (ME) Average Daily Crude Oil Production (1st Qtr 1960 - 2nd Qtr 1989)



Source: 1960-1972, EIA *Annual Energy Review 1988*; 1973-1989, EIA *Monthly Energy Review* March 1989.

slightly less than 100,000 barrels per day compared to the first quarter of 1989. Compared to one year ago, production in the second quarter of 1989 was 3.8 percent higher for the World, 13.5 percent higher for OPEC, 2.3 percent lower for the Non-OPEC ME, and increased only slightly for the CPE countries. The 2 million barrel per day increase in World production from 1987 to 1988 was essentially all from OPEC. Figure 1 shows the data of Table 2 with historical production from 1960 through the second quarter of 1989. The quarterly production shown is actual quarterly data from the first quarter of 1986 forward. Before 1986 only annual averages are shown. Beginning in 1986 Non-OPEC ME production has leveled off while OPEC production has been rising.

New OPEC Quota

As of the end of June 1989, the new OPEC quota for the second half of 1989 is 19.5 million barrels per day of crude oil, an increase of 1 million barrels per day over the first half. However, Kuwait and the United Arab Emirates have announced that they will produce more than their new quotas. Kuwait said it will cut production to 1.35 million barrels per day which is still 257,000 barrels per day more than its official quota [3]. The United Arab Emirates say they will cut production slightly to 1.51 million barrels per day, still 469,000 barrels per day more than their new quota [4]. With the stated overproduction of these two countries, and if the other OPEC countries adhere to their new quotas plus 400,000 barrels per day from the Neutral Zone, OPEC crude oil production should be 20.6 million barrels per day in the third quarter.

Norway has stated it will continue to curtail production by 7.5 percent of capacity in support of OPEC's new quota [5]. Norway started the production restriction in 1987 and has extended it through the end of 1989. However, because of higher production capacity, Norway will increase 1989 production by nearly 30 percent over 1988 production.

Active Drilling Rigs

This quarter, a new addition to the report is a table of the quarterly active rotary rigs for the Market Economies. Table 3 lists the number of active drilling rigs by country for the last 3 years for the ME countries. Several countries where rig counts are roughly half of that three years ago are: Mexico, Brazil, Netherlands, Abu Dhabi, Egypt, and Algeria. On the other hand, Nigeria and India have roughly doubled their number of drilling rigs. Figure 2 shows the historical trends from 1950 forward for OPEC, Non-OPEC ME without the United States, Total ME without the United States, and the United States. Because the large number of drilling rigs for the United States would mask the trends of the Non-OPEC ME and Total ME curves, it is shown separately. A sharp drop in rig counts occurred in 1986. The drop correlates with the oil price collapse of 1986 and the curves have not returned to pre-1986 levels.

Highlights

Since the war with Iraq has ended, **Iran's** goal is to restore and expand revenue producing facilities. Iran hopes to raise oil production capacity to 4 million barrels per day and sustain it at that level for the next decade [6]. Iran also has plans for gas injection projects at Marun and Gach Saran fields. Gas reinjection at Marun will add an estimated 2.6 billion barrels of recoverable reserves according to the National Iranian Oil Company. Other fields scheduled for restoration work are: Sassan, Rostam, Rakhsh, Bahrengansar, Nowruz, Hendijan, and Sirri. Two heavy oil discoveries and a substantial gas find have also been reported. Completion of the Kangan gas plant and the IGAT-2 gas pipeline will make it possible for Iran to start exporting gas to the Soviet Union. Work has also begun on refineries at Abadan, Teheran, and Isfahan.

The production capacity goal for **Iraq** is 4.5 million barrels per day by 1991-1992 [6]. However, expected export capacity by tanker and pipeline is 7 million barrels per day. Currently, Iraq has 10 new fields under development with help from the Soviet company Technoexport, the French company Technip Geoproduction, and the West German Mannesmann Company. Other work includes pipeline expansion to the Red Sea and rebuilding tanker terminals in the Persian Gulf. Iraq began crude oil exports through the Persian Gulf for the first time in eight years in June 1989 [7].

Ten years of successful exploration has enabled **Oman** to double its production capacity to 600,000 barrels of oil per day, according to the Minister of Petroleum and Minerals [6]. All of Oman's production is exported except 50,000 barrels per day. Oman has agreed to supply 224 billion cubic feet per day of natural gas to a floating methanol plant operated by a British consortium [9]. The gas will come from the offshore Bukha gas and condensate field beginning in 1991.

South Yemen's production will climb to 250,000 barrels per day of oil by 1991-1992 [8]. Production will be from the Shabwa area fields which were discovered and are being developed by Technoexport of the U.S.S.R. Pipeline construction from the Shabwa area to the Gulf of Aden will be undertaken by Tyumen Pipeline Construction Association, also of the Soviet Union.

Table 3. Quarterly Active Rotary Rigs for the Market Economies

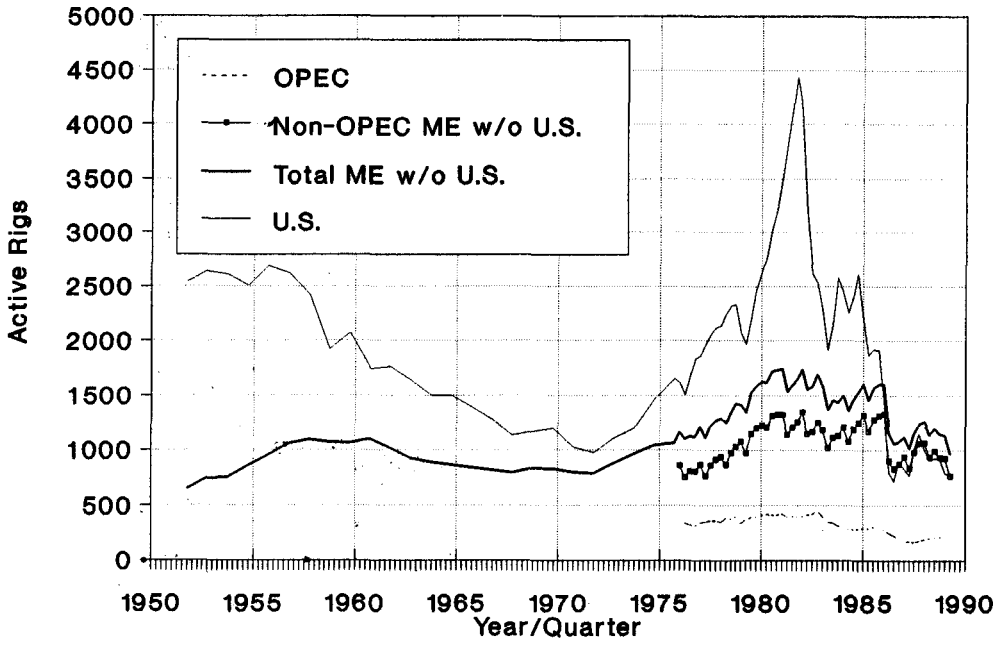
Region/Country	1986			1987				1988				1989	
	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd
North America													
Canada	56	91	153	199	81	196	248	271	146	206	158	177	90
Mexico	152	146	138	135	137	145	154	156	156	155	152	145	91
United States	797	723	894	830	768	1,001	1,146	1,002	902	923	922	786	773
Total	1,035	961	1,185	1,164	986	1,342	1,549	1,429	1,204	1,284	1,232	1,108	954
South America													
Argentina	51	39	38	49	62	67	64	69	64	61	59	56	55
Bolivia	3	2	5	7	6	6	6	6	5	5	6	6	6
Brazil	77	78	72	72	62	55	53	42	43	32	39	35	34
Chile	6	6	6	7	7	7	6	6	6	5	5	4	4
Combia	16	15	14	13	13	13	16	16	21	20	17	16	17
Costa Rica	0	0	0	0	0	1	1	1	0	0	0	0	0
Ecuador	2	2	3	2	2	4	5	5	5	5	7	7	5
Peru	12	15	17	18	18	12	12	10	11	11	11	10	10
Trinidad	11	11	11	10	9	7	8	8	8	7	6	6	6
Venezuela	32	25	26	18	17	18	21	23	23	27	28	26	27
Other	1	0	0	0	0	1	1	1	0	0	0	1	0
Total	211	192	192	196	196	191	193	186	184	173	178	168	164
Western Europe													
Austria	9	4	4	5	4	3	4	5	5	5	3	3	2
Denmark	3	1	1	1	1	4	5	3	1	2	2	2	3
France	17	15	8	7	6	8	12	9	8	8	9	4	8
Greece	0	0	1	2	1	2	2	2	2	2	2	2	2
Netherlands	18	12	10	9	8	10	11	14	13	17	10	9	10
Italy	39	26	24	26	25	26	25	23	23	24	26	28	25
Norway	11	15	8	9	12	12	16	15	16	15	14	11	13
Spain	7	3	2	1	3	2	2	2	2	2	3	3	3
United Kingdom	45	36	34	32	36	45	61	64	57	56	50	51	50
West Germany	21	18	14	11	9	12	16	12	10	10	5	7	8
Other	2	1	0	0	2	0	0	0	2	1	0	0	1
Total	172	129	106	104	108	125	154	148	140	141	124	120	124
Middle East													
Abu Dhabi	16	13	11	10	10	8	7	7	7	7	8	7	5
Dubai	3	3	4	3	2	1	2	3	4	3	4	3	2
Egypt	37	25	26	25	26	21	19	22	22	19	21	20	19
Iran	18	18	18	17	16	20	19	18	18	18	18	19	18
Iraq	25	18	15	8	7	10	17	21	23	22	24	25	27
Jordan	2	2	3	2	2	2	3	3	2	2	2	3	3
Kuwait	6	6	6	6	6	6	6	5	6	6	5	5	4
North Yemen	4	4	4	4	4	4	5	4	3	3	3	2	2
Oman	14	15	11	11	11	9	10	10	9	8	10	11	9
Qatar	0	0	0	1	2	1	1	2	3	3	3	4	3
Saudi Arabia	5	5	6	7	5	5	4	4	4	5	5	6	6
Syria	29	28	25	20	20	23	25	22	21	26	29	24	23
Turkey	29	29	25	30	29	25	23	22	21	24	18	25	19
Other	3	3	2	1	1	1	0	0	0	0	0	2	1
Total	191	169	157	145	139	135	139	144	143	145	150	156	141

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

Region/Country	1986			1987				1988				1989	
	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd
Africa													
Algeria	41	42	40	42	46	39	34	34	33	33	28	19	19
Angola	7	6	7	9	9	10	10	9	13	10	10	9	8
Congo	1	2	3	3	3	3	2	2	2	2	2	1	0
Gabon	3	2	0	1	2	4	4	3	3	7	8	8	6
Kenya	0	0	0	1	0	0	1	2	1	0	1	3	2
Libya	19	17	14	11	11	13	15	16	17	15	17	19	18
Nigeria	8	10	13	12	12	9	11	10	12	14	16	14	15
South Africa	3	3	3	3	3	3	4	5	5	4	3	3	3
Tunisia	4	3	2	4	3	5	4	2	5	3	3	5	3
Other	7	5	3	3	4	6	4	4	7	5	5	5	4
Total	95	90	85	89	93	93	90	86	98	94	92	87	77
Asia-Pacific													
Australia	13	10	12	10	12	21	20	13	14	22	26	15	13
Bangladesh	5	5	5	9	6	4	2	2	2	3	3	5	5
Brunei	5	5	3	4	3	3	3	3	4	4	4	5	4
Burma	33	33	33	32	32	28	26	26	26	26	24	24	24
India	63	62	91	107	118	119	121	131	128	130	134	135	135
Indonesia	66	61	45	42	38	31	36	43	42	46	45	45	48
Japan	14	18	14	8	7	14	12	11	9	11	11	6	4
Malaysia	7	8	7	7	9	9	9	8	8	9	10	11	11
New Zealand	6	4	2	2	4	1	3	3	2	2	2	3	2
Pakistan	16	17	17	16	15	14	12	12	13	14	14	13	15
Papua New Guinea	1	1	1	1	2	2	2	2	3	2	4	3	2
Philippines	1	1	0	1	1	1	4	4	3	3	3	5	6
Taiwan	7	7	8	5	6	3	4	4	5	4	4	5	5
Thailand	4	3	3	4	5	7	7	6	5	5	6	7	5
Other	0	0	0	0	0	0	1	0	1	1	1	1	1
Total	243	235	242	247	258	257	261	267	265	285	291	282	278
Total OPEC[1]	251	225	204	180	176	170	181	194	201	211	215	210	201
Total Non-OPEC ME	1,697	1,551	1,763	1,765	1,604	1,973	2,204	2,065	1,833	1,911	1,852	1,711	1,537
Non-OPEC ME w/o US	899	828	870	935	836	973	1,058	1,063	932	988	930	925	764
Total ME w/o US	1,150	1,053	1,074	1,115	1,011	1,142	1,239	1,257	1,133	1,199	1,145	1,134	965
Total ME[1]	1,947	1,777	1,967	1,945	1,780	2,143	2,385	2,259	2,034	2,122	2,067	1,920	1,738

[1]Includes Middle East Other.
Note: A listing of OPEC, CPE, and ME countries is contained in the Glossary. Columns totals may not add due to independent rounding.
Source: Baker Hughes Inc. and Oil and Gas Journal Energy Database.

Figure 2. Quarterly Active Rotary Rigs for the Market Economies (ME) (1st Quarter 1951 - 2nd Quarter 1989)



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

Qatar has started a three phase development of the North gas field. The 1971 discovery is the biggest offshore natural gas deposit in the world with reserves of 150 trillion cubic feet [9]. Phase 1 will be completed in 1990 and will provide 800 million cubic feet of gas and 4,500 tons of liquids per day (about 46,800 barrels per day) [10]. After completion of phase three, production is planned at 2.4 billion cubic feet of gas per day which means the life of the field will be close to 200 years. Petroconsultants has revised downward its reserve estimate for the North field from 300 to 150 trillion cubic feet of gas since 1988.

Canadian Fracmaster has entered into a joint venture with the **Soviet Union** for stimulation of oil wells in western Siberia [11]. The company will begin operations this year and eventually hydraulically fracture as many as 1,000 wells per year. Soviet oil production was 12.329 million barrels per day for the first quarter of 1989, 12.446 million barrels per day for 1988, and 12.5 million barrels per day for 1987 [12]. Even though production is falling, gross exports of oil and refined products have increased. However, net exports were down 52,000 barrels per day to 3.54 million barrels per day for 1988. The increase in gross exports of 175,000 barrels per day in 1988 over 1987 was possible because of increased imports of 227,000 barrels per day to a total of 550,000 barrels per day of oil and products. Soviet imports come from the Middle East and North Africa. The latest reserve report for Tengiz field is 6 to 7 billion barrels, a drop of nearly 12 billion barrels from the previous report. It appears that previous reserve reports were of oil in place, not recoverable oil.

Because of severe fuel shortages, the **People's Republic of China** will cut oil exports [13]. China's oil exports have been declining since 1985. In October 1988 China began importing oil from the Soviet Union. An oil conservation program was announced which will substitute coal for power generation through the end of the century. Scientists from the Lanzhou Geological Research Institute of the Chinese Academy of Sciences and others have estimated the potential recovery of 210 billion barrels of oil from the Tarim Basin in far northwest China [14].

Petro-Canada estimates that **Canada** will become a net importer of crude oil early in the 1990s [15]. Light and medium crude oil production will decline and synthetic oil from bitumen (tar sand) will increase but total production will fall short of demand by 210,000 barrels per day in 1993. The estimated potential recovery of bitumen for Alberta is 300 billion barrels of the 1.2 to 1.6 trillion barrels in place [16]. About 62 billion barrels (20%) are shallow enough to mine. By the year 2000, syn-

thetic oil production will increase by 165,000 barrels per day to 350,000 barrels per day. Heavy oil production is expected to increase by 100,000 barrels per day to 600,000 barrels per day. However, light crude oil production will decline 310,000 barrels per day to 650,000 barrels per day by the year 2000. Total oil production in 2000 will be 45,000 barrels per day less than in 1988.

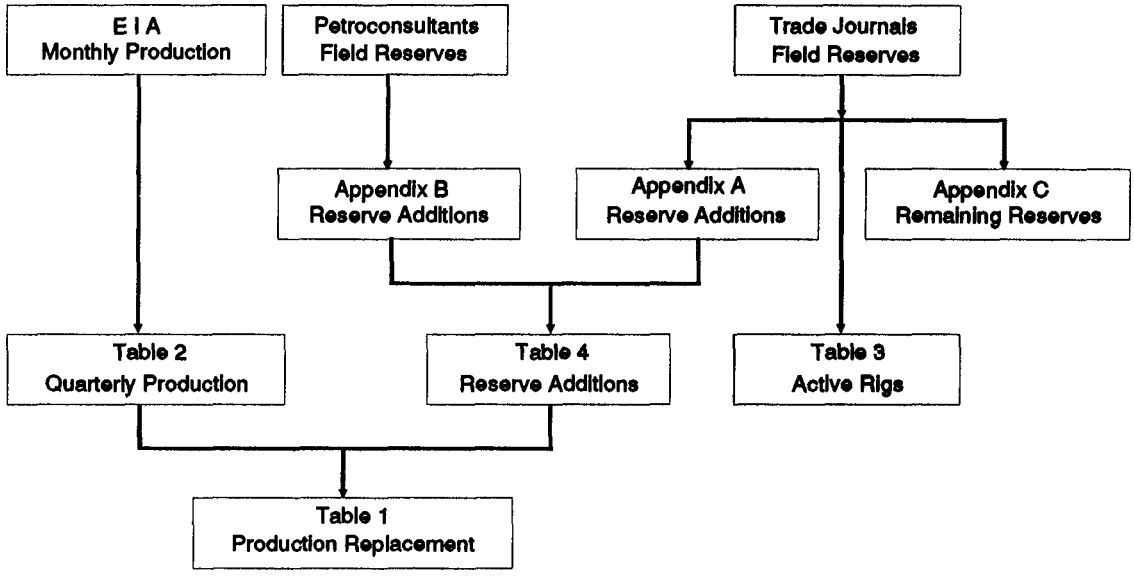
Venezuela estimates reserves for the recent discoveries near El Furrial and Musipan in northern Monogas State at 1.5 billion barrels of oil [17]. It expects total proven and probable reserves will eventually exceed 8 billion barrels for these areas.

The **Netherlands** has added a new category of "possible future" reserves to its gas reserve estimates [18]. Possible future reserves in undrilled structures both on and offshore range from 8.8 to 17.6 trillion cubic feet of gas. The country estimates probable reserves of 66.28 trillion cubic feet of gas and proved reserves of 61.09 trillion cubic feet of gas.

Data Sources and Analysis

There are three main sources of information used in this report: Petroconsultants, S.A., industry trade journals, and the Energy Information Administration (EIA). Figure 3 shows how the data flows from these different sources into the various tables of the report.

Figure 3. International Oil and Gas Exploration and Development Activities, Data Sources and Flow



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

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 Crude Oil and Natural Gas Reserves, are taken directly from industry trade journals. Sub-totals at the end of Table 3 and Appendix C are added for the readers' convenience.

Petroconsultants provides an updated database 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 database to get the changes in ultimate recovery over time. These changes are the reserve additions shown in Appendix B, 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 1988 from the ultimate

recovery values of the second quarter 1989. 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.

It has proved impractical for Petroconsultants to include every field for every country in their database. In fact, they do not include the United States and Canada 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 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 1989 data contain 10,314 field entries, 1,427 more than are in the second quarter 1986 data. World reserve additions for this 36-month period are nearly 214 billion barrels of oil (Appendix B). Most of these reserve additions are from revisions to old fields and not from the 1,427 new entries. Many of the new entries are for fields discovered before the second quarter 1986 and some were actually discovered 15 or 20 years ago (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. However, at some later time a field may become feasible for development due to changes in economics, technology, infrastructure, etc. When a field can be developed, its reserves will then appear in the Petroconsultants database.

The major portion of world reserve revisions come from OPEC. According to Petroconsultants data of Appendix B, OPEC reserve additions for the last 36 months are nearly 131 billion barrels of oil. Most of these reserve additions are due to revisions to older fields, not new discoveries. In recent years, several OPEC countries have announced substantial increases in their remaining reserves. Some of these increases are generally accepted by industry and some are not. Some reserve increases are believed to be politically motivated. Abu Dhabi announced an increase in remaining reserves of 61 billion barrels to 92 billion barrels of oil. Petroconsultants data show an increase of only 23 billion barrels to 55 billion barrels of oil remaining. Iraq announced a 53 billion barrel increase to 100 billion barrels, and Petroconsultants data show a similar 53 billion barrel increase to 101 billion barrels of oil remaining. Iran announced a 45 billion barrel increase to 93 billion barrels while Petroconsultants data show only a 16 billion barrel increase to 65 billion barrels of oil remaining. Finally, Saudi Arabia announced a 82 billion barrel increase to 252 billion barrels while Petroconsultants data currently show only a 13 billion barrel increase to 168 billion barrels of oil remaining.

Abu Dhabi's reserve increase is based primarily on enhanced recovery projects, most of which have not undergone detailed engineering planning; some published comments do not agree with the increase. Comments in industry periodicals are also skeptical of Iran's announced increase in reserves. However, most trade press comments agree with Iraq's increase in reserves as does Petroconsultants. Saudi Arabia's announcement came at the beginning of this year and so far there have not been any negative comments in the trade journals. Petroconsultants probably has not had the time to review the results of the Saudi Aramco study that was the basis for the increase.

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 in detail 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 the reader can see how reserve estimates change over time. Also, reserve ranges, when available, are entered to give the reader a sense of the field's additional potential. Fields in Appendix A that are marked with an asterisk are also in the Petroconsultants database. Reserve additions for fields not marked with an asterisk were added to the reserve additions in Appendix B, along with U.S. reserve additions, to form Table 4, World Oil and Gas Reserve Additions. Reserve additions for a field in Appendix A for any time period are the latest ultimate recovery estimate in the time period minus the ultimate recovery estimate prior to the time period. For example, a new field first reported in July 1986 with a 200 million barrel ultimate recovery estimate, an upward revision to 400 million barrels reported in July 1988, and a further upward revision to 600 million barrels in April 1989 would yield reserve additions of 200 million barrels in the last 3 months, 400 million barrels in the last 12 months, and 600 million in the last 36 months.

The path to Table 4, shown in Figure 3, has been from Petroconsultants field level reserves to Appendix B's reserve additions by country and from published field reserves in trade journals to Appendix A. Reserve additions from fields in Appendix A which are not in Appendix B were added to Appendix B along with U.S. 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 1989.

This report includes all of Petroconsultants field data, whereas, in the previous report only fields listed in Petroconsultants database with a discovery date of 1986 or later were used. Reserve additions for the last 36 months are over 251 billion barrels

Table 4. World Oil and Gas Reserve Additions

Country	Oil, MMbbls			Gas, Bcf		
	Last 3 Months 4/89-6/89	Last 12 Months 7/88-6/89	Last 36 Months 7/86-6/89	Last 3 Months 4/89-6/89	Last 12 Months 7/88-6/89	Last 36 Months 7/86-6/89
Abu Dhabi		4,235	23,385		-1,465	25,114
Algeria		74	-2		27,485	24,826
Angola	54	174	281		34	-61
Argentina	261	3,398	2,677	9,476	13,265	38,467
Australia	33	429	246	-4,132	2,843	3,980
Austria		50	24	16	150	223
Bahrain			-50			1,500
Bangladesh		42	42	-1,500	-1,167	2,253
Barbados		1	-1		2	11
Benin		-3	-83			
Bolivia		50	35	60	77	461
Brazil	349	-572	5,540	-179	-4,214	12,193
Brunei	348	864	713	1,000	5,351	4,451
Bulgaria					-350	-350
Burma	3,073	3,087	3,095	-15	772	5,762
Cameroon	20	-50	29		-1,157	-1,167
Canada		1,046	1,746		5,860	10,860
Chad		79	79			
Chile	1	269	280	59	480	7,230
China	-226	844	9,868	-262	1,923	6,550
Colombia	32	757	1,049	220	368	605
Congo	18	230	373		-1,072	-1,072
Cote D'Ivoire		-25	-75			830
Cuba		1	1			
Denmark	131	231	301	-94	-123	-928
Dubai			20		250	250
Ecuador	20	422	572		-452	-335
Egypt	96	330	694	79	1,314	5,496
Ethiopia						850
France	-4	139	132	1,577	1,794	1,176
Gabon	-49	-202	309	-551	-551	-821
Ghana		5	5		1	1
Greece	-47	-46	-46	-15	-15	-16
Guatemala	18	29	29			
Guinea Equatorial						802
India	-2	359	1,237	-403	-48	1,637
Indonesia	275	1,284	2,161	644	47,605	80,421
Iran	700	11,770	26,000	21,750	57,369	70,813
Iraq	11,000	43,401	53,341	1,500	13,975	16,438
Ireland			-69			47
Israel		25	25			
Italy	-13	207	112	75	501	398
Japan		53	51		240	360
Jordan			-45		2,000	2,000
Kuwait[1]		1,000	17,426		8	12,314
Libya	-33	-569	-5,139	490	974	873
Malaysia	-293	349	367	-5,592	-5,040	-11,028
Mexico	71	18,378	18,363	33	12,238	21,141
Morocco		10	3	-7	37	58

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

Country	Oil, MMbbls			Gas, Bcf		
	Last 3 Months 4/89-6/89	Last 12 Months 7/88-6/89	Last 36 Months 7/86-6/89	Last 3 Months 4/89-6/89	Last 12 Months 7/88-6/89	Last 36 Months 7/86-6/89
Namibia					1,700	1,700
Netherlands	23	111	102	222	-190	-6,053
New Zealand	10	54	40	-9	307	-829
Nigeria	120	761	-972	1,743	15,703	53,555
North Yemen			400			4,700
Norway	603	1,413	3,843	688	-6,565	3,748
Oman	-19	12	1,798	449	1,701	4,586
Pakistan	-40	126	-113	10	2,916	2,371
Papua New Guinea		-60	140		-400	3,678
Peru		71	267		103	15,113
Philippines	-3	17	34	-245	-244	-274
Poland						2
Qatar	50	310	410		-148,585	-150,560
Romania		138	264		282	352
Saudi Arabia[1]		10,356	14,182		9,267	10,035
Senegal			-90	15	15	15
Sharjah			14		470	493
South Africa		1	1			950
South Korea						10
South Yemen			300			
Spain		31	16		68	-433
Sudan		327	327		839	839
Suriname			9			
Sweden	63	64	64			
Switzerland					4	4
Syria	50	528	-1,398			1,035
Taiwan		11	11		45	18
Tanzania						106
Thailand	26	24	17	113	114	3,928
Trinidad and Tobago	1	39	137		7	580
Tunisia		-58	-136		-61	-887
Turkey	10	148	9	1	43	347
Umm Al Qaiwain						250
United Kingdom	252	3,346	4,468	469	9,964	14,437
United States		2,529	7,495		-2,517	23,049
U.S.S.R.	-10,770	-4,337	42,015	682	31,469	70,302
Venezuela	16	9,792	13,536	85	5,390	14,849
Vietnam		26	-1,944			80
West Germany	95	334	337	396	-767	-1,382
Yugoslavia		369	711		1,516	2,399
Zaire	-55	-49	-41	1	1	40
Total OPEC	12,099	82,634	145,243	25,661	27,443	158,515
Total Non-OPEC ME	5,162	38,914	55,196	2,768	41,574	179,916
Total CPE	-10,996	-2,959	50,915	420	34,840	79,335
Total World	6,265	118,589	251,354	28,849	103,857	417,766

[1]Includes 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 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.

Sources: United States data are based on net reserve additions from the Energy Information Administration *U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves, 1988, 1987, 1986, and 1985 Annual Reports* (DOE/EIA-0216), excluding natural gas liquids. Foreign data are based on the commercial information services of Petroconsultants, S.A. and supplemented with Appendix A.

from Table 4. In last quarter's report, reserve additions were 107 billion barrels of oil for the last 36 months. The major difference comes from using the entire Petroconsultants database. This indicates there are major upward revisions to older fields and that reserve growth is the cause of most reserve additions, not discoveries. For example, since the end of the Iran-Iraq War, Iraq has been able to concentrate on development and production of its oil fields. It is the development of previously discovered fields that is responsible for most of the doubling of Iraq's remaining reserves. In fact, an increase in reserve additions for OPEC of nearly 100 billion barrels makes up the major portion of the 150 billion barrel increase in World reserve additions from last quarter's report. Another interesting item in Table 4 is the 11 billion barrel decrease in ultimately recoverable oil for CPE countries for the last 3 months. This is due largely to a drop in the ultimate recovery estimate for the Soviet Union's supergiant Tengiz field from 18.25 to 6.5 billion barrels of oil. It appears that the previously reported 18.25 billion barrel estimate was oil in place, not recoverable oil. One aspect of the method in which reserve additions are calculated from both the Petroconsultants data and Appendix A data is that a shift in the time period will change the reserve additions due to the different mix of quarterly data. If there were no revisions, no discoveries, and no new entries from the first quarter 1989 to the second quarter 1989, the calculated reserve additions for the latest 12- and 36-month periods would change because a quarter with no reserve additions replaced a quarter with reserve additions.

Finally, the reserve additions data of Table 4 are combined with the production data of Table 2 to yield the production replacement data of Table 1. For the last 36 and 12 months the World, OPEC, Non-OPEC ME, and CPE production replacement ratios are shown. The replacement ratios in the table are equal to reserve revisions divided by production. Also shown are net reserve additions which are equal to reserve additions minus the production. Once again, the large replacement ratios for the World are due mostly to the OPEC countries' large upward revisions. The Non-OPEC ME and CPE ratios are higher as well due to the use of all of Petroconsultants data. Compared to last quarter's report, World production replacement ratio increased from 1.7:1 to 4.0:1 for the last 36 months. OPEC increased from 2.3:1 to 6.7:1; Non-OPEC ME from 1.2:1 to 2.2:1; and CPE from 1.7:1 to 3.1:1. For the last 12 months the World replacement ratio increased from 2.5:1 to 5.5:1. OPEC increased from 2.7:1 to 10.4 :1; Non-OPEC ME increased from 1.3:1 to 4.8:1; and CPE decreased from 3.8:1 to -0.5:1. Net reserve additions in the last 12 months for the CPE countries are negative due to the downward revision of the Tengiz field in the Soviet Union mentioned earlier.

This third edition of the quarterly publication marks a significant improvement in the amount of data coverage achieved. Tracking reserve additions in this series of reports has evolved from using several hundred fields to over 10,000 fields to better define the magnitude and location of reserve additions.

- The first edition of the report (fourth quarter 1988) used the data collected from trade journals and listed in Appendix A to determine reserve additions for the last 3 months, last 12 months, and last 36 months. For the last 36 months, fields with a discovery date of 1986 or later in the Petroconsultants database (approximately 700 fields) were used to supplement the reserve additions calculated from Appendix A data.

- The second edition (first quarter 1989) used the data collected from trade journals and listed in Appendix A to determine reserve additions for all three time periods. Fields in the Petroconsultants database with a discovery date of 1986 or later were used to supplement the reserve additions calculated from Appendix A for all three time periods (i.e., the last 3 months, 12 months, and 36 months).

- This third edition (second quarter 1989) used all of the fields contained in the Petroconsultants database as the primary source to determine reserve additions for all three time periods. This change captures the major reserve additions that result from revisions to the reserves of older fields. Data from Appendix A is now used to supplement the Petroconsultants data. The greatly increased data coverage allows a more accurate description of the magnitude and trends for world reserve additions in this and future reports.

Another change in the report has been the replacement of the well test data by active rotary rig counts in the Market Economies. Well tests were discontinued in the second edition because they did not yield meaningful information about reserve additions and their spotty coverage was not a clear indicator of activity. The quarterly active rotary rig counts provide a more systematic measure of activity.

Reserve Additions for the 2nd Quarter 1989

The following is a list of significant discoveries with reserve information reported in the second quarter of 1989. The location and ultimate recovery estimate for each entry are depicted in Figures 4 through 7. Entries in the list are grouped geographically.

South America (Figure 4.)

- Tuskar Resources has discovered the Rubiales field in the southern Llanos basin of Colombia. Reserves are estimated at 70-100 million barrels of oil for the field. Tuskar is currently drilling its fifth well in the area.

Europe (Figure 5.)

- The Petroland K/6 field off the Netherlands has estimated reserves of 353 billion cubic feet of gas. The company hopes that the current appraisal program will double the reserves.
- The floating production platform which serves both the Ivanhoe and Rob Roy fields will be towed out to a location off Scotland in the North Sea soon. Export capacity of the platform is 60,000 barrels per day of oil and 1.65 million cubic feet per day of gas. Reserves for these Amerada Hess fields are 105 million barrels of oil and 65 billion cubic feet of gas.
- Norsk Hydro is hopeful that their proposed development plans for Brage field will be approved next spring by the Norwegian Government. Production could begin in 1993 and peak at 80,000 barrels per day. Reserves for the field are 243 million barrels of oil and 98 billion cubic feet of gas.
- Tern field in the United Kingdom northern North Sea is currently under development by Shell. Reserves for the field are estimated at 175 million barrels of oil.
- Norsk Hydro is planning a one year production test from an oil zone on the west flank of the supergiant Troll gas field. A horizontal well will be drilled to test the oil zone with estimated reserves of 258 million barrels. Gas production is scheduled to begin in the eastern part of this Norwegian field in 1996 and grow to 2 billion cubic feet of gas per day. Gas reserves for the field are 43.8 trillion cubic feet.
- The DUC Dagmar field is Denmark's first North Sea field with sour associated gas. Production startup is scheduled for 1991 at 4,000-8,000 barrels of oil per day. Reserves are estimated to be 19 million barrels of oil.
- Satellite Exploration AB of Sweden announced an oil discovery in the Swedish Baltic Sea. Klints Bank off northeastern Gotland has oil reserves estimated at 63 million barrels.
- An appraisal well drilled off West Germany by BEB resulted in a reserve estimate for the B/4 structure of 50 billion cubic feet of gas. More appraisal drilling is expected.

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

- Petroleum Development Oman announced a discovery of 353 billion cubic feet of gas. The gas was found by deeper drilling in the producing Saih Nihayda field. The new field is reportedly the fifth largest gas field in Oman.
- Iraq has stepped up development of the East Baghdad field. Reserves for the supergiant field are estimated at 7 billion barrels of oil.
- In a joint venture named Intershelf, J.P. Kenny of the United Kingdom, and the Moscow Institute of Civil Engineering and the Industrial Construction Bank of the U.S.S.R. will install a subsea production system for the Peltunastokskoye field. Reserves for the field, located off Sakhalin Island, are 200 million barrels of oil. It is the first development in the Sea of Okhotsk and production is scheduled to begin in 1990.

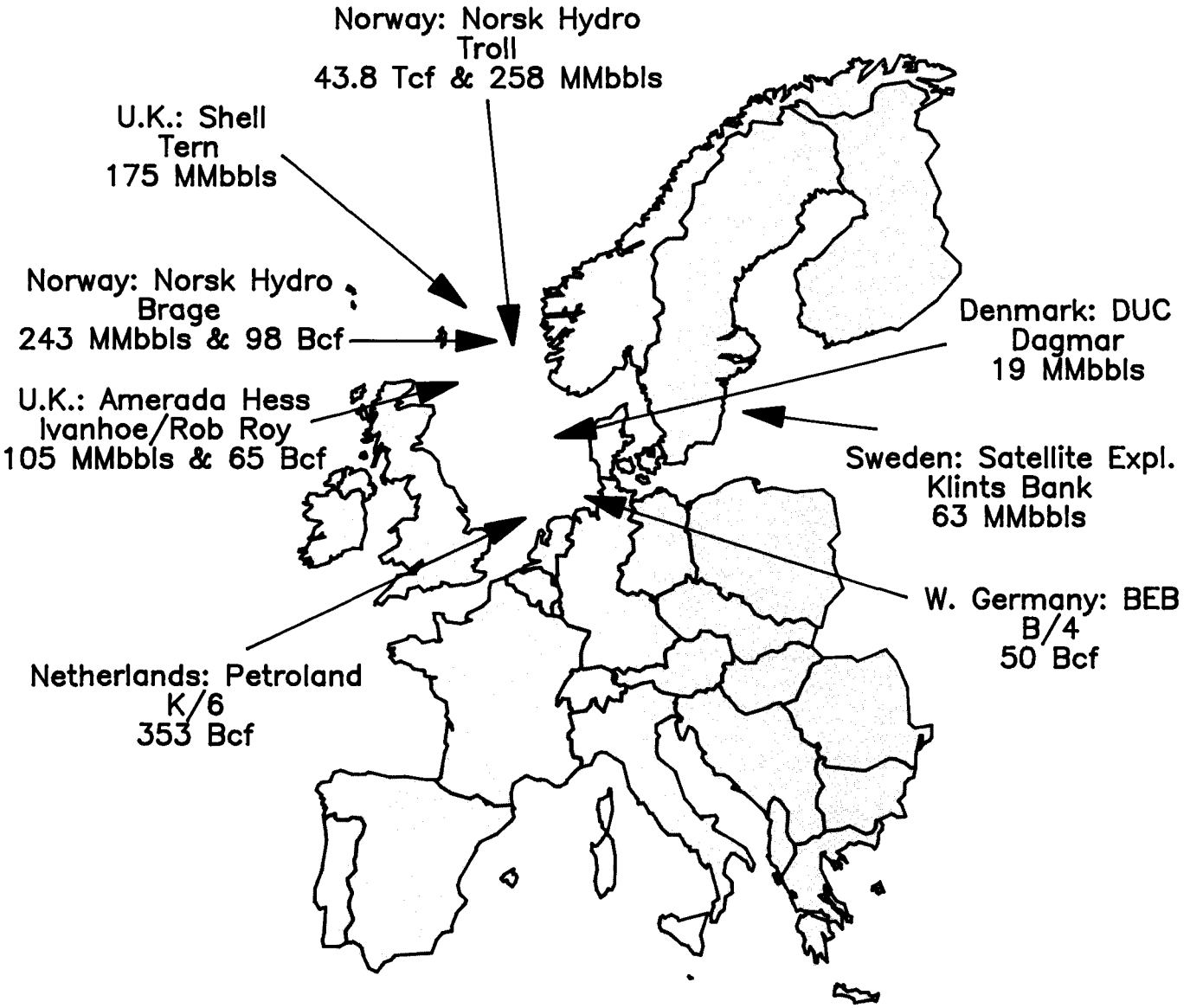
Oceania (Figure 7.)

- Production could start as early as 1991 from the Pagerungan gas field offshore Bali, Indonesia. Arco estimates reserves at 1.5 trillion cubic feet of gas.

Figure 4. South American Reserve Additions for the 2nd Quarter 1989

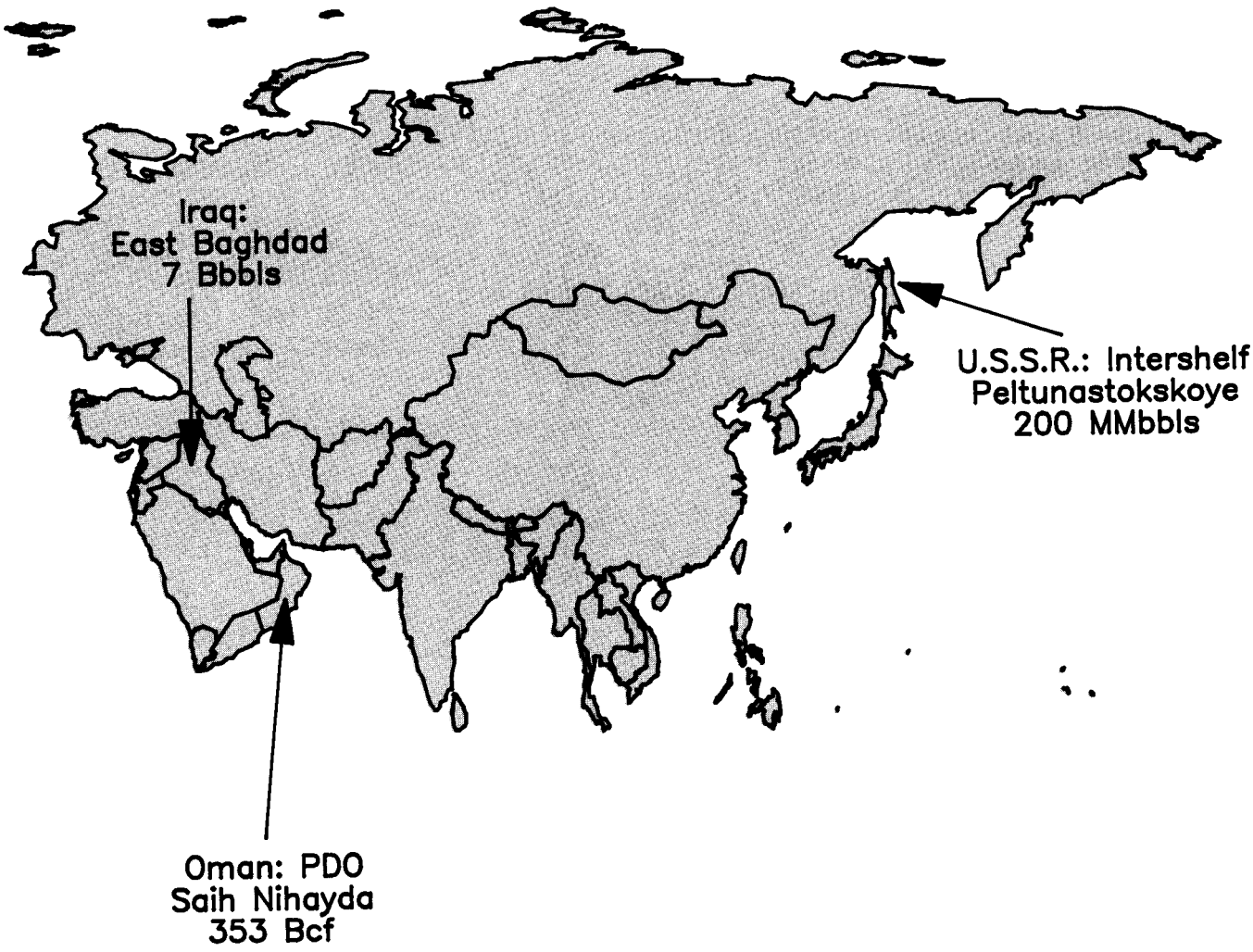
Source: Energy Information Administration, Office of Oil and Gas

Figure 5. European Reserve Additions for the 2nd Quarter 1989



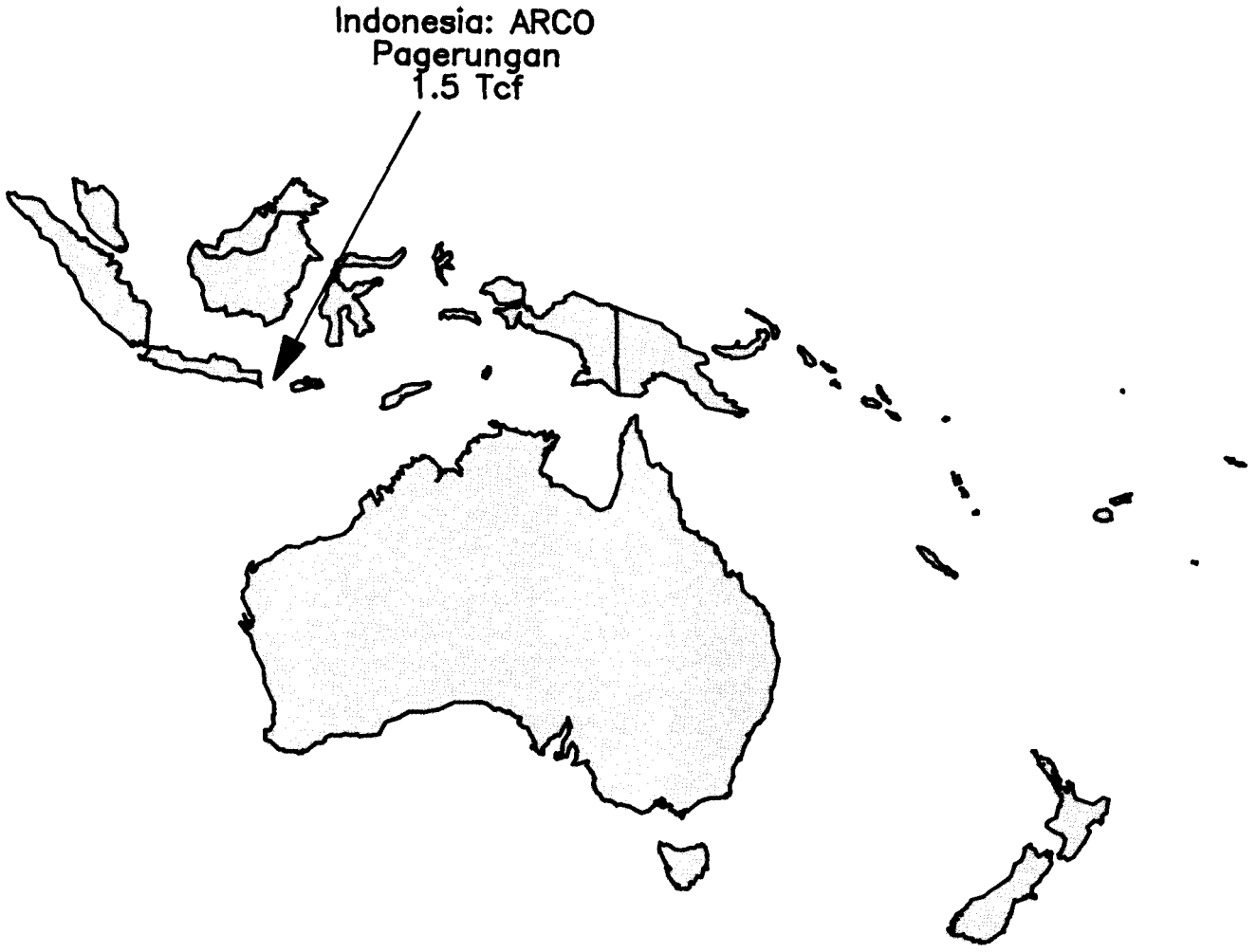
Source: Energy Information Administration, Office of Oil and Gas.

Figure 6. Asian, U.S.S.R., and Middle Eastern Reserve Additions for the 2nd Quarter 1989



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

Figure 7. Oceanian Reserve Additions for the Second Quarter 1989



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

References

1. *Oil and Gas Journal.* May 15, 1989. "Crude Prices fall with Overproduction Concerns." Vol. 87, No. 20, p .17.
2. *Oil and Gas Journal.* June 26, 1989. "OGJ Newsletter." Vol. 87, No. 26.
3. *Oil and Gas Journal.* June 19, 1989. "OGJ Newsletter." Vol. 87, No. 25.
4. *The Oil Daily.* July 5, 1989. "UAE Plans to Cut Output." No. 9295, p. 1.
5. *The Oil Daily.* June 26, 1989. "Norway to Continue Output Curbs." No. 9289.
6. *Oil and Gas Journal.* May 22, 1989. "Postwar Rebuilding Will Restore Production Capacity in Iran, Iraq." Vol. 87, No. 21, pp. 38-48.
7. *Oil and Gas Journal.* May 22, 1989. "OGJ Newsletter." Vol. 87, No. 21.
8. *Oil and Gas Journal.* "April 17, 1989. "OGJ Newsletter." Vol. 87, No. 16.
9. *Oil and Gas Journal.* May 22, 1989." Qatar's Huge North Field is Biggest Middle East Gas Project." Vol. 87, No. 21, p. 50-51.
10. *Oil and Gas Journal.* May 29, 1989. "Qatar's North Field Targets 1990 Completion." Vol. 87, No. 22, p. 64.
11. *Oil and Gas Journal.* April 24, 1989." Soviets Start Two More Upstream Joint Ventures." Vol. 87, No. 17, p. 22.
12. *Oil and Gas Journal.* May 15, 1989." Soviet Oil, Gas Industry Languishes." Vol. 87, No. 20, p. 12-14.
13. *Oil and Gas Journal.* April 3, 1989. "Shortages of Fuel to Trim China's Oil Exports." Vol. 87, No. 14, pp. 28-29.
14. *Petroleum News.* April 1989. "Exploration Briefs." Vol. 20, No. 1, p. 12.
15. *Oil and Gas Journal.* May 29, 1989. "OGJ Newsletter." Vol. 87, No. 22.
16. *Oil and Gas Journal.* June 26, 1989. "Canada's Heavy Oil, Bitumen Upgrading Activity is Growing." Vol. 87, No. 26, pp. 34-36.
17. *Oil and Gas Journal.* June 5, 1989. "Activity to Remain Brisk in E.Venezuela." Vol. 87, No. 23, p. 33.
18. *Oil and Gas Journal.* June 12, 1989. "International Briefs." Vol. 87, No. 24, p. 32.

Appendix A

Foreign Oil and Gas Discoveries

Appendix A

Table A1. Foreign Oil and Gas Discoveries

Country/ Field/Well	Company	Disc Date	Report Date	Source	Reserves and Comments
NEW ENTRIES ARE BOXED AND SHADED					
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	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
*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
*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
*Skua	BHP Petroleum	1987	2/88	OGJ	20 MMbbls
			8/88	W. Oil	20-30 MMbbls Timor Sea
			1/89	Ocn Ind	40-50 MMbbls Timor Sea
*Bream	Esso-BHP	1969	8/88	W. Oil	35 MMbbls Bass Strait
*Tarwhine	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 MMcfd & 3858 bbl/d cond Carnarvon basin
			4/89	Pet News	1 Tcf & 150 MMbbls
*Bambra #3	Bond Corp	1988	1/89	Ocn Ind	6 MMbbls & 50 Bcf 262 bbl/d & 2 MMcfd Carnarvon basin
Bangladesh					
*Kailashtilla/Beanibazar	BOGMC	1986	8/87	W. Oil	40 MMbbls Sylhet
			2/88	Pet News	40 MMbbls Sylhet
*Fenchuganj	BOGMC		2/89	Pet News	40 MMbbls
Haripur	BOGMC	1986	2/89	Pet News	40 MMbbls First oil find in country
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
*Malhado	Petrobras	1986	10/88	OGJ	30 MMbbl Campos basin

Table A1. Foreign Oil and Gas Discoveries (Continued)

Country/ Field/Well	Company	Disc Date	Report Date	Source	Reserves and Comments
Burma					
Martaban	JNOC		1/87	Pet News	4 Tcf Gulf of Martaban
			8/87	W. Oil	3-7 Tcf Gulf of Martaban
*3Da Structure	Myanma Oil Corp	1983	2/89	Pet News	4.3 Tcf Gulf of Martaban
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
Amauligak	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
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
Hibernia	Mobil	1979	7/88	Com Rpt	525-650 MMbbls 186 mi. east of St. John's Newfoundland
Whiterose E-09	Husky	1988	10/88	OGJ	200-300 MMbbls 4999 bbl/d & 3.99 MMcfd f/9526-12086 ft
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
Ya Ya			2/89	OGJ	160 Bcf Mackenzie Delta
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
Chile					
Atacama salt flats	ENAP/Hunt	1987	8/88	W. Oil	125.8 MMbbls Atacama area
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
*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 Area		1987	3/88	OGJ	730 MMbbls Xinjiang Province Junggar basin
*Liuhua 11-1	Amoco	1987	8/88	OGJ	730 MMbbls 21 API 1000 ft of water
			4/89	Pet News	700 MMbbls
Zhongyuan		1988	9/88	OGJ	1.4-2.1 MMbbls added for new pay & new fields in area
*Yacheng 13-1	ARCO	1983	1/89	OGJ	2.1-3.53 Tcf South of Hainan Island
			4/89	Pet News	3.5 Tcf
Moxi		1987	2/89	Pet News	897 Bcf Sichuan Province
A'ershan			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	JCODC	1981	3/89	OGJ	30 MMbbls south central Bohai Sea
*Liuhua 4-1		1987	4/89	Pet News	30 MMbbls

Table A1. Foreign Oil and Gas Discoveries (Continued)

Country/ Field/Well	Company	Disc Date	Report Date	Source	Reserves and Comments
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
Rubiales	Tuskar Resources	1989	4/89	OGJ	70-100 MMbbls southern Llanos basin
Denmark					
*Dagmar	DUC	1983	6/89	OGJ	19 MMbbls offshore 1st Danish North Sea field with sour gas
Egypt					
*Meleiha Permit	Agiba	1972	8/87	OGJ	63 MMbbls Western Desert
*Sinai #1	Petrobel	1987	10/88	AAPG	20 MMbbls offshore Gulf of Suez
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
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	526 Bcf Gulf of Khambhat (Cambay)
*South Tapti	ONGC	1978	2/89	Pet News	230 Bcf Gulf of Khambhat (Cambay)
*Panna	ONGC	1976	2/89	Pet News	93 MMbbls & 244 Bcf western offshore region
Indonesia					
*Tunu	Total	1977	10/87	AAPG	10 Tcf Mahakam Delta
*Bima	ARCO	1983	10/87	AAPG	150 MMbbls NW Java
*Intan/Widuri	Maxus	1988	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
Iran					
Koohe Mand		1988	12/88	OGJ	10 Bbbls very heavy crude southeast of Bushire
Behbahan		1988	12/88	OGJ	200 MMbbls east of Behbahan
Iraq					
*East Baghdad		1979	5/89	OGJ	7 Bbbls
Italy					
*Villafortuna	Agip	1984	6/88	OGJ	<300 MMbbls 45 API f/18700 ft River Ticino

Table A1. Foreign Oil and Gas Discoveries (Continued)

Country/ Field/Well	Company	Disc Date	Report Date	Source	Reserves and Comments
Jordan					
Risha #3	NRA	7/87	10/88	AAPG	1 Tcf 15 MMcfd
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
			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 5 Bbbls & 2.5 Tcf in place
Malaysia					
*Seligi	Petronas	1971	1/89	Ocn Ind	420 MMbbls 171 mi off Trengganu largest in country
Namibia					
*Kudu	SW African Oil Expl	1974	8/87	W. Oil	3-10 Tcf
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	1986	5/89	OGJ	353 Bcf
New Zealand					
*Tariki 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
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
*Ebegoro South 1B	Agip	1987	10/88	AAPG	50 MMbbls NE delta region
Orogho #1	Shell-NNPC		2/89	OGJ	150 MMbbls west of Sapele, Bendel state
Orubou #2	Shell-NNPC		2/89	OGJ	100 MMbbls near Benisede, Bendel state
Akono #1	Shell-NNPC		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

Table A1. Foreign Oil and Gas Discoveries (Continued)

Country/ Field/Well	Company	Disc Date	Report Date	Source	Reserves and Comments
North 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
Norway					
*Heidrun		1985	8/87	W. Oil	745 MMbbls & 1.3 Tcf
			4/89	W. Oil	762 MMbbls & 1.1 Tcf
*Draugen		1984	8/87	W. Oil	400 MMbbls & 60 Bcf
			2/88	AAPG	1 Bbbls
			11/88	OGJ	422 MMbbls & 106 Bcf
*Snorre		1979	8/87	W. Oil	700 MMbbls & 250 Bcf
			4/89	W. Oil	722 MMbbls & 314 Bcf
*Haltenbanken 6407/7-1	Norsk Hydro	1986	8/87	W. Oil	260 MMbbls
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	200-300 MMbbls 9385 bbl/d
*34/7-13	Saga	1988	8/88	W. Oil	30-60 MMbbls 8491 bbl/d
*North Statfjord 33/9-4	Statoil	1977	8/88	W. Oil	120 MMbbls 8900 bbl/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
*Oseberg	Norsk Hydro	1979	4/89	W. Oil	125 MMbbls
			5/89	OGJ	1.57 Bbbls 80 mi west of Bergen
*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
*West Flank, Troll	Statoil		6/89	OGJ	256 MMbbls west flank of Troll
*Brage	Norsk Hydro	1980	6/89	OGJ	243 MMbbls & 98 Bcf offshore
Oman					
*Bukha	IPC	1979	10/87	AAPG	40 MMbbls
*Safah	Occidental	1983	4/89	Com Rpt	50 MMbbls increase f/21-71 MMbbls due to development drilling
Saih Nihayda (deep)	PDO	1989	6/89	Oil Dly	353 Bcf
*Saih Nihayda (shallow)	PDO	1974	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
*Pasca A	Kelvin Energy	1988	2/88	Pet News	30 MMbbls & 300-410 Bcf
			2/89	Pet news	36 MMbbls & 300 Bcf
*Pandora	IPC	1988	12/88	OGJ	3 Tcf
*Iagifu & NW Hedinia			12/88	Pet News	130 MMbbls
*Iagifu-Hedinia-SE Hedinia	Chevron Niugini Gulf		2/89	Pet News	115-500 MMbbls
*Iagifu & Hedinia	Chevron		3/89	OGJ	30-300 MMbbls

Table A1. Foreign Oil and Gas Discoveries (Continued)

Country/ Field/Well	Company	Disc Date	Report Date	Source	Reserves and Comments
Peru					
*Cashiriari	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/Cashiriari	Shell		3/88	OGJ	12 Tcf & 650 MMbbls
			8/88	W. Oil	10 Tcf & 600 MMbbls cond
Qatar					
*North Field	QGPC	1972	8/87	W. Oil	130 Tcf
			5/89	OGJ	150 Tcf
Romania					
E. & W. Lebada		1981	8/87	W. Oil	73 MMbbls Black Sea
South Africa					
Mossel Bay Area	Soekor		8/87	W. Oil	1 Tcf
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 & 106 Bcf
			2/88	Pet News	5-10 MMbbls Straits of Taiwan
Thailand					
*"B" Structure	PTT E&P	1973	7/88	OGJ	1.8 Tcf, 6 Tcf possible
*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
*Sirikit	Shell	1981	2/89	OGJ	20 MMbbls, a 40% increase to 70 MMbbls
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/Petrel	Enterprise/Shell	1987	3/88	OGJ	150-175 MMbbls 6500 bbl/d 40 API
			4/89	W. Oil	320 MMbbls
*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
*Forth	Britoil	1988	5/88	Pet Mngt	200 MMbbls & 60 Bcf
			8/88	OGJ	200 MMbbls & 600 Bcf
Pickerel/Valkyrie area	ARCO/Conoco		8/88	OGJ	850 Bcf
*Welland	ARCO		8/88	OGJ	300 Bcf
*Venture	Conoco		8/88	OGJ	60 Bcf
*Lancelot area	Mobil	1985	8/88	OGJ	600 Bcf

Table A1. Foreign Oil and Gas Discoveries (Continued)

Country/ Field/Well	Company	Disc Date	Report Date	Source	Reserves and Comments
*Anglia	Ranger Oil		8/88	OGJ	250 Bcf
			2/89	OGJ	200 Bcf Blocks 48/16b & 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
*Tiffany & Toni	Agip	1979	8/88	OGJ	125 Bcf & 180 MMbbls T-block 16/17
*Arbroath	Amoco	12/69	8/88	Pet Engr	103 MMbbls 5 mi 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
*Kittiwake	Shell Expro	1981	8/88	Pet Engr	70 MMbbls block 21/18
*Waverley/Brunel	Amerada Hess/Amoco		8/88	Pet Engr	150-200 MMbbls blocks 15/21a & 15/22
			10/88	OGJ	250 MMbbls combined Waverley & Brunel
			12/88	OGJ	400 MMbbls combined Waverley & Brunel
16/28c-11	BP	1988	9/88	OGJ	10 MMbbls 6000 bbl/d 1st horizontal well f/semi off U.K.
*Hudson Field 210/24a	Amoco	1987	10/88	AAPG	100 MMbbls
*Waverley 15/21a	Amerada Hess	1988	10/88	OGJ	150 MMbbls
*Brunel 15/22	Amoco	1988	10/88	OGJ	100 MMbbls
*Crawford 9/28	Hamilton Bros	1975	10/88	OGJ	14.6 MMbbls 140 mi 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	OGL	43 MMbbls 24 API f/5150-5600 ft 70 mi E of Shetlands
*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
*Glamis	Sun	1982	4/89	W. Oil	18 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 mi east of Aberdeen
*Tern	Shell	1975	4/89	W. Oil	175 MMbbls

USSR

*Bovanenko/Kharasavey		1971	8/87	W. Oil	190 Tcf Yamal Peninsula
Tengiz		1979	4/88	OGJ	18.25 Bbbls NE Caspian basin
			4/88	PIW	14-19 Bbbls
			8/88	W. Oil	18.25 Bbbls oil in place? North Caspian basin
			4/89	OGJ	6-7 Bbbls 18 Bbbls oil in place
*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
*Yubileinoye		1969	3/89	OGJ	12.1 Tcf western Siberia proved & probable
Peltunastokskoye			4/89	OGJ	200 MMbbls off Sakhalin Island Sea of Okhotsk

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
*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
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

Table A1. Foreign Oil and Gas Discoveries (Continued)

Country/ Field/Well	Company	Disc Date	Report Date	Source	Reserves and Comments
			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	1987	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
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 possible
Big Bear	Petrovietnam	1988	2/89	Pet News	20 MMbbls Offshore Ho Chi Minh City
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

*Field is also in Petroconsultants database 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. **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

Petroconsultants Reserve Additions

Appendix B

Table B1. Petroconsultants Reserve Additions

Country	Oil, MMbbls			Gas, Bcf		
	Last 3 Months 04/89-6/89	Last 12 Months 7/88-6/89	Last 36 Months 7/86-6/89	Last 3 Months 4/89-6/89	Last 12 Months 7/88-6/89	Last 36 Months 7/86-6/89
ABU DHABI		4,235	23,385		-1,465	25,114
ALGERIA		74	-2		27,465	24,826
ANGOLA	54	174	281		34	-61
ARGENTINA	261	3,396	2,677	9,476	13,265	38,467
AUSTRALIA	33	429	246	-4,132	2,843	3,980
AUSTRIA		50	24	16	150	223
BAHRAIN			-50			1,500
BANGLADESH		2	2	-1,500	-1,167	2,253
BARBADOS		1	-1		2	11
BENIN		-3	-83			
BOLIVIA		50	35	60	77	461
BRAZIL	349	-572	5,540	-179	-4,214	12,193
BRUNEI	348	864	713	1,000	5,351	4,451
BULGARIA					-350	-350
BURMA	3,073	3,087	3,095	-15	772	762
CAMEROON	20	-50	29		-1,157	-1,167
CHAD		79	79			
CHILE	1	143	154	59	460	7,230
CHINA	-226	101	3,357	-262	1,026	5,653
COLOMBIA	-53	672	964	220	368	605
CONGO	18	230	373		-1,072	-1,072
COTE D'IVOIRE		-25	-75			830
CUBA		1	1			
DENMARK	131	231	301	-94	-128	-928
DUBAI			20		250	250
ECUADOR	20	422	572		-452	-335
EGYPT	96	330	694	79	1,314	5,496
ETHIOPIA						850
FRANCE	-4	139	132	1,577	1,794	1,176
GABON	-49	-202	309	-551	-551	-821
GHANA		5	5		1	1
GREECE	-47	-46	-46	-15	-15	-16
GUATEMALA	18	29	29			
GUINEA EQUATORIAL						802
INDIA	-2	45	923	-403	-48	1,637
INDONESIA	275	1,284	2,161	644	47,605	60,421
IRAN	700	1,570	15,800	21,750	57,369	70,813
IRAQ	11,000	43,401	53,341	1,500	13,975	16,438
IRELAND			-69			47
ISRAEL		25	25			
ITALY	-13	207	112	75	501	398
JAPAN		53	51		240	360
JORDAN			-45		1,000	1,000
KUWAIT[1]			16,426		8	12,314
LIBYA	-33	-569	-5,139	490	974	873
MALAYSIA	-293	349	367	-5,592	-5,040	-11,026
MEXICO	71	18,378	18,363	33	12,238	21,141
MOROCCO		10	3	-7	37	58
NAMIBIA					1,700	1,700
NETHERLANDS	23	111	102	222	-190	-6,053
NEW ZEALAND	10	54	40	-9	307	-829
NIGERIA	120	476	-1,257	1,743	15,703	53,565
NORTH YEMEN			400			4,700
NORWAY	603	1,413	3,843	688	-6,565	3,748
OMAN	-19	12	1,798	96	1,348	4,233
PAKISTAN	-40	126	-113	10	2,016	2,371
PAPUA NEW GUINEA		-60	140		-400	3,678

Table B1. Petroconsultants Reserve Additions (Continued)

Country	Oil, MMbbls			Gas, Bcf		
	Last 3 Months 4/89-6/89	Last 12 Months 7/88-6/89	Last 36 Months 7/86-6/89	Last 3 Months 4/89-6/89	Last 12 Months 7/88-6/89	Last 36 Months 7/86-6/89
PERU		71	267		103	15,113
PHILIPPINES	-3	17	34	-245	-244	-274
POLAND						2
QATAR	50	310	410		-145,586	-150,660
ROMANIA		138	191		282	352
SAUDI ARABIA[1]		10,356	14,182		9,267	10,035
SENEGAL			-90	15	15	15
SHARJAH			14		470	493
SOUTH AFRICA		1	1			-50
SOUTH KOREA						10
SOUTH YEMEN			300			
SPAIN		31	16		66	-433
SUDAN		327	327		839	839
SURINAME			9			
SWEDEN		1	1			
SWITZERLAND					4	4
SYRIA	50	528	-1,398			1,035
TAIWAN		11	11		45	16
TANZANIA						106
THAILAND	26	24	17	113	114	3,928
TRINIDAD	1	39	137		7	580
TUNISIA		-56	-136		-61	-887
TURKEY	10	148	9	1	43	347
U.S.S.R.	780	5,463	35,315	682	31,469	70,302
UMM AL QAIWAIN						250
UNITED KINGDOM	252	3,338	4,456	489	9,114	13,567
VENEZUELA	16	7,623	10,447	85	2,590	11,179
VIETNAM		6	-1,964			80
WEST GERMANY	95	334	337	346	-817	-1,432
YUGOSLAVIA		369	711		1,516	2,399
ZAIRE	-55	-49	-41	1	1	40
Total OPEC	12,099	68,980	130,669	25,661	24,642	154,844
Total Non-OPEC ME	5,014	34,701	45,317	2,365	35,978	137,754
Total CPE	554	6,078	37,611	420	33,943	78,438
Total World	17,667	109,759	213,597	28,446	94,563	371,036

[1]Includes 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.

Appendix C

World Crude Oil and Natural Gas Reserves

Appendix C

Table C1. World Crude Oil and Natural Gas Reserves

Region/Country	Oil (Billion Barrels)		Natural Gas (Trillion Cubic Feet)	
	Oil & Gas Journal 12/31/88	World Oil 12/31/88	Oil & Gas Journal 12/31/88	World Oil 12/31/88
North America				
Canada	6.8	7.0	95.1	94.8
Mexico	54.1	53.0	74.8	73.4
United States[1]	26.8	26.8	168.0	168.0
Other	0.1	0.1	0.0	0.0
Total	87.8	87.0	338.0	336.2
South America				
Argentina	2.3	2.3	26.7	27.3
Bolivia	0.2	0.2	5.4	5.5
Brazil	2.6	2.8	3.7	3.8
Chile	0.3	0.3	4.2	4.2
Colombia	2.0	2.2	3.9	4.7
Ecuador	1.4	1.2	4.0	4.0
Peru	0.5	0.4	0.6	0.6
Trinidad and Tobago	0.5	0.5	10.5	10.0
Venezuela	58.1	59.8	102.2	108.8
Other	0.0	0.0	0.0	0.0
Total	67.8	69.7	161.3	168.9
Western Europe				
Austria	0.1	0.1	0.4	0.4
Denmark	0.9	0.5	4.8	2.8
France	0.2	0.2	1.2	1.2
Germany, West	0.4	0.2	9.4	6.3
Greece	0.0	0.0	0.1	0.0
Italy	0.7	1.1	10.2	11.2
Netherlands	0.2	0.2	62.5	61.1
Norway	10.4	11.0	85.5	93.1
Spain	0.0	0.0	0.8	0.4
United Kingdom	5.2	4.3	22.7	20.8
Other	0.0	0.0	1.8	0.8
Total	18.2	17.7	199.1	198.0
Eastern Europe				
U.S.S.R.	58.5	60.9	1,500.0	1,450.0
Other[2]	1.8	2.0	29.0	22.0
Total	60.3	62.9	1,529.0	1,472.0
Middle East				
Abu Dhabi	92.2	54.9	183.5	183.0
Bahrain	0.1	0.1	6.7	6.5
Dubai	4.0	1.3	5.0	4.1
Iran	92.9	63.0	494.4	595.0
Iraq	100.0	99.0	95.0	34.8
Kuwait[3]	94.5	96.6	48.7	41.6
Oman	4.1	4.1	9.3	9.3
Qatar	3.2	2.6	156.7	163.1
Saudi Arabia[3]	172.6	257.5	152.0	185.4
Syria	1.7	1.9	13.1	4.0
Turkey	0.4	0.2	1.0	0.5
Yemen, North	1.0	0.5	3.7	5.5
Yemen, South	3.4	1.0	0.0	5.0
Other	1.9	0.1	14.0	9.2
Total	571.9	584.8	1,183.2	1,247.2

Appendix C

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

Region/Country	Oil (Billion Barrels)		Natural Gas (Trillion Cubic Feet)	
	Oil & Gas Journal 12/31/88	World Oil 12/31/88	Oil & Gas Journal 12/31/88	World Oil 12/31/88
Africa				
Algeria	8.4	8.4	104.2	104.2
Angola	2.0	2.0	1.9	1.7
Cameroon	0.4	0.5	3.9	3.8
Congo	0.7	0.8	2.4	2.5
Egypt	4.3	4.6	11.5	9.4
Gabon	0.7	0.9	0.6	0.5
Libya	22.0	22.4	25.7	25.6
Morocco	0.0	0.0	0.1	0.1
Nigeria	16.0	16.0	85.0	47.3
South Africa	0.0	0.0	1.8	1.8
Tunisia	1.8	1.8	3.1	3.1
Other	0.6	1.4	13.2	8.6
Total	57.0	58.7	253.3	206.2
Far East and Oceania				
Australia	1.7	2.3	16.6	36.8
Brunei	1.4	1.2	11.6	12.6
Burma	0.1	0.2	9.5	5.1
China	23.6	22.0	91.7	30.0
India	6.4	4.5	22.9	21.0
Indonesia	8.8	8.4	93.6	85.6
Japan	0.1	0.1	1.4	1.1
Malaysia	2.9	3.4	51.7	52.6
Pakistan	0.2	0.2	17.7	17.2
Taiwan	0.0	0.0	0.9	0.7
Thailand	0.1	0.2	3.9	6.9
New Zealand	0.2	0.2	5.2	4.0
Other	0.2	0.4	15.8	14.9
Total	44.9	42.8	272.4	288.3
Total OPEC	676.0	694.0	1,553.6	1,592.5
Total Non-OPEC ME	148.0	144.7	821.8	822.3
Total CPE	83.8	84.9	1,560.7	1,502.0
World Total	907.8	923.6	3,936.2	3,916.9

[1]United States reserves are from Energy Information Administration, *U.S.Crude Oil, Natural Gas, and Natural Gas Liquids Reserves, 1988 Annual Report.*

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

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

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

Source: PennWell Publishing Company, *Oil and Gas Journal,* December 26, 1988, pp. 48-49. Gulf Publishing Company, *World Oil,* August, 1989, p. 30. The Energy Information Administration does not certify this 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.
bbl/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 or condensate.
MMcfd	Million cubic feet per day of natural gas.
N	North.
NE	Northeast.
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 well.
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.
Tcf	Trillion cubic feet of natural gas.
Test	Indicates a well was flow tested and produced hydrocarbons.
TVD	True vertical depth of a well.
W	West.