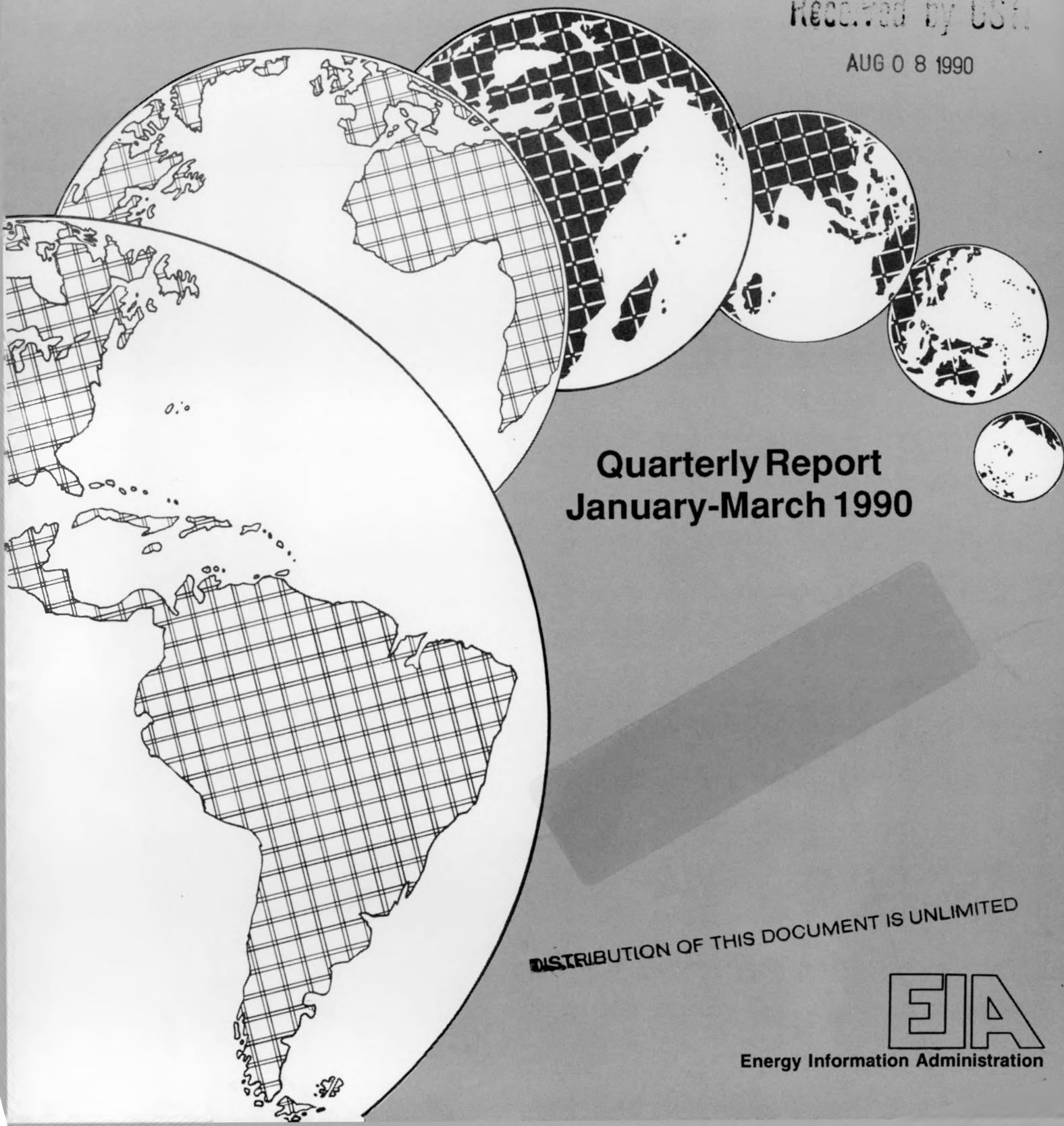


# International Oil and Gas Exploration and Development Activities

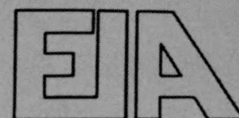
Received by GST

AUG 08 1990



**Quarterly Report  
January-March 1990**

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED



Energy Information Administration

## **DISCLAIMER**

**This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.**

---

## **DISCLAIMER**

**Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.**

This publication may be purchased from the Superintendent of Documents, U.S. Government Printing Office. Purchasing information for this or other Energy Information Administration (EIA) publications may be obtained from the Government Printing Office or EIA's National Energy Information Center. Questions on energy statistics should be directed to the Center by mail, telephone, or telecommunications device for the hearing impaired. Addresses, telephone numbers, and hours are as follows:

National Energy Information Center  
**Energy Information Administration**  
Forrestal Building, Room 1F-048  
Washington, DC 20585  
(202) 586-8800  
Telecommunications Device for the  
Hearing Impaired Only: (202) 586-1181  
8 a.m. - 5 p.m., eastern time, M-F

Superintendent of Documents  
U.S. Government Printing Office  
Washington, DC 20402  
(202) 783-3238  
FAX 1-202-275-0019  
8 a.m. - 5 p.m., eastern time, M-F

### **Action Required to Stay on EIA Mailing List**

Did you return your Energy Information Administration (EIA) 1990 Publications Subscription Renewal Notice? It must be signed and returned by July 31, 1990. If not, your name will be removed from the EIA publications mailing list and you will no longer receive EIA publications free of charge.

If you did not receive a Renewal Notice and wish to remain on the mailing list, please call the National Energy Information Center at (202) 586-8800.

**Note:** This review does not apply to paid subscription lists maintained by the U. S. Government Printing Office.

*Released for Printing: July 26, 1990*

# **International Oil and Gas Exploration and Development Activities**

## **Quarterly Report January-March 1990**

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

This report was prepared by the Energy Information Administration, the independent statistical and analytical agency within the Department of Energy. The information contained herein should not be construed as advocating or reflecting any policy position of the Department of Energy or any other organization.

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

*pr* **MASTER**



# 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.

# Contents

	Page
<b>Introduction</b> .....	1
<b>Overview</b> .....	3
<b>Reserve Additions for the 1st Quarter 1990</b> .....	17
<b>References</b> .....	23
<b>Appendices</b>	
A. Foreign Oil and Gas Discoveries .....	27
B. Modified Petroconsultants Reserve Additions .....	41
C. World Oil and Natural Gas Reserves .....	47
<b>Glossary</b> .....	51
<b>Tables</b>	
1. World Oil Reserve Additions, Production, and Replacement Ratios .....	3
2. World Quarterly Crude Oil Production Including Lease Condensate .....	4
3. Quarterly Active Rotary Rigs for the Market Economies .....	6
4. World Oil and Gas Reserve Additions .....	13
<b>Figures</b>	
1. World Average Daily Crude Oil Production Including Lease Condensate .....	5
2. Quarterly Active Rotary Rigs for the Market Economies .....	8
3. U.S. Refiner Acquisition Cost of Imported Crude Oil .....	9
4. Data Sources and Flow .....	11
5. South American Reserve Additions for the 1st Quarter 1990 .....	19
6. European Reserve Additions for the 1st Quarter 1990 .....	20
7. Asian, U.S.S.R., and Middle Eastern Reserve Additions for the 1st Quarter 1990 .....	21
8. Oceanian Reserve Additions for the 1st Quarter 1990 .....	22

# 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.

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, including lease condensate, from 1986 through the fourth quarter 1989. World production is divided into OPEC, Non-OPEC ME, and CPE production. Figure 1 illustrates oil production for the World, OPEC, and Non-OPEC ME countries. Table 3 shows the average number of active rotary drilling rigs by quarter for the last 36 months for the ME countries. Figure 2 displays the trend of active drilling rig counts 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 reflects the trends in World oil prices using the U.S. refiner acquisition cost of imported crude oil. Figure 4 shows how data from the different sources are used in this report. Table 4 lists the incremental reserve additions for both oil and gas, 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 reported reserves published in industry trade journals. The field ultimate recovery data of Petroconsultants are the primary source for Table 4.

A few of the more significant discoveries are discussed in this report, and their approximate locations are shown in Figures 5 through 8. 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 data base. Appendix B, "Modified Petroconsultants Reserve Additions", is similar to Table 4 but contains Petroconsultants data with selected historical data from Appendix A which was not found in the historical Petroconsultants data. Appendix C, "World Oil and Natural Gas Reserves", presents published oil and gas remaining reserve estimates by country. A glossary of abbreviations is also included at the end of this report.

# Overview

## Oil Reserve Additions

World oil reserve additions have more than replaced production for the last 12-month and 36-month periods ending in March 1990. For the last 12 months, World reserve additions were 33.9 billion barrels and production was 22 billion barrels of oil, a replacement ratio of 1.5:1 (Table 1). Similarly, reserve additions for the Non-OPEC Market Economies (Non-OPEC ME) were 12.1 billion barrels while production was 8.2 billion barrels of oil which yielded a replacement ratio of 1.5:1. The reserve replacement ratio for OPEC was 2.4:1 for the last 12 months. The Centrally Planned Economies (CPE) had a replacement ratio of only 0.3:1 and did not come close to replacing production during the last 12 months. The CPE replacement ratio would have been 1.6:1 except for the downward revision of 7 billion barrels for the Tengiz field in the U.S.S.R. (Appendix A). For the last 36 months, World reserve additions were 244 billion barrels and production was 64.3 billion barrels of oil, a ratio of 3.8:1. 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 6.7:1 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 lower for the World, OPEC, and Non-OPEC ME but each still added more oil reserves than were produced. The CPE's replacement ratio has improved slightly. Iraq is the only country with reserve additions over 10 billion barrels in the last 12 months (Table 4).

Compared to last quarter's report for the last 36 months, reserve additions are higher for OPEC, lower for the World and CPE, and about the same for the Non-OPEC ME. 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 CPE, higher for OPEC, and steady for the Non-OPEC ME. Countries with reserve additions over 10 billion barrels in the last 36 months are: Mexico, Venezuela, U.S.S.R., Abu Dhabi, Iran, Iraq, Kuwait, Saudi Arabia, and China (Table 4).

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

Category	World	Non-OPEC		
		OPEC	ME	CPE
<b>Last 36 Months</b>				
<b>4/87-3/90</b>				
Reported Reserve Additions (MMbbls)	244,307	156,322	57,000	30,985
Production (MMbbls)	64,252	23,421	24,736	16,094
Net Reserve Additions (MMbbls) <sup>1</sup>	180,055	132,901	32,264	14,891
Replacement Ratio <sup>2</sup>	3.8	6.7	2.3	1.9
<b>Last 12 Months</b>				
<b>4/89-3/90</b>				
Reported Reserve Additions (MMbbls)	33,862	20,206	12,121	1,536
Production (MMbbls)	21,977	8,538	8,167	5,272
Net Reserve Additions (MMbbls) <sup>1</sup>	11,885	11,668	3,954	-3,736
Replacement Ratio <sup>2</sup>	1.5	2.4	1.5	0.3

<sup>1</sup>Net Reserve Additions = Reported Reserve Additions minus Production.

<sup>2</sup>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 for the first quarter of 1990 is estimated at 24.2 million barrels per day (Table 2.). This is 3.1 million barrels per day more than was produced in the first quarter of 1989, slightly less than was produced in the fourth quarter 1989, and 2.1 million barrels per day above the OPEC quota of 22.1 million barrels of oil per day. Non-OPEC ME production increased 232,000 barrels of oil per day compared to the first quarter of 1989 and increased 30,000 barrels per day (0.1 percent) compared to the fourth quarter 1989. CPE production has been declining through 1989. Compared to the first quarter of 1989, CPE production is 334,000 barrels of oil per day less. However, CPE oil production is 29,000 barrels per day more than in the fourth quarter of 1989. Compared to one year earlier, production in the first quarter of 1990 is 5.1 percent higher for the World, 14.6 percent higher for OPEC, 1.0 percent higher for the Non-OPEC ME, and 2.3 percent lower for the CPE countries.

**Table 2. World Quarterly Crude Oil Production Including Lease Condensate  
(Thousand 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	58,198	21,101	22,364	14,733
2nd/1989	58,669	22,155	22,011	14,503
3rd/1989	59,844	23,012	22,330	14,502
4th/1989	61,167	24,231	22,566	14,370
Annual Average . . . . .	59,479	22,634	22,318	14,526
1st/1990 <sup>1</sup>	61,168	24,172	22,596	14,399

<sup>1</sup>Production data for the first quarter 1990 are EIA estimates.

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

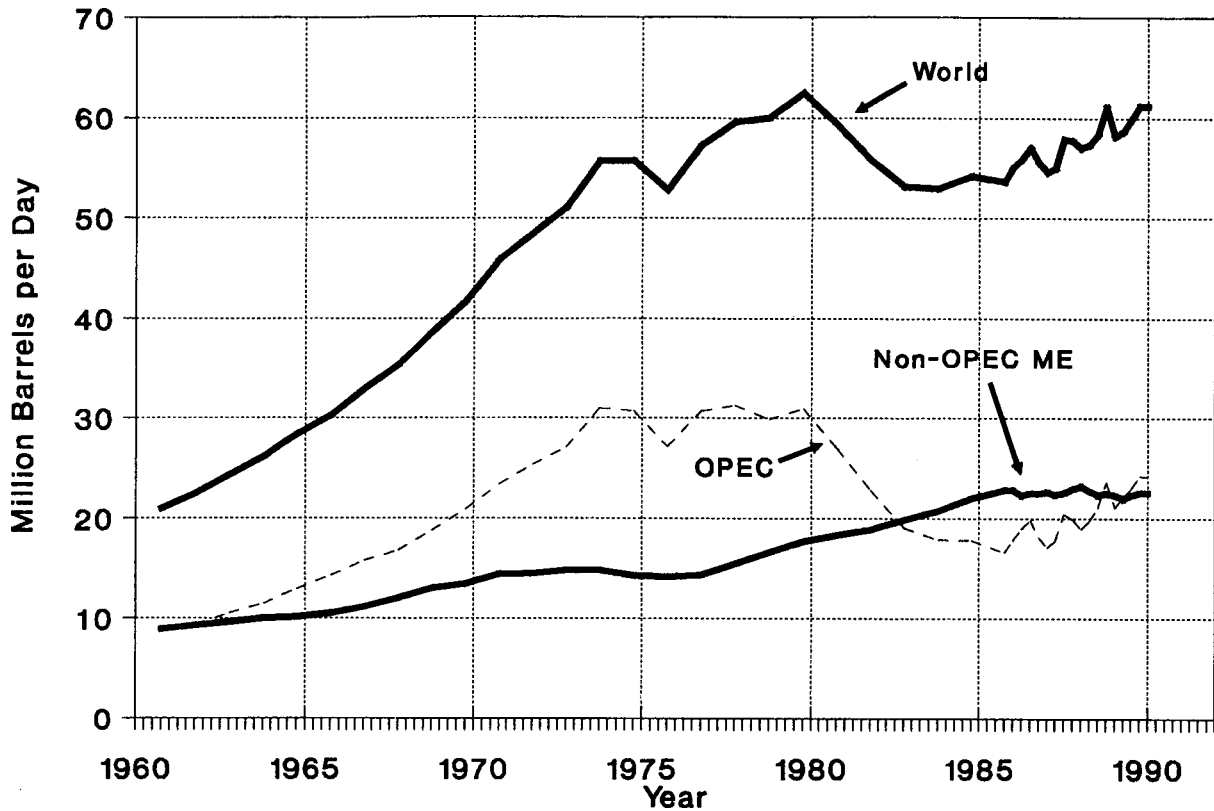
Source: Energy Information Administration, *Monthly Energy Review*, DOE/EIA-0035(90/01).

Figure 1 shows the data of Table 2 with historical production from 1960 through the first quarter of 1990. The quarterly production shown is actual quarterly data from the first quarter of 1986 forward. Before 1986 only annual averages are plotted. Beginning in 1986 Non-OPEC ME production leveled off while OPEC production, and thus World production, has risen. OPEC production has 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 has increased to 38.1 percent for 1989 and 39.5 percent for the first quarter of 1990.

## New Production Quotas

The OPEC oil production quota for the first half of 1990 will be 22.086 million barrels of crude oil per day. All OPEC members received a proportionate increase except for Indonesia, the United Arab Emirates (U.A.E.), and Kuwait. Kuwait gained a 1.2 percent increase of the total quota, while Indonesia and the U.A.E. lost 0.5 and 0.4 percent of the total, respectively.

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



Source: 1960-1972, EIA Annual Energy Review 1988; 1973-1990, EIA Monthly Energy Review January 1990.

Both Indonesia and the U.A.E. received a smaller share of the new total because both their quotas remained the same as in the fourth quarter of 1989.

Norway has supported OPEC and its efforts to stabilize oil prices by reducing Norwegian oil production by 7.5 percent. However, Norwegian support for OPEC is waning. Norway has reduced its curtailment of production from 7.5 to 5 percent of capacity for the first half of 1990<sup>1</sup>. This production curtailment may be completely eliminated in the second half of 1990. Norwegian production is expected to rise to 1.7 million barrels per day in the first half of 1990 compared to 1.55 million barrels per day in 1989.

### Active Rotary Drilling Rigs and World Oil Prices

Table 3 lists the number of active drilling rigs for the ME countries for the last 3 years ending with the first quarter 1990. Countries where rig counts have declined by 50 percent or more in the past 12 months are: Ecuador, Greece, and New Zealand. Countries where rig counts have declined by 50 percent or more in the past 36 months are: Brazil, Peru, Austria, Greece, Kuwait, Congo, and New Zealand. France was able to double its rig count in the last 12 months. In the past 36 months, Denmark, Spain, Iraq, Qatar, Gabon, Kenya, Malaysia, Papua New Guinea, and the Philippines have at least doubled their rig counts.

Figure 2 shows the historical rig counts from 1960 forward for OPEC, Non-OPEC ME excluding the United States, Total ME excluding the United States, and the United States. The data shown are actual quarterly data from the first quarter of 1976 forward. Before 1976 only annual averages are plotted. Because the large number of drilling rigs for the United States would

**Table 3. Quarterly Active Rotary Rigs for the Market Economies**

Region/Country	1987				1988				1989				1990
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st
<b>North America</b>													
Canada	199	81	196	248	271	146	206	158	177	90	103	148	197
Mexico	135	137	145	154	156	156	155	152	145	91	89	88	87
United States	830	768	1,001	1,146	1,002	902	923	922	786	773	890	1,030	939
<b>Total</b>	<b>1,164</b>	<b>986</b>	<b>1,342</b>	<b>1,549</b>	<b>1,429</b>	<b>1,204</b>	<b>1,284</b>	<b>1,232</b>	<b>1,108</b>	<b>954</b>	<b>1,083</b>	<b>1,265</b>	<b>1,223</b>
<b>South America</b>													
Argentina	49	62	67	64	69	64	61	59	56	55	53	54	63
Bolivia	7	6	6	6	6	5	5	6	6	6	5	5	5
Brazil	72	62	55	53	42	43	32	39	35	34	22	20	22
Chile	7	7	7	6	6	5	5	5	4	4	5	6	6
Colombia	13	13	13	16	16	21	20	17	16	17	15	13	11
Costa Rica	0	0	1	1	1	0	0	0	0	0	0	0	0
Ecuador	2	2	4	5	5	5	5	7	7	5	5	4	2
Peru	18	18	12	12	10	11	11	11	10	10	9	9	6
Trinidad	10	9	7	8	8	8	7	6	6	6	6	7	9
Venezuela	18	17	18	21	23	23	27	28	28	27	28	29	29
Other	0	0	1	1	1	0	0	0	1	0	0	0	0
<b>Total</b>	<b>196</b>	<b>196</b>	<b>191</b>	<b>193</b>	<b>186</b>	<b>184</b>	<b>173</b>	<b>178</b>	<b>168</b>	<b>164</b>	<b>148</b>	<b>146</b>	<b>153</b>
<b>Western Europe</b>													
Austria	5	4	3	4	5	5	5	3	3	2	2	1	2
Denmark	1	1	4	5	3	1	2	2	2	3	2	1	2
France	7	6	8	12	9	8	8	9	4	8	9	7	8
Greece	2	1	2	2	2	2	2	2	2	2	0	0	0
Netherlands	9	8	10	11	14	13	17	10	9	10	14	16	17
Italy	28	25	26	25	23	23	24	26	28	25	19	17	20
Norway	9	12	12	16	15	16	15	14	11	13	13	13	10
Spain	1	3	2	2	2	2	2	3	3	3	4	1	2
United Kingdom	32	36	45	61	64	57	56	50	51	50	42	43	47
West Germany	11	9	12	16	12	10	10	5	7	8	9	9	9
Other	0	2	0	0	0	2	1	0	0	1	0	0	0
<b>Total</b>	<b>104</b>	<b>108</b>	<b>125</b>	<b>154</b>	<b>148</b>	<b>140</b>	<b>141</b>	<b>124</b>	<b>120</b>	<b>124</b>	<b>114</b>	<b>109</b>	<b>116</b>
<b>Middle East</b>													
Abu Dhabi	10	10	8	7	7	7	7	8	7	5	6	7	7
Dubai	3	2	1	2	3	4	3	4	3	2	3	2	3
Iran	17	15	20	19	18	18	18	18	19	18	18	25	20
Iraq	8	7	10	17	21	23	22	24	25	27	25	23	31
Jordan	2	2	2	3	3	2	2	2	3	3	3	3	2
Kuwait	6	6	6	6	5	6	6	5	5	4	3	4	3
North Yemen	4	4	4	5	4	3	3	3	2	2	1	3	3
Oman	11	11	9	10	10	9	8	10	11	9	14	18	19
Qatar	1	2	1	1	2	3	3	3	4	3	3	3	3
Saudi Arabia	7	5	5	4	4	4	5	5	6	6	5	4	6
Syria	20	20	23	25	22	21	26	29	24	23	26	22	21
Turkey	30	29	25	23	22	21	24	18	25	19	18	17	17
Other	1	1	1	0	0	0	0	0	2	1	1	2	2
<b>Total</b>	<b>120</b>	<b>114</b>	<b>114</b>	<b>120</b>	<b>122</b>	<b>122</b>	<b>126</b>	<b>129</b>	<b>136</b>	<b>122</b>	<b>126</b>	<b>134</b>	<b>136</b>

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

Region/Country	1987				1988				1989				1990
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st
<b>Africa</b>													
Algeria	42	46	39	34	34	33	33	28	19	19	25	33	35
Angola	9	9	10	10	9	13	10	10	9	8	8	8	8
Congo	3	3	3	2	2	2	2	2	1	0	0	3	1
Egypt	25	26	21	19	22	22	19	21	20	19	19	15	17
Gabon	1	2	4	4	3	3	7	8	8	5	6	5	6
Kenya	1	0	0	1	2	1	0	1	3	2	2	3	2
Libya	11	11	13	15	16	17	15	17	19	18	16	15	15
Nigeria	12	12	9	11	10	12	14	16	14	15	14	13	16
South Africa	3	3	3	4	5	5	4	3	3	3	3	3	3
Tunisia	4	3	5	4	2	5	3	3	5	3	3	2	3
Other	3	4	6	4	4	7	5	5	5	4	3	3	3
<b>Total</b>	<b>114</b>	<b>119</b>	<b>114</b>	<b>108</b>	<b>108</b>	<b>120</b>	<b>113</b>	<b>113</b>	<b>107</b>	<b>96</b>	<b>98</b>	<b>102</b>	<b>109</b>
<b>Asia-Pacific</b>													
Australia	10	12	21	20	13	14	22	26	15	13	15	14	14
Bangladesh	9	6	4	2	2	2	3	3	5	5	5	5	5
Brunei	4	3	3	3	3	4	4	4	5	4	4	4	4
Burma	32	32	28	26	26	26	26	24	24	24	24	20	18
India	107	118	119	121	131	128	130	134	135	135	133	139	137
Indonesia	42	38	31	36	43	42	46	45	45	46	46	47	50
Japan	8	7	14	12	11	9	11	11	6	4	6	6	7
Malaysia	7	9	9	9	8	8	9	10	11	11	11	13	14
New Zealand	2	4	1	3	3	2	2	2	3	2	1	1	0
Pakistan	16	15	14	12	12	13	14	14	13	15	13	12	13
Papua New Guinea	1	2	2	2	2	3	2	4	3	2	3	4	4
Philippines	1	1	1	4	4	3	3	3	5	6	7	7	6
Taiwan	5	6	3	4	4	5	4	4	5	5	4	5	5
Thailand	4	5	7	7	6	5	5	6	7	5	5	6	5
Other	0	0	0	1	0	1	1	1	1	1	0	1	1
<b>Total</b>	<b>247</b>	<b>258</b>	<b>257</b>	<b>261</b>	<b>267</b>	<b>265</b>	<b>285</b>	<b>291</b>	<b>282</b>	<b>278</b>	<b>278</b>	<b>284</b>	<b>283</b>
<b>Total OPEC<sup>1</sup></b>	<b>180</b>	<b>176</b>	<b>170</b>	<b>181</b>	<b>194</b>	<b>201</b>	<b>211</b>	<b>215</b>	<b>210</b>	<b>201</b>	<b>203</b>	<b>217</b>	<b>228</b>
<b>Total Non-OPEC ME</b>	<b>1,765</b>	<b>1,604</b>	<b>1,973</b>	<b>2,204</b>	<b>2,065</b>	<b>1,833</b>	<b>1,911</b>	<b>1,852</b>	<b>1,711</b>	<b>1,537</b>	<b>1,644</b>	<b>1,823</b>	<b>1,791</b>
<b>Non-OPEC ME w/o US</b>	<b>935</b>	<b>836</b>	<b>973</b>	<b>1,058</b>	<b>1,063</b>	<b>932</b>	<b>988</b>	<b>930</b>	<b>925</b>	<b>764</b>	<b>754</b>	<b>793</b>	<b>852</b>
<b>Total ME w/o US</b>	<b>1,115</b>	<b>1,011</b>	<b>1,142</b>	<b>1,239</b>	<b>1,257</b>	<b>1,133</b>	<b>1,199</b>	<b>1,145</b>	<b>1,134</b>	<b>965</b>	<b>956</b>	<b>1,010</b>	<b>1,080</b>
<b>Total ME</b>	<b>1,945</b>	<b>1,780</b>	<b>2,143</b>	<b>2,385</b>	<b>2,259</b>	<b>2,034</b>	<b>2,122</b>	<b>2,067</b>	<b>1,920</b>	<b>1,738</b>	<b>1,847</b>	<b>2,040</b>	<b>2,019</b>

<sup>1</sup>Includes Middle East Other.

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

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

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 remained below pre-1986 levels. Compared to 1 year ago, rig counts are 8.6 percent higher for OPEC, 7.9 percent lower for Non-OPEC ME excluding the United States, and 4.8 percent lower for the ME excluding the United States. Compared to 3 years ago, rig counts are 26.7 percent higher for OPEC, 8.9 percent lower for Non-OPEC ME excluding the United States, and 3.1 percent lower for the ME excluding the United States.

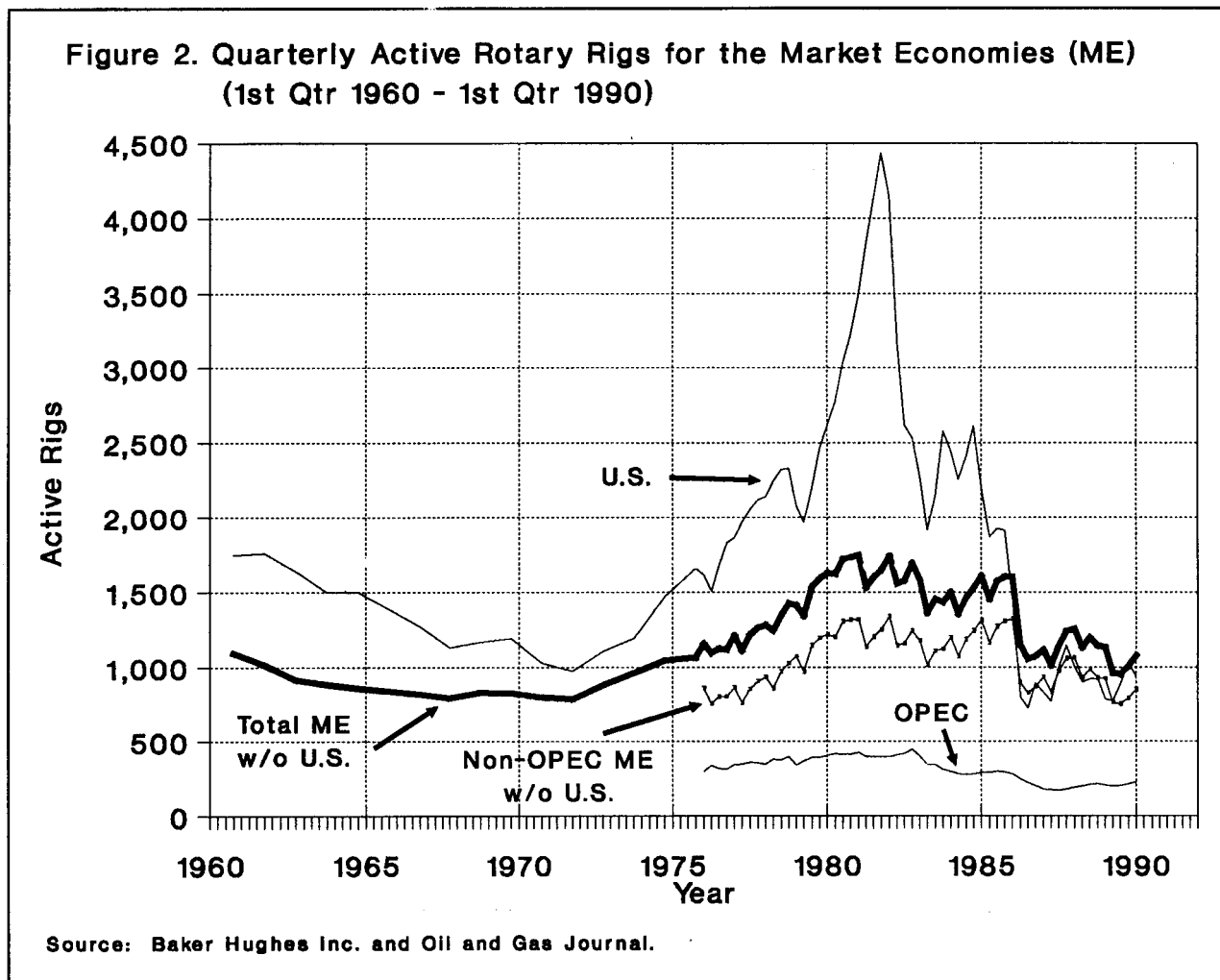
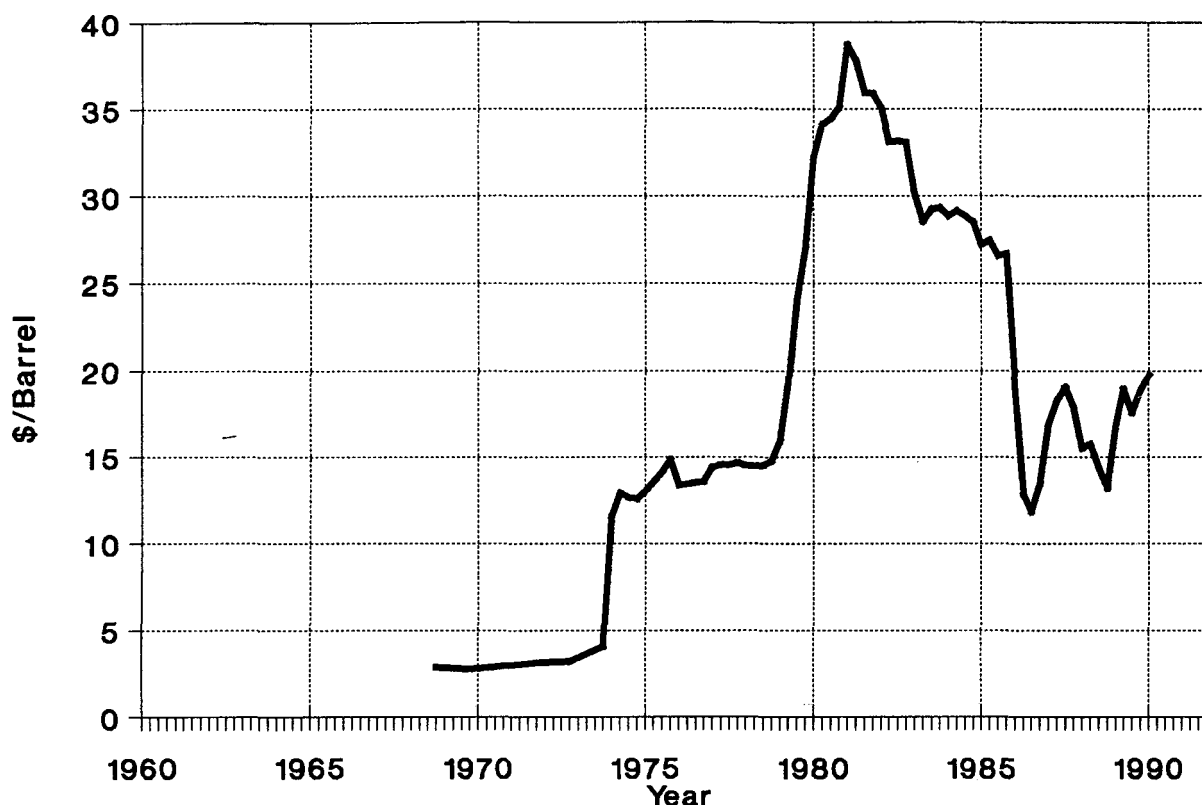


Figure 3 is a plot of the prices paid by U.S. refiners for imported crude oil and reflects the trends in world oil prices. The prices shown are actual quarterly data from the first quarter of 1974 forward. Before 1974 only annual averages are plotted. Figure 3 shows three sharp changes in oil prices. In 1973 oil prices increased due to the Arab oil embargo. Oil prices increased 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 speculative 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 - 1st Qtr 1990)**



Source: 1968-1986, EIA *Annual Energy Review 1988*;  
1986-1990, EIA *Weekly Petroleum Status Report 5/11/90*.

OPEC Secretary General, Dr. Subroto, said that about \$60 billion will be needed to raise OPEC capacity by 6 to 7 million barrels per day by 1995.<sup>2</sup> The countries that are expected to supply this increase in demand are Saudi Arabia, Kuwait, Iraq, U.A.E., and Venezuela. Only 10 percent of the required capital can be funded internally. Kuwait is the only country that does not require external financing. Subroto suggests that international oil companies and consuming countries make capital available at acceptable terms now to prevent a more expensive situation later in the form of sharply increasing oil prices. Saudi Arabia's Sheikh Yamani says \$30 billion is required to increase Saudi capacity to 10 million barrels per day.<sup>3</sup> Saudi Arabia is currently planning to raise capacity to 8.5 million barrels per day by 1992. Yamani is also promoting financial assistance from international companies and consuming countries to provide the necessary capacity now which will ensure oil price stability and avoid sharp price increases in the future.

With the completion of a new pipeline across Saudi Arabia to the Red Sea, Iraq now has an export capacity of 4.9 million barrels per day.<sup>4</sup> Iraq now has crude oil outlets on the Red Sea, Mediterranean Sea, and the Persian Gulf. Iraq's OPEC quota is 3.14 million barrels per day.

Arabian Petroleum Pipelines plans to increase capacity of the Sumed pipeline in Egypt.<sup>5</sup> The Sumed pipeline transports oil from the Red Sea to the Mediterranean Sea. Work over the next 3 years will raise capacity from 1.6 to 2.4 million barrels per day.

Saudi Arabia will drill 110 wells in 1990, an increase of 144 percent over 1989.<sup>6</sup> The increase is part of an effort to expand the productive capacity of the country. Three wells recently drilled south of Riyadh in the Central Province may be part of

one giant field.<sup>5</sup> Saudi Aramco is planning more drilling in the area. The current belief about the size of the field is 30 billion barrels of oil.

Iran has proposed an \$11.7 billion project for a 2,000-mile pipeline to transport associated gas from Persian Gulf oil fields to Pakistan and India.<sup>7</sup> The plan calls for 1 billion cubic feet per day to Pakistan and 2.47 billion cubic feet of gas per day to India.

Nigeria hopes to raise oil reserves to 50 billion barrels by the end of 1994 and increase productive capacity to 2.5 million barrels of oil per day.<sup>8</sup> Also planned is a 4.5 million metric ton per year (632 million cubic feet per day) LNG project. The plan includes six tankers and will cost \$2.5 billion, the cheapest LNG project in the world.<sup>9</sup>

Venezuela has a \$15.8 billion capital spending program for 1990 to 1995 aimed at increasing reserves and productive capacity.<sup>10</sup> The planned capacity increase is from 2.775 to 3.5 million barrels of oil per day with reserves planned to increase from 59 to 70 billion barrels of oil. Venezuela has decided it will allow international participation in exploration and development for the first time since 1976 when the petroleum industry was nationalized.<sup>11</sup> Venezuela has negotiated the sale of 1 million metric tons of Orimulsion (a combination of heavy crude oil, water, and a surfactant) with a U.K. power company (first large commercial shipment), and is negotiating the sale of 2 million metric tons with a Swedish power company.<sup>12</sup> The aim is to have sales of 500,000 barrels per day by the mid-1990's and 1 million barrels per day by 2000. Orimulsion costs about \$3 per barrel to produce and sells for about \$9 per barrel.

Brazil has targeted production of 1.5 million barrels per day by 1997 with the Campos basin providing 72 percent of the total.<sup>13</sup> The success rate for wildcat and appraisal wells in the Campos basin is 60 percent. In the interior of Brazil, proved, probable, and possible reserves in the Rio Urucu and Juria areas of the Solimoes basin are estimated at 362 million barrels of oil equivalent.<sup>14</sup> Production in the basin has climbed to 4,500 barrels of oil per day.

U.S.S.R. oil production was down in 1989 to 12.16 million barrels per day from 12.55 million barrels per day in 1988. Soviets claim annual discoveries, mostly in western Siberia, still exceed annual production, but the new reserves are most often found in small remote fields where oil recovery is difficult and costly.<sup>15</sup> Soviet gas production in 1989 was higher at 28.1 trillion cubic feet compared to 1988 production at 27.18 trillion cubic feet. A group of five companies signed a letter of intent to conduct a development feasibility study on the Shtockmanovskoye field in the Soviet Barents Sea.<sup>16</sup> The companies involved are Norsk Hydro of Norway, Du Pont Services of Holland, and Neste, Imatran Voima, and Wartsila of Finland. The field is 250 miles from shore in 1,000 feet of water in a mainly ice free area.<sup>17</sup> Hyundai is studying a 2,500-mile pipeline project to import gas from Siberia through North Korea to South Korea.<sup>18</sup> Hyundai is part of a joint venture with U.S. and Japanese companies, and the Soviet Union formed to develop Siberian gas fields.

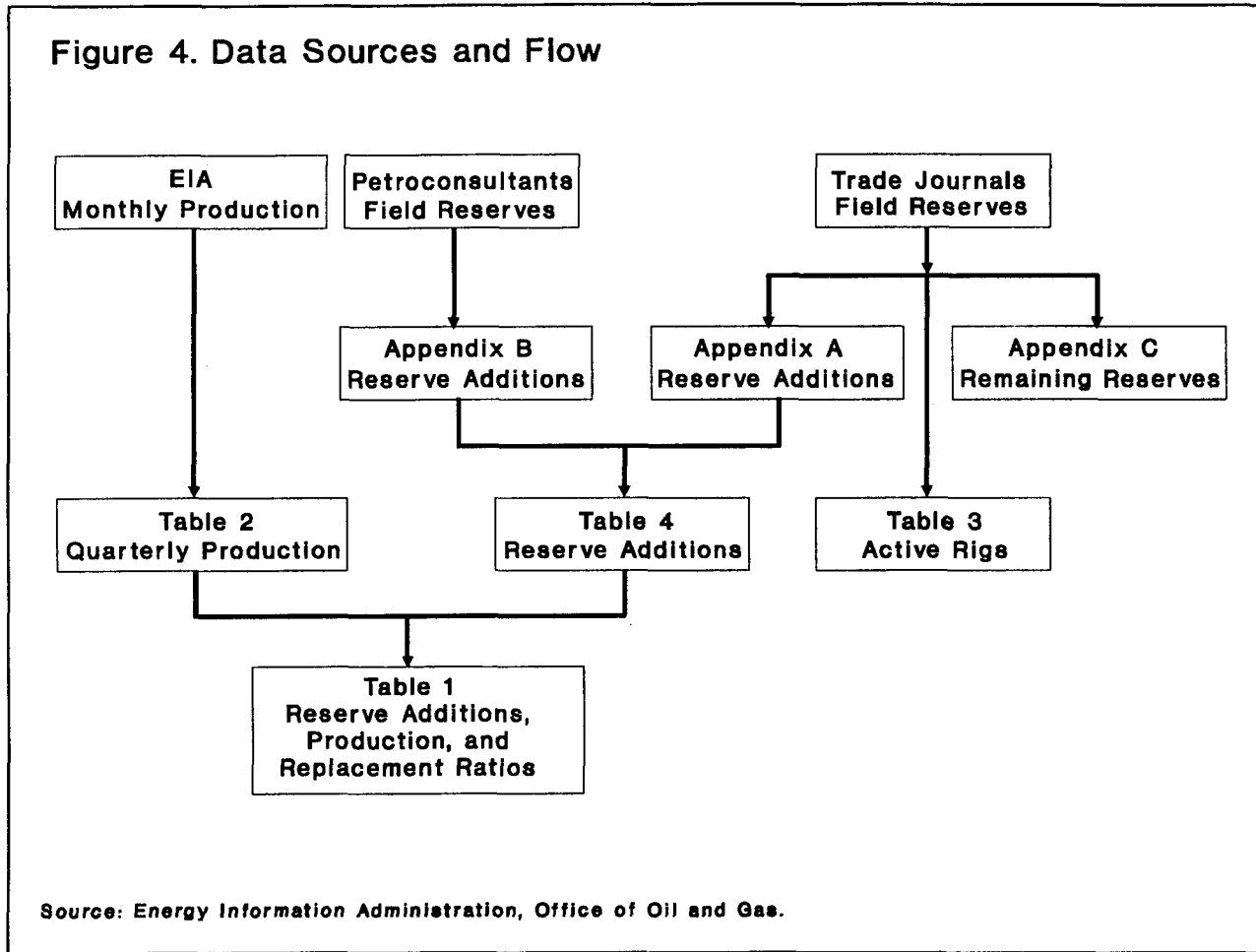
The southeastern province of Jiangsu in the People's Republic of China is one of ten southern provinces open to foreign participation in developing onshore oil resources.<sup>19</sup> Chinese geologists estimate the resources of northern Jiangsu at 2.1 to 4.75 billion barrels of oil, and southern Jiangsu at 8.76 billion barrels of oil and 26.3 trillion cubic feet of gas. Chinese geologists believe the remote Tarim basin, China's largest continental sedimentary basin, to have potential reserves of 74 billion barrels of oil and 282 trillion cubic feet of gas, one quarter and one seventh the national total, respectively.<sup>20</sup>

The United Kingdom's North Sea production could drop as low as 1.71 million barrels per day this summer due as fields are shut-in to install emergency shutdown valves.<sup>21</sup> Average 1990 production is estimated to be 2.01 million barrels per day. After the work is completed, U.K. production should increase to 2.35 million barrels per day in December 1990. The number of exploratory and appraisal wells projected to be drilled in 1990 is 230 to 240, 20 percent higher than 1989.<sup>22</sup> If all the wells are drilled the 1984 record will be exceeded by 10 percent.

Production could start as early as 1992 off the east coast of Canada.<sup>23</sup> PetroCanada, Chevron, Gulf, and Mobil formed Hibernia Management & Development Co., Ltd., to develop Hibernia oil field off Newfoundland, and Lasmo Nova Scotia applied to develop the Cohasset and Panuke oil fields off Nova Scotia.

## 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 shows how the data from these different sources are consolidated into the various tables of the report.



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. Sub-totals 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 first quarter 1989 from the ultimate recovery values of the first 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.)

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 first quarter 1990 data contain 10,898 field entries, 1,671 more than are in the first quarter 1987 data. Most of the reserve additions are from revisions to old fields and not from the 1,671 new entries. Many of the new entries are for fields discovered before the first quarter 1987 and some may have been discovered 15 or 20 years ago (a 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 April 1987 with a 200 million barrel ultimate recovery estimate, an upward revision to 400 million barrels reported in April 1989, and a further upward revision to 600 million barrels in January 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. 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 March 1990. For the last 12 months, oil reserve additions for the World are 33.9 billion barrels of oil. OPEC's reserve additions are 20.2 billion barrels of oil, 60 percent of the World total. The Non-OPEC ME reserve additions are 12.1 billion barrels of oil, 36 percent of the World total. CPE reserve additions are only 4.5 percent of the World total. For the last 36 months, World reserve additions are 245 billion barrels of oil. OPEC's reserve additions are 156 billion barrels of oil, 64 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.

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 75 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.

**Table 4. World Oil and Gas Reserve Additions**

Country	Oil, MMbbls			Gas, Bcf		
	Last 3 Months 1/90-3/90	Last 12 Months 4/89-3/90	Last 36 Months 4/87-3/90	Last 3 Months 1/90-3/90	Last 12 Months 4/89-3/90	Last 36 Months 4/87-3/90
<b>North America</b>						
Canada	140	28	1,110	100	600	3,744
Cuba	59	59	60	139	139	139
Guatemala	-8	10	21	-4	-4	-4
Mexico	809	911	19,329	3,820	3,932	24,379
United States	0	0	5,897	0	0	9,222
<b>Total</b>	<b>1,000</b>	<b>1,008</b>	<b>26,417</b>	<b>4,055</b>	<b>4,667</b>	<b>37,480</b>
<b>South America</b>						
Argentina	-79	459	2,623	-4,829	5,587	25,968
Barbados	-2	-2	-3	-3	-3	8
Bolivia	0	1	36	0	305	706
Brazil	1,394	2,030	5,295	1,439	1,040	5,206
Chile	4	25	168	2	158	7,324
Colombia	285	410	1,279	70	672	979
Ecuador	2	65	485	132	142	-321
Peru	2	32	-19	0	0	15,136
Suriname	0	0	9	0	0	0
Trinidad	79	91	228	-331	-198	32
Venezuela	98	-326	21,162	241	2,645	13,110
<b>Total</b>	<b>1,783</b>	<b>2,785</b>	<b>31,263</b>	<b>-3,279</b>	<b>10,348</b>	<b>68,148</b>
<b>Western Europe</b>						
Austria	-3	-3	24	9	95	354
Denmark	14	175	360	-92	24	-14
France	0	13	152	1,500	2,075	1,711
Greece	0	-47	-46	0	-15	-15
Ireland	0	0	15	225	300	347
Italy	19	-5	205	936	2,775	1,972
Netherlands	2	17	146	532	3,254	-2,622
Norway	1,098	2,093	4,169	1,546	5,393	4,951
Spain	-6	-8	8	-40	-40	-24
Sweden	0	63	64	0	0	0
Switzerland	0	0	0	0	0	4
United Kingdom	85	507	5,028	542	681	14,041
West Germany	5	96	217	215	1,239	-432
<b>Total</b>	<b>1,214</b>	<b>2,901</b>	<b>10,342</b>	<b>5,373</b>	<b>15,781</b>	<b>20,273</b>
<b>Eastern Europe</b>						
Bulgaria	0	0	0	0	0	-350
Poland	0	0	0	0	25	27
Romania	0	75	216	0	0	332
U.S.S.R.	0	-1,285	18,355	-17,000	269,169	329,847
Yugoslavia	49	53	764	898	828	3,227
<b>Total</b>	<b>49</b>	<b>-1,157</b>	<b>19,335</b>	<b>-16,102</b>	<b>270,022</b>	<b>333,083</b>

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

Country	Oil, MMbbls			Gas, Bcf		
	Last 3 Months 1/90-3/90	Last 12 Months 4/89-3/90	Last 36 Months 4/87-3/90	Last 3 Months 1/90-3/90	Last 12 Months 4/89-3/90	Last 36 Months 4/87-3/90
<b>Middle East</b>						
Abu Dhabi	654	594	27,904	1,985	1,960	33,775
Bahrain	0	0	-50	0	500	2,000
Dubai	0	70	90	0	0	250
Iran	-145	1,257	26,557	1,977	221,971	270,120
Iraq	1,900	13,400	49,941	5,900	11,900	26,838
Israel	0	0	25	0	-6	-6
Jordan	-2	-2	-47	0	0	1,000
Kuwait <sup>1</sup>	0	500	17,926	0	500	12,814
No. Yemen	-42	-27	123	5,800	7,800	11,300
Oman	683	902	2,100	-296	1,054	2,934
Qatar	0	100	460	0	25	-148,535
Ras Al Khaimah	0	0	0	0	-3,900	-3,900
Saudi Arabia <sup>1</sup>	3,099	3,099	15,008	1,500	414,500	424,535
Sharjah	0	0	14	0	0	493
So. Yemen	-20	880	1,180	0	0	0
Syria	82	420	767	0	250	1,150
Turkey	149	170	139	36	-38	329
Umm Al Qaiwain	0	0	0	0	0	250
<b>Total</b>	<b>6,358</b>	<b>21,363</b>	<b>142,137</b>	<b>16,902</b>	<b>656,516</b>	<b>635,346</b>
<b>Africa</b>						
Algeria	0	1,027	971	0	-1,538	24,767
Angola	324	594	794	2,185	3,410	3,444
Benin	0	3	-80	0	0	0
Cameroon	0	20	29	0	0	-1,157
Chad	5	5	84	0	0	0
Congo	72	90	440	1	31	-1,041
Cote D'Ivoire	0	1	-74	-290	-344	486
Egypt	214	456	853	1,557	3,241	8,273
Ethiopia	0	0	0	0	0	850
Gabon	-107	110	-164	92	-459	-464
Ghana	0	0	5	1	1	2
Guinea Equatorial	0	0	0	0	0	802
Libya	-487	-508	-5,064	2,354	3,662	3,878
Morocco	0	0	10	0	-16	28
Namibia	0	0	0	0	0	1,700
Nigeria	391	311	-804	6,399	13,751	65,518
Senegal	0	0	-90	0	15	15
So. Africa	-6	19	20	390	546	546
Sudan	0	0	327	0	0	839
Tanzania	0	0	0	-6,090	-6,090	-6,090
Tunisia	-38	-43	-139	-61	-61	-1,048
Zaire	10	-44	-35	-14	2	-9
<b>Total</b>	<b>378</b>	<b>2,041</b>	<b>-2,917</b>	<b>6,524</b>	<b>16,151</b>	<b>101,339</b>

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

Country	Oil, MMbbls			Gas, Bcf		
	Last 3 Months 1/90-3/90	Last 12 Months 4/89-3/90	Last 36 Months 4/87-3/90	Last 3 Months 1/90-3/90	Last 12 Months 4/89-3/90	Last 36 Months 4/87-3/90
<b>Asia-Pacific</b>						
Australia	246	553	830	1,579	-2,937	7,746
Bangladesh	0	0	42	800	-700	3,053
Brunei	-13	365	856	-640	380	4,231
Burma	-3,097	66	80	11	-553	1,234
China	2,467	2,594	13,494	4,975	4,742	12,205
India	483	340	754	-142	-622	1,218
Indonesia	138	507	1,836	-1,372	623	68,389
Japan	14	13	68	-8	81	397
Malaysia	-19	195	1,070	-4,444	-6,172	-5,274
New Zealand	13	27	101	68	64	-696
Pakistan	51	65	256	1,238	2,057	842
Papua New Guinea	50	120	185	20	480	3,856
Philippines	2	3	40	610	430	401
So. Korea	0	0	0	190	190	200
Taiwan	0	0	11	16	-4	14
Thailand	-1	34	11	1	365	4,180
Vietnam	-180	40	-1,904	70	40	120
<b>Total</b>	<b>154</b>	<b>4,922</b>	<b>17,730</b>	<b>2,972</b>	<b>-1,536</b>	<b>102,116</b>
<b>Total OPEC</b>	<b>5,543</b>	<b>20,206</b>	<b>156,322</b>	<b>19,208</b>	<b>665,782</b>	<b>791,516</b>
<b>Total Non-OPEC ME</b>	<b>2,998</b>	<b>12,121</b>	<b>57,000</b>	<b>8,155</b>	<b>31,224</b>	<b>160,722</b>
<b>Total CPE</b>	<b>2,395</b>	<b>1,536</b>	<b>30,985</b>	<b>-10,918</b>	<b>274,943</b>	<b>345,547</b>
<b>Total</b>	<b>10,936</b>	<b>33,862</b>	<b>244,307</b>	<b>16,445</b>	<b>971,949</b>	<b>1,297,785</b>

<sup>1</sup>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 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.

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, 1988, 1987, 1986, and 1985 Annual Reports* (DOE/EIA-0216), excluding natural gas liquids. Canadian data are taken from Appendix A for the last 3 months and last 12 months, and Statistics Canada *The Crude Petroleum and Natural Gas Industry, 1988 and 1987*, excluding pentanes plus. All other foreign data are from the commercial information services of Petroconsultants, S.A., and supplemented with Appendix A.

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 4.1:1 to 3.8:1 for the last 36 months. OPEC increased from 6.4:1 to 6.7:1; Non-OPEC ME remained steady at 2.3:1; and CPE dropped from 3.6:1 to 1.9:1. All groups added substantially more oil reserves than they produced in the last 36 months. For the last 12 months the World replacement ratio dropped from 2.4:1 to 1.5:1. OPEC dropped from 3.7:1 to 2.4:1; Non-OPEC ME dropped from 2.5:1 to 1.5:1; and CPE increased from 0.1:1 to 0.3:1. All groups except the CPE added more oil than they produced in the last 12 months. The replacement ratio for the CPE countries in the last 12 months would have been greater than 1:1 except for a downward revision of 7 billion barrels for the Tengiz field in the Soviet Union (Appendix A).

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 36 percent of the World oil supply while the Non-OPEC ME produced 38 percent of the World supply. CPE countries supplied 25 percent of the World's oil in the last 36 months. Comparing the last 12 months and last 36 months 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 1st Quarter 1990

The following is a list of significant discoveries with reserve information reported in the first 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.

## South America (Figure 5.)

- **Brazil** - Petrobras has another oil discovery in the offshore Campos basin. The 1-RJS-412 is estimated to have 100 million barrels of oil reserves. The find is located in 1,300 to 2,600 feet of water. Two appraisal wells have been approved.

## Europe (Figure 6.)

- **United Kingdom** - Amerada Hess will develop the Hamish satellite field with a directional well drilled from the Rob Roy subsea manifold. Reserves are estimated at 1.5 million barrels of oil.
- **Norway** - Elf Norge has discovered a satellite structure north of Froy field in Block 25/2. Reserves for the discovery are estimated to be 30 to 60 million barrels of oil. The development plan for Froy field will allow for at least one satellite field.
- **Norway** - Norske Shell made the first discovery in the Norwegian sector of the Sojne basin of the North Sea. The 3/7-4 well found reserves of 300 to 400 billion cubic feet of gas and 40 to 50 million barrels of oil.

## Asia, U.S.S.R., and Middle East (Figure 7.)

- **Turkey** - Alladin Middle East has two discoveries. The Zeynel #1 is estimated to have reserves of 10 million barrels of oil, and the Nemrut #1 is estimated to have reserves of 25 million barrels of oil. Both discoveries are in the Adiyaman region of southeast Turkey.
- **China** - ARCO's 3-trillion-cubic-foot Yinggehai gas field offshore Hainan Island is involved in an LNG project feasibility study. The project would require \$1 billion and produce about 1.5 million tons of LNG per year (17.4 million barrels) for sale to Japan.
- **Bangladesh** - Scimitar Exploration will submit a development proposal for its Jalalabad discovery. Reserves are estimated at 1.5 trillion cubic feet of gas and 30 million barrels of condensate.
- **Saudi Arabia** - Saudi Aramco has drilled three wells in a new prospect in the Central Province. The wells may be part of one field with a length of 75 miles. Currently, reserves are estimated at 30 billion barrels of oil.

## Oceania (Figure 8.)

- **Australia** - Santos has discovered 40 to 50 million barrels of oil in the Talbot structure located in the Timor Sea. The Talbot #1 tested 4,300 barrels of oil per day. Santos plans to drill the Talbot #2 sometime between March and July 1990.

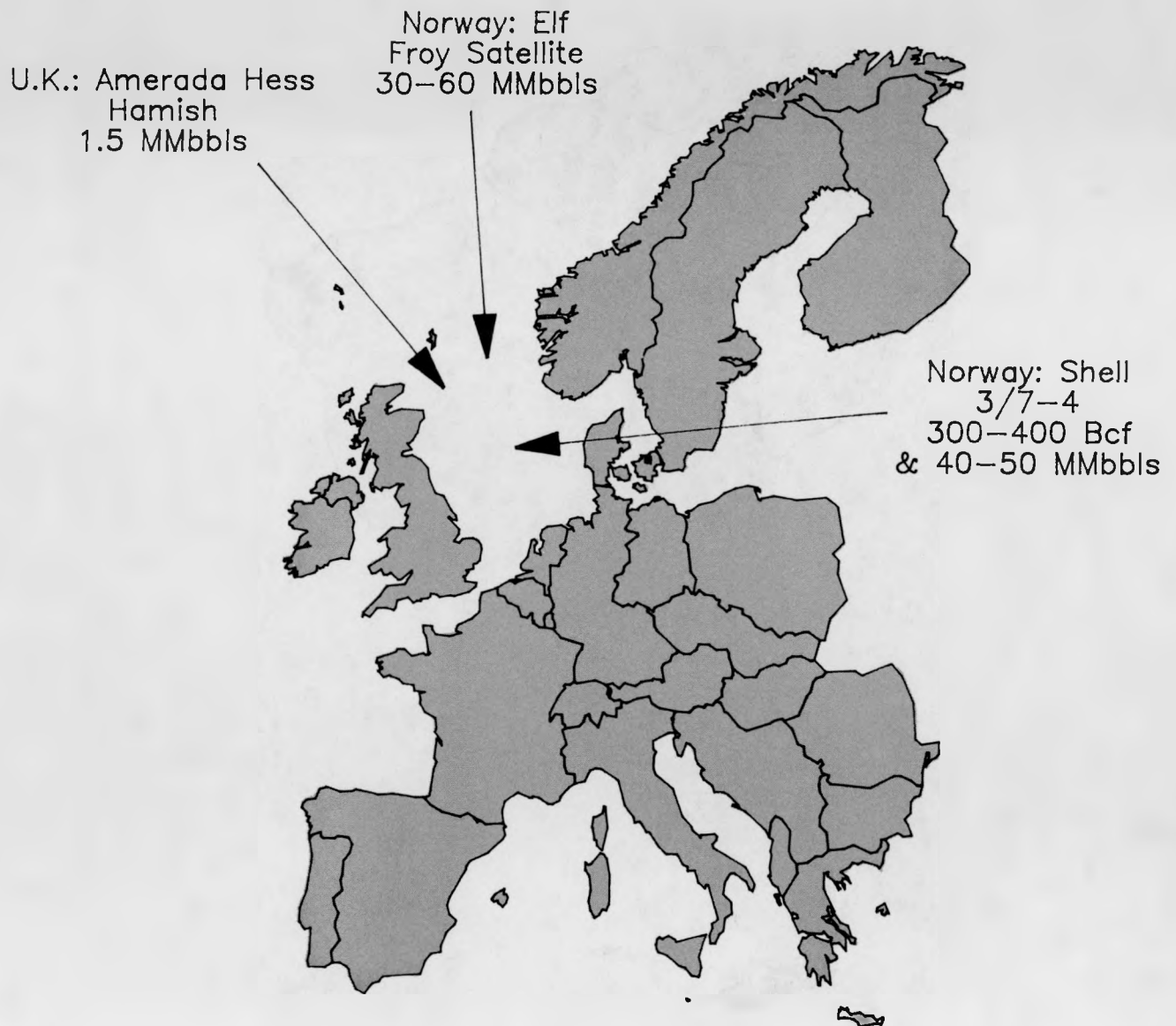
- **Australia - BHP has discovered oil in the Griffin structure offshore on the Northwest Shelf. Reserves are estimated to be 100 to 150 million barrels of oil. Two more appraisal wells are planned to delineate the field.**
- **Australia - Woodside has discovered oil in the Cossack and Wanaea structures offshore on the Northwest Shelf. The combined reserves are estimated to be 300 million barrels of oil. The Commonwealth Department of Primary Industries and Energy's petroleum division said the two discoveries were probably the most significant in Australia in years.**

Figure 5. South American Reserve Additions for the 1st Quarter 1990



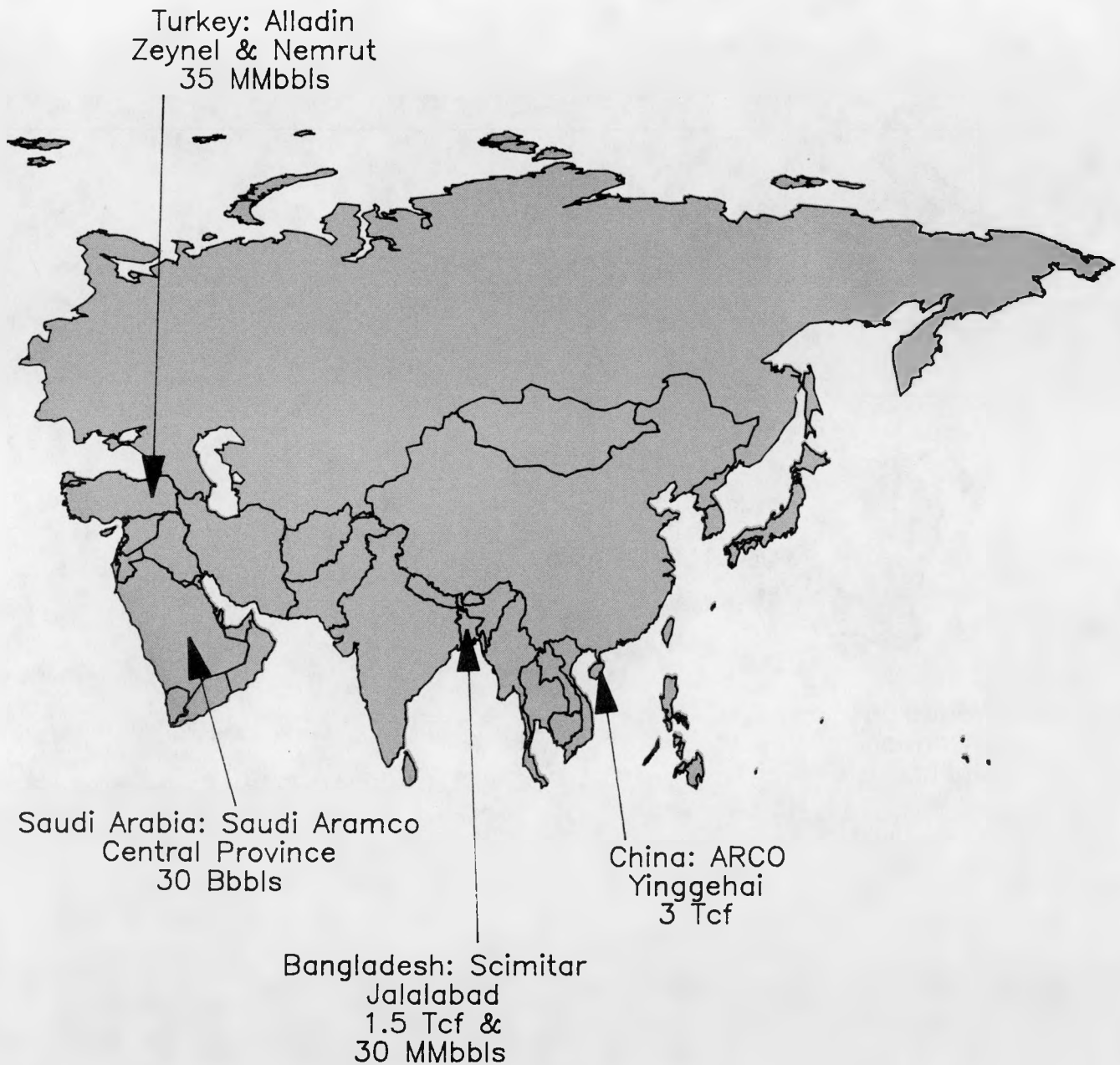
Source: Energy Information Administration, Office of Oil and Gas.

Figure 6. European Reserve Additions for the 1st Quarter 1990



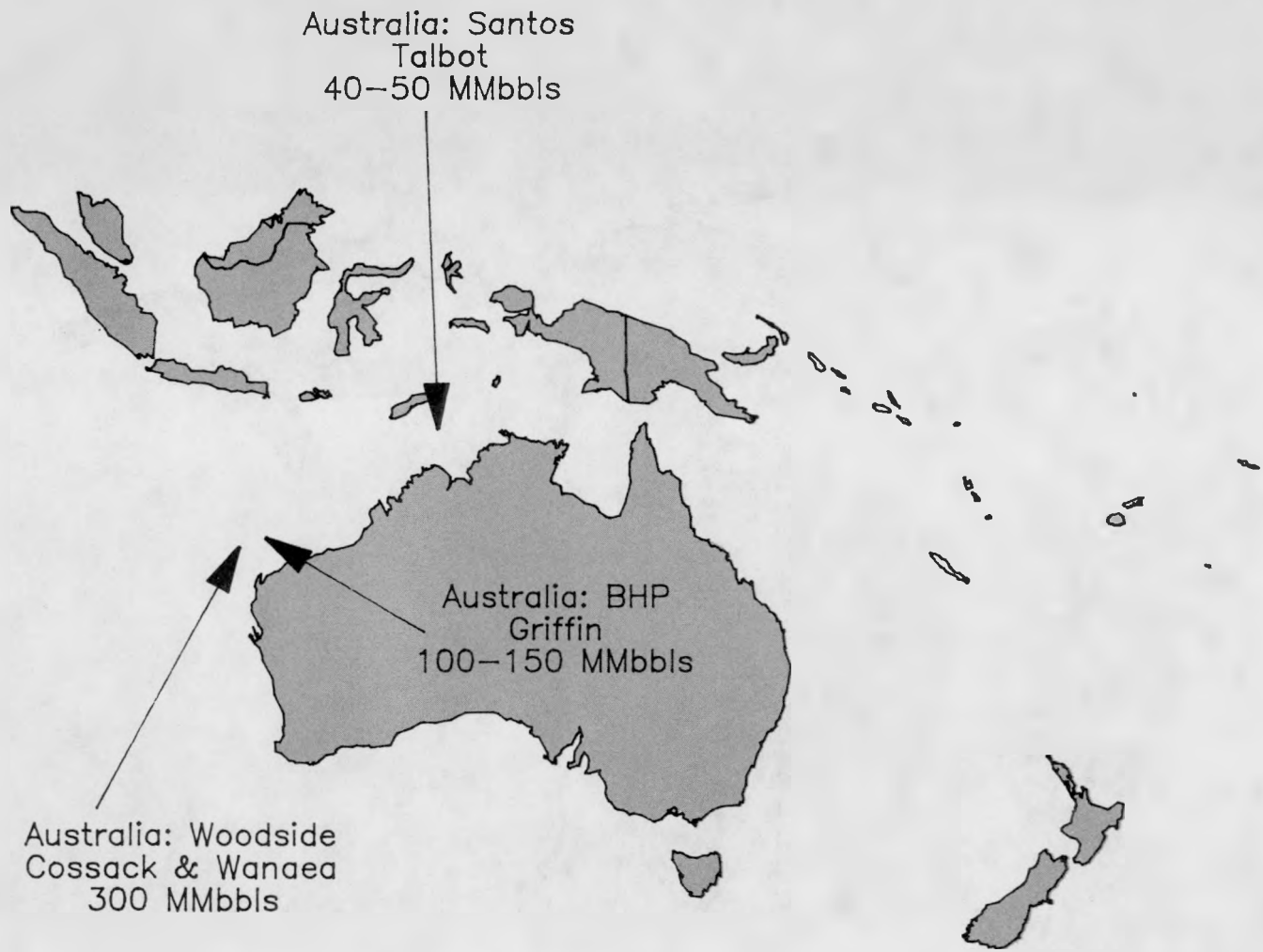
Source: Energy Information Administration, Office of Oil and Gas.

Figure 7. Asian, U.S.S.R., and Middle Eastern Reserve Additions for the 1st Quarter 1990



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

Figure 8. Oceanian Reserve Additions for the 1st Quarter 1990



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

# References

1. *World Oil*. February 1990. "Norway Raises Production Output." Vol. 210, No. 2, p. 9.
2. *Oil and Gas Journal*. February 12, 1990. "A Kinder, Gentler OPEC." Vol. 88, No. 7, p. 13.
3. *World Oil*. February 1990. "A World of Oil." Vol. 210, No. 2, p. 27.
4. *Oil and Gas Journal*. January 22, 1990. "Iraq's New Pipeline." Vol. 88, No. 4, p. 30.
5. *Oil and Gas Journal*. January 29, 1990. "OGJ Newsletter." Vol. 88, No. 5.
6. *World Oil*. February 1990. "Middle East Sparking Increase in World Drilling." Vol. 210, No. 2, p. 90.
7. *Oil and Gas Journal*. January 15, 1990. "OGJ Newsletter." Vol. 88, No. 3.
8. *World Oil*. February 1990. "Order Has Been Restored to World Oil Production." Vol. 210, No. 2, p. 95.
9. *Oil and Gas Journal*. February 26, 1990. "Industry Presses Program to Boost Oil and Gas Production in Nigeria." Vol. 88, No. 9, p. 29.
10. *Oil and Gas Journal*. March 19, 1990. "Venezuelan Reforms Favor Oil Work." Vol. 88, No. 12, p. 26.
11. *Oil and Gas Journal*. February 19, 1990. "OGJ Newsletter." Vol. 88, No. 8.
12. *Oil and Gas Journal*. March 5, 1990. "OGJ Newsletter." Vol. 88, No. 10.
13. *Oil and Gas Journal*. March 5, 1990. "Find Buoys Petrobras Campos Basin Hopes." Vol. 88, No. 10, p. 27.
14. *Oil and Gas Journal*. March 19, 1990. "Brazil's Amazon Action Yields More Success." Vol. 88, No. 12, p. 20.
15. *Oil and Gas Journal*. February 19, 1990. "Soviet Fuel Output Shows First Decline of Postwar Years." Vol. 88, No. 8, p. 27.
16. *Oil and Gas Journal*. January 15, 1990. "Soviet Barents Sea Field's Reserves Sizable." Vol. 88, No. 3, p. 16.
17. *Petroleum Engineer International*. March 1990. "News Hi-lites." Vol. 62, No. 3, p. 1.
18. *Oil and Gas Journal*. January 29, 1990. "OGJ Newsletter." Vol. 88, No. 5.
19. *Oil and Gas Journal*. January 1, 1990. "Oil Flow Rising in E. China." Vol. 88, No. 1, p. 30.
20. *Oil and Gas Journal*. January 22, 1990. "China Eyes Challenges in Remote Tarim Basin." Vol. 88, No. 4, p. 23.
21. *Oil and Gas Journal*. February 19, 1990. "Summer Skid Seen in U.K. North Sea Oil Flow." Vol. 88, No. 8, p. 23.
22. *Oil and Gas Journal*. March 12, 1990. "OGJ Newsletter." Vol. 88, No. 11.
23. *Oil and Gas Journal*. January 8, 1990. "OGJ Newsletter." Vol. 88, No. 2.



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
<b>NEW ENTRIES ARE BOXED AND SHADED</b>					
<b>Abu Dhabi</b>					
*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
<b>Australia</b>					
*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 Challis 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
*Tem	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	1986	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 bb/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 bb/d & 2 MMcfd 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
Griffin	BHP	1989	3/90	OGJ	100-150 MMbbls Northwest Shelf
<b>Bangladesh</b>					
*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

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

Country/Field/Well	Company	Disc Date	Report Date	Source	Reserves and Comments
*Jalalabad #1	Scimitar	1989	3/90	OGJ	1.5 Tcf & 30 MMbbls cond
<b>Brazil</b>					
*RJS-345 Covina	Petrobras	1986	8/87	W. Oil	44 MMbbls Campos basin
*Marim	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
*Abacora	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 Marim field
3-RNS-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
<b>Burma</b>					
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
<b>Canada</b>					
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
			8/89	OGJ	450-500 MMbbls & 2 Tcf Beaufort Sea
			3/90	OGJ	335 MMbbls & 2.2 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
			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
Whitrose E-09	Husky	1988	10/88	OGJ	200-300 MMbbls 4999 bbl/d & 3.99 MMcfd 1/9526-12086 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
			3/90	OGJ	1.8 Tcf & 30 MMbbls cond 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 1/2 zones 5700 ft(sour gas) & 6900 ft

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

Country/Field/Well	Company	Disc Date	Report Date	Source	Reserves and Comments
<b>China</b>					
*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
*Huoshaoashan		1983	3/88	OGJ	730 MMbbls Xinjiang Province Junggar basin
*Lihua 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/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 Erfian 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
*Lihua 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
<b>Colombia</b>					
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	1981	4/89	OGJ	70-100 MMbbls southern Llanos basin
			8/89	W. Oil	250 MMbbls heavy oil
*Balcon	Ecopetrol	8/88	8/89	W. Oil	160 MMbbls Upper Magdalena Valley basin
<b>Cote d'Ivoire</b>					
*Foxtrot	Phillips	1982	8/89	OGJ	940 Bcf gas in place offshore 50 mi sw of Abidjan
<b>Denmark</b>					
*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

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

Country/Field/Well	Company	Disc Date	Report Date	Source	Reserves and Comments
<b>Ecuador</b>					
*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		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
<b>Egypt</b>					
*Meisaha 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
<b>France</b>					
*Fontaine-au-Bron	Elf	1986	10/88	Com Rpt	4.2 MMbbls
<b>Gabon</b>					
*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
<b>India</b>					
*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
*Tanot #1	OIL	1988	8/89	W. Oil	27 Bcf located in Rajasthan
<b>Indonesia</b>					
*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
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

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

Country/Field/Well	Company	Disc Date	Report Date	Source	Reserves and Comments
<b>Iran</b>					
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
<b>Iraq</b>					
*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
<b>Italy</b>					
*Villafortuna	Agip	1984	6/88	OGJ	<300 MMbbls 45 API f/18700 ft River Ticino
*Irminio	Selm	1982	8/89	W. Oil	20-40 MMbbls & 10 Bcf SE Sicily
<b>Jordan</b>					
*Risha	NRA	7/87	10/88	AAPG	1 Tcf 15 MMcfd
			3/90	OGJ	500 Bcf
<b>Kuwait</b>					
*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
<b>Libya</b>					
*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
<b>Malaysia</b>					
*Seligi	Petronas	1971	1/89	Ocn Ind	420 MMbbls 171 mi off Trengganu largest in country
*Jemeh	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
<b>Namibia</b>					
*Kudu	SW African Oil Expl	1974	8/87	W. Oil	3-10 Tcf
			8/89	W. Oil	2 Tcf off Orange River mouth
<b>Netherlands</b>					
*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

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

Country/Field/Well	Company	Disc Date	Report Date	Source	Reserves and Comments
*K/6	Petroland	1986	5/89	OGJ	353 Bcf
<b>New Zealand</b>					
*Tairiki 1/1A	Petrocorp	1986	10/87 10/88	AAPG AAPG	2.97 MMbbls & 85.4 Bcf E. Taranaki Basin 4.21 MMbbls & 85 Bcf
*Ahuroa 2A	Petrocorp	1986	10/87 10/88	AAPG AAPG	1.02 MMbbls & 37.2 Bcf E. Taranaki Basin 1.4 MMbbls cond & 39 Bcf
*Kupe South	TCPL Resources	12/86	2/88 8/88 2/89	Pet News W. Oil Pet News	60 MMbbls & 300 Bcf S. Taranaki Basin 60 MMbbls Taranaki Basin North Island 33 MMbbls, 26 MMbbls LPG, & 400 Bcf Taranaki Basin
Ngaere			2/89	Pet News	40 MMbbls onshore Taranaki Basin
*Waihapa	Petrocorp		8/89	OGJ	14 MMbbls Taranaki Peninsula
<b>Nigeria</b>					
*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
*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/Ukpomari	Elf	1964	3/90	OGJ	100 MMbbls Rivers & Bendel states
<b>North Yemen</b>					
*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	YEPKO	12/87	8/89	OGJ	2.7 Tcf & 133 MMbbls
<b>Norway</b>					
*Heidrun	Conoco	1985	8/87 4/89 8/89 10/89	W. Oil W. Oil OGJ OGJ	745 MMbbls & 1.3 Tcf 752 MMbbls & 1.1 Tcf 750 MMbbls & 1.4 Tcf Haltenbanken area 756 MMbbls & 1.06 Tcf Haltenbanken area
			1/90	OGJ	750 MMbbls & 1.15 Tcf Haltenbanken area
			2/90	JPT	550 MMbbls & 1.02 Tcf
*Draugen		1984	8/87 2/88 11/88 8/89	W. Oil AAPG OGJ OGJ	400 MMbbls & 60 Bcf 1 Bbbls 422 MMbbls & 106 Bcf 400 MMbbls & 60 Bcf Haltenbanken area
*Snorre		1979	8/87 4/89 7/89 8/89	W. Oil W. Oil OGJ OGJ	700 MMbbls & 250 Bcf 722 MMbbls & 314 Bcf 667-680 MMbbls 680 MMbbls & 250 Bcf
Haltenbanken Area			2/88	AAPG	1.9 Bbbls

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

Country/Field/Well	Company	Disc Date	Report Date	Source	Reserves and Comments
*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 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
*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
6407/7-4	Norsk Hydro	1989	8/89	W. Oil	250 MMbbls & 353 Bcf
*East Sleipner		1981	8/89	W. Oil	1.8 Tcf & 106 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	85-125 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

## Oman

*Bukha	IPC	1979	10/87	AAPG	40 MMbbls
*Safah	Occidental	1983	4/89	Com Rpt	50 MMbbls increase 1/21-71 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 bb/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
*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

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

Country/Field/Well	Company	Disc Date	Report Date	Source	Reserves and Comments
*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
<b>Peru</b>					
*Cashirari	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/Cashirari	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
<b>Philippines</b>					
*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	1976	7/89	OGJ	0.735 MMbbls
*Cadlao	Alcorn	1977	7/89	OGJ	11.2 MMbbls
<b>Qatar</b>					
*North Field	QGPC	1971	8/87	W. Oil	130 Tcf
			5/89	OGJ	150 Tcf
<b>Romania</b>					
*E. & W. Lebada		1981	8/87	W. Oil	73 MMbbls Black Sea
<b>Saudi Arabia</b>					
*Central Province	Saudi Aramco	1989	3/90	Pet Mngt	30 Bbbls southeast of Riyadh
<b>South Africa</b>					
*Mossel Bay Area	Soekor		8/87	W. Oil	1 Tcf
<b>Sudan</b>					
*Suakin		1976	8/89	W. Oil	123 MMbbls & 864 Bcf Red Sea 30 mi from Port Sudan
<b>Sweden</b>					
Klints Bank	Satellite Explor	1989	4/89	OGJ	63 MMbbls Swedish Baltic Sea off NE Gotland

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

Country/Field/Well	Company	Disc Date	Report Date	Source	Reserves and Comments
<b>Taiwan</b>					
*CBK	CPC	1979	1/87 2/88	Pet News Pet News	5-10 MMbbls & 106 Bcf 5-10 MMbbls Straits of Taiwan
<b>Thailand</b>					
*B Structure	Total CFP	1973	7/88 10/89 12/89	OGJ Pet News OGJ	1.8 Tcf, 6 Tcf possible 3.5 Tcf 1.8 Tcf & 32 MMbbls cond
			1/90	OGJ	3.5 Tcf Gulf of Thailand
*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 H <sub>2</sub> S
*Sirkit	Shell	1981	2/89	OGJ	20 MMbbls, a 40% increase to 70 MMbbls
*E-5 Structure	Esso	1981	10/89	Pet News	1.5 Tcf located in Khon Kaen
<b>Trinidad &amp; Tobago</b>					
*Pelican		1977	8/89	W. Oil	21 MMbbls & 740 Bcf
<b>Turkey</b>					
*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
<b>United Kingdom</b>					
*Don	BP	1977	4/87 8/88	P. Times Pet Engr	50 MMbbls 56 MMbbls
*Amethyst East & West	BP	1972	4/87 8/88 4/89	P. Times OGJ W. Oil	283 Bcf 850 Bcf 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 4/89 8/89	OGJ W. Oil OGJ	150-175 MMbbls 6500 bbl/d 40 API 320 MMbbls 350 MMbbls & 100 Bcf
*Gryphon	Kerr-McGee	1987	5/88 8/88 8/88 10/88 8/89	Pet Mngt Pet Engr W. Oil AAPG OGJ	300-700 MMbbls 300-700 MMbbls 175-250 MMbbls 250 MMbbls Block 9/18b 250 MMbbls
*Forth	Britoil	1988	5/88 8/88	Pet Mngt OGJ	200 MMbbls & 60 Bcf 200 MMbbls & 600 Bcf
*Pickereel/Valkyrie area	ARCO/Conoco	1985	8/88	OGJ	850 Bcf
			2/90	OGJ	75 Bcf Pickereel 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 2/89	OGJ OGJ	250 Bcf 200 Bcf Blocks 48/18b & 48/19b North Sea
*Camelot	Mobil	1967	8/88 12/88 2/89	OGJ Com Rpt OGJ	250 Bcf 210 Bcf 250 Bcf

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

Country/Field/Well	Company	Disc Date	Report Date	Source	Reserves and Comments
*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	1977	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
			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 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
*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	OGJ	43 MMbbls 24 API f/5150-5600 ft 70 mi 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 mi 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
*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
*Eider		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
*Wellton		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
*Moir	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 mi 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 mi 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

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

Country/Field/Well	Company	Disc Date	Report Date	Source	Reserves and Comments
<b>USSR</b>					
*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 16 Bbbls oil in place
			8/89	W. Oil	9.5 Bbbls officially reported Soviet reserves
*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
Shtokmanovskoye		1988	9/89	OGJ	105-141 Tcf Barents Sea
			1/90	OGJ	106 Tcf Barents Sea 250 mi NE of Murmansk
Russanovskoye		1989	12/89	AAPG	210 Tcf Kara Sea
<b>Venezuela</b>					
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 Tbbls 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 bb/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 bb/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
<b>Vietnam</b>					
*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

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

<b>Country/Field/Well</b>	<b>Company</b>	<b>Disc Date</b>	<b>Report Date</b>	<b>Source</b>	<b>Reserves and Comments</b>
<b>West Germany</b>					
*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 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			Gas, Bcf		
	Last 3 Months 1/90-3/90	Last 12 Months 4/89-3/90	Last 36 Months 4/87-3/90	Last 3 Months 1/90-3/90	Last 12 Months 4/89-3/90	Last 36 Months 4/87-3/90
<b>North America</b>						
Cuba	59	59	60	139	139	139
Guatemala	-8	10	21	-4	-4	-4
Mexico	809	911	19,329	3,820	3,932	24,379
<b>Total</b>	<b>860</b>	<b>980</b>	<b>19,410</b>	<b>3,955</b>	<b>4,067</b>	<b>24,514</b>
<b>South America</b>						
Argentina	-79	459	2,623	-4,829	5,587	25,968
Barbados	-2	-2	-3	-3	-3	8
Bolivia	0	1	36	0	305	706
Brazil	1,394	1,893	5,158	1,439	899	5,065
Chile	4	25	168	2	158	7,324
Colombia	285	410	1,279	70	672	979
Ecuador	2	49	469	132	142	-321
Peru	2	32	-19	0	0	15,136
Suriname	0	0	9	0	0	0
Trinidad	79	91	228	-331	-198	32
Venezuela	98	-326	19,993	241	2,645	13,110
<b>Total</b>	<b>1,783</b>	<b>2,632</b>	<b>29,941</b>	<b>-3,279</b>	<b>10,207</b>	<b>68,007</b>
<b>Western Europe</b>						
Austria	-3	-3	24	9	95	354
Denmark	14	175	360	-92	24	-14
France	0	13	152	1,500	2,075	1,711
Greece	0	-47	-46	0	-15	-15
Ireland	0	0	15	225	300	347
Italy	19	-5	205	936	2,775	1,972
Netherlands	2	17	146	532	3,254	-2,622
Norway	1,053	1,798	3,874	1,546	5,040	4,598
Spain	-6	-8	8	-40	-40	-24
Sweden	0	0	1	0	0	0
Switzerland	0	0	0	0	0	4
United Kingdom	85	507	5,018	542	681	14,041
West Germany	5	96	217	215	1,189	-482
<b>Total</b>	<b>1,169</b>	<b>2,543</b>	<b>9,974</b>	<b>5,373</b>	<b>15,378</b>	<b>19,870</b>
<b>Eastern Europe</b>						
Bulgaria	0	0	0	0	0	-350
Poland	0	0	0	0	25	27
Romania	0	75	216	0	0	332
U.S.S.R.	0	5,515	8,655	0	-46,831	13,847
Yugoslavia	49	53	764	898	828	3,227
<b>Total</b>	<b>49</b>	<b>5,643</b>	<b>9,635</b>	<b>898</b>	<b>-45,978</b>	<b>17,083</b>

Table B1. Modified Petroconsultants Reserve Additions (Continued)

Country	Oil, MMbbls			Gas, Bcf		
	Last 3 Months	Last 12 Months	Last 36 Months	Last 3 Months	Last 12 Months	Last 36 Months
	1/90-3/90	4/89-3/90	4/87-3/90	1/90-3/90	4/89-3/90	4/87-3/90
<b>Middle East</b>						
Abu Dhabi	654	594	27,904	1,985	1,960	33,775
Bahrain	0	0	-50	0	500	2,000
Dubai	0	70	90	0	0	250
Iran	-145	1,257	16,357	1,977	213,971	262,120
Iraq	1,900	13,400	49,941	5,900	7,400	22,338
Israel	0	0	25	0	-6	-6
Jordan	-2	-2	-47	0	0	1,000
Kuwait <sup>1</sup>	0	500	16,926	0	500	12,814
No. Yemen	-42	-27	123	5,800	7,800	11,300
Oman	683	902	2,100	-296	701	2,581
Qatar	0	100	460	0	25	-148,535
Ras Al Khaimah	0	0	0	0	-3,900	-3,900
Saudi Arabia <sup>1</sup>	3,099	3,099	15,008	1,500	414,500	424,535
Sharjah	0	0	14	0	0	493
So. Yemen	-20	880	1,180	0	0	0
Syria	82	420	767	0	250	1,150
Turkey	114	135	104	36	-38	329
Umm Al Qaiwain	0	0	0	0	0	250
<b>Total</b>	<b>6,323</b>	<b>21,328</b>	<b>130,902</b>	<b>16,902</b>	<b>643,663</b>	<b>622,493</b>
<b>Africa</b>						
Algeria	0	1,027	971	0	-1,538	24,767
Angola	324	594	794	2,185	3,410	3,444
Benin	0	3	-80	0	0	0
Cameroon	0	20	29	0	0	-1,157
Chad	5	5	84	0	0	0
Congo	72	90	440	1	31	-1,041
Cote D'Ivoire	0	1	-74	-290	-344	486
Egypt	214	401	798	1,557	3,241	8,273
Ethiopia	0	0	0	0	0	850
Gabon	-107	110	-164	92	-459	-464
Ghana	0	0	5	1	1	2
Guinea Equatorial	0	0	0	0	0	802
Libya	-487	-508	-5,064	2,354	3,662	3,878
Morocco	0	0	10	0	-16	28
Namibia	0	0	0	0	0	1,700
Nigeria	391	311	-824	6,399	13,751	65,518
Senegal	0	0	-90	0	15	15
So. Africa	-6	19	20	390	546	546
Sudan	0	0	327	0	0	839
Tanzania	0	0	0	-6,090	-6,090	-6,090
Tunisia	-38	-43	-139	-61	-61	-1,048
Zaire	10	-44	-35	-14	2	-9
<b>Total</b>	<b>378</b>	<b>1,986</b>	<b>-2,992</b>	<b>6,524</b>	<b>16,151</b>	<b>101,339</b>

**Table B1. Modified Petroconsultants Reserve Additions (Continued)**

Country	Oil, MMbbls			Gas, Bcf		
	Last 3 Months 1/90-3/90	Last 12 Months 4/89-3/90	Last 36 Months 4/87-3/90	Last 3 Months 1/90-3/90	Last 12 Months 4/89-3/90	Last 36 Months 4/87-3/90
<b>Asia-Pacific</b>						
Australia	121	428	705	1,579	-2,937	7,746
Bangladesh	0	0	2	800	-700	3,053
Brunei	-13	365	856	-640	380	4,231
Burma	-3,097	66	80	11	147	934
China	2,467	2,594	8,271	1,975	1,742	8,308
India	483	340	754	-142	-622	1,218
Indonesia	138	497	1,826	-1,372	623	68,389
Japan	14	13	68	-8	81	397
Malaysia	-19	20	895	-4,444	-6,172	-5,274
New Zealand	13	27	61	68	64	-696
Pakistan	51	65	256	1,238	2,057	842
Papua New Guinea	50	120	185	20	480	3,856
Philippines	2	3	40	610	430	401
So. Korea	0	0	0	190	190	200
Taiwan	0	0	11	16	-4	14
Thailand	-1	34	11	1	365	4,180
Vietnam	-180	40	-1,904	70	40	120
<b>Total</b>	<b>29</b>	<b>4,612</b>	<b>12,117</b>	<b>-28</b>	<b>-3,836</b>	<b>97,919</b>
<b>Total OPEC</b>	<b>5,543</b>	<b>20,180</b>	<b>143,907</b>	<b>19,208</b>	<b>653,282</b>	<b>779,016</b>
<b>Total Non-OPEC ME</b>	<b>2,653</b>	<b>11,208</b>	<b>49,018</b>	<b>8,055</b>	<b>30,427</b>	<b>146,559</b>
<b>Total CPE</b>	<b>2,395</b>	<b>8,336</b>	<b>16,062</b>	<b>3,082</b>	<b>-44,057</b>	<b>25,650</b>
<b>Total</b>	<b>10,591</b>	<b>39,724</b>	<b>208,987</b>	<b>30,345</b>	<b>639,652</b>	<b>951,225</b>

<sup>1</sup>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. 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 12/31/88	Oil & Gas Journal 12/31/89	World Oil 12/31/88
<b>North America</b>				
Canada	6.1	7.0	94.3	94.8
Mexico	56.4	53.0	73.4	73.4
United States <sup>1</sup>	26.8	26.8	168.0	168.0
Other	0.0	0.1	0.0	0.0
<b>Total</b>	<b>89.4</b>	<b>87.0</b>	<b>335.7</b>	<b>336.2</b>
<b>South America</b>				
Argentina	2.3	2.3	27.3	27.3
Bolivia	0.2	0.2	5.5	5.5
Brazil	2.8	2.8	3.8	3.8
Chile	0.3	0.3	4.2	4.2
Colombia	2.1	2.2	4.0	4.7
Ecuador	1.5	1.2	4.0	4.0
Peru	0.4	0.4	0.7	0.6
Trinidad and Tobago	0.5	0.5	10.0	10.0
Venezuela	58.5	59.8	100.8	108.8
Other	0.0	0.0	0.0	0.0
<b>Total</b>	<b>68.6</b>	<b>69.7</b>	<b>160.3</b>	<b>168.9</b>
<b>Western Europe</b>				
Austria	0.1	0.1	0.4	0.4
Denmark	0.8	0.5	4.5	2.8
France	0.2	0.2	1.2	1.2
Germany, West	0.4	0.2	6.6	6.3
Greece	0.1	0.0	0.2	0.0
Italy	0.7	1.1	11.7	11.2
Netherlands	0.2	0.2	61.1	61.1
Norway	11.5	11.0	82.2	93.1
Spain	0.0	0.0	0.8	0.4
United Kingdom	4.3	4.3	20.8	20.8
Other	0.0	0.0	0.0	0.8
<b>Total</b>	<b>18.3</b>	<b>17.7</b>	<b>189.5</b>	<b>198.0</b>
<b>Eastern Europe</b>				
U.S.S.R.	58.4	60.9	1,500.0	1,450.0
Other <sup>2</sup>	1.7	2.0	28.0	22.0
<b>Total</b>	<b>60.1</b>	<b>62.9</b>	<b>1,528.0</b>	<b>1,472.0</b>
<b>Middle East</b>				
Abu Dhabi	92.2	54.9	182.9	183.0
Bahrain	0.1	0.1	6.5	6.5
Dubai	4.0	1.3	4.9	4.1
Iran	92.9	63.0	500.0	595.0
Iraq	100.0	99.0	95.0	34.8
Kuwait <sup>3</sup>	97.1	98.6	54.6	41.8
Oman	4.3	4.1	9.3	9.3
Qatar	4.5	2.6	163.1	163.1
Saudi Arabia <sup>3</sup>	257.6	257.5	187.3	185.4
Syria	1.7	1.8	4.0	4.0
Turkey	0.5	0.2	0.7	0.5
Yemen, North	1.0	0.5	5.5	5.5
Yemen, South	3.0	1.0	0.0	5.0
Other	1.9	0.1	13.1	9.2
<b>Total</b>	<b>660.8</b>	<b>584.8</b>	<b>1,226.9</b>	<b>1,247.2</b>

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

Region/Country	Oil (Billion Barrels)		Natural Gas (Trillion Cubic Feet)	
	Oil & Gas Journal	World Oil	Oil & Gas Journal	World Oil
	12/31/89	12/31/88	12/31/89	12/31/88
<b>Africa</b>				
Algeria	9.2	8.4	114.0	104.2
Angola	2.0	2.0	2.1	1.7
Cameroon	0.4	0.5	3.9	3.8
Congo	0.8	0.8	2.8	2.5
Egypt	4.5	4.6	11.7	9.4
Gabon	0.7	0.9	0.6	0.5
Libya	22.8	22.4	25.5	25.6
Morocco	0.0	0.0	0.1	0.1
Nigeria	16.0	16.0	87.4	47.3
South Africa	0.0	0.0	1.8	1.5
Tunisia	1.8	1.8	3.1	3.1
Other	0.6	1.4	14.0	6.5
<b>Total</b>	<b>58.8</b>	<b>58.7</b>	<b>266.7</b>	<b>206.2</b>
<b>Asia-Pacific</b>				
Australia	1.7	2.3	16.5	36.8
Brunei	1.4	1.2	11.4	12.5
Burma	0.1	0.2	9.4	5.1
China	24.0	22.0	35.3	30.0
India	7.5	4.5	23.0	21.0
Indonesia	8.2	8.4	87.0	85.6
Japan	0.1	0.1	1.1	1.1
Malaysia	3.0	3.4	51.9	52.5
New Zealand	0.1	0.2	5.1	4.0
Pakistan	0.1	0.2	18.0	17.2
Taiwan	0.0	0.0	0.8	0.7
Thailand	0.2	0.2	6.9	6.9
Other	0.2	0.4	16.9	14.9
<b>Total</b>	<b>46.5</b>	<b>42.8</b>	<b>283.3</b>	<b>288.3</b>
<b>Total OPEC</b>	<b>767.1</b>	<b>694.0</b>	<b>1,620.2</b>	<b>1,592.5</b>
<b>Total Non-OPEC ME</b>	<b>151.3</b>	<b>144.7</b>	<b>807.0</b>	<b>822.3</b>
<b>Total CPE</b>	<b>84.1</b>	<b>84.9</b>	<b>1,563.3</b>	<b>1,502.0</b>
<b>World Total</b>	<b>1,002.5</b>	<b>923.6</b>	<b>3,990.4</b>	<b>3,916.9</b>

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

<sup>2</sup>*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.

<sup>3</sup>Includes 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, 1989, p. 30. 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

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