

Oil and Gas Developments in North Africa in 1989¹

Bogdan M. Popescu²

ABSTRACT

For 1989, the North African countries (Algeria, Egypt, Libya, Morocco, Sudan, and Tunisia) showed marginal increases in acreage under rights (up 1.9%) and in overall drilling activity (up 0.2%) when compared with 1988. Seismic acquisition fell 25.5% compared to 1988, but crude oil production increased 5%. Amoco tested 20,170 BOPD at its October North 183-1 new-field wildcat in the Gulf of Suez and put the well on-stream late in the year.

INTRODUCTION (Tables 1-4)

Following increased efforts to attract companies' interest in exploring for the hydrocarbon potential of North African basins during the previous 2 years, the licensed acreage to foreign companies increased sizably in Egypt and Libya and to a lesser extent in Algeria in 1989. Oil companies were less actively seeking acreage in Morocco and Tunisia, where the licensed area remained almost unchanged or decreased. Large relinquishments took place in Sudan in early 1990.

Following the trend noted last year, the number of party-months spent on seismic activity rose in Egypt and Tunisia, but dramatically fell in Morocco, where relinquishments of acreage held by foreign companies continued in 1989. In Libya, the seismic effort was somewhat lower than in 1988 and concentrated on land licenses only.

Drilling meterage, for the third year in a row, was higher than in the previous year. About 825,000 m was drilled and 295 wells completed versus the 1988 revised 823,000 m and 305 completions (the revision comes from Algeria where, in 1988, there were 107,500 m drilled in 44 development wells; our estimate was 50,000 m and 20 wells). As in 1988, the gains were mainly due to the increase of the development drilling activity; the number of exploratory holes and the meters drilled continued to

decrease. Of 99 exploratory wells drilled, 39% were successfully completed, as in 1988. A spectacular discovery was reported by Amoco at its new-field wildcat, October North 183-1, which tested 20,170 BOPD from the Miocene clastics of the northern Gulf of Suez.

Oil production increased in both OPEC producing countries (Algeria and Libya) and remained almost unchanged in the two other major producers in the area (Egypt and Tunisia).

ALGERIA³ (Figure 1; Tables 5-7)

A total of 1,495,879 (revised) km² was covered by petroleum rights at the end of 1989, including 3 offshore blocks over 60,035 km². Onshore, foreign companies operated under production-sharing contracts a total of 51,220 km² (3 pre-awards not included) in 11 onshore blocks. The remaining area was held by Sonatrach as production leases or as designated blocks, open for farm-ins.

In 1989, new production-sharing contracts were signed by Sonatrach and foreign companies for 9 blocks: Alepco (1), Anadarko-Lasmo (4), BHP (2), and Total et al. (2). Four seismic option permits expired.

With a total of 6416 km of seismic lines recorded in 87 party-months in 1989, surface exploration was slightly less than in 1988 when 7600 line-km were shot in 85 party-months. Sonatrach (6250 line-km and 85 party-months) was active in most of the country's sedimentary basins, whereas Agip acquired seismic lines in the Ghadames basin in the Zemoul el Kbar block.

Exploratory drilling activity during 1989 resulted in 18 wells and 43,888 m drilled. This compares with 14 wells and about 46,400 m (revised) drilled in 1988. Efforts focused on the Ghadames, Timimoun-Sbaa Illizi, and Ahnet basins and on the Saharan-Tunisian Atlas. Sonatrach had 5 successful wells (4 gas and 1 oil), probably all discoveries; it abandoned 11 wells. Agip abandoned 2 outposts with oil shows. About 12 wells were active at year end. In the Saharan Atlas, Sonatrach's Guerguit el Kihal Nord 1 (GKN-1) tested light sulfur-free oil over a 115-m interval in the Cenomanian-Turonian carbonates. Elsewhere, Sonatrach found gas in the Timimoun basin at wildcats Bouhadid 1bis (BD-1b) and Bouhadid Ouest 1 (BDW-1), in the Sbaa basin at Hassi Ilatou Nord-est 2 (LTNE-2), and in the Ahnet basin at wildcat Gour Mahmoud 1 (GMD-1).

No official information on development drilling was released by Sonatrach. The state company was working with about 20 land rigs in 1989 compared with about

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²Petroconsultants SA, 8-10 rue Muzy, 1211 Geneva 6, Switzerland.

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³Exploration data for Sonatrach was furnished by A. Attar.

10–15 rigs in 1988. Upon the signing of an enhanced-oil-recovery joint agreement between Total-CFP and Sonatrach, initialed in December 1989, the French company will conduct a drilling-workover program on specific zones of Hassi Messaoud field.

Crude oil output averaged about 720,000 b/d in 1989 compared with an estimated 640,000 b/d in 1988. The average condensate production was reported at 390,000 b/d, unchanged from 1988. Average gross gas production was more than 11,000,000 mcf/day, a slight increase from 1988 revised output of 10,607,000 mcf/day. Reinjecting gas amounted to about 48%, domestic needs and exports accounted for about 41%, and the balance was flared or lost. In 1989, Algerian gas exports amounted to 29.83 billion m³ (1053 bcf), a 10% increase from 1988. Higher liftings from traditional purchasers and successfully negotiated new gas export contracts explain the rise.

Reserves as high as 9.4 billion bbl of liquid hydrocarbons and more than 113 tcf of gas were reported for the country as of December 31, 1989.

EGYPT (Figure 2, 3; Tables 8-11)

At the end of 1989, about 173,350 km² (including pre-awards) were covered by permits for hydrocarbon exploration and exploitation compared to 158,100 km² at the end of 1988. A total of 51 exploration concessions was operated by 19 foreign companies. Twenty joint-venture companies were operators of about 63 development leases. The national operating company, GPC, had both exploration and production rights over 24 blocks.

A record number of 28 new concession agreements became effective. From the 12 contracts completed for acreage in the Western Desert, 2 were signed with newcomers to the Egyptian exploration scene (Crescent and Kriti Oil and Gas). Four contracts were completed for blocks in the Nile Delta, and 1 contract became effective for a large unexplored area on the Sinai Peninsula. Eleven agreements were completed for offshore acreage: 9 in the Gulf of Suez and 2 in the Mediterranean off the Western Desert. One onshore concession and 7 offshore concessions (including 2 development leases) were relinquished.

Geophysical acquisition increased with 50 party-months spent on land seismic and 14 party-months on marine seismic (in 1988, 35 party-months were spent land seismic and 14 party-months on marine seismic). The most active operators were Arco, Conoco, Esso, IEOC, and Shell. About 6 crew-months were spent on other geophysical land surveys, including 2 months of magnetotelluric acquisition, a method applied for the first time in Egypt.

A total of 135,600 m was drilled in 51 exploratory wells during 106 rig-months, a decrease of about 9% in drilling activity compared to 1988. Of the 43 wells completed, 17 were successful.

Onshore, in the Northern Egypt basin, Phillips reported 2 new-field discoveries: Khepri 1 (it produced an aggregate of 1200 BOPD, 27,300 MCFGD, and 208 BCPD from 2 pay zones in Cretaceous clastics) and Sethos 1 (located updip of Khepri 1, it flowed up to 4000 BOPD

from various Cretaceous levels). In the Abu Gharadig basin, Shell made a discovery with Badr el Din 17-1, which encountered oil in the Upper Cretaceous Abu Roash Formation. In the Nile Delta, the local Agip subsidiary, IEOC, announced a Miocene gas discovery in Abu Madi West 1.

Offshore, the most spectacular discovery of 1989 was made by Amoco in the Gulf of Suez, adjacent to October field (currently Egypt's biggest producer). The new-field wildcat, October North 183-1, flowed light oil at a rate of 20,170 b/d from Miocene upper Rudeis clastics. Production from the structure which is estimated to contain reserves of 50 million bbl, started in October 1989. Shell made a discovery at Gemsa Southeast 3 in the southern Gulf of Suez. It produced an aggregate of 5000 BOPD from early Miocene Nukhul sandstones. Conoco announced a gas discovery with its new-field wildcat, Hareed 3, in the East Hurghada concession at the mouth of the Gulf of Suez. Gupco's July 85, which was spudded as a development well in July field, was reclassified as an exploratory well after encountering oil below the original field oil-water contact. The well produced 4500 BOPD from the lower Rudeis Formation, and the new pay zone is reported to add about 3 million bbl to the reserves of the field. Rudoco found oil in SG 300-8 in the Gharib Marine South block with 4300 b/d of light crude from the Cretaceous Nubia "A" Formation. In the Nile Delta, Wepco's NFW Abu Qir West 1 found 1500 b/d of light oil, 12,500 mcf/day of gas, and 300 b/d of condensate in the Pliocene clastics of the Abu Maadi Formation. It was the first time that such rates of crude were tested in the Nile Delta basin, which was traditionally considered a gas province.

A total of 194,200 m was drilled in development wells during 106 rig-months, a decrease in rig activity of about 18% compared to 1988. A total of 71 wells was completed.

The 1989 average crude oil output amounted to 850,900 b/d, 0.1% less than in 1988. Gas production reached an all-time record high with 749,200 mcf/day, 12.2% more than in 1988. Condensate production also reached a record high with 22,800 b/d, 7.9% more than in 1988. Two oil fields, Bardy (onshore Western Desert) and North October (offshore Gulf of Suez), were put on-stream in 1989.

LIBYA (Figure 4, 5; Tables 12–15)

On December 31, 1989, total acreage in force amounted to 484,687 km² versus 436,803 km² (revised) at the end of 1988. During 1989, 13 onshore permits and 1 offshore permit were granted over a total of 25,502 km² under the third bidding round terms (EPSA III) opened in 1988.

International Petroleum Ltd. (IPL) secured 3 onshore blocks (NC 154, NC 155, and NC 156) in the eastern part of the Sirte basin. The Yugoslavian state company, Ina-Naftaplin, signed an agreement to explore in 6 blocks (NC 157 to NC 162), 5 of which are onshore in the Sirte basin and 1 is offshore in the Pelagian basin adjacent to the Tunisian border. Braspetro and partners OMV and Husky were awarded the 10,950-km² NC 166. In the Sirte basin,

OMV and Husky acquired NC 163, NC 164, and NC 165. In the Ghadames basin, OMV and partners Braspetro and Husky were granted NC 162 (6558 km²). The Ghadames basin block NC 153 of Societa Energia Montedison (SELM), signed on a preliminary basis on August 10, 1988, received the government's final ratification in May 1989.

Exploration activities, all onshore, amounted to 114.5 party-months of seismic in 1989 compared to 125.8 party-months in 1988. About 74% of all operations were concentrated in the Sirte basin, 13% in the Ghadames basin, 8% on the Cyrenaica platform, and 5% in the Kufra basin where CGG was running a spec survey for NOC. The most active companies were the Libyan state companies Agoco, Sirte Oil, Waha, and Zueitina on the Cyrenaica platform and in the Sirte and Ghadames basins. Three foreign companies, Agip, Veba, and Wintershall, carried out exploration work in the Sirte basin.

Exploratory drilling remained at about the same level as in 1988: 74,500 m were drilled in 69.5 rig-months compared to 70,136 m and 71.7 rig-months in 1988. Of the 26 wells drilled and 6 wells still active at year end, 22 were wildcats (including 8 oil, 1 gas, and 8 dry wells) and 10 were outposts (4 oil, 1 gas, and 1 dry). Most of the activity took place onshore in the Sirte basin. One well was also spudded on the Cyrenaica platform and, offshore, 2 wells were drilled in the Pelagian basin. Land discoveries were reported by Sirte Oil (550 BOPD at 4K-1-6, 500 BOPD at 4L-1-6, and 1500 MCFGD at A-1-NC130A), Waha (LL-1-32 and 1A-6-59), Wintershall (7000–8000 b/d of 38° API oil at B-1-96) and Zueitina (495 b/d of 48° API oil and 715 MCFGD at G-1-NC74B), all in the Sirte basin. Offshore, Agip abandoned B-8NC41 after testing about 1000 b/d of 19° API oil and 7500 mcf/day of gas.

About 61 development wells were drilled, accounting for an estimated total of 183,000 m and 100 rig-months versus about 49 wells, 134,800 m, and 98 rig-months in 1988. About two-thirds of the wells were drilled onshore in 20 fields in the Sirte basin by Agoco, Agip, Sirte, Veba, Waha, and Zueitina. The others were drilled offshore by Agip in Bourri field.

During 1989, Libya continued as the leading oil-producing country in North Africa. Output averaged an estimated 1,100,000 BOPD (up 7% versus 1988) and about 660,000 MCFGD. Onshore, state-owned fields produced about 900,000 BOPD, and Agip, Elf, Veba, and Wintershall fields together produced about 170,000 BOPD. Offshore, Agip's Bourri field yielded 30,000 BOPD. Associated gas (about 1 mcf/bbl) was flared.

MOROCCO (Figure 6; Table 16)

Area under license decreased again in 1989. Six operators were holding 84,019 km² in 1989 versus the revised 92,945 km² 1 year earlier. Onarep, the state company, was granted 2 onshore permits and relinquished 1 offshore and 6 onshore permits. SCP received 2 land permits and relinquished 2 smaller blocks, which were immediately included in new application areas. Walter International, a newcomer to the country, was awarded an offshore block.

PCIAC and Onarep have agreed to extend until March 1992 the technical assistance program begun in 1985.

There was a major decrease of activity in 1989 when only 880 line-km were recorded in 8.5 party-months compared with 8416 km acquired in 92.6 party months in 1988. Onarep and SCP carried out short Vibroseis surveys in central and northern Morocco. Drilling activity, both exploratory and development, was at standstill in 1989, the first time in many years.

Declining production averaged 185 BOPD, 105 BCPD, and 5786 MCFGD in 1989 compared to 198 BOPD, 239 BCPD, and 8037 MCFGD in 1988.

SUDAN (Figure 7; Tables 17, 18)

In December 1988, the Ministry of Energy and Mining called for bids over 400,000 km² onshore in northwest Sudan and over 96,200 km² offshore in the Red Sea. The call for bids has not shown positive results so far, probably because of the tense political situation. In 1989, acreage under license remained unchanged. At the beginning of February, British Gas acquired 15% in the Sun-operated Nile and Dongola blocks (138,100 km²).

Geophysical operations remained at the same level as in 1988. In 1989, 2 operators ran 5.9 party-months of Vibroseis compared to 6 party-months in 1988. Chevron was active in the Muglad area, whereas Sun carried out a survey west of Khartoum.

Three new wells were spudded and 10,529 m drilled during 1989. In 1988, 1 well was spudded and 3553 m drilled. Chevron abandoned Azraq 1 and Dirak 1 in the northern part of the Muglad block. South of Khartoum, Sun abandoned 2 dry holes, Al Salam 1 and Sudan 6, and was preparing to relinquish its permits in Sudan.

TUNISIA (Figure 8; Tables 19–22)

At year end, area under license covered 86,246 km², marginally up from the revised 86,000 km² at the end of 1988. Three awards—to Fina (onshore Merzoug block), Maxus (offshore Mahdia East) and Springfield (offshore South Kerkennah)—were reported during 1989. Six concessions were subject to area increases (1476 km²) or reductions (1928 km²), and 2 exploration permits were fully relinquished (9128 km²). On April 11, 1989, Tunisia and Libya set up the Joint Company for Exploration and Petroleum Services (JCEPS) to operate the 7th November concession.

Seismic acquisitions more than doubled in 1989 with 9813 line-km recorded in 15.4 party months versus 4401 line-km over 7.2 party-months in 1988. The bulk of activity took place offshore in the Gulf of Gabes (86%) and in the Gulf of Hammamet (14%) for the following operators: British Gas, BHP, Elf, and Maxus. Onshore, nearly 60% of the recordings were done in Trias Province, and 35% in the Saharan-Tunisian Atlas. Surveys were run for British Gas, Conoco, Fina, Kufpec, Shell, and Usoco.

In 1989, 8 wells and 26,129 m were drilled in 30.9 rig-months compared to 32,583 m in 27.8 rig-months in 1988.

Three-quarters of the drilling was on land. The Agip new-field wildcat, Sanhar N-1, in Trias Province, yielded 1080 b/d of 41° API oil from the Jurassic and small amounts of 38° API oil from the Silurian. Kufpec tested 2930 BOPD from the Upper Cretaceous in its Kilani 1 new-field wildcat. Shell's Zinnia 1 new-field wildcat gauged 1195 BOPD from the Upper Cretaceous of the Pelagian basin. Another minor Cretaceous discovery was reported by Elf at Bou Ghrara 1.

Field drilling continued to decline in 1989 with 3 well completions and 11,951 m drilled versus 8 completions and 24,335 m drilled in 1988. Sitep and Elf continued drilling in the onshore El Borma field and in the offshore Ashtart field, respectively.

Crude oil production averaged 101,980 b/d, marginally higher than in 1988. Marketed gas averaged 35,132 mcf/day, an increase of 5.5% from 1988. Onshore, British Gas' Gremda field was brought on-stream on February 7, 1989.

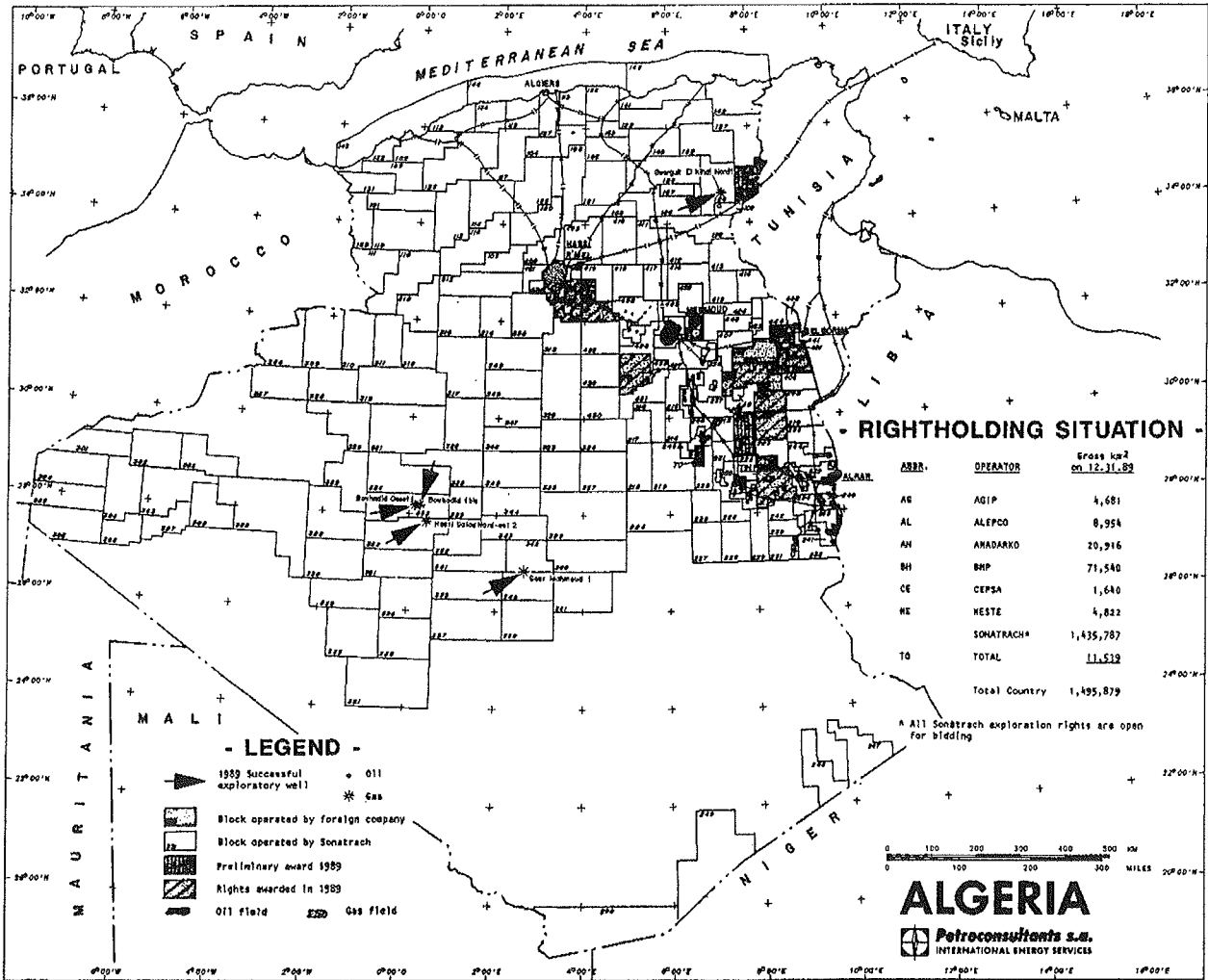


Figure 1—Algeria rightholding situation and successful exploratory wells, 1989.

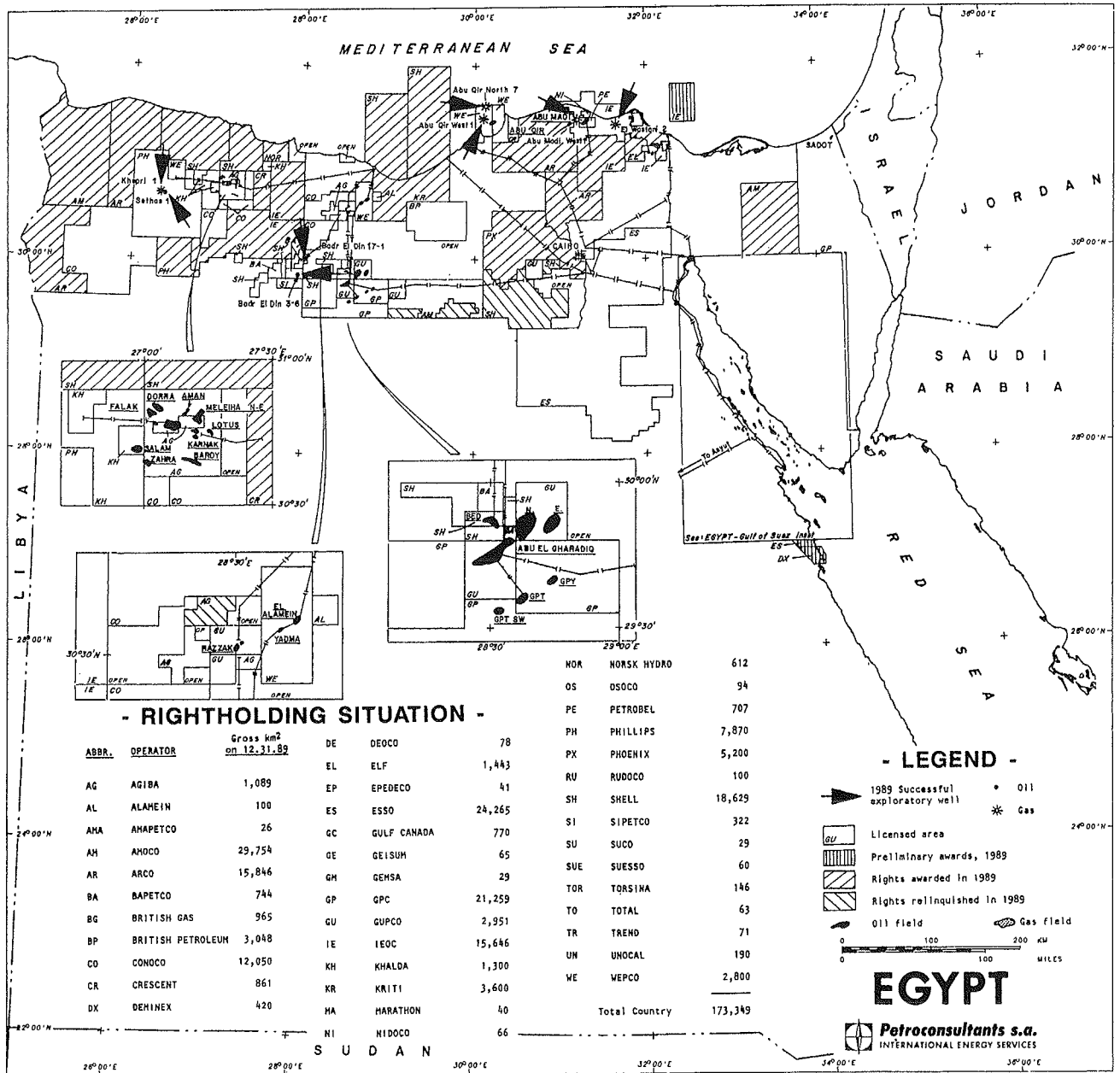


Figure 2—Egypt rightholding situation and successful exploratory wells, 1989.

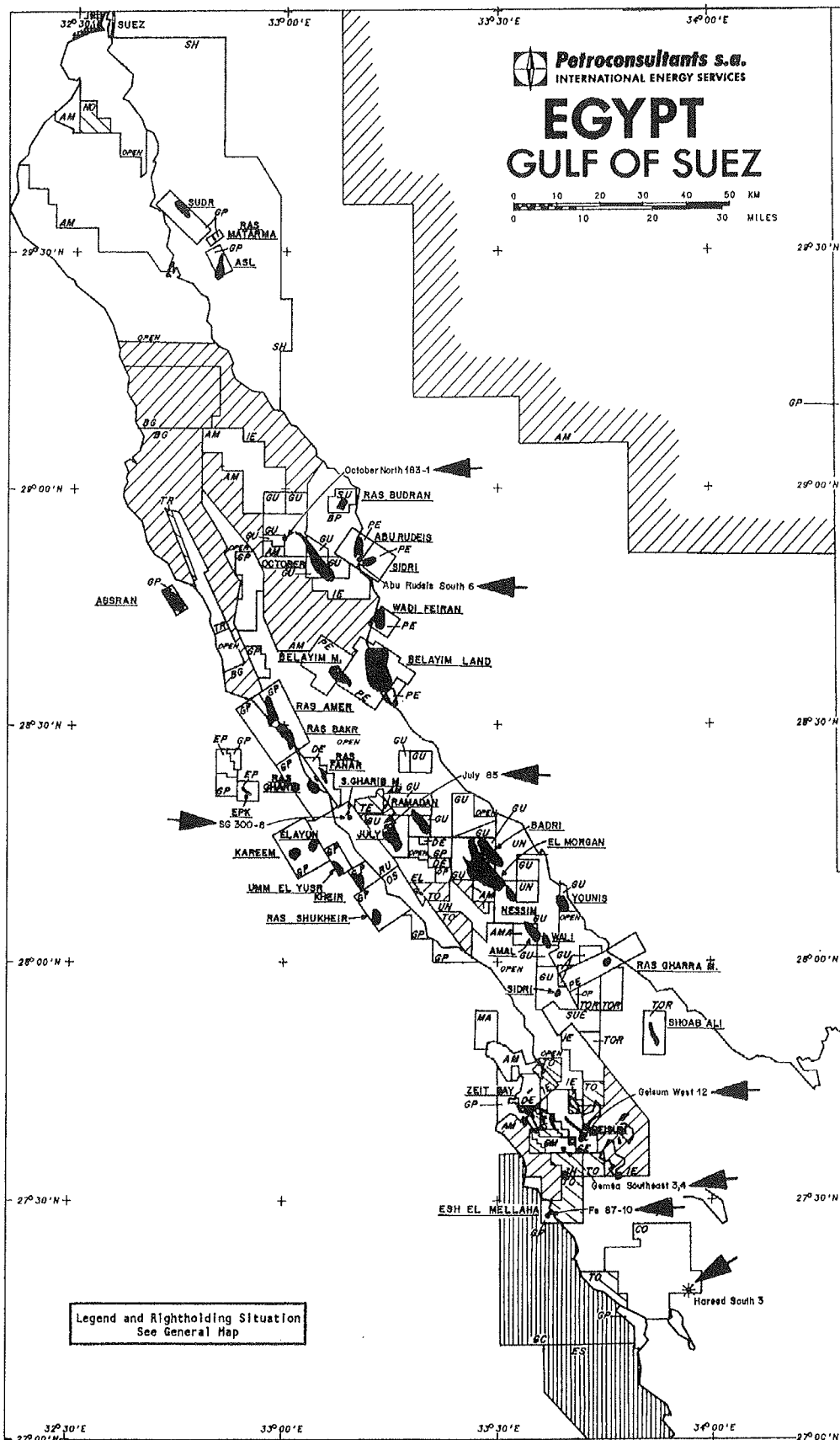


Figure 3—Egypt Gulf of Suez rightholding situation and successful exploratory wells, 1989. For location, see Figure 2.

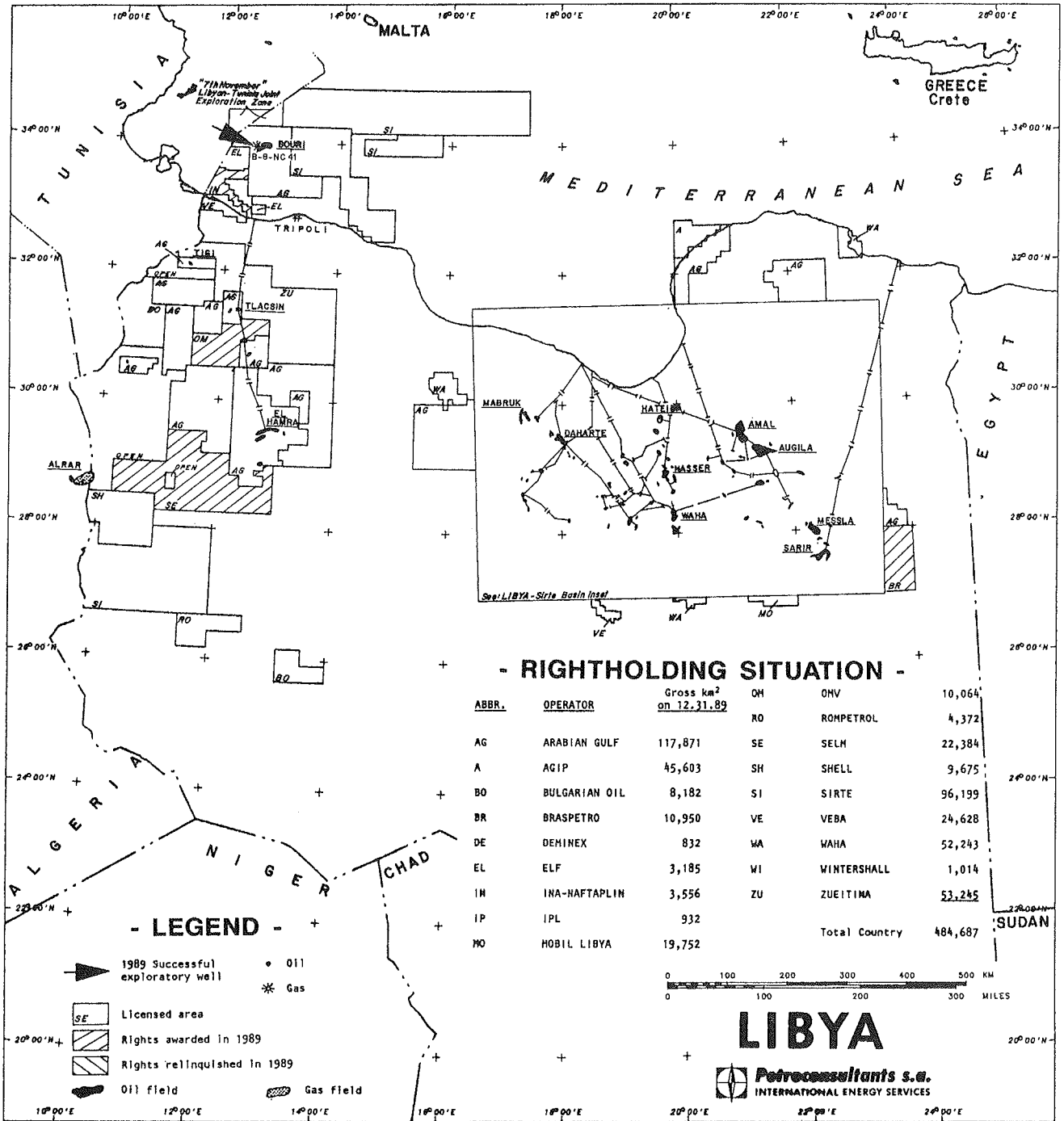


Figure 4—Libya rightholding situation and successful exploratory wells, 1989.

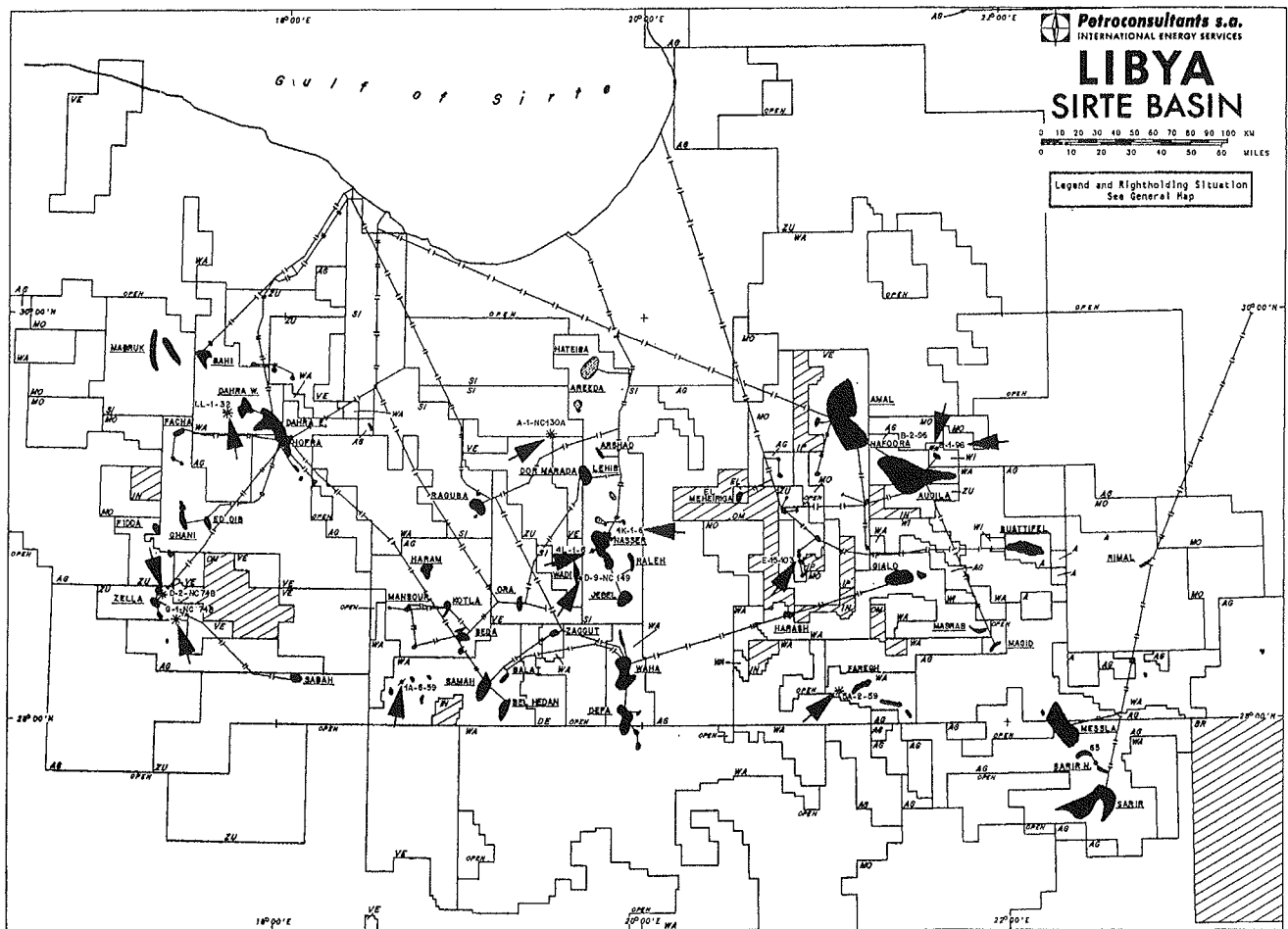


Figure 5—Libya Sirte basin rightholding situation and successful exploratory wells, 1989. For location, see Figure 4.

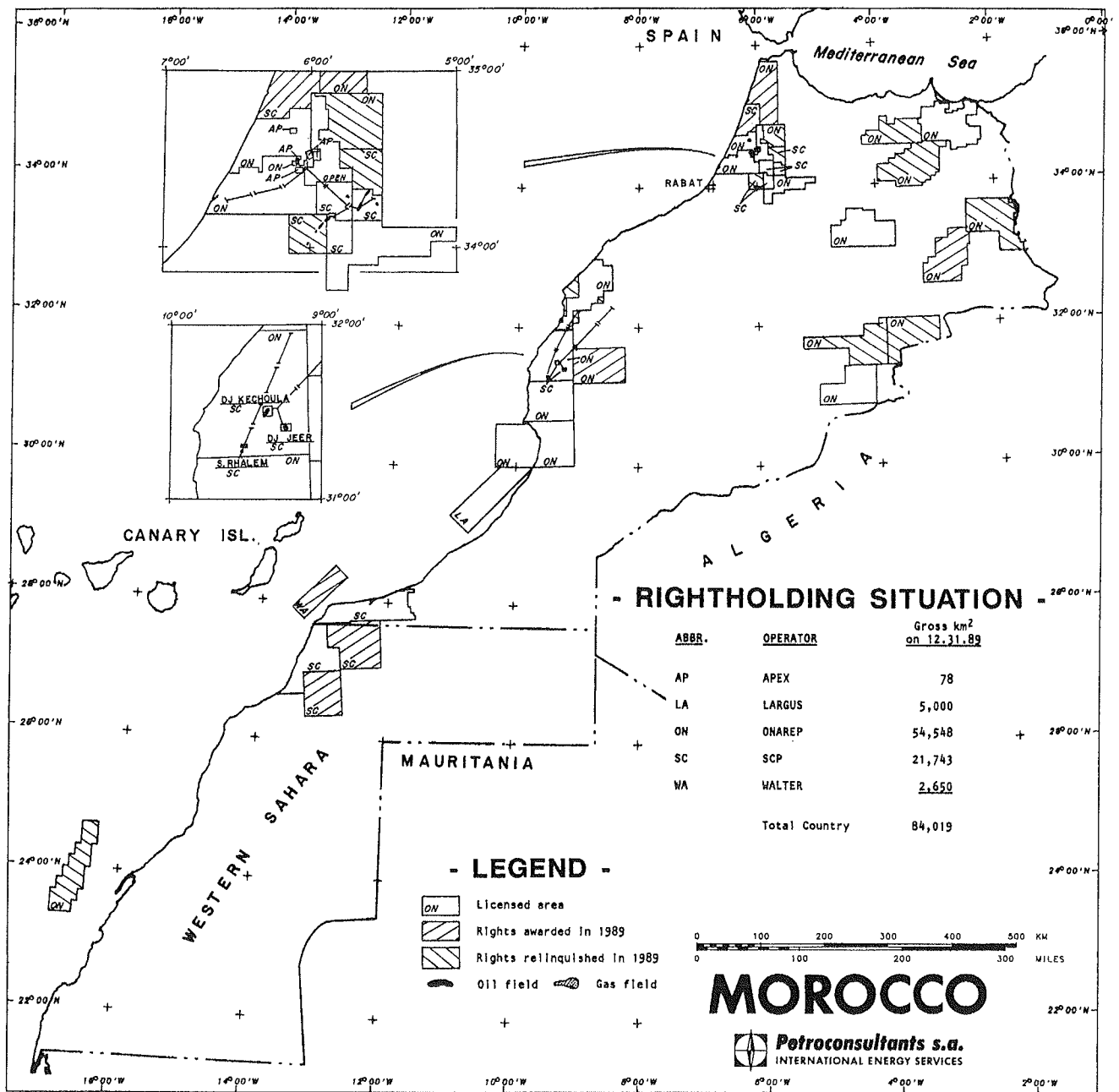


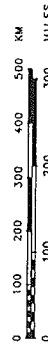
Figure 6—Morocco rightholding situation, 1989.

- RIGHTHOLDING SITUATION -

OPERTOR	Gross km ² on 12.31.89
CHEVRON	224,900
PANOCO	7,482
SUN	138,100
TOTAL	171,393
Total Country	541,785

- LEGEND -

- ▲ Wells drilled in 1989
- ▭ Licensed area
- Oil field
- * Gas field



SUDAN

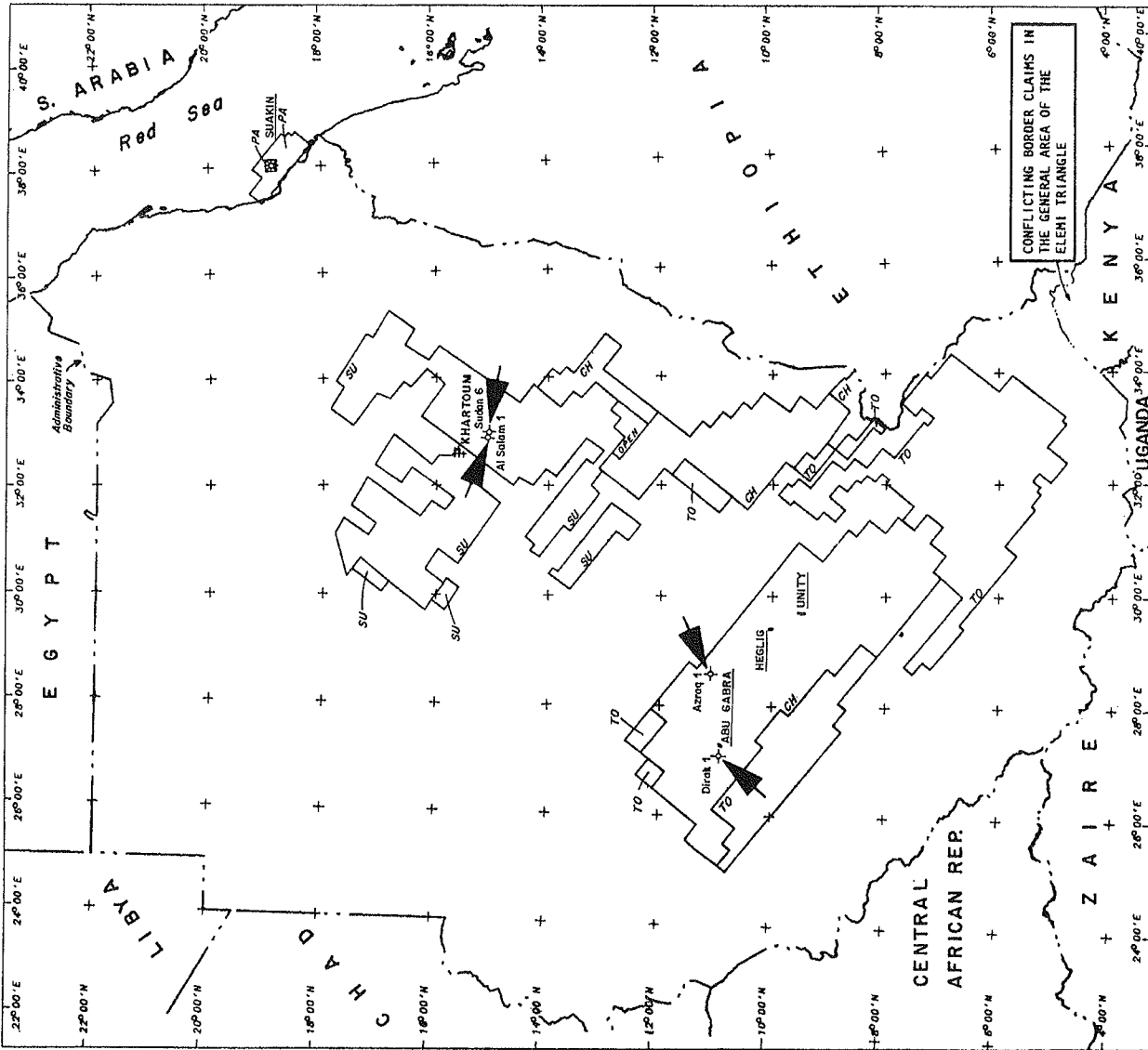


Figure 7—Sudan rightholding situation and wells drilled, 1989.

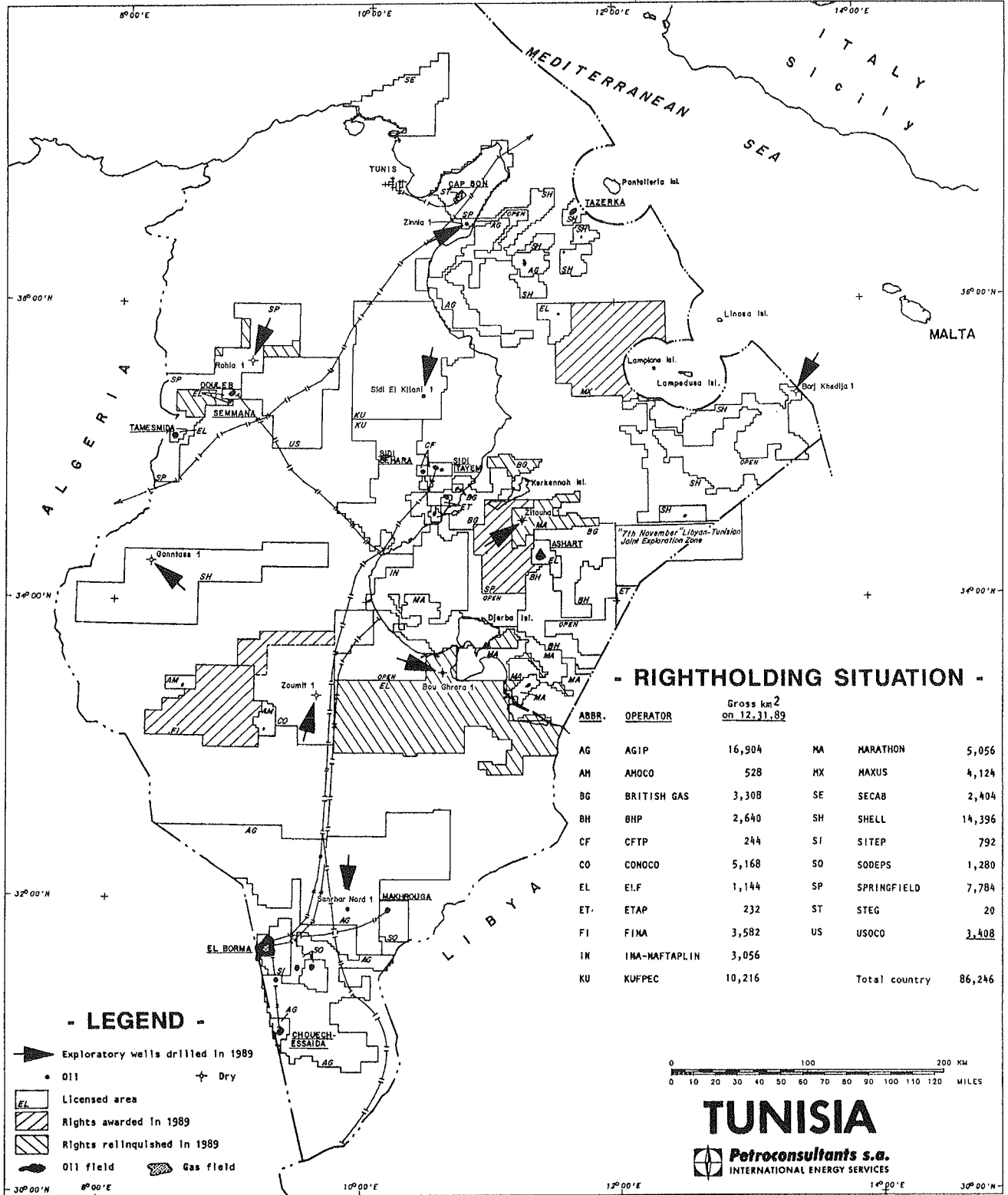


Figure 8—Tunisia rightholding situation and exploratory wells drilled, 1989.

Table 1. North Africa Exploration and Production Rights (in km²) at End of 1989

	ALGERIA	EGYPT	LIBYA	MOROCCO	SUDAN	TUNISIA	Total
Land	1,435,844	153,686	413,837	71,919	534,303	52,610	2,662,199
Shelf	10,330	12,308	33,142	8,500	7,482	28,412	100,174
Deepwater	49,705	7,355	37,708	3,600	—	5,224	103,592
Total 1989	1,495,879	173,349	484,687	84,019	541,785	86,246	2,865,965
Total 1988	1,495,879 (r)	158,100 (r)	436,803 (r)	92,945 (r)	541,785 (r)	86,000 (r)	2,811,512 (r)

*Includes rights in Western Sahara.
(r) = revised.

Table 2. North Africa Drilling Activity, 1989

Country	Exploration		Development		Total	
	Wells	Meterage	Wells	Meterage	Wells	Meterage
ALGERIA	18	43,888	60*	145,000*	78*	189,000*
EGYPT	43	135,600*	71	194,200	114	329,800*
LIBYA	26	74,500*	61	183,000	87	257,500*
MOROCCO	0	0	0	0	0	0
SUDAN	4	10,526	0	0	4	10,526
TUNISIA	8	26,129	3	11,951	11	38,080
Total 1989	99	290,500*	195*	534,000*	295*	824,500*
Total 1988	109	306,250* (r)	195* (r)	516,500* (r)	305* (r)	822,750* (r)

*Estimated.
(r) = revised.

Table 3. North Africa Seismic Activity, 1989

Country	Land		Marine		Total	
	Line-Km	P-Months	Line-Km	P-Months	Line-Km	P-Months
ALGERIA	6,416	87.3	0	0	6,416	87.3
EGYPT	10,537	50.0	3,600*(†)	14	14,100*	64
LIBYA	9,000*	114.5	0	0	9,000	114.5
MOROCCO	880	8.5	0	0	880	8.5
SUDAN	940	5.9	0	0	940	5.9
TUNISIA	1,711	10.2	8,102	5.2	9,813	15.4
Total 1989	29,400*	276.40	11,700*	19.2	41,000*	295.6
Total 1988	37,850*	350*	16,489	18.5*	54,300*	370*

*Estimated.
† Plus 3077 km² 3-D.

Table 4. North Africa Oil Production, 1989

Country		Daily Average (b/d)		Change from 1988
		1989	1988	
ALGERIA	Crude oil	720,000*	640,000*	+ 12.5%
	Condensate	390,000*	390,000*	0
EGYPT	Crude oil	850,900	851,600	- 0.1%
	Condensate	22,800	21,200	+ 7.9%
LIBYA	Crude oil	1,100,000*	1,030,000	+ 6.8%
MOROCCO	Crude oil	185	198	- 6.3%
	Condensate	105	239	- 56.1%
SUDAN		0	0	0
TUNISIA	Crude oil	101,980	101,792	+ 0.2%
Total		3,185,000*	3,035,000*	+ 5.0%

*Estimated.

Table 5. Algeria Seismic Activity, 1989

OPERATOR	--- Land seismic --- P-Months	--- Line-Km
AGIP	2.5	166.5
SONATRACH	84.8	6,249.8
Total 1989	87.3	6,416.3
Total 1988	85.0	7,600.0

Table 6. Algeria Exploratory Drilling, 1989

Operator	Wells Spudded	Wells Completed During Period					End Period Susp	Period Active	m(ft) Drilled	Rig-Months
		Oil	Gas	Dry	Unsp	Total				
ONSHORE										
AGIP *	2	0	0	2	0	2	0	1	5,030	8.2
SONATRACH *	17	1	4	11	0	16	0	11	38,858	123.0
TOTAL 1989	19	1	4	13	0	18	0	12	43,888 (143,987)	131.2
TOTAL 1988	12	3	2	9	0	14	0	12	46,400 (152,200)	121.3

*Includes directional sidetracks.

Table 7. Algeria Completed Exploratory Wells, 1989

OPERATOR	Well - CLASSIFICATION	Co-ordinates	Contractor	Rig	Ref elev GL In m	Objective BHF	Depth m(ft)	Spudded Completed	Status Dec 31, 1989
ONSHORE									
AGIP									
Rhourde Ouled Messaoud 2 OUT									
	E 8° 7' 24.4	---	L Devonian	TD 3,951	28 Oct 88	Abd, oil			
	N 31° 10' 50.9	195	Siegenian	(12,962)	11 Apr 89	shows			
	Saipem Nat-110 UE								
Rhourde Ouled Messaoud 2A OUT - sidetracked									
	E 8° 7' 24.4	---	L Devonian	TD 3,614	12 Apr 89	Abd, oil			
	N 31° 10' 50.9	195	Siegenian	(11,857)	16 Jun 89	shows			
	Saipem Nat-110 UE								
SONATRACH									
Anasmit Est 1 NFW									
	E 2° 42' 59.3	---	---	TD 1,660	15 Apr 89	Abd, dry			
	N 26° 17' 11.0	221	---	(5,446)	11 Sep 89	hole			
	ENTP OW 840 E								
Bouhadid Ibis NFW - sidetracked									
	E 0° 14' 1.5	---	---	TD 2,575	24 Jul 87	Susp, gas			
	N 28° 11' 20.0	302	---	(8,448)	5 Mar 89				
	Enafor OW 840 E								
Bouhadid Ouest 1 NFW									
	E 0° 8' 7.7	---	---	TD 2,860	3 Apr 89	Susp, gas			
	N 28° 11' 13.0	298	---	(9,383)	7 Dec 89				
	Enafor OW 840 E								
Dîmeta Nord-ouest 1 NFW									
	E 3° 3' 5.3	---	---	TD 3,087	5 Apr 88	Abd, oil			
	N 28° 59' 30.5	601	---	(10,128)	31 May 89	shows			
	ENTP BRD 125								
Gara Sud 2 OUT									
	E 8° 58' 35.0	---	---	TD 2,080	15 Feb 89	Abd, dry			
	N 28° 5' 54.0	511	---	(6,824)	4 Jun 89	hole			
	ENTP BRD 125								
Gour Mahmoud 1 NFW									
	E 2° 38' 37.4	---	---	TD 2,130	1 Sep 88	Susp, gas			
	N 26° 50' 21.0	324	---	(6,988)	29 Aug 89				
	Enafor OW 2000 E								
Guerguit El Kihal Nord 1 NFW									
	E 7° 18' 42.8	---	---	TD 3,627	21 Dec 87	Susp, oil & gas			
	N 34° 37' 29.8	235	---	(11,899)	20 Mar 89				
	ENTP n.a.								
HRT 1 NFW									
	E 9° 2' 36.0	---	---	TD 2,685	9 Feb 89	Abd, dry			
	N 31° 32' 23.0	220	---	(8,809)	31 May 89	hole			
	Enafor OW 2000 E								
Hassi Farida Nord 1 NFW									
	E 9° 22' 56.0	---	---	TD 2,463	30 Aug 88	Abd, dry			
	N 27° 43' 52.0	417	---	(8,081)	26 Mar 89	hole			
	ENTP BRD 125								
Hassi Ilatou Nord-est 2 NFW									
	E 0° 24' 7.5	---	---	TD 2,572	22 Jun 88	Susp, gas & cond			
	N 27° 51' 2.5	371	---	(8,438)	10 Feb 89				
	ENTP C 1200								

(continued)

Table 7 Continued.

OPERATOR					
Well - CLASSIFICATION					
Co-ordinates Contractor Rlg	Ref elev GL In m	Objective BHF	Depth m(ft)	Spudded Completed	Status Dec 31, 1989
HSL 1 NFW					
E 1° 8'17.8 N 27°10' 3.0 ENTP C 1200	---	---	TD 2,135 (7,005)	8 Mar 89 15 Sep 89	Abd, dry hole
OBL 1 NFW					
E 3°45'40.1 N 32°57'26.4 ENTP 3DH 250	---	---	TD 2,596 (8,517)	28 Feb 89 28 Aug 89	Abd, dry hole
Oued GueterInl Nord 1 NFW					
E 3°43'0.0" N 36° 0'42.0 Enafor OW 840 E	---	---	TD 3,310 (10,859)	13 Jun 88 2 Nov 89	Abd, dry hole
Oued Tordja 1 NFW					
E 1°15'11.1 N 28°16'54.0 Enafor OW 2000 E	---	---	TD 2,815 (9,235)	8 Jul 88 4 Apr 89	Abd, dry hole
Rhourde Sayah Ibis NFW					
E 7° 4' 1.5 N 31° 3'14.0 Enafor OW 2000 E	---	---	TD 4,107 (13,474)	24 Jan 88 24 Jul 89	Abd, dry hole
Taoull 3 NFW					
E 7° 4'59.0 N 30°21'11.0 Enafor OW 2000 E	---	---	TD 4,030 (13,222)	7 Jul 88 11 Aug 89	Abd, dry hole

GL = ground level, BHF = bottom hole formation.

Table 8. Egypt Seismic Activity, 1989

OPERATOR	-- Land Seismic --		- Marine Seismic -	
	P-Months	Line-km	P-Months	Line-Km
ARCO	8.3	1,782	--	--
BAPETCO	4.5	434	--	--
BP	--	--	1.7*	500*
BRITISH GAS	--	--	2.4	3,077**
CONOCO	5.8	1,631	--	--
EPEDECO	1.3	147	--	--
ESSO	7.2	1,432	--	--
GPC	1.2	278	--	--
GUPCO	--	--	1.5	496
IEOC	4.4	1,341	1.6	564
NIDOCO	3.5	352	--	--
NORSK HYDRO	1.0	295	--	--
OSOCO	--	--	0.7	51
PETROBEL	1.5	295	2.0	539
PHILLIPS	3.6	892	--	--
SHELL	8.0	1,658	--	--
UNOCAL	--	--	0.2	290
SPEC SURVEY (GECO)	--	--	4.0	1,150
TOTAL 1989	50	10,537	14	3,600* 3,077**
TOTAL 1988	35	9,880*	14*	8,087

*Estimated.

**km².

Table 9. Egypt Exploratory Drilling, 1989

Operator	Wells Spudded	Wells Oil	Completed Gas	Completed Dry	During Period Unsp	Period Total	End Susp	Period Active	m(ft) Drilled	Rig Months
ONSHORE										
AGIBA	1	0	0	1	0	1	0	0	1,919	0.5
BAPETCO	1	1	0	0	0	1	0	0	3,784	2.9
BP	1	0	0	1	0	1	0	0	3,543	2.4
CONOCO	5	0	0	4	0	4	0	1	19,888	9.9
GPC	1	1	0	1	0	2	0	0	4,100*	6.6
GUPCO	0	0	0	1	0	1	0	0	1,300*	1.4
IEOC	4	0	2	0	0	2	0	2	7,200*	5.8
KHALDA	1	0	0	1	0	1	0	0	2,894	0.6
PETROBEL	1	1	0	0	0	1	0	0	4,500*	6.0
PHILLIPS	2	2	0	1	0	3	0	0	8,775	10.4
SHELL	2	1	1	2	0	4	0	0	7,900*	5.7
WEPCO	1	0	0	1	0	1	0	0	3,423	1.7
Onshore Total	20	6	3	13	0	22	0	3	69,200* (227,100)	53.9
OFFSHORE										
AHOCO	5	1	0	2	0	3	0	2	17,400*	11.0
BP	0	0	0	1	0	1	0	0	1,500	2.1
CONOCO	1	1	0	0	0	3	0	0	3,800*	3.0
ELF	1	0	0	1	0	1	0	0	3,199	2.8
IEOC	1	0	0	4	0	4	0	0	7,000*	7.1
PETROBEL	1	0	0	1	0	1	0	1	3,800*	5.0
RUDOCO	2	1	0	0	0	1	0	1	4,100*	2.3
SHELL	1	2	0	0	0	2	0	0	5,100*	5.0
TREND	2	0	0	2	0	2	0	0	7,400*	4.4
UNOCAL	1	0	0	0	0	0	0	1	2,900*	1.1
WEPCO	3	1	1	1	0	3	0	0	10,106	6.2
Offshore Total	18	6	2	13	0	21	0	5	66,400* (217,700)	50.0
TOTAL 1989	38	12	5	26	0	43	0	8	135,600* (444,800)	103.9
TOTAL 1988	58	19	3	34	1	57	0	12	147,300* (483,600)	115.2

*Estimated.

Table 10. Egypt Completed Exploratory Wells, 1989

OPERATOR	Well - CLASSIFICATION	Co-ordinates Contractor	Ref elev GL In m	Objective BHF	Depth m(ft)	Spudded Completed	Status Dec 31, 1989
ONSHORE							
AGIBA							
11023 1 NFW							
	E 27°12'27.9	KB 225	---	---	TD 1,920	17 Apr 89	Abd,
	N 30°49'56.0	220	---	---	(6,300)	1 May 89	assumed dry.
	Egy. Drilg. Co						
	EDC-7						
BAPETCO							
Badr El Din 3 6 OUT							
	E 27°06'55.0	KB 13	---	---	TD 3,785	1 Jul 89	Compl, oil
	N 29°01'19.6	12	Kharita	---	(12,418)	26 Sep 89	
	Egy. Drilg. Co						
	EDC-10						
BP							
Wadi Natrun West 1 NFW							
	E 29°01'49.2	---	---	---	TD 3,544	14 Aug 89	Abd,
	N 30°19'21.2	124	L Jurassic	---	(11,628)	25 Oct 89	assumed dry
	Salem						
	SPH-63						
CONOCO							
Dabaa North 1 NFW							
	E 28°24'26.5	KB 98	---	---	TD 3,995	14 Jun 89	Abd,
	N 30°45'17.5	9A	Alam	---	(13,107)	27 Jul 89	hydrocarbon shows
	Santa Fe						
	SF-97						
Faghour 1 NFW							
	E 25°03'34.4	KB 210	---	---	TD 3,780	14 Aug 89	Temporarily
	N 30°21'38.4	201	Alam	---	(12,400)	30 Oct 89	abd, oil shows
	Egy. Drilg. Co						
	EDC-9						
Ras Qattara North 1 NFW							
	E 27°23'42.5	KB 233	---	---	TD 3,376	20 May 89	Abd, dry.
	N 30°34'10.6	225	Khatatba	---	(11,076)	7 Jul 89	
	Egy. Drilg. Co						
	EDC-11						
Ras Qattara West 1 NFW							
	E 26°04'44.3	KB 183	---	---	TD 4,689	8 Apr 89	Abd, dry.
	N 30°19'46.4	174	---	---	(15,385)	3 Jul 89	
	Egy. Drilg. Co						
	EDC-9						
GPC							
Areesh East 1 NFW							
	E 33°08' 3.5	---	---	---	TD 2,800	31 Mar 89	Abd, dry
	N 31°0' 54.6	52	Jurassic	---	(9,187)	16 Jul 89	hole
	Gen. Petr. Co						
	GPC-12						
Esh El Mellaha East 6 OUT							
	E 33°37'0.0"	KB 8	---	---	TD 1,387	28 Dec 88	Compl, oil
	N 27°28'0.0"	3	Basement	---	(4,552)	3 Apr 89	
	Gen. Petr. Co						
	Cabot						
GUPCO							
Northwestern Desert 349 2 NFW - sidetracked							
	E 28°24'57.8	KB 211	---	---	TD 3,477	16 Nov 88	Abd, dry
	N 30°31'35.1	202	L Jurassic	---	(11,408)	12 Feb 89	hole
	Egy. Drilg. Co						
	EDC-9						
IEOC (IEOC 2)							
Abu Hadl West 1 NFW							
	E 31°11'56.3	KB 8	---	---	TD 3,466	16 May 89	Compl, gas
	N 31°26' 9.5	2	Qawasim	---	(11,372)	5 Sep 89	
	Egy. Drilg. Co						
	EDC-1						
El Wastanl 2 OUT							
	E 31°09'10.5	KB 8	---	---	TD 3,120	17 Sep 89	Susp, gas
	N 31°23' 5.7	0	Sidi Salem	---	(10,237)	13 Nov 89	
	Egy. Drilg. Co						
	EDC-1						

(continued)

Table 10 Continued.

OPERATOR						
Well - CLASSIFICATION						
Co-ordinates	Ref elev	Objective	Depth	Spudded	Status	
Contractor	GL in m	BHF	m(ft)	Completed	Dec 31, 1989	
Rig						
KHALDA						
Hayat West 1 NFW						
E 26°53'53.8 N 30°37'34.2 Egy. Drig. Co EDC-11	KB 193 184	--- Alam	TD 2,895 (9,498)	21 Jul 89 7 Aug 89	Abd, dry hole	
PETROBEL						
Abu Rudels South 6 OUT - sidetracked						
E 33°10'33.5 N 28°51'20.2 Cope Cope-7	KB 10 4	--- Nubia A	TD 4,135 (13,566)	15 Mar 89 13 Sep 89	Compl, oil.	
PHILLIPS						
Khepr 1 NFW - sidetracked						
E 26°19'15.2 N 30°40'51.9 Santa Fe SF-104	--- ---	--- Paleozoic	TD 4,389 (14,400)	23 Jan 89 5 Aug 89	Compl; aggr 1,200 BOPD & 27,330 MCFGD	
Sethos 1 NFW						
E 26°21'37.0 N 30°40'51.9 Santa Fe SF-104	KB 214 208	--- Alam	TD 4,115 (13,500)	6 Sep 89 28 Dec 89	Compl; 4,000 BOPD	
Theris 1 NFW						
E 26°38' 0.8 N 30°38' 9.8 Santa Fe SF-104	KB 201 196	--- Alam	TD 3,861 (12,666)	23 Oct 88 8 Jan 89	Abd, dry hole	
SNELL						
Badr El Din 2 3 OUT						
E 27°42'11.3 N 29°53'13.6 Egy. Drig. Co EDC-10	KB 85 47	--- Kharita	TD 2,610 (8,563)	4 Dec 88 26 Jan 89	Susp, gas & cond	
Badr El Din 16 1 NFW						
E 27°58'10.8 N 29°54'38.4 Nat. Drig. Co NDC-1	--- 37	--- Kharita	TD 4,227 (13,869)	21 Jan 89 12 Apr 89	Abd, oil shows.	
Badr El Din 17 1 NFW						
E 28° 1'39.1 N 29°59'37.2 Nat. Drig. Co NDC-1	--- 41	--- Kharita	TD 3,421 (11,224)	22 Apr 89 27 Jun 89	Compl, oil	
Qarun 3 NFW						
E 30°56' 5.7 N 29°40'11.1 Nat. Drig. Co NDC-1	KB 122 113	--- Kharita	TD 3,840 (12,599)	3 Oct 88 1 Jan 89	Abd, dry hole	
MEPCO						
Giddiya 1 NFW						
E 30°22'10.9 N 31°23'45.4 Egy. Drig. Co EDC-8	KB 10 1	--- Sidl Salem	TD 3,424 (11,234)	14 Jun 89 5 Aug 89	Abd, dry hole	

(continued)

Table 10 Continued.

OPERATOR						
Well - CLASSIFICATION						
Co-ordinates	Ref elev	Objective	Depth	Spudded	Status	
Contractor	MO in m	BHF	m(ft)	Completed	Dec 31, 1989	
Rig						
AMOCO						
GS 159 2 NFW						
E 32°56'39.4 N 28°58' 7.8 Santa Fe SF-136 Jack-up	KB 23 63	--- Nubia	TD 3,702 (12,147)	9 Jan 89 26 Feb 89	Abd, dry hole	
GS 334 4 NFW - sidetracked						
E 33°24'22.7 N 28°10'25.4 Egy. Drig. Co Sneferu Jack-up	KB 26 34	--- Thebes	TD 4,120 (13,518)	13 Jun 89 7 Nov 89	Abd, dry hole	
October North 183 1 NFW						
E 33°59'58.8 N 28°53'45.4 Sonat Offsh Offshore Comet Jack-up	KB 27 65	--- Nubia	TD 4,224 (13,859)	21 Apr 89 28 May 89 30 May 89 9 Jul 89	Compl; 20,170 BOPD	
BP						
Abu Zeneina 11 1 NFW - sidetracked						
E 33° 5'24.1 N 28°54' 7.2 Egy. Drig. Co Sneferu Jack-up	KB 28 52	--- Oligocene	3,830 (12,567)	23 Nov 88 6 Mar 89	Abd, dry hole	
CONOCO						
Estacosa 1 NFW						
E 33°53'17.2 N 27°25'40.2 Santa Fe Key Gibraltar Jack-up	KB 22 100	--- Basement	TD 2,697 (8,850)	5 Dec 88 4 Feb 89	Abd, dry hole	
Gelsum West 12 OUT						
E 33°42'11.0 N 27°38'17.0 Santa Fe SF-141 Jack-up	--- 15*	--- Basement	TD 1,521 (4,990)	19 Jul 84 19 Aug 84 10 Oct 89 12 Oct 89	Compl, oil	
Hareed South 3 NFW						
E 33°56'44.5 N 27°18'34.2 Santa Fe Key Gibraltar Jack-up	KB 22 88	--- Basement	TD 2,227 (7,308)	10 Mar 89 2 May 89	Susp, gas	
ELF						
Ras El Deeb Marine West 1 NFW						
E 33°17'48.0 N 28°12' 0.4 Santa Fe Key Gibraltar Jack-up	--- 70	--- Rudels	TD 3,200 (10,499)	28 Aug 89 22 Nov 89	Abd, dry hole	
GUPCO						
July 85 DEV						
E 33°14'35.0 N 28°17'23.4 Santa Fe SF-136 Jack-up	KB 28 38	--- Eocene	TD 3,801 (12,472)	19 Sep 89 6 Dec 89	Susp; 4,500 BOPD	
IEOC						
G1082 20 NFW						
E 33° 8'19.7 N 28°48' 0.0 Maersk Drig Maersk Endurrer Jack-up	--- ---	--- Nubia	TD 4,167 (13,671)	16 Mar 89 29 Jun 89	Abd, dry hole	

(continued)

Table 10-Continued.

OPERATOR						
Well - CLASSIFICATION						
Contractor	Ref elev	Objective	Depth	Spudded	Status	
Rig	WD In m	BHF	m(ft)	Completed	Dec 31, 1989	
Abu Qir North 7 OUT						
E 30° 7' 1.5	KB 30	---	TD 3,270	27 May 89	Compl, gas	
N 31°35'40.0	32	Sidl Salem	(10,728)	3 Aug 89		
Santa Fe SF-124 Jack-up						
Abu Qir West 1 NFW						
E 30° 5'46.7	KB 30	---	TD 3,780	9 Aug 89	Abd; 1,500	
N 31°27'16.4	27	Hoghra	(12,400)	28 Oct 89	BOPD, 12,500	
Santa Fe SF-124 Jack-up						
Abu Qir West 2 OUT						
E 30° 6' 1.4	KB 30	---	TD 3,060	3 Nov 89	Abd, dry	
N 31°25' 5.5	24	Sidl Salem	(10,040)	15 Dec 89	hole	
Santa Fe SF-124 Jack-up						
PETROBEL						
Abu Rudels Marine 2 OUT						
E 33° 8'54.8	KB 22	U Cretaceous	TD 3,400	7 Nov 88	Abd, dry	
N 28°52'10.5	17	L Cretaceous	(11,155)	15 Mar 89	hole	
Maersk Dr'g Maersk Endurer Jack-up						
RUDOCO						
Gharib Marine South 8 OUT - sidetracked						
E 33° 9' 6.7	KB 35	---	TD 2,102	7 Mar 89	Compl;	
N 28°18'37.6	45	Nubia C	(6,895)	26 Apr 89	4,300 BOPD	
Maersk Dr'g Maersk Vanguard Jack-up						
SHELL						
Gemsa Southeast 3 NFW						
E 33°39'18.9	KB 59	Nukhul	TD 2,872	28 Dec 88	Compl; aggr	
N 27°36'24.5	19	Basement	(9,423)	3 Mar 89	5,000 BOPD	
Santa Fe SF-141 Jack-up						
Gemsa Southeast 4 OUT						
E 33°39'13.1	KB 23	Nukhul	TD 2,760	4 Mar 89	Compl, oil	
N 27°36'39.9	19	Basement	(9,055)	3 Jun 89		
Santa Fe SF-141 Jack-up						
TREND						
G1078 1 NFW - sidetracked						
E 32°46'31.9	KB 86	---	TD 2,843	8 May 89	Abd; 9 BOPD	
N 28°52'36.4	64	---	(9,326)	23 Aug 89		
Santa Fe Key Gibraltar Jack-up						
G1078 2 NFW						
E 32°44'16.6	KB 22	---	TD 2,109	10 Feb 89	Abd, dry	
N 28°56'125.8	43	Nubia	(6,919)	8 Mar 89	hole	
Santa Fe Key Gibraltar Jack-up						
WEPCO						
Abu Qir North 7 OUT						
E 30° 7' 1.5	KB 30	---	TD 3,270	27 May 89	Compl, gas	
N 31°35'40.0	32	Sidl Salem	(10,728)	3 Aug 89		
Santa Fe SF-124 Jack-up						
Abu Qir West 1 NFW						
E 30° 5'46.7	KB 30	---	TD 3,780	9 Aug 89	Abd; 1,500	
N 31°27'16.4	27	Hoghra	(12,400)	28 Oct 89	BOPD, 12,500	
Santa Fe SF-124 Jack-up						
Abu Qir West 2 OUT						
E 30° 6' 1.4	KB 30	---	TD 3,060	3 Nov 89	Abd, dry	
N 31°25' 5.5	24	Sidl Salem	(10,040)	15 Dec 89	hole	
Santa Fe SF-124 Jack-up						

Table 11. Egypt Development Drilling, 1989

Operator Field	Wells Spudded	Completed During Period					End Period		m(ft) Drilled	Rig- Months
		Oil	Gas	Dry	Other	Total	Susp	Active		
ONSHORE										
AGIBA										
Aman	2	2	0	0	0	2	0	0	3,857	1.1
Melelha	4	5	0	0	0	5	0	0	8,106	2.4
Melelha Northeast	2	0	0	0	2	2	0	0	3,842	0.9
Melelha Southeast	1	0	0	0	0	0	1	0	1,953	0.6
Group total	9	7	0	0	2	9	0	1	17,758	5.0
BAPETCO										
Badr El Din 03	4	0	1	0	2	3	0	1	13,900*	6.9
DEOCO										
Zelt Bay	2	1	0	0	0	1	0	1	4,272	5.2
EPEDECO										
Bakr West K	2	0	0	2	0	2	0	0	3,143	1.9
GUPCO										
Razzak	1	0	0	0	1	1	0	0	858	0.7
	2	0	0	0	2	2	0	0	4,005	1.4
Group total	3	0	0	0	3	3	0	0	4,863	2.1
KHALDA										
Hayat	2	2	0	0	0	2	0	0	4,783	2.3
Khalda	3	1	0	0	2	3	0	0	6,262	1.6
Salam	2	0	0	0	1	1	0	1	2,200*	0.7
Tut West	1	1	0	0	0	1	0	0	2,834	0.8
Group total	8	4	0	0	3	7	0	1	16,100*	5.4
PETROBEL										
Abu Madi	0	0	1	0	0	1	0	0	0	0.7
Belayim Land	0	0	0	1	0	1	0	0	300*	2.1
Group total	0	0	1	1	0	2	0	0	300*	2.8
WEPCO										
Alamein	1	1	0	0	0	1	0	0	2,035	1.1
Onshore Total	29	13	2	3	10	28	0	4	62,400* (204,600)	30.4
OFFSHORE										
DEOCO										
Ras Fanar	1	0	0	1	0	1	0	0	1,000	1.8
Zelt Bay	2	1	0	0	2	3	0	0	3,900*	4.0
Group total	3	1	0	1	2	4	0	0	4,900*	5.8
GEISO										
Gelsum	3	2	0	0	0	2	0	1	5,400*	3.5
GPC										
Amer North Offshore	1	0	0	0	0	0	0	1	900*	0.3
GUPCO										
Badr I	3	2	0	0	1	3	0	0	7,002	3.3
Belayim South 294	1	1	0	0	1	1	0	0	2,767	1.7
July	5	1	0	0	1	2	1	2	15,600*	6.8
Morgan	6	5	0	0	2	7	0	0	13,755	4.8
October	6	4	0	1	1	6	0	1	24,400*	11.0
Ramadan	1	3	0	0	0	3	0	0	7,000*	5.9
Group total	22	16	0	1	5	22	1	3	70,500*	33.5
PETROBEL										
Belayim Marine	4	5	0	0	0	5	0	0	11,849	9.5
SHELL										
Gemsa Southeast	1	1	0	0	0	1	0	0	4,847	3.0
SUESSO										
El Zelt East	5	3	0	0	1	4	0	1	19,000*	11.3
TORSINA										
Hilal	2	2	0	0	0	2	0	0	8,110	4.6
Shoab Ali	1	2	0	0	0	2	0	0	2,800*	1.4
Group total	3	4	0	0	0	4	0	0	10,900*	6.0
WEPCO										
Abu Qir North	1	0	2	0	0	2	0	0	3,524	3.6
Offshore Total	43	32	2	2	8	44	1	6	131,800* (432,500)	76.5
TOTAL 1989	72	45	4	5	18	72	1	10	194,200* (637,100)	106.9
TOTAL 1988	97	61	5	7	21	94	0	11	249,300* (818,000)	130.4

*Estimated.

GL = ground level, WD = water depth, BHF = bottom hole formation, R = re-entered.

*Estimated.

Table 12. Libya Seismic Activity, 1989

OPERATOR	-- Land Seismic --		-- Marine Seismic --	
	P-Months	Line-Km	P-Months	Line-Km
AGIP	7.2	n.a.	---	---
AGOCO	38.4	n.a.	---	---
SIRTE	26.7	n.a.	---	---
VEBA	5.0	n.a.	---	---
WAHA	23.8	n.a.	---	---
WINTERSHALL	1.4	n.a.	---	---
ZUEITINA	12.0	n.a.	---	---
Total 1989	114.5	9,000*	---	---
Total 1988	125.8	10,000*	---	---

*Estimated.

Table 13. Libya Exploratory Drilling, 1989

Operator Group	Wells Spudded	Wells Completed During Period				End Period Susp	Active	n(ft) Drilled	Rig-Months
		Oil	Gas	Dry	Unsp Total				
ONSHORE									
AGIP	1	0	0	0	0	0	1	4,693	5.3
AGOCO	2	0	0	0	0	0	2	2,787	2.0
SIRTE	6	3	1	1	6	0	1	18,353	19.8
VEBA	3	1	0	3	4	0	0	5,643	3.8
WAHA	6	2	1	2	7	0	1	14,663	15.0
WINTERSHALL	2	2	0	0	2	0	1	9,480	6.1
ZUEITINA	4	3	0	2	5	0	0	15,600*	14.0
Onshore Total	24	11	2	8	3	24	0	71,300* (233,800)	66.0
OFFSHORE									
AGIP	1	1	0	1	0	2	0	3,260	3.5
Offshore Total	1	1	0	1	0	2	0	3,260 (10,695)	3.5
TOTAL 1989	25	12	2	9	3	26	0	74,500* (244,500)	69.5
TOTAL 1988	26	8	4	13	0	25	0	70,136 (230,106)	71.7

*Estimated.

Table 14. Libya Completed Exploratory Wells, 1989

OPERATOR	Well - CLASSIFICATION		Objective BHF	Depth m(ft)	Spudded Completed	Status Dec 31, 1989
	Co-ordinates Contractor	Ref elev GL in m				
ONSHORE						
SIRTE						
4K-1-6 NPW - sidetracked						
	E 19°49' 6.0	KB 165	---	TD 2,316	4 Jun 89	Susp; 550
	N 28°54' 39.0	160	---	(7,600)	10 Sep 89	BOPO
	NDC #8					
4L-1-6 NFW						
	E 19°43' 33.7	KB 172	Gargaf Group	TD 2,402	20 Sep 89	Susp; 500
	N 28°51' 5.7	166	---	(7,880)	2 Dec 89	BOPO
	NDC #8					
A-1-NC130A NFW						
	E 19°29' 10.6	KB 172	Gargaf Group	TD 3,048	5 Nov 88	Susp; 1,500
	N 29°25' 26.1	168	---	(10,000)	9 Feb 89	HCFGD
	Forex #43					
8-1-NC130B NFW						
	E 19°31' 16.0	KB 130*	---	TD 3,505	21 Feb 89	Abd, gas
	N 29°32' 18.0	123	Gargaf Group	(11,500)	14 Jun 89	shows
	Forex #43					
D-9-NC149 OUT						
	E 19°39' 16.0	KB 203	---	TD 4,176	3 May 89	Compl;
	N 28°43' 35.0	196	---	(13,700)	30 Sep 89	1,500 BOPO
	ADNOC #6					
FF-17-6 OUT						
	E 19°36' 10.6	KB 45	---	TD 3,780	8 Jan 89	Susp,
	N 29°37' 25.7	38	---	(12,400)	End Apr 89	result unknown
	ADNOC #6					
VEBA						
40-1-11 DPW						
	E 17°59' 15.0	KB 294	---	TD 1,175	26 Jun 89	Compl, oil
	N 29°23' 36.0	290	---	(3,855)	10 Aug 89	
	ADNOC #53					
0-15-12 OUT						
	co-ordinates NA	---	---	TD 853	8 Nov 89	Abd, dry
	ADNOC #4	---	---	(2,800)	22 Nov 89	hole
	MH-1-13 NFW					
	E 19°37' 8.0	KB 182	U Cretaceous	TD 3,141	28 Dec 88	Abd, dry
	N 28°57' 45.0	177	---	(10,305)	15 Feb 89	hole
	Amazonas #2					
PP-1-12 NFW						
	E 21°13' 54.0	KB 75	---	TD 858	24 Nov 89	Abd, dry
	N 29° 7' 39.0	70	---	(2,815)	4 Dec 89	hole
	ADNOC #4					
WAHA						
1A-6-59 NFW						
	E 18°40' 33.0	KB 296	---	TD 2,220	5 Apr 89	Susp, oil
	N 28°12' 41.0	290	---	(7,285)	15 Jun 89	
	NDC #9					
3U-3-59 NFW						
	E 21°29' 30.0	KB 137	---	TD 3,018	8 May 89	Abd, dry
	N 28° 9' 5.0	130	---	(9,900)	12 Jun 89	hole
	ADNOC #3					

(continued)

Table 14 Continued.

OPERATOR					
Well - CLASSIFICATION					
Co-ordinates	Ref elev	Objective	Depth	Spudded	Status
Contractor	GL in m	BHF	m(ft)	Completed	Dec 31, 1989
Rig					
5A-2-59 OUT					
E 21° 4'26.0	KB 180	Sarlr	TD 3,536	29 Sep 88	Susp, gas &
N 28° 9'36.6	151	Sarlr	(11,600)	5 Jan 89	cond
ADWOC #3					
8B-6-59 OUT					
E 21° 16'24.0	KB 137	Sarlr	TD 3,194	6 Jan 89	Abd, result
N 28° 12'13.0	129	Basement	(10,480)	15 Apr 89	unknown
ADWOC #3					
LL-1-32 NFW					
E 17° 41'28.1	KB 582	Bahl	TD 1,650	25 Nov 88	Compl, oil
N 29° 31' 5.0	577	Basement	(5,415)	29 Jan 89	& gas.
NDC #6					
HH-1-32 NFW					
E 17° 44'27.1	KB 294	---	TD 1,577	7 Jan 89	Abd, good
N 29° 27'33.3	300	---	(5,175)	23 Feb 89	oil shows
ADWOC #118					
NN-1-32 NFW					
E 17° 59'12.0	KB 281	---	TD 1,347	10 Feb 89	Abd, result
N 29° 33' 4.0	276	---	(4,420)	21 Mar 89	unknown
NDC #6					
WINTERSHALL					
B-1-96 NFW					
E 21° 37'40.6	---	Hublan	TD 3,840	24 Dec 88	Susp; 8,000
N 29° 20'0.0	---	---	(12,600)	18 Mar 89	80PD
OD&E #9					
B-2-96 OUT					
E 21° 36'15.0	KB 34	Hublan	TD 3,840	8 Sep 89	Susp; 5,750
N 29° 20'29.0	26	---	(12,600)	28 Nov 89	80PD
ADWOC #3					
ZUEITINA					
D-2-NC074B OUT					
E 17° 21'15.0	KB 307	---	TD 2,286	3 Jul 89	Compl;
N 28° 37'24.0	301	---	(7,500)	16 Aug 89	1,000 BOPD & 1,200 HCFGD
OD&E #9					
E-15-103 DPW					
E 20° 51'40.0	KB 120	---	TD 2,926	5 Aug 89	Compl;
N 28° 49'34.0	113	---	(9,600)	1 Oct 89	2,000 BOPD
ADWOC #37					
G-1-NC074B NFW					
E 17° 25'51.0	---	Facha Do Hb	TD 3,200	31 Dec 88	Susp; 495
N 28° 30' 0.3	---	Beda	(10,500)	23 Apr 89	80PD
OD&E #7					
H-1-NC074F NFW					
E 18° 27'34.0	KB 243	---	TD 4,005	2 Aug 89	Abd, dry
N 28° 9'33.0	237	---	(13,140)	6 Dec 89	hole
OD&E #7					
U-1-103 NFW					
E 20° 51'22.0	KB 116	---	TD 3,213	4 Oct 89	Abd, oil
N 28° 52'11.0	111	---	(10,540)	29 Dec 89	shows
ADWOC #37					

(continued)

Table 14 Continued.

OPERATOR (GROUP)					
Well - CLASSIFICATION					
Co-ordinates	Ref elev	Objective	Depth	Spudded	Status
Contractor	WD in m	BHF	m(ft)	Completed	Dec 31, 1989
Rig					
OFFSHORE					
AGIP					
B-8-NC041 OUT					
E 12° 27'40.0	KB 33	Metlaoul	TD 2,841	29 Sep 88	Abd; 1,000
N 33° 55'10.0	145	El Haria	(9,320)	24 Jan 89	80PD & 7,500 HCFGD
Salpem					
Scarabeo IV					
Semi-sub (Anc)					
S-1-NC041 NFW					
E 12° 18'45.0	KB 247	---	TD 3,261	25 Jan 89	Abd, dry
N 34° 7'39.0	111	---	(10,700)	16 Apr 89	hole
Salpem					
Scarabeo IV					
Semi-sub (Anc)					

GL = ground level, WD = water depth, BHF = bottom hole formation.
*Estimated.

Table 15. Libya Development Drilling, 1989

Operator Field	Wells Completed During Period					End Period		m(ft)	Rig-Months
	Spudded	Oil	Gas	Dry	Other	Susp	Active		
ONSHORE									
AGIP									
Bu Attifel (100-A)	2	1	0	0	1	2	0	1	8,602 10.3
AGOCO									
Auglla-Nafoora (102-D)	1	0	0	0	1	1	0	0	551 0.9
Hessla (065-HH)	3	1	0	0	1	2	0	1	8,608 5.7
Hessla (080-DD)	4	2	0	0	2	4	0	0	7,400* 4.6
Sarlr (065-C)	4	3	0	0	1	4	0	1	13,500* 9.9
Sarlr (065-L)	2	1	0	0	0	1	0	1	5,728 3.9
Group total	14	7	0	0	5	12	0	3	35,800* 25.0
SIRTE									
Lehlab-Dor Marada (6-UU)	2	2	0	0	0	2	0	0	5,800* 3.9
Nasser (006-C)	1	2	0	0	0	2	0	0	3,100* 3.2
Wadi (104-D/NC149-K)	1	0	0	1	0	1	0	1	4,616 5.5
Group total	4	4	0	1	0	5	0	1	13,500* 12.6
VEBA									
011-VVV	1	1	0	0	0	1	0	0	1,858 1.1
Amal (012-B/E/H/R)	4	4	0	0	0	4	0	0	12,200* 5.8
Ghani (011-RRR)	3	1	0	0	2	3	0	0	5,681 4.1
Ora (013-I)	1	1	0	0	0	1	0	0	2,453 2.6
Group total	9	7	0	0	2	9	0	0	22,200* 13.6
WAHA									
Bahl (032-A)	1	1	0	0	0	1	0	0	1,185 1.1
Gialo (059-E)	1	1	0	0	0	1	0	0	1,950 1.1
Harash (059-Q)	1	1	0	0	0	1	0	0	2,316 1.5
Waha (059-A)	1	1	0	0	1	2	0	0	2,488 2.4
Group total	4	4	0	0	1	5	0	0	7,939 6.1
ZUEITINA									
Fidda (NC074A-B)	2	2	0	0	0	2	0	0	3,745 2.1
Sabah (078-G)	2	2	0	0	0	2	0	0	3,600* 2.2
Safsaf (NC074B-C)	1	1	0	0	0	1	0	0	2,742 2.1
Group total	5	5	0	0	0	5	0	0	10,100* 6.4
OFFSHORE									
AGIP									
Bour1	23*	23	0	0	0	23	0	3	85,000* 36.0*
TOTAL 1989	60*	51	0	0	9	61	0	8	183,000* 100.0* (600,000)
TOTAL 1988	46*	46*	0	1	2	49*	0	8	134,800* 98.4 (442,400)

*Estimated.

Table 16. Morocco Seismic Activity, 1989

OPERATOR	Land seismic	
	P-Months	Line-km
ONAREP	5.9	595
SCP	2.6	285
Total 1989	8.5	880
Total 1988	92.6	8,416

Table 17. Sudan Seismic Activity, 1989

OPERATOR	Land seismic	
	P-Months	Line-Km
CHEVRON	2.5	500.0
SUN	3.4	440.0
Total 1989	5.9	940.0
Total 1988	6.0	1,100.0

Table 18. Sudan Exploratory Wells Drilled, 1989

OPERATOR	Well - CLASSIFICATION	Co-ordinates	Ref elev	Objective	Depth	Spudded	Status
Contractor	Rig	GL In m	BHF	m(ft)	Completed	Dec 31,1989	
ONSHORE							
CHEVRON							
Azraq 1 NFW							
	E 28 ho s36'28.0 N 11 ho s 4'14.0 Parker Parker #195	---	Bentiu ---	TD 3,060 (10,040)	1 Mar 89 23 Apr 89	Abd, tight hole	
Dirak 1 NFW							
	E 27 ho s 6'49.0 N 10 ho s54'10.0 Parker Parker #195	---	---	TD 4,609 (15,123)	10 Nov 88 20 Feb 89	Abd, tight hole	
SUN							
Al Salam 1 NFW							
	E 32 ho s53' 6.5 N 15 ho s 5'33.0 Parker Parker #119	---	U Cretaceous ---	TD 2,733 (8,965)	15 Mar 89 1 May 89	Abd, dry hole	
Sudan 6 NFW							
	E 32 ho s59'13.3 N 15 ho s 4'55.4 Parker Parker #119	RT 402 394	Cretaceous U Jurassic L Cretaceous	TD 3,680 (12,074)	22 Oct 89 22 Dec 89	Abd, dry hole	

GL = ground level, BHF = bottom hole formation.

Table 19. Tunisia Seismic Activity, 1989

OPERATOR	Land Seismic		Marine Seismic	
	P-Months	Line-km	P-Months	Line-km
BRITISH GAS	0.9	62	1.8	3,872
BHP	-	-	0.3	426
CONOCO	1.4	361	-	-
ELF	-	-	2.6	2,640
FINA	1.6	304	-	-
KUFPEC	1.2	353	-	-
MAXUS	-	-	0.5	1,164
SHELL	2.8	365	-	-
USOCO	2.3	266	-	-
TOTAL 1989	10.2	1,711	5.2	8,102
TOTAL 1988	4.1 (r)	880(r)	3.1(r)	3,521(r)

(r) = revised.

Table 20. Tunisia Exploratory Drilling, 1989

Operator	Wells Spudded	Wells Drilled	Gas	Dry	Unsp	Period Total	End Period Susp	Active	m(ft) Drilled	Rig-Months
ONSHORE										
AGIP	1	1	0	0	0	1	0	0	3,121	3.7
CONOCO	1	0	0	1	0	1	0	0	4,054	4.0
ELF	0	1	0	0	0	1	0	0	1,542	5.3
KUFPEC	0	1	0	0	0	1	0	0	2,124	4.6
SHELL	2	1	0	0	0	1	0	1	6,635	7.9
SPRINGFIELD	1	0	0	1	0	1	0	0	2,359	0.9
Onshore Total	5	4	0	2	0	6	0	1	19,835 (65,074)	26.4
OFFSHORE										
MARATHON	1	0	0	1	0	1	0	0	2,874	2.2
SHELL	1	0	0	1	0	1	0	0	3,420	2.3
Offshore Total	2	0	0	2	0	2	0	0	6,294 (20,649)	4.5
TOTAL 1989	7	4	0	4	0	8	0	1	26,129 (85,724)	30.9
TOTAL 1988	10	3	0	6	1	10	0	2	31,800* (104,000)	28.0

*Estimated.

Table 21. Tunisia Completed Exploratory Wells, 1989

OPERATOR						
Well - CLASSIFICATION	Co-ordinates	Ref elev	Objective	Depth	Spudded	Status
Contractor	GL or WD in m	BHF	m(ft)	Completed	Dec 31, 1989	
ONSHORE						
<u>AGIP</u>						
Sahrhar Nord 1 NFW						
E 9 ho s53°15.6	---	Triassic	TD 3,121	1 Jun 89	Compl; aggr	
N 31 ho s56°20.4	---	Ordovician	(10,239)	22 Sep 89	1,080 BOPD	
Salpem Nat. 110						
<u>CONOCO</u>						
Zoumit 1 NFW						
E 9 ho s37° 4.4	KB 196	Permian	TD 4,054	23 May 89	Abd, dry	
N 33 ho s22° 5.5	188	Devonian	(13,300)	23 Sep 89	hole	
CTF #4						
<u>ELF</u>						
Bou Ghrars 1 NFW - deviated						
E 10 ho s36°49.0	---	Zebbag	TD 4,266	16 Oct 88	Abd; 126	
N 33 ho s31°40.0	26	M Triassic	(13,996)	9 Jun 89	BOPD	
Salpem Nat. 110						
<u>KUFPEC</u>						
Sidi El Kilani 1 NFW						
E 10 ho s26°42.9	---	Turonian	TD 3,212	21 Dec 88	Compl;	
N 35 ho s22°32.4	---	Senomanian	(10,538)	22 Apr 89	2,930 BOPD	
Salpem Nat. 110						
<u>SHELL</u>						
Zinna 1 NFW						
E 10 ho s47°36.2	---	U Cretaceous	TD 2,845	22 Jun 89	Compl;	
N 36 ho s32°30.8	---	Abiod	(9,334)	20 Nov 89	1,195 BOPD	
Salpem Nat. 110						
<u>SPRINGFIELD</u>						
Rohla 1 NFW						
E 9 ho s 3°33.0	---	Cretaceous	TD 2,359	5 May 89	Abd, dry	
N 35 ho s36°40.0	606	Serdj	(7,739)	2 Jun 89	hole	
Salpem Nat. 110						
OFFSHORE						
<u>MARATHON</u>						
Zitouna 1 NFW						
E 11 ho s14°40.0	KB 29	---	TD 2,874	18 Jun 89	Abd, oil &	
N 34 ho s32°42.0	30	Cretaceous	(9,429)	25 Aug 89	gas shows	
Reading C B Roger W Howell Jack-up						
<u>SHELL</u>						
Borj Khediya 1 NFW						
E 13 ho s28° 9.1	---	Aptian	TD 3,420	16 Aug 89	Abd, dry	
N 35 ho s22°42.7	---	Aptian	(11,220)	26 Oct 89	hole	
Global Glomar Biscay 1 Semi-sub (SP)						

Table 22. Tunisia Development Drilling, 1989

Operator Field	Wells Completed During Period					End Period		m(ft) Drilled	Rig-Months
	Spudded	Oil	Gas	Dry	Other	Susp	Active		
ONSHORE									
SITEP El Borma	3	1	0	1	0	2	0	2	8,111 10.9
Onshore Total	3	1	0	1	0	2	0	2	8,111 (26,610) 10.9
OFFSHORE									
ELF Ashtart	1	1	0	0	0	1	0	0	3,840 2.7
Offshore Total	1	1	0	0	0	1	0	0	3,840 (12,598) 2.7
TOTAL 1989	4	2	0	1	0	3	0	2	11,951 (39,208) 13.6
TOTAL 1988	6	7	0	0	0	7	0	1	21,200* (69,500) 17.8

*Estimated.

GL = ground level, WD = water depth, BHF = bottom hole formation, R = re-entered.

Oil and Gas Developments in South America, Central America, Caribbean Area, and Mexico in 1989¹

W. David Wiman²

ABSTRACT

Exploration activity in South America, Central America, the Caribbean area, and Mexico in 1989 continued to rebound from the low levels reported in 1987. Exploratory drilling increased in most major producing countries and, for the first time, wildcatting began in Aruba and stratigraphic drilling was done in Puerto Rico. Noteworthy discoveries were made in Argentina (Selva Maria-1, Estancia Vieja-1, and Lago Fuego-1), Bolivia (Patuju X-1, San Roque X-10, and Vibora X-2), Brazil (1-RJS-414 and 1-RJS-409 offshore, and 1-CUP-1-AM and 1-CRP-1-AM onshore), Chile (Terramar XE-1, Fresia-1, Mata Negra-1, Municion Oeste-1, and Gaviota Norte-6), Colombia (Cohembi-1, Mansoya-1, Mecaya-1, Toroyaco-1, Camoa-1, Chaparrito Norte-1, Los Toros-1, Sirenas-1, Bucaro-1, Guacamayo-1, Valdivia-1, El Deseo-1, Doña María-1, Pacande-1, Olini-1, and Chenche-1), Ecuador (Danta-1, Lobo-1, Iro-1, Sunka-1, and Yanpuna-1), Peru (Chambria Este-123), and Venezuela (Boqueron Norte-1, Corozo-1, Carito Este-1, and Tejero-1).

The highlights of 1989 were again in the eastern Venezuela deep basin, the Llanos basin of Colombia, the sub-Andean Amazon basins of Colombia, Ecuador, and Peru, and in the Neuquen basin of Argentina.

INTRODUCTION

Petroleum developments in 24 countries are reported for 1989. Drilling activity for 19 countries is summarized in Table 1. Oil and gas production is listed in Tables 2 and 11. Argentina, Bolivia, Brazil, Colombia, Ecuador, Guatemala, Mexico, Suriname, and Venezuela reported increased oil production; Argentina, Bolivia, Brazil, Colombia, and Mexico showed increased gas production.

Tables 3–10 list significant tests and exploration activities for which data are available.

ARGENTINA (Table 5)

Data from Petroconsultants S.A., Geneva, Switzerland

In 1989, 597,653 km² were held under petroleum rights, up 67% from 1988. Private companies were awarded 28 onshore blocks and YPF, the state oil company, was given 2 small areas. Two offshore blocks were awarded to private companies. Three exploitation licenses were granted to Occidental, and Perez returned to YPF 2 small gas fields in the Austral basin. The fifth round of the Houston Plan had 5 block applied for out of the 70 offered.

Seismic activity was up 29% to 17,752 line-km with YPF acquiring 60% of the total. Offshore activity was 996 line-km versus none in 1988. Gravity and magnetic acquisition was 826 and 509 km, respectively.

In 1989, 120 exploration wells drilled approximately 269,800 m, up 16% from 1988. Occidental (Citico) confirmed its major discovery in the Neuquen basin (Estancia Vieja-1, 3144 BOPD) with 4 successful outpost wells. Occidental had another discovery at Puesto Prado-1 (289 BOPD). YPF had 3 significant discoveries in the Neuquen: Portezuelo del Choique-1 (362 BOPD), Rincon de Aranda Oeste-1 (201 BOPD), and Punta Barda-1 (333 BOPD). In the San Jorge basin, YPF had success at Estancia dos Lagunas-1 (1.5 MMCFGD) and Meseta Sirven-1 (566 BOPD). In the Austral basin, Occidental's (CPOA) Lago Fuero-1 tested 2.9 MMCFGD and 44 BCPD. In the Cretaceous basin, YPF tested 2327 BOPD and 7.95 MMCFGD in its Selva Maria-1 wildcat.

Crude production increased 2.5% from 1988 to approximately 460,000 b/d. Natural gas production increased 6.8% to about 2.4 bcf/day.

ARUBA

Data from Petroconsultants S.A., Geneva, Switzerland

The government of Aruba ratified 3 production-sharing agreements covering 1880 km² on its Caribbean shelf. These were the first licenses offered in Aruba.

In 1989, 1621 line-km of seismic were acquired offshore, the first activity since 1982. One wildcat was abandoned and a second spudded during the year.

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²BG Ecuador, S.A., 1100 Louisiana, Houston, Texas 77002.

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