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PEOPLE'S REPUBLIC OF CONGO  
The Development of the Petroleum Industry  
(Document prepared by the ECA secretariat)

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## PEOPLE'S REPUBLIC OF CONGO

## 1. GENERAL DATA

- 1.1 The Congo is situated in Central Africa extending about 125 km, south west and northeast from the coast of the Atlantic Ocean to the border of the Central African Republic, and about 400 km, south east and north west.
- 1.2 The area of the country is 341,999.14 square kilometres.
- 1.3 The population is 1,101,750 inhabitants (1970)
- 1.4 The main towns: Brazzaville (capital) with about 170,000 inhabitants, Pointe Noire (about 100,000 inhabitants), Dolisie (about 53,000 inhabitants) Jacob (about 20,000 inhabitants) (1968 data).
- 1.5 The country's currency: the CFA franc.  
1 CFA = 0.02 French francs = 0.0036 US\$ (1971)
- 1.6 Congo is a People's Republic
- 1.7 GNP/Capita - US\$215.0 (1968)
- 1.8 Congo holds the eighth place among oil-producing countries of Africa (1972).
- 1.9 Production of oil in 1971: 101,193 barrels
- 1.10 Production of gas in 1971: 16,000,000 cu.m

## 2. GEOLOGICAL DATA (Annex 1)

Two thirds of the Congo's territory is composed of sedimentary deposits developed in two basins: the Great Congo Basin (its north-western edge) and the Pointe Noire Basin.

The remaining third of the territory is composed of metamorphic and igneous rocks of Precambrian age with various degrees of metamorphism, which form two main massifs: the Ogoué and Sangha massifs.

2.1. The Precambrian area has rocks of Lower, Middle and Upper Precambrian age. They consist of granites, gneiss and quartzites, overlain with shales, feldspathic sandstones, argillites and dolomites. Due to its metamorphic and igneous rocks, the area is considered non-prospective for hydrocarbons and did not represent an objective for petroleum exploration.

2.2. The Great Congo Basin consists of Mesozoic, Tertiary and Quaternary sediments.

The Mesozoic deposits occasionally occur near the Precambrian basement as a continental and lacustrine detrital series, known by the name of the Stanley Pool Series. It is composed of kaolinitic sandstones, hard-sand-stones and

red argillites with sandy interbeddings. Eastwards, the thickness increases and the series contains at least two marine invasions (Zaire's territory).

The Tertiary deposits consist of sandy sediments of continental origin overlying the Mesozoic beds. They form the so-called Bateke Series, characterized by sandy marls and partially silicified sandstones. This series which is about 100 m. thick, disappears eastwards under the recent alluvial deposits of the Congo and Oubangui rivers.

Due to the continental facies and a relatively thin series of its deposits the Congo Basin is considered to have poor hydrocarbon prospects (on the People's Republic of Congo's territory).

2.3. The Pointe Noire Basin is a typical Mesozoic-Tertiary marginal basin of the African west coast characterized by the presence of a thick evaporite formation developed in the Cretaceous. This structure can also be found northwards to the Gabon Basin and southwards to the Cabinda and Cuanza coastal basins. The basin extends about 160 km. along the shore of the Atlantic Ocean, and about 55 km. east and west. It is separated from the Gabon Basin by the Precambrian massif of Cap Matouti (near Mayoumba) where the Basement's rocks outcrop only a few kilometres from the coast.

The geological history of the Pointe Noire Basin is related to a subsidence of the coastal area which began in the Jurassic period and continued, with a break during the Paleogene epoch, to the present day. Beginning in the Lower Cretaceous the sea invaded the area and until the end of the Mesozoic over 3500 metres of marine sediments were deposited. After a break in sedimentation a new marine invasion took place in the Pliocene epoch and another few hundred metres of sediment were deposited. The latter cover nearly the entire area of the Pointe Noire Basin and hide the older formations, except for a narrow strip located along the precambrian of the Mayoumba-Congo chain, where the Cretaceous deposits outcrop.

The Sedimentary series of the Pointe Noire Basin begins with the Lower Cretaceous deposits which mainly consist of argillaceous and arenaceous sediments. They start with about 300 metres of sandstones discordantly overlying the metamorphic basement. The sandstones are overlain with 100 metres of black clays followed by 300-400 metres of more or less argillaceous-arenaceous deposits, micaceous and chloritic, with conglomeratic sequences. Towards the top, a 1000 m. thick complex of brown clays and argillaceous shales with sandy layers, follows. This complex is overlain with about 300 m. of green-grey, soft, argillaceous deposits with layers of sands and lumachellic limestones. The above-mentioned deposits, from lower sandstones to lumachellic limestones, are roughly attributed to the Hauterivian-Barremian age.

These clastic deposits of Lower Cretaceous are covered by a layer of salt 750 m. thick followed by a limited thickness of anhydrites. They form the Evaporite Series assumed to be of Aptian age.

The Evaporite Series is overlain with about 500 metres of reddish sediments composed of arenaceous rocks, marls and occasionally arenaceous limestones and at least partially is considered to be of marine origin. The upper part of this series contains fossils of Albian-Senonian age and is therefore attributed to the Upper Cretaceous.

The Upper Cretaceous series of marine origin is discordantly overlain with 100 + 200 metres of gravels, sands, red clays and marls known by the name of the Circus Series and considered to be of Plio-Pleistocene age. This series is locally overlain with recent alluvial deposits.

The Pointe Noire Basin is tectonically characterized by the absence of important salt movements, so common in the Gabon or Guenza basins, and the structures discovered are mainly related to the morphology of the Precambrian basement. The sedimentary deposits of the basin form a large neocline dipping southwestwards, affected locally by gentle folds and longitudinal or transversal faults of little value.

The Pointe Noire Basin has good hydrocarbon prospects, the most favourable areas being those located offshore as the last exploration results, indicate.

### 3. CONCESSIONS AND COMPANIES

The first foreign oil company which carried out exploration work in the Congo, was SPAEF (Société des Pétroles d'Afrique Equatoriale Française). In November 1949, this company was granted by the Government, a general exploration permit for a 40-year period over the entire sedimentary area (onshore) of the Republic of Congo, and until 1958 was the sole company engaged in exploration.

In July 1958 in addition to its onshore permit SPAEF was granted the first exploration permit in the offshore area (3,950 sq.km) for a 5 year period. In respect of this permit SPAEF entered, during the same year, into an agreement with Mobil whereby Mobil earned a 50% interest in parts of SPAEF's acreage by meeting certain commitments.

The area involved was 3,564 sq. km. onshore for which SPAEF was operator and 7,888 sq.km. offshore for which Mobil was operator. As far as the onshore remaining area comprising the southern part of the Pointe Noire Basin was concerned, SPAEF continued to operate there for its own account (including the Pointe Indienne oil field, discovered in 1957). Thus, at the end of 1958, the SPAEF-Congo permit was divided into three parts, as follows:

- a) offshore part - SPAEF 50%, Mobil 50% (Mobil operator)
- b) onshore from the Kouilou river north to Mayoumba - SPAEF 50%, Mobil 50% (SPAEF operator)
- c) onshore from the Kouilou river south to the Cabinda border - SPAEF 100%.

As pointed out above, the Pointe Noire offshore permit (3,950 sq. km.) was granted to SPAEF for a 5 year period and on September 1, 1963, its first validity period came to an end. SPAEF applied for renewal and was granted an extension for 3 years in the same area with a 35 per cent reduction, from September 1, 1963.

As the exploration results offshore were not encouraging, effective December 1, 1964, Mobil ended its partnership with SPAEF in the Congo and the latter once more became the sole operator in the country.

The second period of validity of the Pointe Noire offshore permit expired on September 1, 1966 and SPAFE immediately requested a renewal for 3 years of the southern block of the permit (1,191 sq. km.). SPAFE's request for renewal remained unanswered until January 17, 1968, when the Congo Government refused it. On October 17, of the same year, the Pointe Noire Grands Fonds permit of 4,100 sq. km. (including the area requested by SPAFE in 1966) was awarded to ERAP (ELF) and the Madingo offshore permit of 3,415 sq. km. was awarded to AGIP. Both new permits awarded were valid for a 5 year period providing for 20 per cent government participation, rising to 30 per cent when production reaches 20 million tons per year. On September 26, 1969, under the agreement reached between the Congo Government and ERAP, a new company ELF-CONGO was created (20% Congo Government, 70% ELF/ERAP and 10% ELF/SPAFE) and at the same time a request was made to transfer the Pointe Noire permit from ERAP to ELF-CONGO. The permit was transferred and it is valid until October 1973 (The Madingo Maritime permit of AGIP was valid until January 1973).

In 1970, the Emeraude producing lease, with an area of 331 sq. km. was granted to ELF- CONGO/AGIP for a 50 year period beginning November 8. ELF-CONGO holds a 65% interest and AGIP 35% interest in the producing lease.

At the end of the year 1971, ELF/SPAFE still held all the onshore area in Congo (28,300 sq. km).

Two more permits were recently (1973) awarded to ELF-CONGO, one onshore and one in deep water offshore.

The conceded areas held by foreign companies in the Congo at the end of 1971 are shown in Annex 2.

#### 4. PETROLEUM ACTIVITY

##### 4.1. Exploration

Exploration for petroleum in the Congo commenced as far back as 1928-1929 and mainly concentrated on Surface geology and studies of asphalt seepages along the coast near Pointe Noire. Beginning in 1951 it was carried out more systematically, and surface geology surveys were followed by gravimeter, aeromagnetic and seismic work and finally by exploration drilling. They resulted in the discovery of oil and gas in 1957 (the Pointe Indienne onshore oil-gas field). A non-successful 12-year period followed until 1969 when the first offshore oil field was discovered (the Emeraude oil field). This discovery put the country back among petroleum producers and again stimulated the interest of petroleum companies in exploration. Their activity during recent years resulted in the discovery in 1972 of the second offshore oil field, the Loango Marine oil field (AGIP).

##### 4.1.1 Exploration surveys

In 1949 SPAEF acquired all petroleum rights in the Congo and took over control of all exploratory surveys. It carried out geophysical surveys which resulted in the discovery of a good number of structures, mainly along the

coast. The method used was mainly the seismic survey and on the basis of the results obtained the Pointe Indienne oil field was discovered in 1957.

In 1958, SPAEF carried out 12 months of reflection seismic work as a part of its exploration surveys programme.

In 1959 there were 9.3 party/months of reflection seismic work completed in the onshore area and 3.7 party/months in the offshore area.

In 1960, 9 party/months of reflection seismograph were completed onshore (3.5 party/months in SPAEF 100% zone with SPAEF operator and 5.5 party/months in the association SPAEF Mobil zone).

Generally, the data from seismic work could not be used for sub-salt mapping because deep reflections were masked by the salt and beginning in 1961, refraction seismic was therefore utilized. It proved to be successful and two markers were found to be mappable, the first one within sediments under the salt and the other at the basement level. From 1961 onward there was an eight-year break in exploration surveys. The old data were analysed and activities were resumed only in 1969, when a marine seismic programme was carried out in the area covered by the Pointe Noire Grands Fonds permit. During the 3 week programme, 2,350 km of new profile was obtained. In 1970 an experimental sparker survey of 0.16 months duration was carried out on and around the Emeraude oil field (discovered in 1969) to study structural relations.

In 1971 ELF-Congo continued seismic sparker surveys in the Pointe Noire Grands Fonds area with 0.3 party/months and obtained 579 km of profile. It also conducted a 0.5 month airborne magnetometer survey over the onshore basin and the continental shelf, totaling 5,500 k.

On the other hand AGIP carried out seismic surveys which resulted in the discovery of the Loango structure, the future site of the second offshore oil field in Congo (1972). A summary of exploratory surveys carried out during the 1957-1971 period in Congo, is given in Table 1.

#### 4.1.2 Exploratory Drilling

The first exploratory well was drilled in Congo in 1957 on a large dome found by seismic work, 16 km. north of Pointe Noire, at Pointe Indienne. The well, PI-1, resulted in the discovery of the Pointe Indienne oil field and it will be dealt with under the chapter "Development and Production Activities".

A second well, PI-2 was located and drilled during the same year, 1 mile south-southeast of the PI-1 well. It was stopped for mechanical reasons in the upper limestones (1,482 feet) and was replaced by the PI-2 bis well, at the same location. The latter has been drilled to basement and along with the Pointe Noire-1 well (PN-1) drilled in 1958 yielded important stratigraphic information. It indicated that the age of the sediments overlying the salt is Upper Cretaceous and that the salt is probably of Aptian age. Moreover, it established that the series below the salt belongs, at least partially, to the Cocobeach Formation of Upper Jurassic-Lower Cretaceous period.

Table 1  
People's Republic of Congo - Exploration Surveys (party/months)

Year	Company	Seismic surveys	Magnetometer surveys	Total
1957	SPAEF	12.00	-	12.00
1958	SPAEF	12.00	-	12.00
1959	SPAEF & MOBIL	13.00	-	13.00
1960	" -	9.00	-	9.00
1961	SPAEF	7.80	-	7.80
1962	-	-	-	-
1963	-	-	-	-
1964	-	-	-	-
1965	-	-	-	-
1966	-	-	-	-
1967	-	-	-	-
1968	-	-	-	-
1969	ELF-CONGO	0.75	-	0.75
1970	" -	0.16 sparker	-	0.16
1971	" -	0.30 sparker	0.50 air borne	0.80
Total	-	55.01	0.50	55.51

Source: Petroleum Developments in Central and Southern Africa, BAAPG, 1958-1972

The generalized stratigraphic section of both wells (PI-2 bis and PN-1), from surface to basement, was as follows:

1,800 feet of sandstones and dolomitic sandstones

2,500 feet of evaporites (anhydrites at the top, then salt and potash salts alternating)

7,200 feet of micaceous shales and sandstones.

The lower sandstones yielded good oil and gas shows, but did not prove to have good production characteristics. The shallower beds just below the salt, were salt-water bearing in the PN-1 well although they are good reservoirs and are oil-bearing in the Pointe Indienne oil field.



In 1959, a dry wildcat was drilled in the SPAEF-MOBIL association zone by SPAEF, on the coast at Tchibota (TB-1), 50 km north of Pointe Noire\*. The well drilled to a depth of 12,772 feet, provided important stratigraphic information showing the following section from surface to bottom:

- 1,500 feet of sands, shales and thin limestones of the Upper Cretaceous period;
- 3,100 feet of stratified evaporites (halite and potash salt);
- 1,000 feet of good sands, with a porosity of 30-35 per cent and a permeability of up to 2 darcys, but water-bearing;
- 7,172 feet of sediments comparable with those found in the PI-2 bis and PN-1 wells, with a thick section of pyrobituminous shales and sandstones of poor reservoir characteristics.

Also, during 1959, a second exploratory well was located at the top of an anticline at Holle (HL-1) 40 km. north east of Pointe Noire, near the Pointe Noire-Brazzaville railroad (in the SPAEF 100 per cent zone). The HL-1 well found the top of the salt at 700 feet and the thickness of the salt was only 1,260 feet. A 250 foot sand layer was encountered below the salt which is comparable to the sand layer found at Pointe Indienne. This same sand, which had oil shows in the PN-1 well, has also been found in the Tchibota well (TB-1). At Holle, the sand has good reservoir characteristics and yielded shows of oil.

The HL-1 well was completed in 1960 along with four other wells drilled in the SPAEF 100 per cent zone. The latter found the same sand (the Chela sand) 16 to 200 feet thick just below the salt with heavy oil shows. Two of the wells tested salt water and were abandoned as dry. A second objective of the above mentioned wells was the sands and limestones of the Upper Cocobeach Formation which yielded oil in the Pointe Indienne field. This objective was deeper than the Chela sands and has been encountered in three wells with oil and gas shows, but no production was obtained.

In addition to the 5 exploratory wells completed in 1960 on the SPAEF 100 per cent zone an exploratory well (YL-1) was located in the SPAEF-Mobil Association zone (completed in 1961). The YL-1 well, located at Yangala, confirmed the interpretation of gravity and aeromagnetic surveys, which showed a northeast/southwest high in the basement (Noumbi Nose). It encountered 1300 feet of salt and below the salt, between 2927 and 2950 feet the Chela sands (water bearing). The well reached the basement at 3,615 feet.

With the YL-1 well accomplished, exploratory drilling in the Congo was limited during the following years to drilling in the northern part of the Pointe Noire Basin. Thus, two wildcats (Tinkossonu-1b and T-2) were drilled in 1962 in the SPAEF-MOBIL Association in order to determine the northern extension of the Tchibota sands found under the Aptian Evaporite Series at Tchibota-1. The Sands were missing in both wells.

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\* For well's location see Annex 2

In 1963 only one offshore well was drilled by Mobil (the CMG-1 well with T.D. 7,273 feet). It was located about 11 km. west of Tchibota-1 well and was intended to search for the extension of the same sands found under the Aptian Evaporites series at Tchibota-1 well. The well encountered these sands, but found them water bearing.

After drilling the CMG-1 well (the first offshore well drilled in Congo) exploration was stopped and Mobil withdrew from operation in Congo (effective December 1, 1964).

There was no exploration drilling in the Congo during 1964, 1965 and 1966. During this period, the reinterpretation and review of all data obtained, were carried out in Paris.

In 1967, SPAFE deepened 10 wells (a total of 14,472 feet at its own cost), originally drilled as potash-evaluation wells by the Congo Potash Co. Practically no structural differences in these wells were found. As expected numerous oil shows were observed, but no oil or gas was discovered. However the wells gave important stratigraphic information concerning the evolution of the Evaporite Series along the edge of the Pointe Noire Basin.

No exploration drilling took place in the Congo during 1968.

In 1969, one exploration well, Emeraude Marine-1 (EMM-1) was drilled offshore in the Pointe Noire permit area and resulted in the discovery of the Emeraude oil field. The results of the well will be described under the chapter "Development and Production Activities".

During 1970, two deep offshore wells were drilled by AGIP/ELF-Congo: the Djeno Marine-1 well in the southern block of the Madingo Maritime permit and Madingo Marine-1 well in the northern block of the same offshore permit. Both wells totalled in footage some 20,621 and were abandoned as dry wells.

In 1971 two exploratory wells were drilled. The Loango Marine-1 well, located on a structure overlapping the AGIP and ELF-Congo permits (see Annex 2), encountered high-pressure gas at 2,064 feet and blew out. Subsequently the Loango Marine-1R, a directional relief (R) well, was drilled to kill the blow out and was abandoned after successful plugging operations.

The second exploratory well, the Topaz Marine-1 well (TOM-1) was drilled by ELF-Congo on a seismic high and abandoned as dry at 3,736 feet in the Evaporite Series.

At the end of the year the LOM-2 well (Loango Marine-2) was spudded 1,750 m. north of the Loango Marine-1 well. It had encountered good hydrocarbon shows and resulted in the discovery of the second offshore oil field in the Congo - the Loango oil field (AGIP's Madingo permit).

All the above mentioned exploratory wells drilled in the Congo during the 1957-1971 period are listed in Table 2 together with their total depth, brief results, and the operating companies. As can be seen from Table 2, 35 exploratory wells were drilled during 15 years of exploratory effort, resulting in the discovery of three fields: the Pointe Indienne oil and gas

field, Emerald oil field and Loango oil field. The number of exploratory wells drilled by year, the yearly footage and the rate of success of the exploratory drilling by year are shown in Table 3.

#### 4.2. Development and Production Activities

Development drilling in the Congo began in 1957 on the Pointe Indienne oil and gas field. It continued until the end of 1961 when the field was considered to be entirely developed and the drilling was stopped. With the discovery of the Emerald field in 1969, development drilling recommenced and was concentrated on the above-mentioned field. Beginning in 1972 development drilling was registered on AGIP's newly discovered oil field, Loango Marine. A summary of development drilling in Congo during the 1957-1971 period is given in Table 4.

As far as the production of crude oil in the Congo is concerned, it began in 1960 (commercially) from ELF's Pointe Indienne field and attained the maximum mark in 1962 (924,018 barrels). From 1962 onwards production of the field declined and in September 1973 was just about stopped although some gas is still being supplied to local industry (the supply of gas began in 1969). At the end of 1971, the offshore Emerald oil field went on stream and put the Congo back among the oil producers.

Production is scheduled to begin in 1975 from the AGIP's Loango oil field.

The development and production activities carried out between 1957 and 1972 by field are given below.

##### 4.2.1 The Pointe Indienne oil and gas field

The field was discovered by the PI-1 well in 1957 located on the northern pericline of a large dome found by seismic surveys on the top of Evaporite series 16 km. north of Pointe Noire, at Pointe Indienne (onshore). It went on stream (commercial) in July 1960. The PI-1 well, found 1300 feet of sands and silts, then 170 feet of limestone with gypsum and anhydrite and then went through 2,550 feet of an alternation of salt and potash. Below the salt, there were 230 feet of gray shales and then 90 feet of sandy limestones and coquinas from 4,440 to 4,529 feet with good oil shows and porosity from 10 to 25 per cent, (the permeability averaged 100 md). The tests made on this zone produced from 50 to 105 barrels per hour with chokes of  $\frac{1}{4}$  inch to  $\frac{1}{2}$  inch. The bottom pressure was 2,114 psi. The well was stopped at 4,644 feet and completed in November 1957.

The trap results from a combination of structural and stratigraphic factors (below an unconformity) involving a detrital series of sands, coquinas and limestones. The reservoir beds, with a thickness ranging from 3 to 27 metres, pinch out at the top of the structure by facies variation, and are cut by a fault in the northeast.

Just below the salt and above the unconformity, there is a coarse-grained gas-bearing sand and conglomerate section, which is about 5 metres thick.

Table 2

People's Republic of Congo - Wildcats completed (1957-1971)

Operator	Well name	Location	Date spudded	Date completed	Total depth (feet)	Remarks
SPAFEF	PI-1	Pointe Indienne	7- 2-57	11- 1-57	4,644	Oil
"	PI-2	" "	11-11-57	11-18-57	1,482	
"	PI-2bis*	" "	12- 5-57	6-12-58	10,620	NEW Dry, gas shows
"	PN-1	Pointe Noire	6-30-58	12-20-58	11,775	NEW Dry, oil & gas shows
"	TB-1	Tchibota	1-14-59	7-23-59	12,772	Dry
"	HL-1	Holle	10-31-59	2- 3-60	6,148	Dry
SPAFEF	PN-2	Pointe Noire	2-15-60	3-22-60	6,111	Dry
"	RR-1	R. Rouge	3-27-60	4-21-60	5,776	Dry
"	LM-1	Loeme	5-24-60	5-28-60	1,559	
"	LM-1 bis	"	6-12-60	7-31-60	5,940	Dry
"	BK-1	Bas Kouilou	8- 7-60	8- 9-60	841	
"	BK-1bis	" "	8-19-60	8-25-60	868	
"	BK-1ter	" "	8-27-60	10-17-60	6,369	Dry
"	YL-1	Yangala	11-20-60	1-13-61	3,653	Dry
"	TK-1	Tinkoussou	5-19-62	5-20-62	738	Abandoned (Junked)
"	TK-1bis	"	5-26-62	6-20-62	5,051	NFW, dry
"	TK-2	"	7- 2-62	6-29-62	6,061	NFW, oil shows 33.5° API
"	K-25	Tchivoula	5-21-62	5-31-62	3,005	Core holes for potash research
"	K-39	Tchienzolo	12-11-62	12-29-62	4,018	Deepened through salt for SPAFE, dry
Mobil	CMG-1	Offshore, Str. G	2- 5-63	2-24-63	7,273	NFW Dry
CPC-SPAFEF	K-58	Onshore	1967	6- 6-67	4,275	1896 ft. drilled by SPAFE
"	K-53	"	1967	7-11-67	2,661	1017 ft. drilled by SPAFE
"	K-57	"	1967	7- 9-67	4,183	2070 "
"	K-54	"	1967	8- 4-67	3,474	2001 "
"	K-50	"	1967	8-14-67	1,975	154 "
"	K-55	"	1967	8-25-67	3,547	1663 "
"	K-51	"	1967	9- 6-67	1,919	409 "
"	K-56bis	"	1967	9-27-67	3,445	1962 "
"	K-52	"	1967	10- 5-67	3,064	1049 "
"	K-59	"	1967	11-20-67	4,564	2251 "
ERAP	EMM-1	Offshore	1969	5-27-69	12,092	NFW. Oil
AGIP/ELF- Congo	DjenoM-1	Madingo Marit. permit	3-1-70	6-19-70	11,000?	
AGIP/ELF- Congo	Madingo M-1	Madingo Marit. permit	6-30-70	7-30-70	10,000?	
AGIP	Loango M-1	"	1971	12-14-71	2,064	NFW. Gas, blow out
ELF-Congo	Topaz M-1	P. Noire. G.F. permit	1971	1971	3,736	Dry
AGIP	Loango M-2	Madingo Maritime permit	1971	1972	2,789 12-31-71	Hydrocarbon shows

\* Output

Source: Petroleum Developments in Central and Southern Africa, BAAPG, 1958-72  
(compiled).

Table 3

People's Republic of Congo Exploratory wells completed and footage drilled							
Year	Exploratory tests					Footage	Rigs active at the end of the year
	Oil	Gas	Dry	Total	% successful		
1957	1	-	1	2	50.00	10,654	1
1958	-	-	2	2	0.00	17,867	1
1959	-	-	1	-	0.00	17,540	1
1960	-	-	8	8	0.00	36,321	1
1961	-	-	1	1	0.00	944	-
1962	-	-	5	5	0.00	13,726**	-
1963	-	-	1	1	0.00	7,273	-
1964	-	-	-	-	-	-	-
1965	-	-	-	-	-	-	-
1966	-	-	-	-	-	-	-
1967	-	-	10	10*	0.00	14,472	-
1968	-	-	-	-	-	-	-
1969	1	-	-	1	100.00	12,092	-
1970	-	-	2	2	0.00	20,621	-
1971	-	1	1	2	50.00	10,386***	1
TOTAL	2	1	32	35	8.20	161,896	-

\* Potash tests deepened for stratigraphic data

\*\* 1,273 feet only for SPAFE in potash research core holes

\*\*\* Includes 1,758 feet for relief well to LCM-1 gas blow-out.

Source: Petroleum Developments in Central and Southern Africa BAAPG, 1958-1972 (compiled).

The delineation of the field began in 1958 and was completed in 1960. During this period, 18 development wells were drilled on the structure (PI-2 to PI-19 inclusive), to an average depth of 4,600 feet per well. Of these, 12 wells were producers when the field went on stream. Field's production by year was as follows\*:

1960	-	391,269	barrels -
1961	-	776,840	barrels - 98.2 per cent increase
1962	-	924,018	barrels - 18.7 per cent increase
1963	-	822,159	barrels - a decline of nearly 13 per cent
1964	-	627,745	barrels - a decline of nearly 23 per cent
1965	-	534,309	barrels - 15 per cent decline
1966	-	466,892	barrels - 12.4 per cent decrease
1967	-	376,046	barrels - 19.4 per cent decline
1968	-	308,830	barrels - 15 per cent decrease
1969	-	172,952	barrels - 40 per cent decline
1970	-	143,092	barrels - a decrease of 22 percent
1971	-	101,193	barrels - a 30 per cent decrease
Cumulative 5,575,345 barrels			

\* Source: BAAPG, 1958-1972 (compiled).

In tons, the field's production was as follows:\*

Year	Tons	Value in FCFA
1960	51,976	n.a.
1961	103,197	n.a.
1962	122,748	n.a.
1963	109,217	323,620,000
1964	82,506	234,180,000
1965	70,987	204,420,000
1966	61,992	147,540,000
1967	50,011	114,025,000
1968	42,553	107,105,000
1969	24,215	35,289,000
1970	18,943	27,467,000
Total	738,345	1,193,646,000**

\* Source: Gisements et industries en République populaire du Congo, Rapport final VII. Projet Nations Unies UNOTC-COB/68/I-Rev. 2 Brazaville, 1972

\*\* Incomplete

Table 4  
People's Republic of Congo - Development drilling (wells and footage)

Year	Field	Producers completed at the end of the year	Dry holes completed at the end of the year	Total completions	% successful	Footage	Rigs active at the end of the year
1958	Pointe Indienne	3	4	7	42.6	37,659	1
1959	" "	7	3	10	70.0	45,940	-
1960	" "	1	-	101.0	100.0	4,841	-
1961	-	-	-	-	-	-	-
1962	-	-	-	-	-	-	-
1963	-	-	-	-	-	-	-
1964	-	-	4	-	-	-	-
1965	-	-	-	-	-	-	-
1966	-	-	-	-	-	-	-
1967	-	-	-	-	-	-	-
1968	-	-	-	-	-	-	-
1969	Pointe Indienne	-	-	-	-	6,750	1
1970	Emeraude	6	1	7*	85.5	10,890	1
1971	"	14	-	14	100.0	16,404	-
Total	"	31	8	39	79.1	122,484	-

\* Does not include wells drilled in connexion with underground gas storage nor secondary recovery oil operations.

Source: Petroleum Developments in Central and Southern Africa, BAAPG, 1958-1972 (compiled).

In 1971 of a total of 19 wells drilled on the structure (the discovery well included), 5 wells were producing at a rate of less than 400 barrels per day.

In 1972 the same wells were producing at a rate of 300 barrels per day (flowing). The field is nearly depleted.

#### 4.2.2. The Emeraude oil field

The field was discovered in 1969 by the EMM-1 well some 20 km off the Atlantic Coast in more than 200 feet of water. The field is located in the ELF-Congo's Pointe Noire Grands Fonds permit area (ELF-Congo is the operator and has a 65 per cent interest in the field) in which AGIP has a 35 per cent interest (the Government also has a 20 per cent interest). The EMM-1 well was located on a seismic high and stopped in the Cocobeach Formation at 12,092 feet. The Upper Cretaceous producing reservoir sands of the field, are at a relatively shallow depth below the sea bed (some 250-300 m) but lie under more than 90 metres of water. The field pressure is weak with a low output per well.

The field is about 12 km. long, 2.4 km wide at the north end and 4.8 km wide at the south. Development of the field has posed complex technical problems. It began with the installation of the first production platform in the south-central portion of the field shortly after its discovery. Immediately after the discovery well, a shallow well (EMM-101) was drilled in close proximity, in order to evaluate the crude oil and reservoir characteristics. Then, a programme of 5 appraisal wells was begun to determine the size of the structure and the facies variations of the different reservoirs. During 1970 a total of 7 development wells was drilled on the structure including 4 appraisal wells (EMM-105 to EMM-108) and three additional wells (EMM-131-132 and 133). The last three wells were the initial units of an experimental production programme for the field to comprise 15 wells drilled from 5 platforms. Appraisal well EMM-105 was drilled on a monoclinical rise outside of the structure and found the reservoirs to be water-bearing.

In 1971 development of the field continued and 14 wells from 7 platforms in the center of the structure were drilled. In the northern part of the structure, 6 platforms were planned for drilling 27 wells and 8 additional wells were planned to be provided with submarine producing equipment.

In all, twenty one development wells have been drilled on the field until the end of 1971.

In getting initial development of the field completed ELF spent 36 months, and by mid-1972, the south-central portion of the field was producing 7500 b/d of crude oil, later rising to 8,500 barrels per day. A second phase of development in the northern portion of the field was completed in February 1973 and in March 1973, ELF-Congo reported a flow of 34,650 b/d from the northern wells. The company has begun further development in the northern part of the field.

In May 1973 production of the Emeraude field was up to an annual rate of more than 3 million tons, with two sections of the very large but complex field developed thus far. (In 1972 the field had 12 wells capable of production).

#### 4.2.3. The Loango oil field

The field was discovered in 1972 by the Loango Marine-1 well (LOM-1), located on the boundary with neighbouring ELF's Emeraude permit. The well tested some 2,200 b/d of crude oil from a depth of 700-900 metres. The field is scheduled to begin production in 1975 and will be operated by AGIP but developed jointly with ELF-Congo (each company has a 35 per cent cross-interest in the adjoining area, and both permit agreements provide for 20 per cent initial government participation rising to a maximum of 30 per cent when production reaches 20 million tons per year).

Development plans call for the installation of a production platform plus 3 fixed concrete-base platforms of a new type, all of which will be linked to the new Djeno terminal.

In mid-1972, AGIP was evaluating the field and the results indicated that although the field is probably smaller than the Emeraude oil field, it is a less difficult structure to develop. There is no available date concerning the stage of development activities to date.

4.2.4. Apart from oil, Congo also produces natural gas (the Pointe Indienne field). The gas production by year was as follows:

- 1969	- 2,736,482 m <sup>3</sup>
1970	-10,148,000 m <sup>3</sup>
1971	-16,000,000 m <sup>3</sup>

It was delivered to Compagnie des potasses du Congo, a potash company.

4.2.5. In addition to oil and gas, Congo has bituminous rocks a part of which could present an economic interest.

Thus, in 1965 an ECA mission for Economic Co-operation in Central Africa established that there is an estimated 100,000 tons of bitumen near Fourastier with a content of 14 to 15 per cent, and 1 million tons at Tsitsini-Mouila near Guena, formed occasionally of grit, with a content of 5-15 per cent and sometimes with soft sands with a content of 10 to 22 per cent.

The mission also pointed out that the dredging of Pointe Noire has brought to the surface up to 14 per cent bituminous impregnations.

In 1968 a Soviet geological mission mentioned important reserves of bituminous sands in the Mayoumba area, with a content of 22 per cent.

#### 4.3 The Quality of Congo's Crude Oil

There are two types of crude oil in Congo, according to the location of the reservoirs in the oil fields.

The Pointe Indienne oil field which has its reservoirs at an average depth of 5,000 feet has a light crude with low sulphur content and paraffinic-base. Its density is 36-36.5° API; GOR-480 cu ft/b.



The Emeraude oil field's reservoirs are located at a shallow depth (around 1800 feet) and contain a heavy and highly viscous crude (22-23°API). The crude has a low-sulphur content (0.2 per cent) and can yield 60 per cent fuel oil, 23 per cent white products and 17 per cent motor fuel.

Unfortunately no data is available concerning the quality of the Loango field's crude oil.

#### 4.4 Oil and Gas Reserves

Recoverable reserves of oil for the Pointe Indienne field were estimated at 1 million cu.m. with a recovery rate of 25 per cent (Industries et Travaux d'Outre-mer, No. 165 August 1967 pg. 752). Reserves of natural gas for the same field are estimated at 400 million cu.m. (BAN. No. 699, 12 July 1972). According to the Oil and Gas Journal of 23 April 1973 no estimates of Emeraude field reserves has been disclosed. However, the same journal states, engineers that have worked in the development programme reported previously that as little as 6 per cent of the oil in place probably would be recovered.

In spite of this affirmation, Petroleum Encyclopedia, 1972, estimates Congo's offshore reserves (the Emeraude oil field) at 500 million barrels. Moreover, according to the country's president, H.E. Marien Ngouabi, reserves were estimated at 100 million tons for the Emeraude oil field (January 1972).

Taking into account the above-mentioned statements one can estimate Congo's reserves in oil and gas, as follows:

Pointe Indienne:

- oil - 1 million cu. m
- gas - 400 million cu.m

Emeraude field - 100 million tons of oil.

In addition to these we have to take into consideration the Loango field's reserves, not yet estimated but important when bearing in mind the size of the field.

#### 4.5. Oil and Gas Transportation (Annex 3)

4.5.1. The oil produced by Congo's fields is transported to two terminals: Rivière Rouge and Djeno, both located on the Atlantic Coast. The Rivière Rouge terminal received oil from the Pointe Indienne oil field and partially from the Emeraude oil field, through a 10-inch pipe and then the oil is loaded into tankers through a 22-inch line.

The Djeno terminal receives oil from the Emeraude field. The northern wells of the Emeraude field are linked through a 4.4 mile, 16 inch submarine line to the central producing platform. The central producing platform is linked to shore with a 16-inch submarine line that one ties into the 10-inch onshore line which goes to the Rivière Rouge terminal. The bulk of the oil arriving at Djeno terminal goes to a loading buoy via a 22-inch, 1.5-mile sea-line.

4.5.2. Congo's gas (produced by the Pointe Indienne field) has been used since 1969 as an energy source for the treatment of sylvinite by the Congo Potash Co. It is transported along a 6-inch, 35-km. pipeline from the Pointe Indienne gas reservoirs to the St. Paul Potash mine (Holle area) at a rate of about 70,000 cu. m/d.

4.5.3. Construction of a new sea-oil line to link the Loango oil field to the shore is being planned.

#### 4.6. Refining

4.6.1. There is no refinery in Congo and the Government has a 5 per cent share in neighbouring Gabon's Port Gentil refinery.

However, at the time of the Emeraude field's inauguration (December 1971) Congo announced that a refinery would eventually be built near Pointe Noire. An European consortium led by Humphreys and Glasgow was later awarded a contract for the design and construction of a 21,500 b/d refinery (1 million t/y) at Pointe Noire (owned by the Government) and the foundation stone was laid on 7 July 1972 on its future site.

4.6.2. In 1968 a lubricant plant owned by Shell was inaugurated at Pointe Noire. The plant treats imported oil and mixes it with chemical additives in order to produce some 40 types of highly specialized lubricants. It has a 750 m. pipeline, 5 reservoirs of 2,900 cu. m and a laboratory.

### 5. EXPORTS, IMPORTS, CONSUMPTION and EXPENDITURES

#### 5.1. Exports

In 1960 the Congo became an oil exporter for the first time, the year when its first oil field (Pointe Indienne) went on stream. The quantities exported rose until 1962 (the maximum production was registered during that year) and then they decreased to a negligible amount in 1971 (Table 5). However, the country's exports were boosted in 1972, when the first shipment of crude oil from ELF-Congo's Emeraude field was loaded at the Rivière Rouge terminal for le Havre (March).

Although there is no refinery in the country, the Congo exported some quantities of petroleum products. The explanation is that Pointe Noire and Brazzaville act as transit ports for products destined for the Central African Republic and Chad and some portion of the imported petroleum products have been exported outside the People's Republic of the Congo.

#### 5.2. Imports

Imports are those of petroleum products for local consumption. They consist of white and black products and small quantities of LPG, as can be seen in Table 6. As the available data is from two different sources the table is also divided in two in order to give a more or less complete review of the petroleum products' movements by item and year.

Table 5

People's Republic of the Congo - Exports of crude oil and petroleum products

Year	Crude oil		Petroleum products (tons)
	Tons	Value in million CFA	
1960	33,952	n.a.	-
1961	113,371	n.a.	-
1962	127,557	448	-
1963	100,946	n.a.	-
1964	86,813	257	12,600
1965	70,800	240	7,300
1966	65,182	213	11,100
1967	38,400	88	11,800
1968	55,300	152	n.a.
1969	31,800	99	n.a.
1970	17,800	60	n.a.
1971	19,656	93	n.a.
TOTAL	761,577	1,650*	-

\*Incomplete

Source: BAN, No. 621 18/11/1970 and No. 699, 12/7/72; Summaries of Economic Data, Congo, ECA, October 1971; M. Diallo, L'énergie en république du Congo, juillet 1967.

As a producing country, Congo did not import crude petroleum. However records show a quantity of 134,807 metric tons imported from Nigeria, in 1970 (Petroleum Times, vol. 75, No. 1919).

### 5.3 Consumption

The only available data for petroleum products' consumption in the Congo is that published by the World Energy Supplies, UN Statistical Paper. According to this the total apparent consumption of petroleum products reached 126,000 metric tons in 1970 which represents an increase of 46 per cent when compared to 1961. Per capita consumption of petroleum products during the same year, was 135 kg. (107 kg. in 1961). Consumption of petroleum products is given by item and year, in Table 7.

In addition to the consumption of petroleum products, records show natural gas consumption by the Compagnie des Potasses du Congo. In accordance with the agreement signed in 1968 between SPAFE and the said company, deliveries of natural gas began in 1969. By year, the CPC consumed the following quantities of natural gas:

1969 - 2,736,482 cubic metres  
1970 - 10,137,335 cubic metres  
1971 - over 16,000,000 cubic metres.

### 5.4 Expenditures

Little data is available concerning investment in the petroleum industry in Congo.

From the beginning of its activity in the Congo until 1966, SPAFE spent 3,697 million FCFA of which 3,270 million onshore and 427 million offshore.

Table 6

People's Republic of Congo - Imports of Petroleum products					
Year	aviation gasolines (m <sup>3</sup> )	Tourisme gasolines (m <sup>3</sup> )	Kerosenes (m <sup>3</sup> )	Gas-oil (m <sup>3</sup> )	Fuel-oil (t)
1960	18,888	24,930	7,614	39,727	4,900
1961	31,880	27,213	8,862	47,837	9,205
1962	30,923	25,369	8,182	42,694	6,458
1963	31,710	25,778	9,540	53,347	7,520
1964	31,500*	26,559	10,119	52,648	4,635
1965	32,000*	23,797	10,252	58,693	9,305
Total	176,901	153,646	54,569	294,946	42,023

\*Estimates

Source: M. Diallo, *L'énergie en république du Congo*, juillet 1967  
(after "l'Annuaire Statistique du Congo")

Year	Gasolines	Kerosene and jet fuels	Fuel oil	(metric tons)	
				LPG	Total
1966	22,000	20,000	66,000	1,000	109,000
1967	21,000	23,000	71,000	1,000	116,000
1968	22,000	24,000	80,000	1,000	127,000
1969	22,000	15,000	85,000	1,000	123,000
1970	22,000	15,000	90,000	1,000	128,000
Total	109,000	97,000	392,000	5,000	603,000

Source: *World Energy Supplies*. UN Statistical Papers, series J. No. 15  
N.Y. 1972

Table 7

People's Republic of Congo - Consumption of petroleum products						
Year	Gasolines (mt)	Kerosenes and jet fuels (mt)	Fuel oils (mt)	LPG (mt)	Apparent consumption	
					Total (mt)	per capita (kg)
1961	36,000	6,000	34,000	1,000	86,000	107
1962	29,000	7,000	44,000	1,000	81,000	99
1963	28,000	7,000	40,000	1,000	76,000	94
1964	30,000	12,000	44,000	1,000	87,000	105
1965	20,000	12,000	48,000	1,000	81,000	96
1966	22,000	12,000	66,000	1,000	101,000	118
1967	21,000	12,000	71,000	1,000	105,000	120
1968	22,000	13,000	80,000	1,000	116,000	130
1969	22,000	13,000	85,000	1,000	121,000	132
1970	22,000	13,000	90,000	1,000	126,000	135

Source: *World Energy Supplies*; UN statistical Papers series J. No.15, N.Y 1972.

As at the end of 1971, ELF-Congo invested a total of 13 million FCFA in the development of the Emeraude oil field.

In 1973 it was reported that investment in the Emeraude field including the terminal to be built near Djeno, would amount to US\$50 million.

#### 6. PRICES. GOVERNMENT'S OIL REVENUE and LEGISLATION

6.1. The interministerial decree No. 5746/MPIMT of 31 December 1961 fixed the value of 1 ton of crude oil produced during the year 1961, at 3006.60 FCFA.

The decree of 15 January 1965 established the value at 2,963.16 FCFA per ton of crude produced during 1964. Export prices for crude oil during the following years were as follows:

1969	-	3,113.6	FCFA/ton
1970	-	3,370.1	FCFA/ton
1971	-	4,731.7	FCFA/ton

On the internal market, the prices were as follows:

1966	-	crude oil	-	300 FCFA/hectolitre
		gas	-	3.50 FCFA/cubic metres
1970	-	oil	-	400 FCFA/hectolitre (OFNACOM) - 750 FCFA/hectolitre (private)

6.2. As at the end of 1962, there was still in force in the Congo, the petroleum law for French overseas territories. Before June 1973, fiscal terms were similar to those in Gabon, i.e. 38 per cent tax rate based on realized price at the wellhead, except that royalties rose from  $6\frac{1}{2}$  to 15 per cent depending on production level.

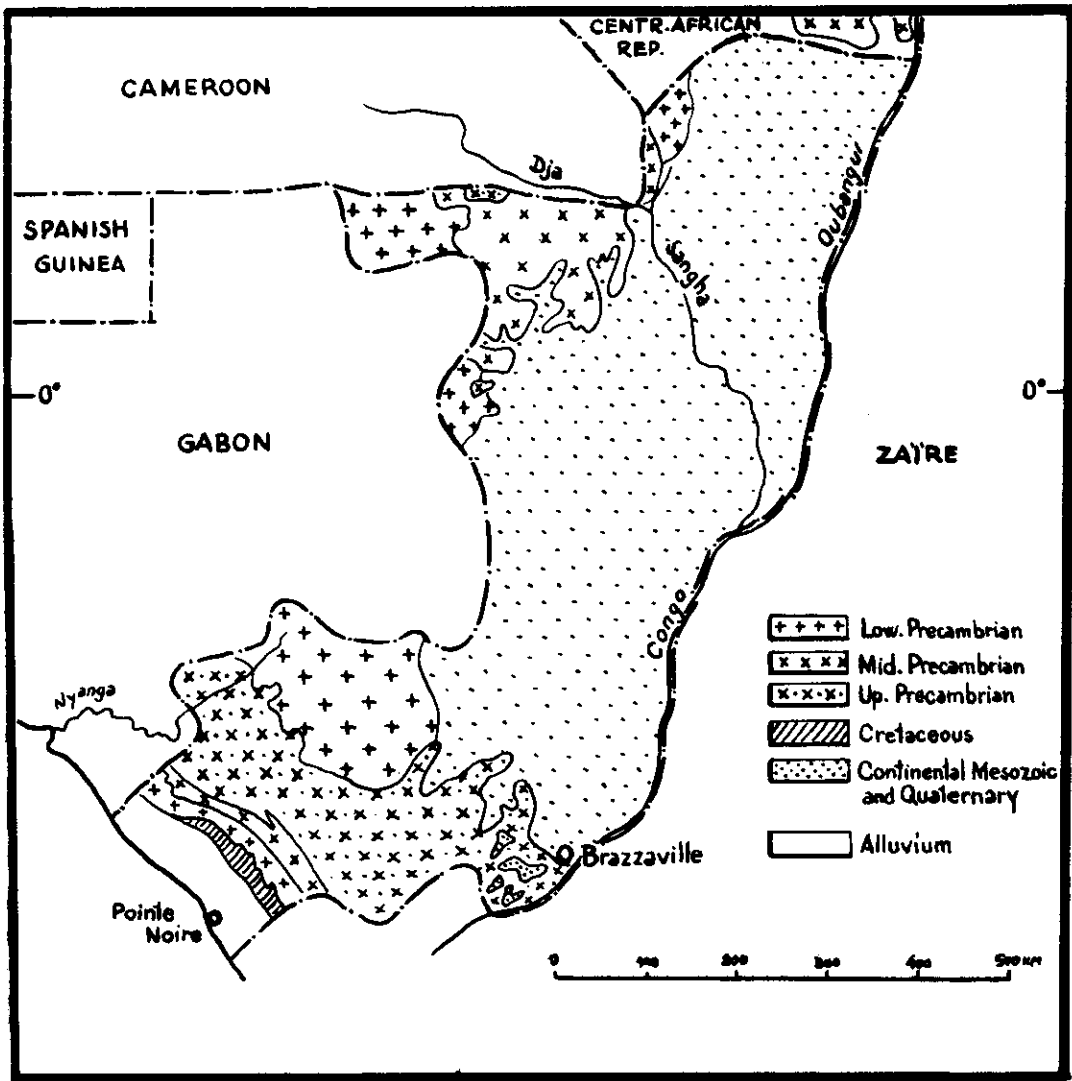
From June 1973, fiscal terms were adjusted under agreements signed by the Government of the Congo with ELF-Congo and AGIP, based on OPEC regulations. The signature of the agreement, resulted in an increase of the tax rate from 38 per cent to 42 per cent, although royalties remained as before ( $6\frac{1}{2}$  to 15 per cent). The Government obtained a 20 per cent participation option, at production levels up to 10 million tons per year, rising in stages to a maximum of 30 per cent at 20 million tons.

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PEOPLE'S REPUBLIC OF CONGO. GEOLOGICAL SKETCH-MAP

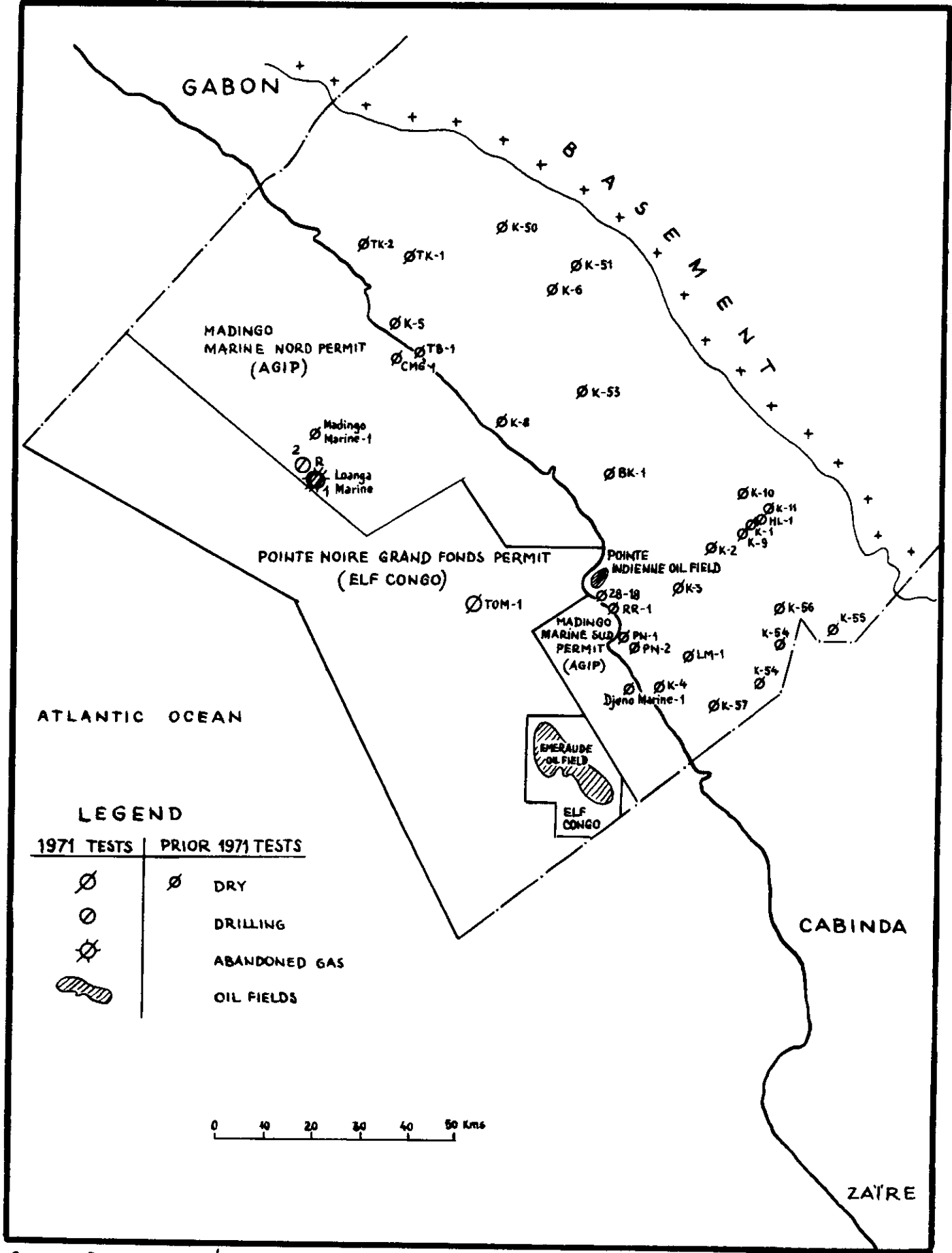


Source : Enciclopedia del Petrolio e del Gas Naturale

ANNEX 1



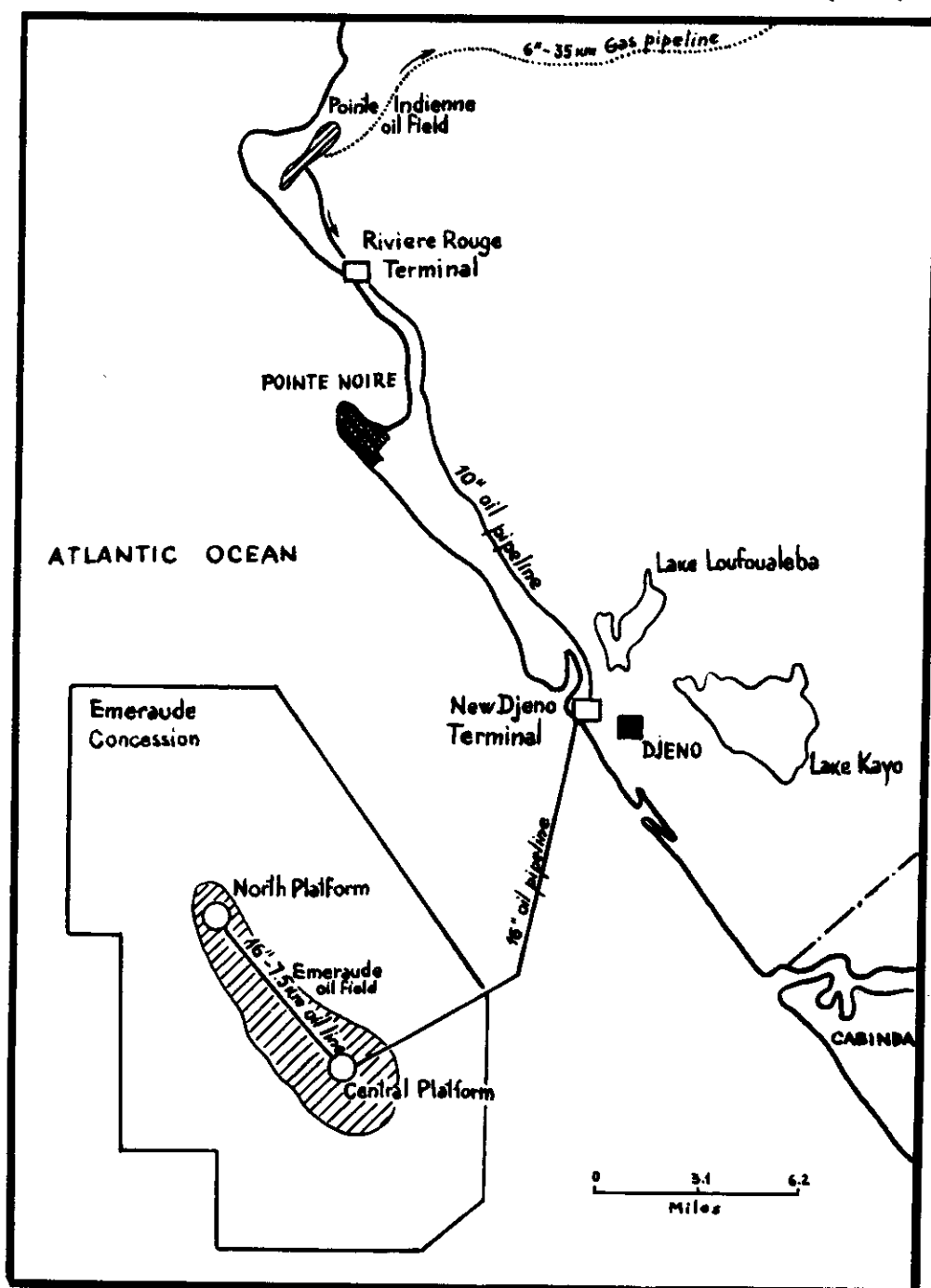
PEOPLE'S REPUBLIC OF CONGO. CONCESSIONS, EXPLORATORY WELLS & OIL FIELDS (END 1971)



Source : BAAPG, vol. 56/9 Sept. 1972

ANNEX 2

# PEOPLE'S REPUBLIC OF CONGO. OIL FIELDS AND PIPELINES (1973)



Source: Oil and Gas Journal, 23 April 1973

ANNEX 3

073-816