

ANGOLA

By George J. Coakley

The Republic of Angola had a population of more than 12 million in a 1,246,700-square-kilometer (km²) area. The area includes Cabinda, a coastal strip 100 kilometers (km) wide and 150 km long, located between the Republic of the Congo [Congo (Brazzaville)] and the Democratic Republic of the Congo [Congo (Kinshasa)]. The mineral economy of Angola was dominated by petroleum with diamond being another important source of revenues. According to the Banco Nacional de Angola (2002a^{§1}, b[§]), the country had a favorable merchandise trade balance of payments in 2001 of \$3.35 billion, which was based on export values of \$6.53 billion, of which crude and refined petroleum product exports accounted for \$5.80 billion and merchandise imports, \$3.18 billion. By comparison, in 2000, Angola exported \$6.95 billion of crude petroleum, \$132 million of refined petroleum products, \$37 million of natural gas, and \$739 million of diamonds. The drop in export value of crude petroleum was attributed primarily to the lower average price per barrel of oil as Angola exported 256.1 million barrels of oil in 2000 at an average price of \$27.10 compared with 250.73 million barrels in 2001 at an average price of \$22.69 per barrel.

Events in early 2002 suggested a major turning point in the political and economic future for Angola. In January 2002, the leader of the National Union of the Total Independence of Angola (UNITA) rebel movement was killed, and in April 2002, a cease-fire agreement was signed between the Government and UNITA, which apparently brought an end to the nation's long civil war. During the 27-year conflict, about 1 million people were killed; tens of thousands were maimed, chiefly from land mines; more than 4 million people were displaced; and the country was left with a massive debt. The country was spending approximately one-third of its annual GDP to service its foreign debt estimated in 2000 to be around \$11 billion, which was one of the highest in Africa (African Forum & Network on Debt & Development, undated[§]). Inflation also remained a problem, although inflation decreased to 116% in 2001 from 268% in 2000.

The redevelopment of Angola will be based on development of its rich offshore petroleum endowment and to a lesser extent by reopening access to its land-based diamond resources to new foreign investment. The highlight of the mineral industry in Angola for 2001 continued to be the success of offshore deepwater petroleum exploration programs. Protected from the onshore civil war actions, the major consortiums holding oil-production-sharing agreements with the State-owned Sociedade Nacional de Combustiveis de Angola (Sonangol), which were led by BPAmoco, ChevronTexaco Corp., ExxonMobil Angola Ltd., and TotalFinaElf, reported 34 significant new deepwater

oil discoveries, which included 4 during 2001, between 1996 and 2001 (table 2). Historically, nearly two-thirds of oil production came from ChevronTexaco's block 0, new deepwater discoveries in blocks 14, 15, 17, and 18 however, will significantly expand production. During 2001, ChevronTexaco's Kuito Field in Block 14 and TotalFinaElf's large Girassol Field in block 17 came onstream, which will add about 285,000 barrels per day (bbl/d) of new production.

This successful exploration has increased national reserves to an estimated 12 billion barrels of oil and 270 billion cubic meters of natural gas. Between 2002 and 2007, an estimated \$20 billion is scheduled for investment in developing these petroleum resources; Angola has been projected to surpass Libya as the second largest oil producer in Africa after Nigeria. Petroleum production was expected to increase from 730,000 bbl/d in 2001 to 1.5 million bbl/d by 2005 to 1.7 million bbl/d by 2007 and from 1.9 million to 2.0 million bbl/d by 2010. Investment plans include construction of a new \$2 billion liquified natural gas (LNG) plant in Luanda by 2006; the plant was expected to process 4 million metric tons (5.5 billion cubic meters) per year (Mt/yr) of captured natural gas (Aremu, 2001[§]; Embassy of Angola, Washington, DC, 2002[§]).

Despite the ongoing civil war and United Nations sanctions against illegally mined diamonds, officially reported diamond production in 2001 increased by 19% to 5.17 million carats of diamond. According to the United Nations Security Council (2001[§]), 69% of diamond under Government control in 2000 came from nine official mines, and 31% was attributed to artisanal miners. The value of production was reported to be \$398.5 million for the official sector and \$347.6 million for the unofficial diamond sector. Diamond smuggling by UNITA and other sources was estimated to have increased to \$250 million in 2000. The United Nations estimated that the total value of diamond mining, which included production from UNITA-controlled mines, was a minimum of \$1.1 billion. The April 2001 United Nations report also concluded "that the increase in non-UNITA smuggling during 2000 meant that illicit Angolan diamonds are still reaching diamond markets regardless of the certificate of origin system and which makes the tracing of UNITA smuggling more problematic." The United Nations report explained the operations of the Angola Selling Corp. (ASCorp), which was a governmental single-channel marketing system designed to regulate diamond buying; the efforts to train and regulate the estimated 100,000 artisanal miners working in Angola; the operations of the Guichet Unico, which was established to investigate applicants for diamond credentials and to issue credentials; and the illicit diamond trading and smuggling operations.

In 2001, Sociedade Miniera de Catoca Ltda. (SMC) remained the largest producer with output of around 1.5 million carats from its Catoca kimberlite pipe, which is located 35 km south of

¹References that include a section twist (§) are found in the Internet References section.

Saurimo. SMC was a joint venture of Empresa Nacional de Diamantes de Angola (Endiama) (32.8%), Russia's Almazay Rossii-Sakha (32.8%), Brazil's Odebrecht Mining Services Inc. (18.4%), and Israel's Lev Leviev (16%). Between the beginning of exploration in 1997 and the end of 2001, SMC mined 9.7 million metric tons (Mt) of ore and recovered 7.5 million carats of diamonds. Diamond sales during this period totaled 7.3 million carats at an average value of \$72 per carat. SMC planned to invest more than \$50 million between 2002 and 2005 to increase production capacity to 7 Mt/yr of ore that would yield 4,826,000 carats per year (Sociedade Miniera de Catoca Ltda., 2002a§). Estimates of reserves in the Catoca kimberlite were reported to be 271 Mt of ore that contains 189.3 million carats of diamond (Sociedade Miniera de Catoca Ltda., 2002b§).

Sociedade de Desenvolvimento Mineiro de Angola, S.A.R.L. (SDM), which was a joint venture of Ashton Mining Ltd. of Australia, Endiama, and Odebrecht, was formed in 1995 to mine alluvial diamond in the 85,600-km² Cuango River Valley concession, which is centered near the town of Luzamba in northeastern Angola. The operations included the Tázua alluvial mine and a final recovery plant at Luzamba. Despite ongoing security problems and related intermittent work suspensions during the past 2 years, SDM was able to produce 419,000 carats of high-quality diamonds in 2001. Bulk sampling of river terrace gravels in the vicinity of the Ganzo, the Ginge, and the Tázua River diversions have revealed economic diamond grades (Mbendi Information Services, 2002§).

DiamondWorks Ltd. of Canada held a majority interest in the Luo and the Yetwene alluvial diamond projects, which have been on care and maintenance since November 1999. DiamondWorks also held mining rights to five kimberlite pipes, which included the large Camatchia Pipe and the Camagico pipe. DiamondWorks underwent a financial and management restructuring in 2001 and was positioned to consider reopening its operations during 2002.

By yearend 2001, negotiations on finalizing the terms of the proposed Camafuca kimberlite joint venture and obtaining approval of the mining permit from the Government were ongoing between SouthernEra Resources Ltd. of Canada and its Angolan joint-venture stakeholders. The joint venture will be incorporated as the Sociedade Mineira do Camafuca, Lda.; ownership will be split among Welox Limited, which was a member of the Leviev Group of Companies (33%), SouthernEra (32%), and Endiama (20%), and Sociedade Mineira do Lucapa Limitada (SML), which was an affiliate of Endiama (15%). Welox had agreed to provide \$20 million of the financing for the first phase of the dredge-mining project. The Phase I feasibility study on the Camafuca-Camazamba kimberlite facies, which was completed by SouthernEra in 2001, reported total resources at Camafuca to a depth of 145 meters estimated to be 209.5 million cubic meters at an average grade of 0.111 carats per cubic meter and to contain 23.24 million carats of diamond valued at \$109 per carat. The initial 5-year-long Phase I project will remove 6.13 million cubic meters of dredged material that contains an average grade of 0.18 carat per cubic meter, which would yield 220,000 carats per year valued at \$117 per carat. Dredged material will move by a slurry pipeline to a land-based conventional dense-media separation plant. Estimated capital

cost of the project was \$25 million (SouthernEra Resources Ltd., 2002§).

The joint venture between SML (51%) and Sociedade Portuguesa de Empreendimentos (49%) operated several alluvial projects in Lunda Norte and Lunda Sud Provinces in 2001 and held exploration rights over a 35,000-km² area. Diamond production during 2001 included 244,000 carats from the Mufuto project, 199,000 carats from the Calonda project, and 69,000 carats from the Lucapa project. Associacao Chitotolo, which was an alluvial diamond company owned by Sociedade Miniera de Lumanhe (50%), ITM Mining Ltd. (35%), and Endiama (15%), produced 232,000 carats of alluvial diamond in 2000 (Mbendi Information Services, 2002§).

During 2000, the joint venture between De Beers Angola Prospecting Ltd., which was a wholly owned subsidiary of De Beers Consolidated Mines Ltd., and Endiama announced the discovery of 17 new kimberlites in its concession areas in Lunda Norte and Lunda Sul Provinces. Exploration was suspended in May 2001 pending negotiations between De Beers and the Angolan Ministry of Mines and Geology on the terms applicable to mining and marketing of diamond from mines discovered as a result of prospecting by De Beers (De Beers S.A., 2002§).

International Defense and Security Forces Resources NV (IDAS) of the Netherlands Antille (a wholly owned subsidiary of American Mineral Fields, Inc., of Canada) held the Cuango International area prospecting license and the Luremo Mining license in the Cuango Valley. IDAS had only limited access to the UNITA-controlled areas during 2000. During 2001, the company significantly reduced its operating presence in Angola and concentrated on negotiating the security of its license areas and on a new operating agreement or model final contract with Endiama, which governed the management, ownership, and expenditure commitments for the licences. In October 2001, IDAS was awarded two new licenses in Lunda Norte and Malange Provinces that covered a 2,690-km² area along the Cuanga River flood plain up to the border between Angola and Congo (Kinshasa) and an adjoining license to the south that covered 246 km² situated to the north of Cafunfo (American Mineral Fields, Inc., 2001).

Other companies involved with diamond exploration included Botswana Diamondfields Inc. (a subsidiary of Crew Development of Canada) AmCan Minerals Ltd. of Canada, Randsburg International Gold Corp. of Canada, Trans Atlantic Enterprises Inc. of Canada, Majestic Resources of Australia, and Petra Diamonds Ltd. of South Africa.

For more extensive coverage of the mineral industry of Angola, see the 2000 Minerals Yearbook, Volume III, Mineral Industries of Africa and the Middle East.

Reference Cited

American Mineral Fields, Inc., 2001, American Mineral Fields awarded Angolan diamond licenses: London, United Kingdom, American Mineral Fields, Inc., press release, October 3, 1 p.

Internet References Cited

African Forum & Network on Debt & Development, [undated], Debt profiles—Angola, accessed January 7, 2003, at URL <http://www.afrodad.org/html/Debt/angola.htm>.

Aremu, Moses, 2001 (September 22), Angola—Deepwater developments blooming, Oil and Gas International, accessed December 7, 2002, at URL http://www.oilandgasinternational.com/departments/special_features/angola.html.

Banco Nacional de Angola, 2002a, 1994-2001—Balança global, Indicadores Macro-económicos—Angola—Balança de Pagamentos, accessed January 7, 2002, at URL http://www.bna.ebonet.net/bna_bp6-7.htm.

Banco Nacional de Angola, 2002b, 1994-2001—Composição das exportações, Indicadores Macro-económicos—Angola—Balança de Pagamentos, accessed January 7, 2002, at URL <http://www.bna.ebonet.net/expint.htm>.

De Beers S.A., 2002, Exploration—Global activities—Angola, accessed November 22, 2002, at URL <http://www.debeersgroup.com/exploration/expGloActAngola.asp>.

Embassy of Angola, Washington, DC, 2002, Angola poised to become Africa's second largest oil producer, O Pensador, March/April, Economic Notes, accessed December 12, 2002, at URL <http://www.angola.org/news/pensador/index.html>.

Mbendi Information Services, 2002 (October 30), Angola—Mining—Diamond mining, accessed December 15, 2002, at URL <http://mbendi.co.za/indy/mining/dmnd/af/an/p0005.htm>.

Sociedade Miniera de Catoca Ltda., 2002a, Catoca—Informações económicas e financeiras and Ações estartégicas, accessed January 22, 2003, at URL <http://www.catoca.com>.

Sociedade Miniera de Catoca Ltda., 2002b, Catoca—Geologia, accessed January 22, 2003, at URL <http://www.catoca.com>.

SouthernEra Resources Ltd., 2002 (April 20), Annual report for 2001, accessed January 9, 2003, at URL <http://www.southernera.com/SUFannual2001.pdf>.

United Nations Security Council, 2001 (April 18), Addendum to the final report of the monitoring mechanism on sanctions against UNITA, Report No. S/2001/363, accessed July 15, 2001, at URL <http://www.un.org/Depts/dhl/docs/s2001363.pdf>.

Major Sources of Information

Angolan Mining Association
 Rua Cte Nzaji 7
 Luanda, Angola
 Tel: (244-2) 320-656

Empresa Nacional de Diamantes de Angola (Endiama)
 Av. Major Kanhangulo N.º 100
 Caixa Postal 1247
 Luanda, Angola
 Telephone: (244-2) 337-276
 Fax: (244-2) 330-377
 E-Mail: endiama@endiama-angola.com
 Internet: <http://endiama-angola.com>
 Ministry of Geology and Mines (Ministério de Geologia e Minas)
 Avenida Comandante Gika
 Caixa Postal 1260
 Luanda, Angola
 Telephone: (244-2) 326-724 or 322-766
 Fax: (244-2) 321-655 or 322-569
 Ministry of Petroleum (Ministerio dos Petroleos)
 Avenida 4 de Fevereiro
 Luanda, Angola
 Tel: (244-2) 337-448/492/493
 Fax: (244-2) 335-381
 Sonangol Holding (Sociedade Nacional de Combustiveis de Angola)
 Rua 1º Congresso do MPLA, N.º 8-16
 Caixa Postal 1316
 Luanda, Angola
 Telephone: (244-2) 334-448 or 331-690
 Fax: (244-2) 391-782
 Telex: 2089 SONANG AN
 E-mail: secretariageral@sonangol.co.ao
 Internet: <http://www.sonangol.co.ao>

TABLE 1
ANGOLA: PRODUCTION OF MINERAL COMMODITIES 1/

Commodity	1997	1999	1999	2000	2001	
INDUSTRIAL MINERALS						
Cement, hydraulic	thousand metric tons	301 2/	350 2/	350 e/	350 e/	350 e/
Diamond 3/ 4/	thousand carats	1,234 2/	2,764 2/	3,806 2/	4,313 2/	5,159 2/
Granite e/	thousand cubic meters	1,500	1,500	1,500	1,500	1,500
Marble e/	do.	100	100	100	100	100
Salt e/	metric tons	30,000	30,000	30,000	30,000	30,000
MINERAL FUELS AND RELATED MATERIALS						
Gas, natural:						
Gross 6/	million cubic meters	5,804 2/	5,804 2/	5,800	11,613 2/	11,027 2/
Dry	do.	566 2/	566 2/	560	560 2/	574 2/
Liquified petroleum gas	thousand 42-gallon barrels	1,643 2/	1,292 2/	1,290 r/	1,300 2/	1,300 2/
Petroleum:						
Crude	thousand 42-gallon barrels	262,800 2/	268,275 2/	279,590	273,020 2/	270,100 2/
Refinery products 5/	do.	11,700	13,180 2/	14,000	14,000	14,000

e/ Estimated; estimated data are rounded to no more than three significant digits. r/ Revised.

1/ Includes data available through November 2002.

2/ Reported figure.

3/ Exports; does not include smuggled production.

4/ Production was approximately 90% gem and 10% industrial grade.

5/ Included asphalt and bitumen.

6/ Angola has no natural gas distribution system. Most gas was vented and flared.

TABLE 2
ANGOLA: OIL AND GAS DISCOVERIES AND PROPOSED INVESTMENT, 1996-2011 1/

Operating Company	Development	Commodity	Capacity	Investment (million dollars)	Startup date	Comments, reserves etc.
ChevronTexaco Corp. 2/	Block 0 - Cabinda	Petroleum	100,000 to 600,000 bbl/d	2,000	2006	Concession extended 2010 to 2030.
Do.	Block 0 - North Nemba	do.	40,000 bbl/d		2001	
ChevronTexaco Corp. 3/	Block 14 - Kuito	do.	80,000 bbl/d	400	2001	Discovered 1997; 400 Mbbbl.
Do.	Block 14 - Kuito Phase 3 Development	do.	55,000 to 85,000 bbl/d	50	October 2001	
Do.	Block 14 - Benguela	do.				Discovered January 1998.
Do.	Block 14 - Landana	do.				Discovered October 1998.
Do.	Block 14 - Landana 2a	do.				Discovered December 2001.
Do.	Block 14 - Belize	do.				Discovered 1998.
Do.	Block 14 - Tombocco	do.				Discovered October 2000.
Do.	Block 14 - Lobito-1X	do.				Do.
Do.	Block 14 - Tombua	do.				Discovered July 2001.
Do.	Block 14 - Gabela-1	do.				Discovered July 2002.
Do.	Benguela/Belize Development	do.	140,000 bbl/d			
Do.	Block 14 - Negage	do.				Discovered December 2002.
ChevronTexaco (32%) and Sonangol (20%)	Luanda LNG plant	Natural gas	5 billion cubic meters per year (4 Mt/yr)	2,000	2006	Gas processing plant; Angolan natural gas reserves=270 billion cubic meters.
ChevronTexaco summary	Block 14 total			6,000	by 2006	3 Gbbl.
ExxonMobil Angola 4/	Block 15 - Kissanje	Petroleum				Discovered 1998.
Do.	Block 15 - Marimba	do.				Do.
Do.	Block 15 - Hungo	do.				Do.
Do.	Block 15 - Dikanza	do.				Do.
Do.	Block 15 - Chocalho	do.				Discovered July 1999.
Do.	Block 15 - Xicomba	do.				Discovered September 1999.
Do.	Block 15 - Xicomba FPSO	do.	80,000 bbl/d		2003	100 Mbbbl reserves.
Do.	Block 15 - Mondo	do.				Discovered June 2000.
Do.	Block 15 - Saxi-1	do.				Discovered August 2000.
Do.	Block 15 - Batuque-1	do.				Discovered November 2000.
Do.	Block 15 - Kizomba-A FPSO	do.	250,000 bbl/d	3,100	2004	Develops Hunga and Chocalho fields, 1 Gbbl reserves.
Do.	Block 15 - Kizomba-B FPSO	do.	330,000 bbl/d		2006	Develops Kissanje and Dikanza fields, 1 Gbbl reserves.
Do.	Block 15 - Mblumbumba-1	do.				Discovered April 2001.
Do.	Block 15 - Vicango-1	do.				Discovered May 2001.
Do.	Block 15 - Mavacola-1	do.				Do.
Do.	Block 15 - Reco Reco-1	do.				Discovered Sept., 2002
Sonangol (50%)	Lobito refinery	Petroleum, refined	200,000 bbl/d	3,600	2006	Seeking finance in 2002.
ExxonMobil Angola 5/ ExxonMobil summary	Block 24 - Semba-1	Petroleum		NA		Block 15, 4 Gbbl reserves.
Canadian Natural Resources Ltd. 6/	Block 16	do.				
TotalFinaElf 7/	Block 17 - Girassol FPSO	do.	200,000 bbl/d	3,000	2001	Discovered 1996; 800 Mbbbl.
Do.	Block 17 - Dalia	do.	300,000 bbl/d	3,000	2006	Discovered 1997.
Do.	Block 17 - Rosa	do.				Discovered 1998.
Do.	Block 17 - Liro	do.		3,000	2002+	Do.
Do.	Block 17 - Tulipa	do.				Discovered June 1999.
Do.	Block 17 - Orquidea	do.				Discovered September 1999.
Do.	Block 17 - Cravo	do.				Discovered October 1999.
Do.	Block 17 - Camelia	do.				Discovered December 1999.
Do.	Block 17 - Jasmine	do.				Discovered 2000.

See footnotes at end of table.

TABLE 2--Continued
ANGOLA: OIL AND GAS DISCOVERIES AND PROPOSED INVESTMENT, 1996-2011 1/

Operating Company	Development	Commodity	Capacity	Investment (million dollars)	Startup date	Comments, reserves etc.
TotalFinaElf--Continued: 7/	Block 17 - Perpetua 1	Petroleum				Discovered December 2000.
Do.	Block 17 - Violeta	do.				
Do.	Block 17 - Anturio	do.				
Do.	Block 17 - Zinia-1	Petroleum				Discovered December 2002.
Do.	Block 17 - Hortensia- 1	do.				Discovered March 2003.
Do.	Block 17 - Acacia	do.				Discovered March 2003.
TotalFinaElf 8/	Block 32 - Gidungo-1	Exploration				October 2002
TotalFinaElf summary				NA		
BPAmoco 9/	Block 18 - Platina	do.				Discovered 1999.
Do.	Block 18 - Plutonio	do.				Do.
Do.	Block 18 - Galio	do.				Discovered 2000.
Do.	Block 18 - Paladio	do.				Do.
Do.	Block 18 - Cromio	do.				Discovered October 2000.
Do.	Block 18 - Cobalto	do.				Discovered December 2000.
Do.	Plutonio/Cobalto FPSO		80,000+ bbl/d		2005	400 Mbbl reserves.
Do.	Galio/Cromio Development					300 Mbbl reserves.
BPAmoco 10/	Block 31- Plutao 1			7,500	by 2011	6 fields, 1 Gbbl.
Norsk Hydro ASA, 11/	Block 34	Petroleum				
Angola grand total		Petroleum	2 million bbl/d	20,000	2010	
		Natural gas	5 billion cubic meters per year	2,000	2006	

NA Not available. FPSO Floating production storage and offloading vessel.

1/ Blank column indicates no information was available.

2/ Block 0: Chevron Texaco (39.2%), Sonangol (41%), Elf Petroleum Angola (10%), and AGIP Angola Production (9.8%).

3/ Block 14: Cabinda Gulf Oil Co. (ChevronTexaco) (31%), Sonangol Pesquisa e Produção S.A.R.L. (20%), Agip Angola Exploration BV (20%), and TotalFinaElf E&P Angola (20%), and Petrogal Exploração (9%)

4/ Block 15: ExxonMobil Angola (40%), BP Exploration (Angola) Limited (26.67%), Agip Angola Exploration B.V. (20%) and Statoil Angola (13.33%).

5/ Block 24: Esso Exploration Angola (Block 24) Limited (50%), Sonangol (20%), Petronas Carigali Overseas SDN BDH (15%) and Ocean Angola Corporation (15%)

6/ Block 16: Canadian Natural Resources Ltd. (50%), Odebrecht Oil & Gas (30%), and Sonangol (20%).

7/ Block 17: TotalFinaElf (35%), ExxonMobil (20%), Sonangol (20%), BP Amoco (6.67%), Den Norske State Oljeselskap a.s. (Statoil) (13.33%), Norsk Hydro ASA (10%), and Petrofina 5%.

8/ Block 32: TotalFinaElf (30%), Sonangol (20%), Prodev (20%), ExxonMobil (15%), Marathon (10%), and Petrogal (5%).

9/ Block 18: Amoco Angola B.V. (a wholly owned subsidiary of BP) (50%), and Shell Development Angola B.V. (50%).

10/ Block 31: BP (26.7%), ExxonMobil (25%), Statoil (13.3%), Marathon (10%), TotalFinaElf (5%), and Sonangol, (20%).

11/ Block 34: Sonangol (20%), Norsk Hydro (30%), Phillips Petroleum (20%), Shell (15%), and Petrobras (15%).

Sources: U.S. Geological Survey compilation from published company and Angolan Government data available through December 2002.