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The Libyan Oil Industry: Dependence on Foreign Companies (U)

An Intelligence Assessment

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The Libyan Oil Industry: Dependence on Foreign Companies (U)

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This paper was prepared by [ ] Office of Global Issues, and [ ] Office of Near Eastern and South Asian Analysis. Comments and queries are welcome and may be directed to the Chief, Strategic Resources Division, OGI, on [ ] [ ] (U)

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The Libyan Oil Industry: Dependence on Foreign Companies (U)

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Key Judgments

Information available as of 10 January 1986 was used in this report.

Libya is heavily dependent on foreign oil companies for operating and maintaining its oil industry—the mainstay of the Libyan economy. Maintaining steady earnings, however, has been a challenge to Tripoli, especially in light of the soft oil market. As a result, Libyan oil revenues plunged from $23 billion in 1980 to $11 billion in 1985. To protect its ability to generate revenues from oil, Tripoli is trying to:

- Maintain the oil industry's productive capacity by reversing the deterioration of existing onshore oilfields and facilities caused by shortcomings in maintenance and management.
- Develop new oilfield productive capacity principally through investments in offshore projects. Leading these activities is Tripoli's major investment in the offshore Bouri oilfield—located about 100 kilometers northwest of Tripoli in the Mediterranean Sea.
- Induce foreign firms to explore for new oilfields, especially in western Libya, by requiring producing companies to invest money in exploration to ensure access to equity oil shares.
- Make investments in new downstream programs—including refining, petrochemicals, and marketing. [ ]

To make progress on these goals, Tripoli has had to depend on foreign oil companies and personnel, and we foresee that it will have to continue to do so for the efficient long-term operation of its system. Foreign operating partners are involved in about 80 percent of current Libyan production. In particular, foreign companies and workers provide:

- Technical and management expertise in an industry that is short of qualified personnel.
- Equipment to repair and upgrade the oilfields and facilities; Libya has no oil equipment manufacturing capability.
- Capital to help finance a large portion of Tripoli's oil development programs, including exploration. Libya has significantly drawn down its financial reserves since 1981, as conditions in the oil market have softened. [ ]

The heavy dependence of the Libyan oil industry on foreign companies makes it vulnerable, at least in principle, to economic sanctions. Although limited unilateral controls since 1982 on trade of US-origin goods and technology have had some impact in limiting access to certain state-of-the-art computer equipment, the widespread availability of petroleum equipment has greatly softened the impact of US controls on Libya's petroleum industry. [ ]

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We judge that the new, wider ranging unilateral economic sanctions by the United States could have greater consequences for the Libyan petroleum industry during the next few months if US production and service companies pull out or are forced out of Libya abruptly:

- Production could drop modestly in the short term; a phased withdrawal would have a smaller impact.
- Oil exports could fall temporarily by up to 20 percent or so from the current level of 1.1 million barrels per day (b/d). US firms currently market 260,000 b/d—roughly 25 percent of Libyan exports—and alternate export channels would have to be found, probably through price discounts. If discounts end up exceeding price concessions previously given the US firms, Tripoli will suffer some erosion in oil revenues.
- Tripoli will face delays replacing equipment and services previously procured from the United States. [ ]

Over the longer term, the impact of US sanctions will tend to fade as time passes unless our allies follow suit. Several factors, however, work against a significant widening of the international scope of the sanctions. Many countries hold large Libyan debts that can be repaid only through oil exports. Some countries, especially in the Mediterranean area, also probably fear Libyan reprisals for any actions in support of the US sanctions. In response to the sanctions, Tripoli could offer the US oil concessions to companies in countries such as Austria, West Germany, Italy, France, Finland, Brazil, or even Romania. Alternatively, Libya may nationalize the companies and operate them with foreign technical assistance as happened after Exxon's withdrawal from Libya in 1981. Beyond the marketing disruption, any short-term production problems in oilfields currently involving US oil firms could be handled by other foreign technicians and a small, but competent cadre of trained Libyan managers once the necessary arrangements were made. A strong point in Libya's favor is that most US companies provide services to Libya through their West European subsidiaries, often using European personnel. The number of US oilfield workers in Libya probably is no more than 500 to 800 and replacements could be recruited from a number of countries. Most oilfield equipment and services are already obtained from non-US sources and most denied US trade can be replaced. [ ]

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In reacting to the US sanctions, Qadhafi is unlikely to detain US citizens or take them hostage. Following the initial imposition of sanctions in 1982, for example, Qadhafi even helped expedite the departure of US citizens as a propaganda ploy. Qadhafi probably believes any move against US personnel would be used to justify a US military strike against Libya. The Libyan leader may even offer lucrative incentives to retain the services of select, highly skilled workers. Qadhafi probably will use economic sanctions to marshal support for even greater domestic austerity and to blame Washington for any further deterioration in economic conditions. [ ]

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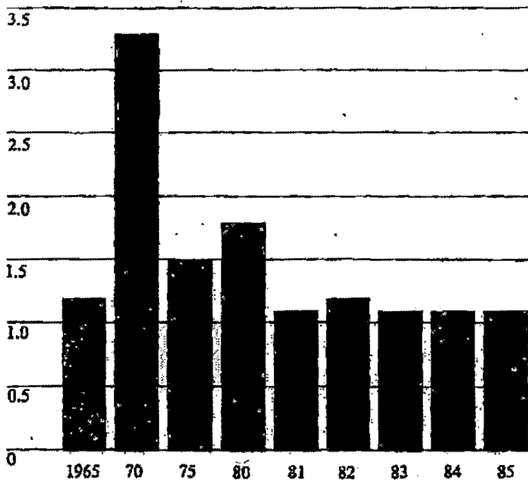
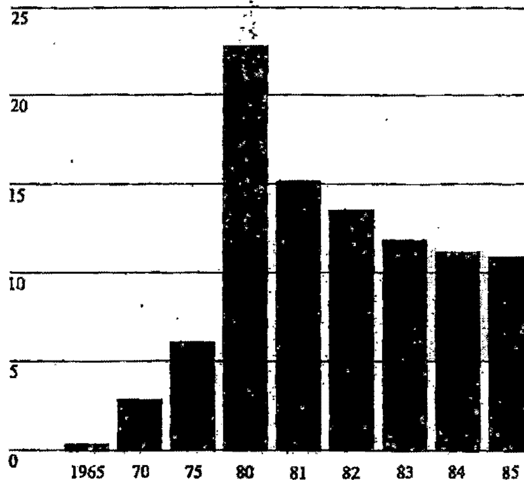
Contents

	Page
Key Judgments	iii
Oil and the Libyan Economy	1
Dimensions of the Oil Industry	1
Crude Production Systems	2
Other Oil Industry Programs	4
Libyan Oil Policy	4
Foreign Company Involvement in the Oil Industry	6
Maintaining Production and Revenues	10
Boosting Capacity	11
Exploration	11
Downstream Activities	12
Impact of Economic Sanctions	12
Experience With Limited Controls	12
Sanctions in the Near Term	12
Longer Term Prospects	13
How Qadhafi Will Play the Sanctions	15

Figure 1
Libya: Oil Production and Revenues From Oil Exports, 1965-85





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The Libyan Oil Industry: Dependence on Foreign Companies (U)

Oil and the Libyan Economy

Oil is the mainstay of the Libyan economy and the principal source of Qadhafi's international influence. Oil revenues totaling about $150 billion earned since the revolution of 1969 have fueled his ambitious development plans and foreign adventures. Petroleum exports account for virtually all of Libya's foreign exchange earnings, about half of GDP, and 70 percent of government revenues. Because of soft oil market conditions, however, real GDP per capita has declined since 1980 by about 40 percent and overall economic activity has fallen below the 1978 level. Oil revenues plunged from a peak of $23 billion in 1980 to $11 billion in 1985 (figure 1), forcing Qadhafi to cut back on his nonpetroleum development plans and to expel several hundred thousand foreign workers. The government, however, has made sure that most basic consumer goods are available—albeit at reduced quality and with greater inconvenience, according to reliable reporting.

Libya's major oil customers are the West European–OECD countries, which purchase roughly 80 percent of total Libyan oil exports (table 1). The degree of dependence of individual West European countries on Libyan oil varies widely, but no one country is strategically dependent on Libyan oil, given the ready availability of oil from other sources. West Germany and Italy alone account for half of Libya's oil exports, but get more than 80 percent of their oil imports from other exporters. Communist countries, principally the USSR in barter for Soviet arms, import another 15 percent of Libyan oil.

Table 1
The Recent Pattern of Libyan Oil Exports

	Estimated 1985 Liftings of Libyan Oil [a] *(thousand b/d)*	Libyan Exports *(percent)*	Purchaser's Imports *(percent)*
Total Libyan Exports	**1,075**		
To OECD Countries [a]	843	78	7
Austria	18	2	9
France	49	5	3
Greece	64	6	25
Italy [b]	262	24	15
Spain	66	6	7
Turkey	52	5	16
United Kingdom	49	5	5
West Germany	205	19	9
Other	78	7	
To Communist countries	167	16	
Bulgaria	22	2	7
Romania	20	2	8
Yugoslavia	10	1	5
USSR [c]	115	11	40
To other countries	65	6	
South Korea	17	2	3
Syria	15	1	12
Other	33	3	

[a] Compiled from industry reporting and published OECD statistics.
[b] Italy resells about half of its Libyan oil to third parties.
[c] The USSR accepts Libyan oil in barter for arms. Most of this oil is shipped directly to Soviet customers in Western Europe—primarily Finland. The Soviets also reexport about 20,000 b/d of this oil to Yugoslavia, and a lesser amount to Bulgaria. The USSR uses none of this oil domestically.

Dimensions of the Oil Industry

The Libyan system was developed primarily by US companies during the 1960s, and production grew to 3.3 million b/d by 1970 (figure 1). Since reaching its peak in the early 1970s, Libyan production has steadily fallen to its present level of about 1.1 million b/d, largely paralleling the dramatic cut in overall OPEC oil production as a result of softening oil market conditions. During the same period, production capacity has fallen from more than 3 million b/d

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to about 1.6 million b/d because of inadequate oilfield maintenance and a more conservative approach to managing Libya's national petroleum resources. Nonetheless, Libya's excess capacity represents about 20 percent of that outside the Persian Gulf. Moreover, Libya's crude is premium quality—therefore easily marketable—having high gravity and low sulfur content.

Foreign operating companies, such as Occidental, AGIP, and the OASIS partners, form the backbone of the Libyan crude oil industry. In total, fields involving foreign participation account for about 80 percent of current Libyan production. These companies not only provide infusions of badly needed capital but also bring to Libya essential technical skills and managerial experience.

Crude Production Systems

Libya's crude oil production comes from five essentially separate export systems with a combined export-handling capacity of at least two times its current 1.1 million b/d production level (figure 2). The redundancy and the dispersion of the oil system across Libya with links to five separate terminals along the coast increase flexibility and reduce the vulnerability of Libyan exports to disruption:[1]

- ***OASIS.*** The OASIS system is the most important, accounting for more than one-third of Libya's total production, or about 400,000 b/d (table 2). The system is owned and operated by the OASIS Oil Company, a partnership of three US oil companies—Conoco, Marathon, and Amerada Hess—and the Libyan National Oil Company (LNOC), which has controlling interest. This system probably has the best maintained fields in Libya we believe maximum sustainable capacity (MSC) is about 600,000 b/d. The system supplies crude to the As Sidr export facility. OASIS reportedly employs about 2,500 people, of whom a large proportion reportedly are from a number of Western countries.

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- ***Occidental.*** The Occidental system—a joint US-Italian (AGIP)-operated system, which produces about 285,000 b/d—is currently the second-largest producer. OMV of Austria recently bought 25 percent of Occidental's Libyan holdings. Occidental administers its Libyan operations from the United Kingdom. LNOC has controlling interest in both Occidental's Libyan holdings and AGIP's Libyan operating companies. This production system is well maintained with the help of foreign operating personnel. Current production from Occidental and AGIP fields is about 125,000 b/d and 160,000 b/d, respectively, with maximum production capacity estimated at about 150,000 b/d and 190,000 b/d. The system provides crude to the Az Zuwaytinah export terminal.

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- ***AGECO.*** The two government-controlled companies—Arab Gulf Exploration Company (AGECO) and Umm al-Jawabi—own and operate the third-largest system in Libya. Current production is about 40,000 b/d and 185,000 b/d from its western and eastern fields, respectively. This system was originally developed by a partnership of British Petroleum and Nelson Bunker Hunt in the mid-1960s following the discovery of the giant Sarir field in east-central Libya. AGECO is used as LNOC's swing producer because of its significant underutilized capacity. we estimate AGECO's fields could produce about 450,000 b/d, primarily from the Sarir oilfield. The system supplies the new Ra's al Unuf export facility with a crude mix from its Sarir and Messla fields, in addition to exporting Sarir crude from its Marsa al Hariqah terminal near Tobruk in eastern Libya. AGECO also operates LNOC fields and pipelines in western Libya where it supplies a small volume of crude—about 40,000 b/d—to the Az Zawiyah refinery near Tripoli.

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- ***Sirte.*** The Sirte system was built by Exxon but has been operated by the government-controlled Sirte Oil Company since Exxon pulled out of Libya in late 1981. W. R. Grace—a US firm—has a small equity position in the Sirte system.

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Table 2
The Libyan Crude Oil System: Organization, Production, and Capacity

Crude Oil Subsystems (Producing Companies and Partners Noted)	Ownership (*percent*)	Current Production [a] (*thousand b/d*)	Maximum Sustainable Production (*thousand b/d*)	Export Terminal or Refinery
Systems total		**1,100**	**1,600**	
OASIS System		400	600	As Sidr
OASIS Oil Company		400	600	
Conoco (US)	16			
Marathon (US)	16			
Amerada Hess (US)	8			
LNOC	60			
Occidental System		285	340	Az Zuwaytinah
Occidental Oil Co. of Libya		125	150	
Occidental (US)	37			
OMV (Austria)	12			
LNOC	50			
AGIP of Libya		160	190	
AGIP (Italy)	50			
LNOC	50			
AGECO System		225	450	
AGECO East (LNOC)	100	185	400	Marsa al Hariqah or Ra's al Unuf (refinery)
AGECO West (LNOC)	100	40	50	Az Zawiyah (refinery)
Sirte System		125	135	Marsa al-Burayqah
Sirte Oil Company		125	135	
W. R. Grace/LNOC	12			
LNOC	88			
VEBA System		65	75	Ra's al Unuf
VEBA-Gelsenberg of Libya		60	65	
VEBA (West Germany)	35			
LNOC	65			
Wintershall of Libya		3	5	
Wintershall (West Germany)	49			
LNOC	51			
Elf of Libya		2	5	
Elf (France) [b]	49			
LNOC	51			

[a] Estimates based on analysis of reporting from various sources.
[b] Latest reporting suggests Elf is no longer a producer.

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maintenance programs have been neglected or delayed for years, and the Libyans have had some difficulties running the system since Exxon left Libya. Sirte is now making a major effort to modernize its facilities and increase production. Current production and maximum sustainable capacity are about 125,000 b/d and 135,000 b/d, respectively. The system supplies crude oil to the Marsa al Burayqah export facility and natural gas to Libya's LNG facility at Marsa al Burayqah.

- *VEBA.* This is the smallest producing system in Libya with about 65,000 b/d production. It was built and operated by Mobil until the company suspended its Libyan production in 1982. VEBA Oil—a Mobil partner—and Wintershall, both West German firms, have small producing fields in this system. The oilfields in this system are reportedly in poor condition, although one source has reported that problems are being resolved in the pipeline network. Crude is supplied to the Sirtica export terminal at Ra's al Unuf.

Other Oil Industry Programs

Although crude oil still provides the bulk of Libya's earnings, the role of natural gas, refined products, and petrochemicals is becoming increasingly important. According to Foreign Minister 'Ali Turayki, Libyan longer term marketing strategy is to export refined products and petrochemicals, rather than just crude, and to utilize domestic natural gas resources.

Natural gas is becoming increasingly important as both a revenue earner and a domestic fuel and feedstock. Libya's LNG export facility at Marsa al Burayqah—built in 1971—has a rated capacity of about 3.4 billion cubic meters (bcm) per year, although available capacity is less than 2.0 bcm because of serious maintenance problems. Shutdown is possible at any time because of the poor condition of the facility, according to the US Embassy in Rome. Libya, however, recently embarked upon a modernization program, and the plant could be at full capacity by the end of 1985. Libya's nonpetroleum development projects, including its steel plant and aluminum smelter, will utilize natural gas for energy as will the future expansion of Libya's petrochemical industry, which is currently on hold because of a lack of revenues. These projects, combined with the potential development of a domestic gas grid, will result in increased domestic gas consumption. With recoverable reserves estimated by industry sources at 27 trillion cubic feet, LNOC is confident that domestic requirements will be met for the next 30 years.

Libya is also trying to diversify through expanded downstream activities. Libya has three domestic refineries—all government owned—at Az Zawiyah (120,000 b/d), Marsa al Burayqah (10,000 b/d), and Tobruk (20,000 b/d), which meet its domestic consumption of approximately 100,000 b/d. The Az Zawiyah refiner and terminal complex handles imports and limited exports of petroleum products. In addition, in 1985 Libya started up its 220,000-b/d export refinery at Ra's al Unuf. output averaged 120,000 b/d in mid-1985. We estimate that more than 50 percent of this output is exported as fuel oil to Europe. In an effort to further secure an outlet for its crude production, Libyan interests have purchased Italy's 100,000-b/d Tamoil refinery and the associated distribution system of approximately 1,000 service stations, according to the US Consulate in Milan.

The Libyan petrochemical industry began in 1981 with the startup of the first phase of the Marsa al Burayqah petrochemical complex consisting of a 1,000-ton/day fertilizer plant, a 1,000-ton/day ammonia plant, and a 1,000-ton/day methanol plant. A major petrochemical complex is also being developed at Ra's al Unuf with a 330,000-ton/year ethylene plant nearing completion. Additional units at both these complexes are planned but are on hold until Libya's financial situation improves.

Libyan Oil Policy

Given the predominant role of oil sales in the Libyan economy, the generation of revenues is the highest priority goal of the country's oil industry. Indeed,

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Qadhafi reportedly has tasked LNOC to maximize the country's income from crude and product sales by improving the efficiency of oil production and by sustaining the highest petroleum prices and export levels bearable by the market. Despite interest in the highest possible revenues, Tripoli has adhered reasonably closely to its OPEC oil production quota of 1 million b/d to help assure oil price—and earnings—stability while maintaining its historic OPEC market share. At the same time, Tripoli has tried to maintain a reputation as a reliable oil supplier and diversified its customer base to reduce the risk that its sales will be curtailed.

In addition to the continuing primary goal of maximizing its oil revenues, Tripoli has established several general development objectives that are guiding current investment efforts. **25X1, E.O.13526** First among these goals is to maintain Libya's productive capacity. Maximum oil productive capacity has fallen from more than 3 million b/d in the early 1970s to about 1.6 million b/d today, according to our analysis. LNOC is specifically seeking to reverse the deterioration of its oilfields caused by previous shortcomings in maintenance and management by both LNOC and the Western oil operators, **25X1, E.O.13526** major investments in secondary recovery systems, well-workovers, and pipeline repairs will be required to achieve this objective. Maintaining oil productive capacity substantially above production gives Tripoli the option to increase production to maintain oil export revenues in an oil price decline or to maximize revenues caused by oil supply disruptions elsewhere.

To maintain overall productive capacity, LNOC is also making a major effort to develop new oilfields. Tripoli's major investment in the offshore Bouri oilfield leads these activities. We expect this ongoing development effort—by AGIP of Italy—will add at least 75,000 b/d in new oil productive capacity by 1990. Less costly development efforts call for reassessment of the oil potential in Libya's existing oilfields. **25X1, E.O.13526** Qadhafi is particularly interested in determining Libya's overall petroleum potential and has assigned it high priority. the reassessment has already resulted in a refocused well-workover program in key Libyan fields and a number of discoveries near established oilfields that should result in improved oilfield productive capacity.

Management of Libyan Oil Policy

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Mu'ammar Qadhafi personally sets the guidelines for the Libyan National Oil Company. Acting Secretary of Petroleum, Fawzi al-Shakshuki, is Qadhafi's primary policy assistant. Aside from Shakshuki's role, the Ministry of Petroleum does not play a major role in policy formation. LNOC also reportedly has no direct participation in the design of the country's oil policy, and acts only to implement oil industry guidelines.

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LNOC management is under pressure to meet its goals with the threat of political disfavor or even jail if they fail. Pressure reportedly has been increased over the past year because of acute economic conditions. Management, nevertheless, appears to be given a relatively free hand in implementing policy guidelines.

A number of sources say the quality of LNOC top management is fairly good and that the company takes a businesslike, pragmatic approach to operations. Top managers have either been trained abroad and are experienced in the oil industry or are knowledgeable businessmen with access to foreign trained advisers and personnel within LNOC's structure. The chairman of LNOC is Abdallah al Badri, **25X1, E.O.13526** *One of his primary assets is his good political standing with Qadhafi. The quality of LNOC management personnel at the middle and lower levels is reported to be poor.*

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Foreign Company Linkages To Libyan Oil

Foreign companies link to the Libyan oil industry in many diverse and complex ways. Generally, there are four kinds of foreign companies that the Libyan oil industry is heavily dependent on:

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- ***Producing companies,*** *are the most important. These companies work in partnership with LNOC to operate a particular producing system. LNOC is the majority party and controls decisions affecting each particular system, but the minority foreign partners provide the bulk of the management and technical expertise. Operating companies are obligated to purchase a portion of the crude produced in their system by virtue of the equity share they own of the partnership. They receive a price discount—the equity margin—as their return on their investment in the producing system.* 25X1, E.O.13526

- ***Service companies,*** *are critical sources of technology and know-how related to a wide array of industry operations. In particular, service companies provide critical maintenance of downhole equipment, pumps, and other elements of Libya's extensive petroleum infrastructure. They also provide seismic and other services involved with exploration activities.* 25X1, E.O.13526

- ***Construction and engineering companies,*** *manage the large engineering projects involved with modernization and expansion of the industry. Recently, such projects have included the petrochemical complex at Ra's al Unuf and the development of the offshore Bouri field.* 25X1, E.O.13526

- ***Petroleum equipment companies,*** *are sources of equipment and spare parts that are essential for maintenance of production and transportation systems and for refinery operations. With no indigenous manufacturing capabilities of this kind, Libya must look to these companies for all of its oilfield equipment needs.*

Exploration for new oilfields also plays a role in Tripoli's oil program. New onshore and offshore areas can be explored without incurring heavy investment costs. 25X1, E.O.13526 Qadhafi is determined to develop the oil potential of western Libya and is encouraging foreign firms to explore in that region. Offshore prospects include an area north of Tripoli near the large Bouri field and an area west of Bangazi, where AGIP of Italy made a recent discovery according to press releases. 25X1, E.O.13526

New downstream initiatives—into refining, petrochemicals, and marketing—are largely being deferred in the continuing soft oil market except for the recent purchase of Italy's Tamoil operation. LNOC is also trying to expand sales of products from its new 220,000-b/d refinery at Ra's al Unuf. Work is also proceeding on a domestic natural gas network grid to make more gas available for use as a fuel and possible feedstock for the planned expansion of its petrochemical industry.

The objectives set by Qadhafi for the Libyan oil industry are ambitious, especially in light of the soft oil market. There is clearly a shortage of financial reserves to make all the necessary investments.

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Besides serious financial constraints, continued efforts to Libyanize the oil industry work force have hampered progress in numerous areas. 25X1, E.O.13526 some skilled foreign midlevel personnel have been lost, reducing the effectiveness of decisionmaking and weakening implementation of some oil program initiatives.

Foreign Company Involvement in the Oil Industry

Despite Tripoli's efforts to Libyanize the oil sector, the industry is dominated by the presence of foreign companies and workers (table 3). Their presence is dictated by three key Libyan oil industry needs:

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Table 3
Foreign Companies Operating in Libya's Oil Industry

	Activities					Comments
	Production	Oilfield Services	Exploration Services	Construction and Engineering	Equipment Sales	
United States						
Amerada-Hess	x		x			
Baker Oil Tools					x	
Baroid		x				
Brown & Root				x		
Christenson Diamond					x	
Coastal			x			
Combustion Engineering			x x			
Conoco	x				x	
Dresser Industries					x	
Geosource			x			
Halliburton		x				
Lummus Crest, Inc.				x		
Marathon	x		x			
Milcem					x	
Occidental	x		x			
Petty Ray			x			
Pool Interdrill			x			
Sun Oil			x			
C. E. Vetco		x				
Weatherford International					x	
Western Geophysical			x			
W. R. Grace	x					
Austria						
OMV	x		x			
Voest-Alpine					x	
Brazil						
Braspetro			x			
France						
Coflexip					x	Flexible Pipe
Elf	x					
EMH					x	Single point mooring
Forex			x		x	Neptune Drilling services
Dowell Schlumberger		x				
Technip				x		
Usinor					x	OCTG (steel)
CGG			x			

Table 3
Foreign Companies Operating in Libya's Oil Industry (continued)

	Activities					Comments
	Production	Oilfield Services	Exploration Services	Construction and Engineering	Equipment Sales	
Italy						
AGIP	x		x			
Bellili				x		Jacket construction
Bonatti		x				
Dalmine					x	Wellheads
Foster-Wheller (Italy)				x		Petrochemical plant
Marconi					x	Refinery equipment
Mariani					x	Refinery equipment
Micoperi				x		Jacket construction
Montubi				x		
Riva					x	Refinery equipment
Saipem			x	x		
Snamprogetti				x		Offshore Bouri work
Technimont				x		Petrochemical plant
Tecnomare				x		Jacket design
Turbotecnica					x	Gas turbines
Japan						
Marubeni				x		Coke facility
NEC					x	Communication and computer gear
Niigata Engineering				x		
Yokagawa Electric					x	Electric controls
Netherlands						
Shell			x			
Kuwait						
Sante Fe International Corp.			x			
Norway						
EB Communications					x	Telecommunications
GECO			x			
South Korea						
Hyundai				x	x	Topside manufacturer
Samsung				x	x	Oil storage tanks, water injection
Switzerland						
Sulzer					x	Oilfield pumps, turbines
BBC–Brown Boveri					x	Oilfield pumps, turbines, electric gear

Table 3 (continued)

	Activities					Comments
	Production	Oilfield Services	Exploration Services	Construction and Engineering	Equipment Sales	
United Kingdom						
Brown & Root–UK				x		
Davy McKee				x		Ra's al Unuf refinery
General Descaling		x				Pipeline inspection
John Brown				x		Project manager of Bouri field
SSI			x			Seismic services
Imperial Chemical Industries (ICI)					x	
Weir					x	Downhole pumps
Motherwell Bridge Constructors				x		
West Germany						
Deminix			x			
Mannesmann					x	Tubular steel
Siemens				x		Electrical gear
Prakla Seismos			x			
Uhde				x		Petrochemical plant
Veba	x		x			
Thyssen					x	Tubular steel
Wintershall	x		x			
Kloeckner-Humboldt-Deutz				x		
Soviet Bloc						
Bulgarian Oil (Bulgaria)			x			
Rompetrol (Romania)			x			
Tsvetmetpromehksport (USSR)				x		Gas pipeline construction

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- The need for skilled technicians and managers to handle the more complex operations of the oil industry. According to numerous sources, there are shortages of qualified personnel at all levels in the Libyan oil industry, particularly in middle management ranks.

- The need for foreign equipment and services to repair and upgrade the Libyan oil infrastructure. Libya has no domestic oil equipment manufacturing capability and must import all equipment—from steel tubulars to seismic processing computers. Foreign service companies are required for pipeline inspection. Foreign technical assistance is especially critical in Libya's offshore exploration and development program.

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- The need for foreign capital to carry out Tripoli's oil development programs. The drawdown in Libyan foreign reserves has necessitated more foreign equity or barter arrangements that minimize Libyan capital outflows.

Maintaining Production and Revenues

Tripoli is fully aware of its reliance on foreign oil companies, service companies, and personnel for the efficient operation of its oil system and has tried to make working in Libya attractive to foreign companies and personnel. The government has regularly adjusted equity margins for its foreign oil equity partners to maintain their production and presence in Libya. Foreign equity participation and barter arrangements are generally viewed by the foreign companies as particularly profitable investments, All of this has led foreign oil production, service, engineering, and equipment companies to participate actively in the Libyan oil program despite political strains in recent years.

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Besides oilfield expertise and capital investment, operating companies provide an assured crude oil sales outlet. We estimate foreign companies in Libya currently lift about one-third of Libya's production, the exact amount depending upon buyback arrangements (table 4). In a period of market surplus, assured crude oil markets are extremely important to maintaining Libyan revenues. Operating companies are assessed stiff financial penalties if they fail to lift their equity shares.

All Libyan operating companies use equipment and service companies from the United States, Canada, and Western and Eastern Europe for specialized tasks, including well maintenance and workover tasks, artificial lift equipment, installation, and pipeline inspection services. Dowell Schlumberger of France performs electric and wire line logging, cementing, and chemical operations. Italian, French, and US companies have drilling rigs at work engaged in well-workovers. In particular, US companies perform critical downhole equipment and maintenance and pipeline inspection services.

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Table 4
Equity Liftings for Foreign Companies

	Crude Equity Liftings (*thousand b/d*)
Total [a]	**344**
United States	224
Conoco	64
Marathon	64
Amerada Hess	32
W. R. Grace	14
Occidental	50
Western Europe	120
Elf (France) [b, c]	2
Wintershall (FRG)	2
VEBA (FRG) [c]	21
OMV (Austria) [c]	15
AGIP (Italy) [c]	80

[a] These figures exclude buyback arrangements and spot sales, which vary from quarter to quarter. Latest reporting indicates US firms are lifting about 260,000 b/d.
[b] Latest reporting indicates Elf is no longer producing oil in Libya.
[c] These companies are either entirely or partially government owned.

The role of overseas subsidiaries of US companies in serving Libyan needs is particularly complex. Most US manufacturers of oilfield equipment as well as US engineering and service companies have established foreign operations to avail themselves of lower manufacturing costs and trade and tax advantages and as a means of avoiding US export and trade restrictions. A survey of 16 major US oilfield equipment suppliers operating 230 facilities worldwide placed 55 percent of the manufacturing facilities in North America, 18 percent in Europe, 16 percent in South America, and the remaining 11 percent in Africa and the Middle East. Consequently, most oilfield equipment, such as downhole gear-like packers and seals; drilling equipment, such as drill bits; and wellhead equipment, such as blowout preventers and christmas trees, can be

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procured from US manufacturing subsidiaries throughout the world, but particularly in Western Europe. These companies operate under the laws of their host countries and employ primarily local personnel. Consequently, while US companies may be the ultimate source of certain petroleum equipment and services used in the Libyan oil industry, the actual equipment and services may be provided by a foreign subsidiary, especially West European.

Expatriates comprise up to 40 percent of the work force of Libya's operating companies. 25X1, E.O.13526 Based on our estimates and press reporting, approximately 1,000 to 1,200 US citizens are now living in Libya along with 1,500 Canadians, 5,000 British, 1,500 West Germans, 1,200 French, and 16,000 Italians. Although, we do not have a breakdown by occupation, we believe many of these individuals have petroleum-related jobs. Other foreign personnel include Pakistani, Indian, Philippine, South Korean, Maltese, and Dutch workers. 25X1, E.O.13526 Westerners are hired as technicians (machinists and computer specialists), engineers, drilling supervisors, oil pipeline and terminal operators; and Asians are hired for rig operations and as construction contractors and workers. In addition, LNOC has about 100 US, Canadian, British, and Iranian consultants who act as geologists, geophysicists, and engineers. One of the advisers to LNOC is reportedly the former head of the Iranian National Oil Company. As of December 1985, the expulsion of expatriate workers from Libya had not affected skilled foreign workers in the petroleum industry. 25X1, E.O.13526

The quality of foreign personnel has improved because of the worldwide oil slump and the subsequent availability of talent hungry for work. 25X1, E.O.13526 LNOC also tries to make living conditions as pleasant as possible for expatriate workers. For instance, in contrast to the conditions in the rest of the country, the government is assuring that the center of the oil industry at Marsa al Burayqah is a showplace by Libyan standards. 25X1, E.O.13526 Nevertheless, retaining the expatriates reportedly is difficult because they are overworked. Salaries also are not as inviting as in the past. LNOC reportedly has been forcing foreign technicians to accept a percentage of their salaries in Libyan dinars—a nontransferable currency—which effectively lowers their salaries.

Boosting Capacity

Besides maintaining the productive capacity of existing oilfields, foreign producing companies operating in Libya are involved in the development of new oilfields. Producing companies provide the capital and development plans, and foreign oil service companies carry out the actual development work. The most important new oilfield project is the offshore Bouri field, the largest oilfield yet developed in the Mediterranean. The Italian oil company AGIP is developing the field near the Tunisian border north of Tripoli at an estimated cost of more than $2 billion. 25X1, E.O.13526 the project is being financed 81 percent by LNOC and 19 percent by AGIP. Plans call for two drilling and production platforms to be set in 165 meters of water and the drilling of 50 wells. Recoverable reserves are estimated at 500 million barrels. First-phase production is expected to flow into moored tankers at the rate of 50,000 to 75,000 b/d in late 1987 with full production by 1990. maximum field capacity at 150,000 b/d, a AGIP estimates capacity at 75,000 b/d because of a higher-than-expected gas content in the crude.

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The Italian Government is reportedly involved in this project primarily because most of the planned construction work will be carried out by Italian firms, and it will secure a 20-percent share of the oil produced. Besides Italian companies, French, British, Norwegian, and Korean firms also are participating in this scheme. The entire project is being developed without US-built equipment or services, according to available information.

Exploration

Although the Libyan operating companies of AGECO and Sirte have the most active exploration programs, numerous foreign companies are also involved. We

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estimate LNOC has budgeted about $610 million for oil exploration in 1986, representing a 10-percent increase over the 1985 budget. The key players include not only foreign producing companies, such as OASIS, Occidental, and AGIP, but also companies holding undeveloped concessions in Libya, such as Bulgarian Oil from Bulgaria, Rompetrol from Romania, and Braspetro from Brazil.

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Qadhafi is determined to develop the oil potential of western Libya near the Algerian border and is encouraging foreign firms to explore in that region. The Romanian company, Rompetrol, has discovered a number of smaller oil deposits in this region.

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Downstream Activities

Libyan efforts to develop the downstream sector of its petroleum industry have been sharply curtailed by the severe drop in Libyan oil revenues and the excess capacity in the worldwide refinery and petrochemical industries. Most important, a second export refinery of 220,000 b/d at Misratah has been put on hold until financial and market conditions improve, as have the second-phase developments of the petrochemical complexes at Marsa al Burayqah and Ra's al Unuf. Libya's domestic natural gas development plans have likewise been affected by current conditions. If Libya's financial picture improves, all of these downstream plans will be contingent on the availability of foreign equipment and services.

Impact of Economic Sanctions

The heavy dependence of the Libyan oil industry on foreign companies makes it extremely vulnerable, in principle, to economic sanctions. As in all such cases, however, the eventual impact of sanctions depends upon the uniqueness and range of the denied goods and services and the international scope of the sanctions imposed.

Experience With Limited Controls

The United States has maintained since 1982 unilateral controls on exports or reexports to Libya of US-origin goods and technology. Although far short of outright denial of trade through sanctions, these measures allowed the United States to restrict the flow of certain goods and services to Libya. The controls required a validated license from the Department of Commerce for the export to Libya of virtually all US-origin equipment and technology other than food and medical supplies. Because of the widespread foreign availability of most petroleum equipment,[2] licenses were generally approved for most petroleum equipment, except for those items that had dual civilian-military uses or would contribute to the development of the refining and petrochemical processing complex at Ra's al Unuf.

The most noticeable effect of US export controls on Libya's petroleum industry was the inability to acquire state-of-the-art computer equipment. In a few areas, such as array processors, the lack of access handicapped the oil industry's ability to process large quantities of seismic data efficiently and effectively. In other areas, the effect was limited to the increased time and cost spent in acquiring US-embargoed equipment through middlemen. Except for computer equipment, the Libyans were able to acquire the full range of petroleum equipment necessary to maintain capacity from non-US manufacturers,

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Sanctions in the Near Term

The new, wider ranging economic sanctions announced by the United States go well beyond the trade controls imposed in 1982. The US sanctions will

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be disruptive to the Libyan petroleum industry for several months at least, if the US producing and service companies pull out or are forced out of Libya. The abrupt withdrawal of these US companies could result in a modest short-term drop in Libyan oil production in our opinion; a phased withdrawal would have a smaller impact. Any resulting production decline, however, would most likely be temporary and inflict limited hardship on the government. The number of US oilfield workers in Libya, for example, is no more than 500 to 800. The Libyans could rely on domestic personnel and workers from Western Europe, Canada, and the Soviet Bloc for assistance. Applications by Canadians exceeded demand by a ratio of 4 to 1 following the withdrawal of US personnel in 1982, a situation that probably would still prevail. Much of the foreign labor force of US oil firms operating in Libya probably could be persuaded to remain. Moreover, most US companies provide services to Libya through their West European subsidiaries, often using European personnel, so they would be immune to the US sanctions. Occidental might be able to continue its Libyan production operations because they are administered from the United Kingdom.

Although production might hold up fairly well, the departure of US operating companies would complicate the marketing of Libya's crude. Prior to the sanctions, US companies received a margin of about $2 per barrel for lifting as much as 200,000 b/d of Libyan crude—about 20 percent of current output—as compensation for their equity holdings. The companies then either processed the crude in their own downstream operations outside of Libya or sold the crude on the spot market. As for Tripoli, it must now find buyers to replace the assured offtake of US companies—a move that will probably require price discounts to attract new customers away from existing arrangements. Even if sufficient new buyers are found for the equity oil, the required price discount may exceed the presanctions equity margin, eroding Tripoli's oil revenues somewhat.

Trends over the past few years have worked to lessen the impact of the removal of US petroleum equipment companies from Libya. Within that period, European and Asian equipment companies—including US subsidiaries—have gained a dominant position in Libya's petroleum goods markets. Several subsidiaries already are supplying the Libyans with many of the standard items usually provided in the past by US-based firms. In addition, Italian, French, and British companies working in Libya probably are easily replacing standard supply items, such as drill pipe, needed by the Libyans. Although replacement parts for US-manufactured pumps, compressors, and other equipment might be harder to obtain, suitable substitutes probably can be procured from European subsidiaries of US firms or the USSR. If these efforts failed, the Libyans could replace the equipment at greater expense with new systems.

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Although near-term production and revenues might see some temporary erosion as a result of US sanctions, Tripoli's development, exploration, and downstream activities seem more insulated. The major push offshore to develop the Bouri field is being overseen by AGIP, an Italian firm, with John Brown Engineering, a British firm, as project manager. Other firms from Italy, France, Norway, and South Korea are providing services and equipment. Firms from Italy, France, Brazil, Bulgaria, Romania, West Germany, the Netherlands, and the United Kingdom are heavily involved in exploration activity along with US firms and could step in quickly to fill any gap. The downstream refinery and petrochemical activities are primarily the domain of construction and equipment companies from Italy, West Germany, the United Kingdom, and Japan.

Longer Term Prospects

The longer term impacts of the US sanctions depend primarily on the extent to which other countries follow suit. Among the allies, the United Kingdom has few trade and financial ties to Libya, and those that exist are of little importance to London. Many factors, however, work against a significant widening of the international scope of the sanctions. Several countries hold large Libyan debts that can be repaid

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only through oil exports. Many countries also see the potential of gaining large construction contracts in Libya and do not want to endanger their prospects. Some countries, especially in the Mediterranean area, probably also fear Libyan reprisals for any actions taken in support of the US sanctions:

- France in early 1983 reportedly agreed to augment its imports of Libyan crude in return for Libyan promises to consider French companies in public works contracts and to pay past-due bills owed French exporters—which probably total about $100 million. Libya supplies about 3 percent of France's petroleum needs. Although Qadhafi's movement into Chad has caused Paris to curtail military shipments to Libya, imports of crude oil have not been reduced much during the past two years.

- Italy is Libya's largest trading partner in Europe, and Italian officials have placed considerable importance on trade ties in justifying Rome's maintenance of normal relations with Tripoli. Libya's serious arrearage problem—$800 million—with Rome, however, is clouding this relationship. Qadhafi has linked the payment of arrearages to increased Italian imports of Libyan oil and gas. Italy also has a substantial stake in the development of Libya's large offshore oil resources.

  While economics is at the heart of the relationship, political and security aspects have gained prominence in recent years. Concern about Libya's ability to threaten Italian interests has increased in Rome, and we believe that Qadhafi plays on these fears in his effort to intimidate the Italians. Qadhafi repeatedly has threatened to attack military bases in Sicily and elsewhere if they are used to stage a strike against Libya. The significant economic ties and heightened security concerns probably will make Rome reluctant to reduce imports of Libyan oil, or other commercial ties, in the near term. Prime Minister Craxi, however, recently ordered a special study of its overall trade with Libya and hopes to gradually scale down economic ties.

- West Germany's economic ties to Libya are significant, and Bonn would resist measures jeopardizing them. Libyan oil accounts for 9 percent of West Germany's needs, and, barring Libyan outrages, Bonn probably will be unwilling to reduce the amount.

- Greece relies on Libya for about one-fourth of its oil imports and probably would be unwilling to decrease this trade in the near term. Athens enjoys its trading relationship with Tripoli because Libya is one of the few countries willing to engage in barter arrangements with Greece.

- South Korea has significant trade ties to Libya and the Dong Ah company has the largest share—$3.3 billion out of $7 billion—of Qadhafi's Great Man-made River project. According to a reliable source, Tripoli has suggested that South Korean firms take as much as 150,000 b/d of oil in barter for existing contracts and to ensure further consideration for lucrative Libyan construction contracts. Seoul probably would be unwilling to reduce its oil imports or abandon its large engineering and construction commitment.

- Turkey has experienced significant problems in gaining Tripoli's cooperation in meeting long-overdue commercial arrearages to domestic firms. Turkey's oil imports from Libya are linked to Tripoli's repayment of these debts, and they are unlikely to be reduced any time soon.

- Austria takes Libyan oil as a means of diversifying petroleum supplies. A growing interest in direct participation in Libya's petroleum sector and iron and steel industry weigh against Austria being persuaded to reduce its purchases of Tripoli's crude oil in the near term.

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Given time, Tripoli could offer the US oil concessions to non-US oil companies under terms that would be enticing even in the present soft oil market. Alternatively, Libya could choose to nationalize the assets of US companies and operate them with foreign technical assistance as happened after Exxon's withdrawal from Libya in 1981. With the present glut in the petroleum equipment and services markets, Libya

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would probably have little trouble arranging, in the long run, to operate without the involvement of US companies, if the economic sanctions remained unilateral. [ ]

On the other hand, a broader set of sanctions involving, for example, the NATO countries, including France, would impose considerable, long-lasting damage on the Libyan oil industry:

- About half of present revenues would be lost if not replaced through adjustments in trade pattern involving the international oil market as a whole.
- Companies from South Korea, Japan, Brazil, and the Soviet Bloc might replace the services and equipment lost from NATO countries but at a significant overall reduction in effectiveness. This cost would be evident increasingly over time through increased physical deterioration of the production system, a fall in maximum sustainable capacity (MSC) as production declines outpaced new development projects, and decreased replacement of reserves through exploration. [ ]

We believe an effective allied-wide economic boycott of Libya would succeed only if Italy is a major participant. Besides American companies, the Italian oil company AGIP has the largest equity stake in the Libyan oil industry and gains most from Libyan oil exports. Moreover, Italian investment in the Bouri offshore oil development program is the largest ongoing investment activity in the petroleum sector by any foreign company. Even if Rome acts fully in concert with the United States, the likelihood that other European governments will follow suit is probably still small. [ ]

How Qadhafi Will Play the Sanctions

Qadhafi probably will use economic reprisals to marshal support for even greater domestic austerity and to blame Washington for any further deterioration in economic conditions. Qadhafi is unlikely, however, to detain US citizens or to take them hostage. Following the imposition of sanctions in 1982, for example, Qadhafi even helped expedite the departure of US citizens as a propaganda ploy. Qadhafi probably believes any move against US personnel would be used to justify a US military strike against Libya, which he is probably reluctant to encourage. Qadhafi may even offer lucrative incentives to regain the services of select highly skilled workers. [ ]

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