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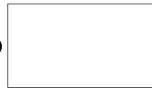
Directorate of Intelligence

The Libyan Oil Industry: Dependence on Foreign Companies



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An Intelligence Assessment

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January 1986

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The Libyan Oil Industry: Dependence on Foreign Companies

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An Intelligence Assessment

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 or secure

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The Libyan Oil Industry: Dependence on Foreign Companies

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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. 25X1

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. 25X1

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. 25X1

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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.

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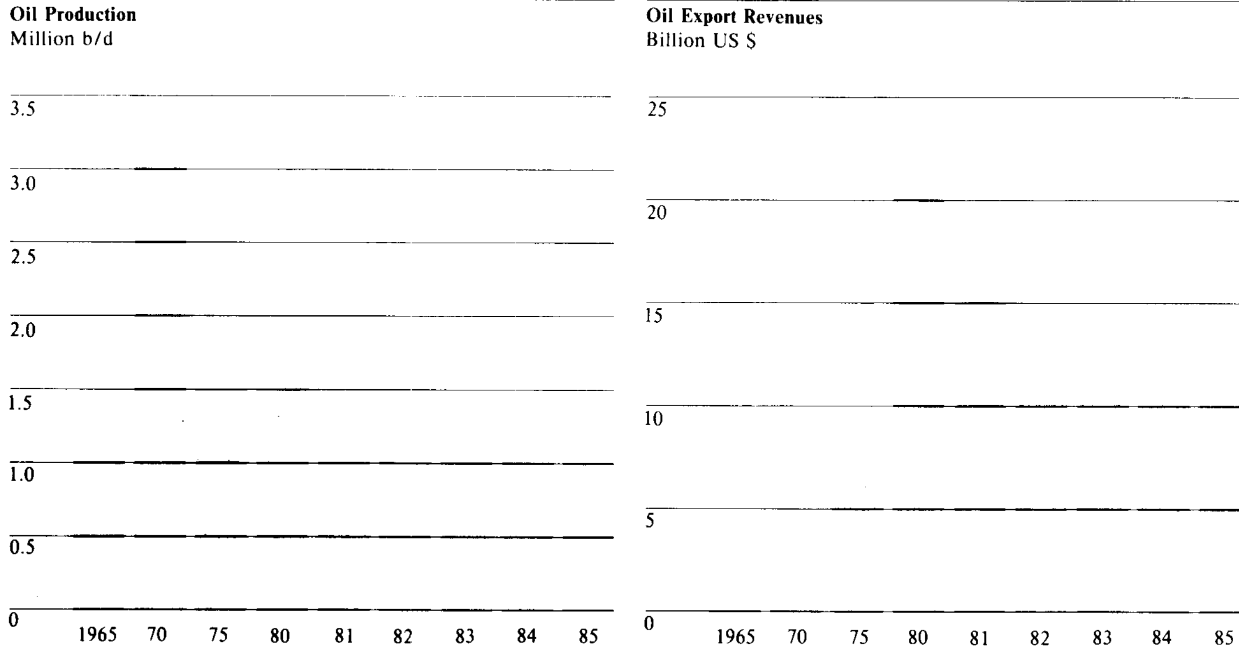
Figure 1
Libya: Oil Production and Revenues From Oil Exports, 1965-85



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The Libyan Oil Industry: Dependence on Foreign Companies

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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,

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Libya's major oil customers are the West European–OECD countries, which purchase roughly 80 percent of total Libyan oil exports 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.

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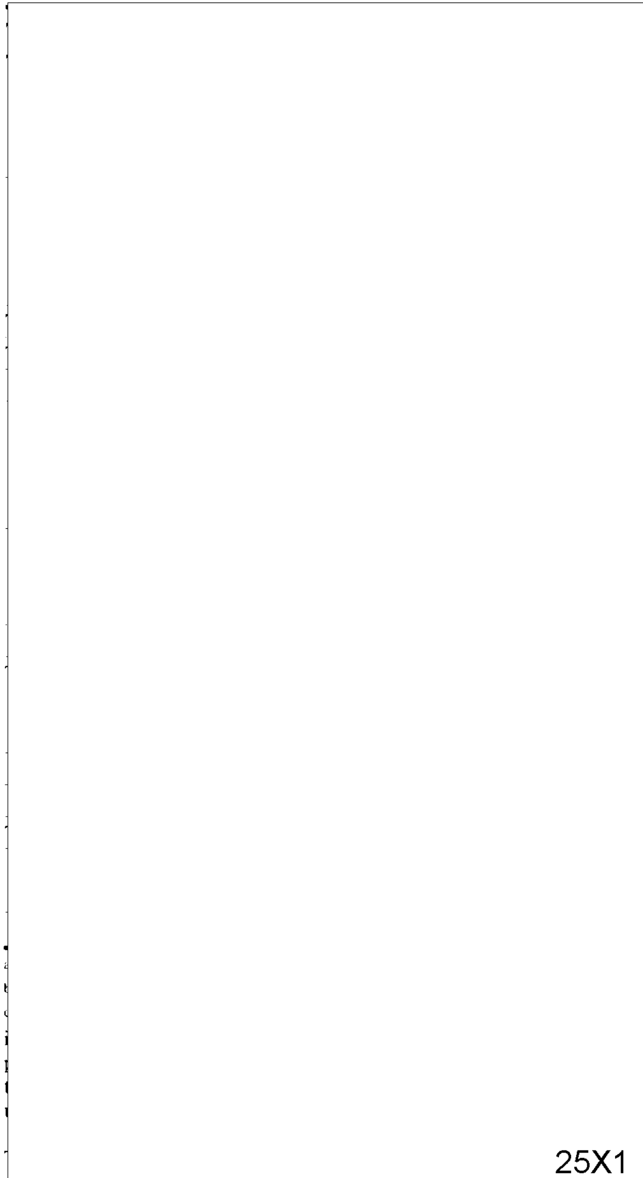

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Dimensions of the Oil Industry

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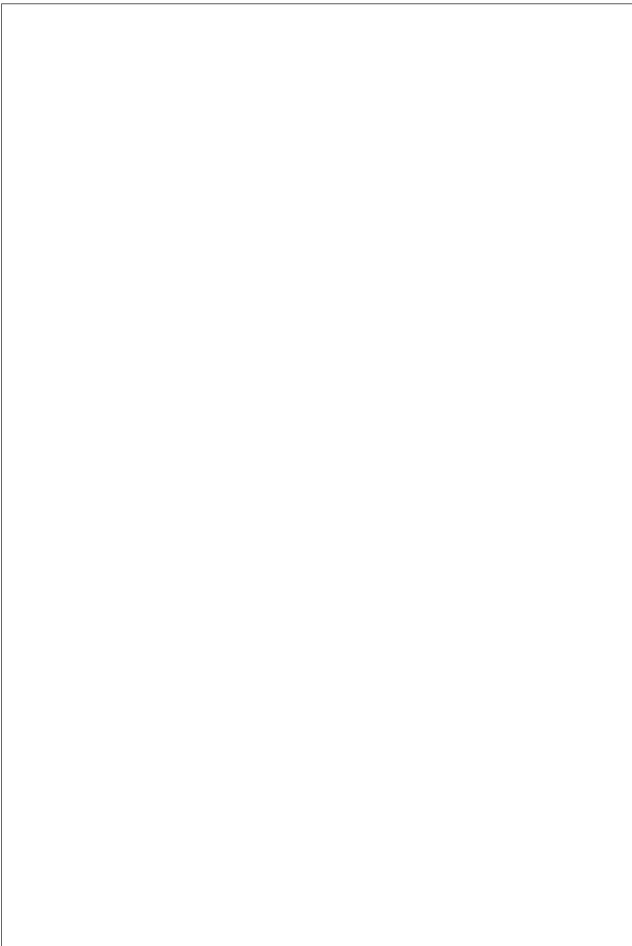
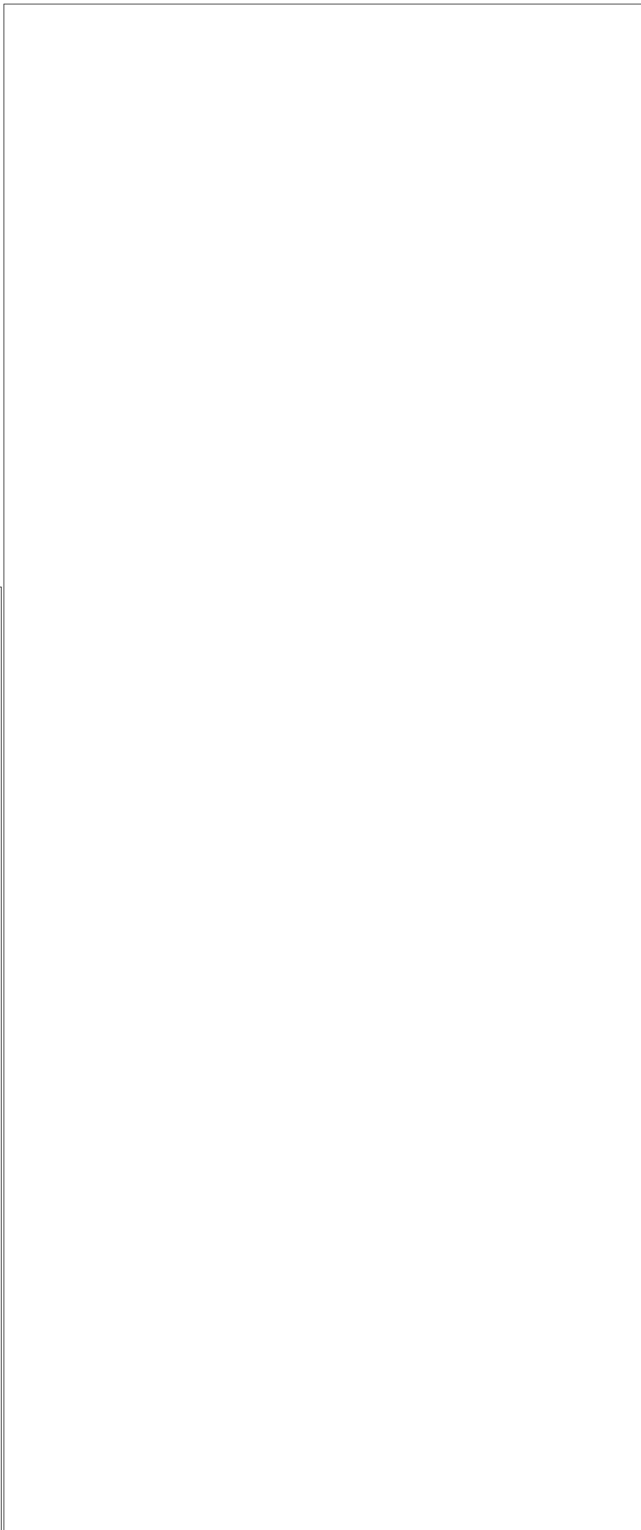
to about 1.6 million b/d because of inadequate oilfield maintenance and a more conservative approach to managing Libya's national petroleum resources. Nonetheless, Libya's excess capacity represents about 20 percent of that outside the Persian Gulf. Moreover, Libya's crude is premium quality—therefore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





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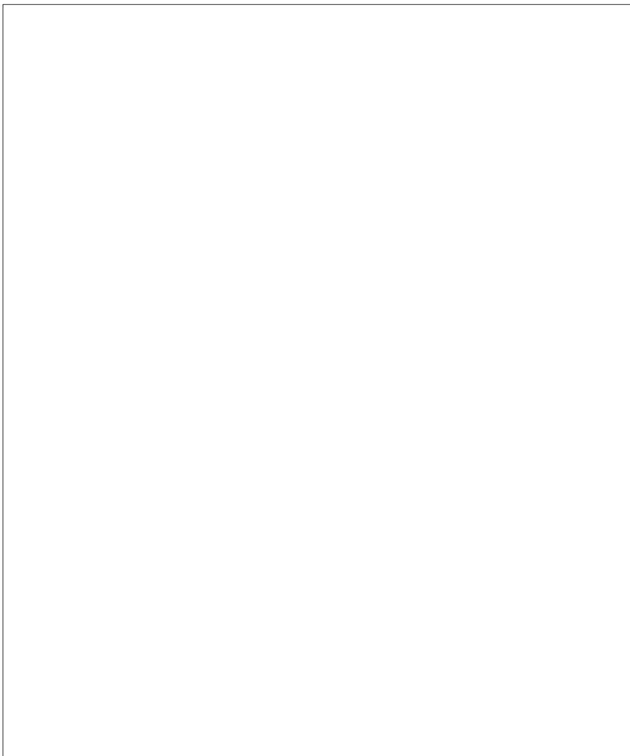

Other Oil Industry Programs

Although crude oil still provides the bulk of Libya's earnings, the role of natural gas, refined products, and petrochemicals is becoming increasingly important. 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,

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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.

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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

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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. 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 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 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.

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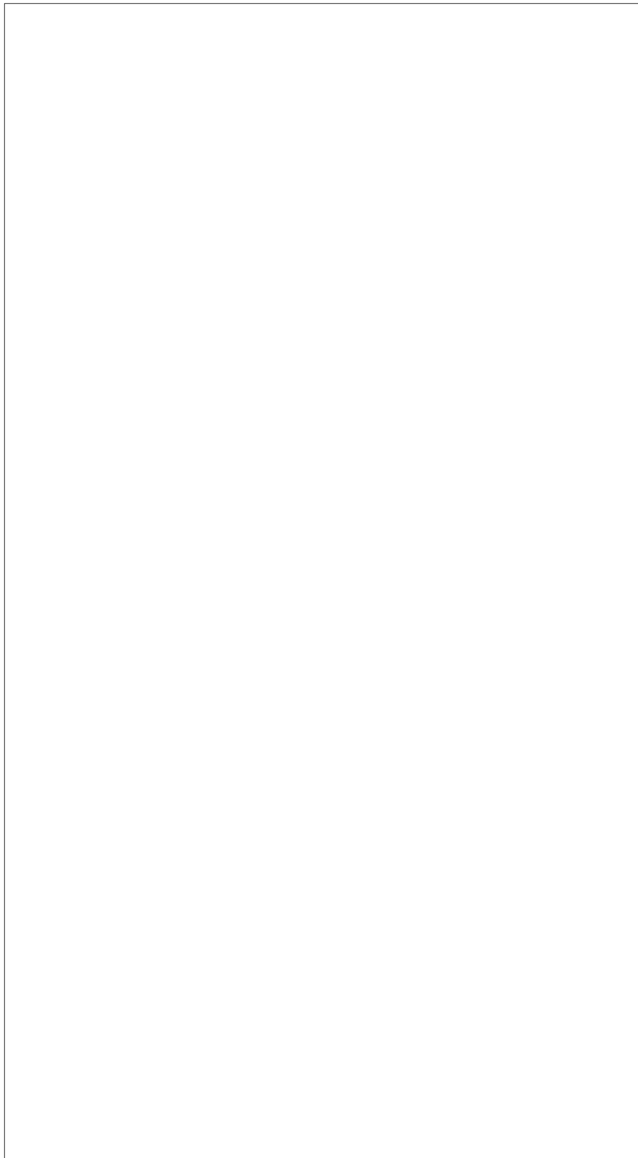

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New downstream initiatives—into refining, petrochemicals, and marketing—are largely being deferred in the continuing soft oil market except for the recent purchase of Italy's Tamoil operation. LNOC is also trying to expand sales of products from its 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.

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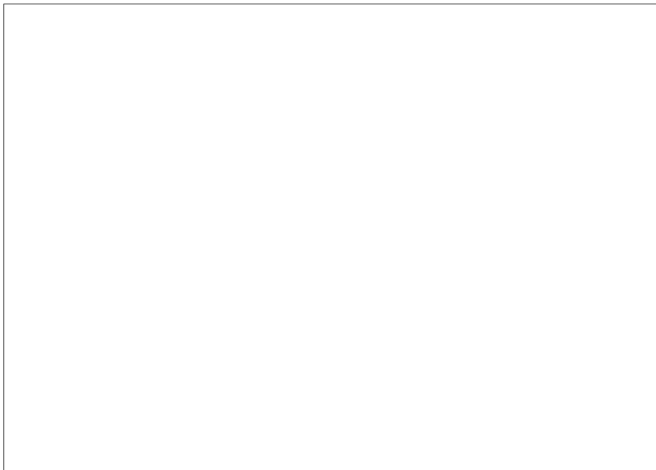

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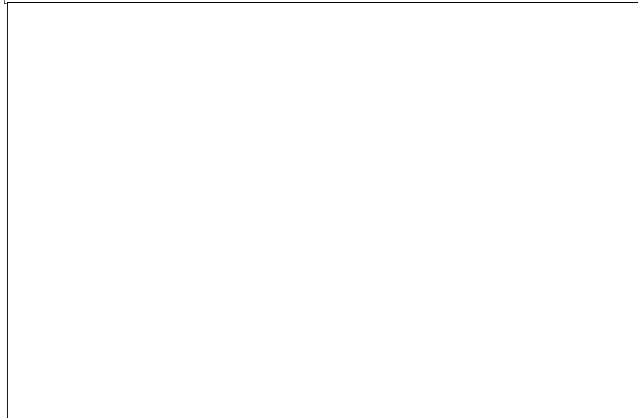

Foreign Company Involvement in the Oil Industry

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			

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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

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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
SSL			x			Seismic services
Imperial Chemical Industries (ICI)					x	
Weir					x	Downhole pumps
Motherwell Bridge Constructors				x		
West Germany						
Deminix			x			
Mannessmann					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. [redacted] 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.

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.

Table 4
Equity Liftings for Foreign Companies

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	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.

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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. 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. 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.

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. 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.

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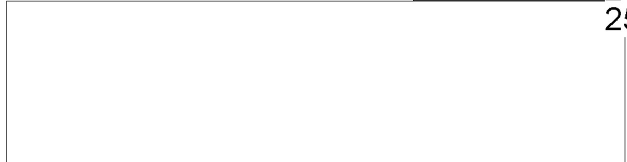

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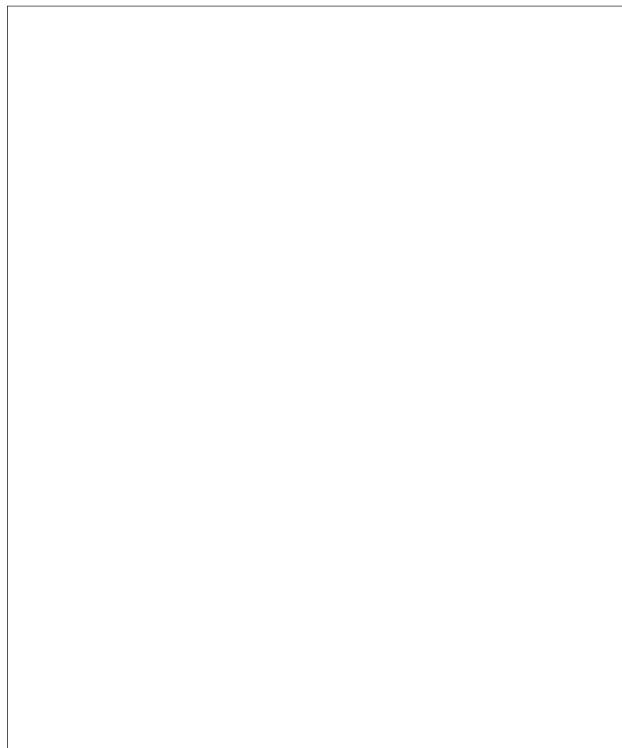

Downstream Activities
Libyan efforts to develop the downstream sector of its petroleum industry have been sharply curtailed by the severe drop in Libyan oil revenues and the excess capacity in the worldwide refinery and petrochemical industries. Most important, [redacted] a second export refinery of 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. [redacted]

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. [redacted]

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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. [redacted]

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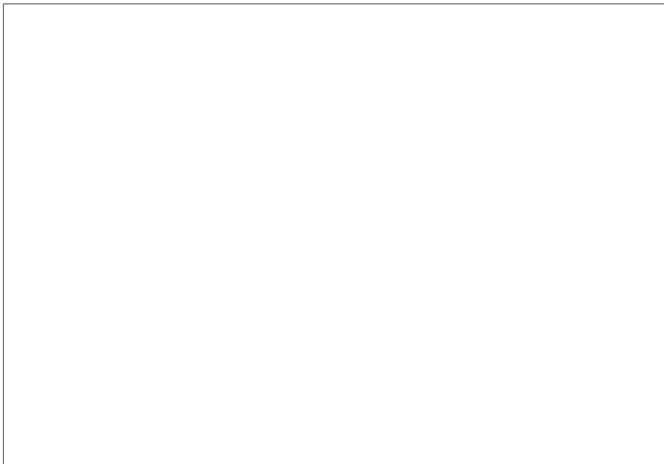

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Sanctions in the Near Term
The new, wider ranging economic sanctions announced by the United States go well beyond the trade controls imposed in 1982. The US sanctions will

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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.

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.

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