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South Yemen's Oil Resources: The Chimera of Wealth



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A Research Paper

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South Yemen's Oil Resources: The Chimera of Wealth

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A Research Paper

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This was prepared by [Redacted]
[Redacted] Office of Near Eastern and South
Asian Analysis, and [Redacted]
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**South Yemen's Oil Resources:
The Chimera of Wealth** [Redacted]

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Scope Note

This Research Paper examines South Yemen's oil potential and the impact of oil development on its economy, domestic politics, and foreign relations. This is the second, and more speculative, study assessing the oil potential of the two Yemens. [Redacted]

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[Redacted] Our evaluation of South Yemen's oil potential is based on the results of contract studies that estimate the quantity of recoverable oil and gas resources with the aid of photogeology and industry-standard methods of subsurface geologic analysis. These studies permitted us to identify prospective petroleum areas and estimate the amount of recoverable oil and gas in South Yemen. [Redacted]

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**South Yemen's Oil Resources:
The Chimera of Wealth**

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Summary

*Information available
as of 31 August 1988
was used in this report.*

South Yemen's potentially recoverable oil resources amount to at least 5 billion barrels, about the same level of reserves as in Egypt, according to a contractor study and our own analysis. The Soviet Union, Aden's primary benefactor, is developing the bulk of South Yemen's oil resources, but Aden is frustrated with the slow progress of Soviet drilling and is seeking greater participation by Western firms. We believe Moscow will accommodate Aden's request to accelerate development efforts by increasing its drilling activity and accepting Western technology and equipment. Under this scenario, South Yemen oil exports could reach 100,000 barrels per day (b/d) by 1990 and 500,000 b/d by the mid-1990s. Aden's share of the oil revenues could total nearly \$300 million in 1990 and about \$2.5 billion annually by mid-decade.

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Oil earnings will ease significantly South Yemen's strained finances and provide the regime with considerably greater flexibility in policymaking, but will be inadequate to resolve Aden's deep-seated economic problems. South Yemen is among the most underdeveloped countries in the world, and it will continue to rely heavily on remittances from Yemenis working abroad as well as foreign grants and loans. Noticeable progress in improving social services, upgrading the country's infrastructure, and expanding agricultural and industrial production probably will have to wait at least until the early-to-middle 1990s, when production and oil revenues should begin to increase substantially.

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The regime certainly will try to use growing oil revenues to consolidate its political power in the wake of the 1986 civil war. It will seek to expand the control of the South Yemeni Socialist Party over all institutions of the state—particularly the military, which poses the greatest challenge—and further into the countryside where the vestiges of tribalism remain influential. Oil revenues alone, however, will not provide South Yemen with political stability. We believe that competition for control of the oil wealth probably will deepen existing political and regional divisions and intensify Aden's chronic leadership factionalism. At the very least, this will prompt a leadership reshuffle in the near term.

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Oil revenues will complicate relations between South Yemen and its Arab neighbors, which distrust Aden's intentions and suspect that the current moderate trend in South Yemen's foreign policy is merely a tactic to obtain financial assistance. They fear that a South Yemen strengthened by oil

revenues will again engage in a confrontational policy toward them. North and South Yemen recently signed a border accord, but they will have difficulty overcoming their deep historical animosity, and their rivalry will be further intensified by their race to develop their respective oil resources. Nevertheless, we believe South Yemen and the neighboring states recognize the advantages of some sort of accommodation and that disputes are likely to remain localized. [REDACTED]

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South Yemen is unlikely to alter significantly its relationship with Moscow—its primary benefactor—as a result of oil developments. Pro-Soviet hardliners within the regime remain powerful enough to prevent dramatic change. Nonetheless, the advent of oil revenues will offer Aden the opportunity for greater flexibility in its foreign policy and may prompt it to adopt a more nonaligned stance. We believe that the Soviets, as long as Aden maintains the present good relationship and does not restrict their access to its port facilities and airbases, will be unwilling to put that relationship at risk by working to prevent South Yemen's movement toward a more balanced foreign policy. [REDACTED]

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We believe the participation of Western oil companies in South Yemen's oil development will lead to expanded commercial ties to Western states as Aden seeks their assistance to develop its economy. Aden also probably will seek corresponding political ties to Western countries that offer economic benefits. South Yemen has been wary of dealing with the United States because of longstanding distrust, ideological differences, and almost certain Soviet disapproval. Nevertheless, we believe that Aden now sees value in at least limited diplomatic ties as a means to facilitate access to Western aid organizations and help balance Soviet influence. [REDACTED]

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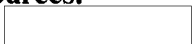
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South Yemen's Oil Resources: The Chimera of Wealth



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South Yemen's Oil Industry: A Status Report

Fifty years of episodic oil exploration in South Yemen has only recently met with success. Exploration focused on the eastern part of the country until the mid-1980s, when the discovery of North Yemen's Alif field led to substantial exploration interest in South Yemen's adjacent Shabwah Governorate. The Soviet Union began exploring the Shabwah area in 1985 and discovered oil in late 1986, but this was not announced until April 1987. By November 1987 the Soviets had discovered three oilfields in the governorate, and South Yemen announced that the fields contained about 3.5 billion barrels of oil. We believe this figure to be an estimate of oil-in-place; the amount of oil commercially recoverable probably is closer to 800 million barrels.¹

current production from the fields is only a minuscule 400 barrels per day (b/d), and it is trucked to the Aden refinery.

Western firms also are participating in South Yemen's oil development, but they have yet to make a discovery. According to press reports, a consortium of Kuwaiti, French, and US firms was awarded a contract to explore part of the East Shabwah Basin last year. Other oil companies from the United States, France, and the United Kingdom have signed exploration and production agreements to explore for oil outside the Shabwah area, according to press reports. A subsidiary of a US company began drilling operations in South Yemen in early June 1988.

¹ South Yemen probably has more than 20 billion barrels of oil-in-place. Oil-in-place is the estimated total amount of oil in a region's reservoirs and is a first measure of a region's oil potential. For both economic and technical reasons, however, most of the oil-in-place cannot be recovered.

South Yemen's Oil Potential

On the basis of a contract study and our analysis, we estimate that potentially recoverable oil resources in South Yemen amount to at least 5 billion barrels.

This represents:

- About the same amount as Egypt's reserves.
- An amount sufficient to support production of 500,000 b/d for more than 20 years.

Our estimate is intentionally conservative because of the limited geological and geophysical information available. We believe that South Yemen's potential recoverable oil resources could be considerably larger than our estimate because the country's most promising oil basins are geologically analogous to adjacent oil-rich basins in North Yemen.² Moreover, deposits of oil and gas probably exist in the newly created neutral zone along the disputed border between North and South Yemen that the two recently agreed to develop jointly.

Analysis of South Yemen's geologic characteristics indicates the presence of the conditions necessary for generating and accumulating large quantities of oil. Source rocks needed to generate the oil are widespread and locally thick. Reservoir rocks have good porosity and permeability—which will facilitate production—and the natural seals necessary to keep oil in the reservoirs are generally good. Like North



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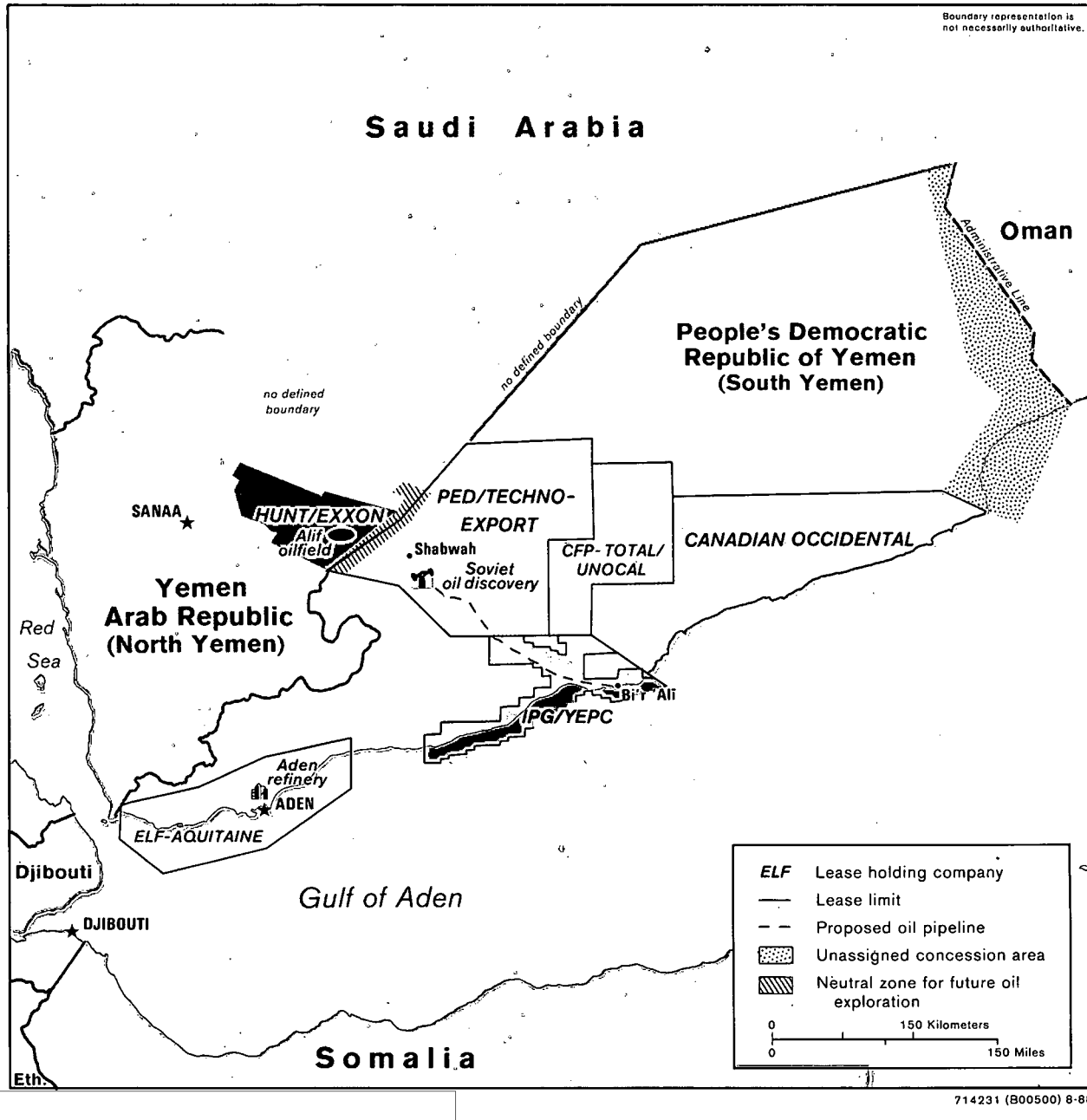
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Figure 1
Oil Concessions, Oil Facilities, and Proposed Oil Pipeline in South Yemen



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Yemen, South Yemen has many structures that can trap oil, some of which could hold several hundred million barrels of oil. [redacted]

Oil-in-Place and Potentially Recoverable Oil

The limited extent of exploration and development in South Yemen makes it difficult to determine the portion of recoverable oil-in-place. Our estimate of 4-6 million barrels of recoverable oil, therefore, is based on a combination of the available data and the typical recovery rates in the region. Oil production experiences elsewhere in the Arabian Peninsula suggest that South Yemen can expect to produce between 20 and 40 percent of its oil-in-place. Because the actual proportion depends largely on specific reservoir conditions and production techniques, our analysis assumes a conservative recovery efficiency of 20 to 30 percent for South Yemen. [redacted]

The bulk of South Yemen's oil reserves is located in Shabwah Province and is being developed by the Soviet Union. The East Shabwah Basin probably has the best long-term oil potential in South Yemen, with more than 3 billion barrels of recoverable oil. The West Shabwah Basin possibly has more than 2 billion barrels of recoverable oil. Our analysis suggests that the two basins are extensions of North Yemen's Ma'rib-Al Jawf Basin, which is the site of North Yemen's 150,000-b/d Alif field, and may contain several billion barrels of recoverable oil. [redacted]

The Hadhramaut region and the Balhaf Basin also are promising but on a much smaller scale than the Shabwah basins. Our analysis indicates that each of these areas could have more than 300 million barrels of recoverable oil. Oil companies have explored the Hadhramaut region since the 1930s, and, although no fields have been developed, the US Embassy in Sanaa reports that several Western oil companies believe the area has good potential. The Balhaf Basin also lacks producing fields, but industry interest apparently remains high. Although the Aden-Abyan Basin is poorly explored, it appears to have only limited oil potential. [redacted]

Exploration and Drilling Activities

Oil exploration and drilling activity by the Soviet Union has proceeded slowly since the initial discovery in 1986. Since then, the Soviets have drilled only a half dozen wells in the Shabwah area, an extremely slow rate by Western standards or in comparison with the exploration effort under nearly the same conditions in North Yemen. According to the US Embassy in Sanaa, each of Aden's wells so far has taken three to nine months to complete as compared with about 30 days for North Yemeni wells, which are being drilled by a US company. The Embassy also reports that the Soviets are having operating difficulties at the few wells that are pumping oil. [redacted]

Progress appeared to have picked up in January 1988 when the Soviet Union agreed to develop several oilfields in the Shabwah area and to construct a 225-kilometer pipeline to Bi'r 'Ali on the Gulf of Aden. South Yemen has announced that construction on the pipeline will begin in the fall of 1988 and is scheduled to be completed by late next year. The pipeline will be able to export 50,000 to 100,000 b/d initially, with its capacity rising eventually to 500,000 b/d. [redacted]

Aden's oil development program is expected to focus on expanding the Shabwah fields during the next several years. According to press reports, Moscow has committed \$200 million through 1990 to finance development of the oilfields and construction of the export pipeline. The Soviets plan to develop at least two of the three fields in northern Shabwah—Amal and East and West Iyad—during 1988, and are both delineating the fields and continuing to explore elsewhere in northern Shabwah. The US Embassy in Sanaa reports, however, that the Soviets have scheduled to drill only 11 wells this year as compared with 25 production wells drilled in North Yemen the year before Sanaa started exporting oil. Prospects for developing commercial fields outside of Shabwah

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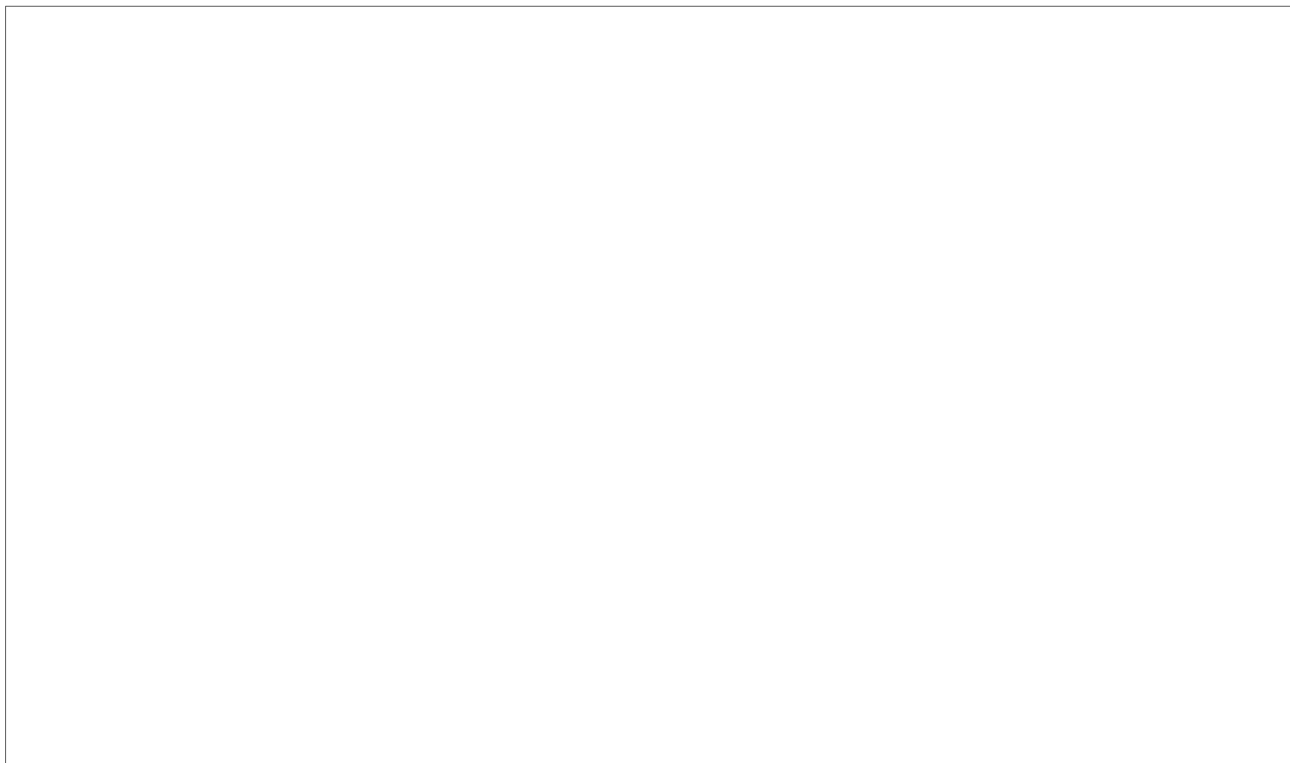
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Figure 2
Oil Resource Potential by Geologic Basin in North and South Yemen



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anytime soon are limited unless drilling activity accelerates. In our judgment, these few areas will not contribute substantially to Aden's oil production until the mid-1990s at the earliest. [redacted]

The slow pace of Soviet exploration and development operations has frustrated Aden and has encouraged it to seek Western participation. According to US Embassy reporting [redacted] Aden has complained about the low quality of Soviet work, the slow pace of drilling, and Moscow's unwillingness to provide timely progress reports. [redacted]

[redacted] a growing number of South Yemeni oil officials have come to realize that Moscow's oilfield technology and drilling techniques are inferior to those of the West and that Western firms will work more quickly and less expensively than the Soviets. [redacted]

According to press reports, several Western firms have been offered concessions in areas adjacent to Moscow's Shabwah oilfields. The US Embassy in

North Yemen reports that Aden recently asked a US company for expertise in enhanced oil recovery techniques and handling difficult oil reservoirs. Moreover, the announced oil export pipeline agreement with Moscow permits the subcontracting of work to non-Soviet companies. [redacted]

Oil Production Possibilities

The pace of development of South Yemen's production and export capacity will depend on the frequency of Soviet drilling and the degree of Western participation. If the Soviets continue their slow pace and reject Western assistance, South Yemen probably will not meet the late 1989 pipeline completion date. Our engineering studies indicate that, at the current rate of progress, production capacity would reach only 85,000 b/d in 1990 and would not reach a total production capacity of 500,000 b/d before 1995. [redacted]

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The Soviet Union probably will accommodate Aden's desire to intensify development by increasing its drilling activity and accepting some Western technology and equipment. According to press reports, Aden and Moscow agreed in June to speed work on oilfield development and the export pipeline. Under this scenario, South Yemen probably could complete by late 1989 the pipeline, export terminal, and wells and facilities capable of supporting production of 100,000 b/d. A relatively small, 24-inch-diameter line with one pump station could be built with an initial capacity of 100,000 b/d. The pipeline's capacity could then be increased to 300,000 to 500,000 b/d, at a small cost, by adding a second pump station. To meet the late 1989 completion date, however, construction of processing equipment and export facilities would have to start by late 1988. Indications that activity is picking up would include:

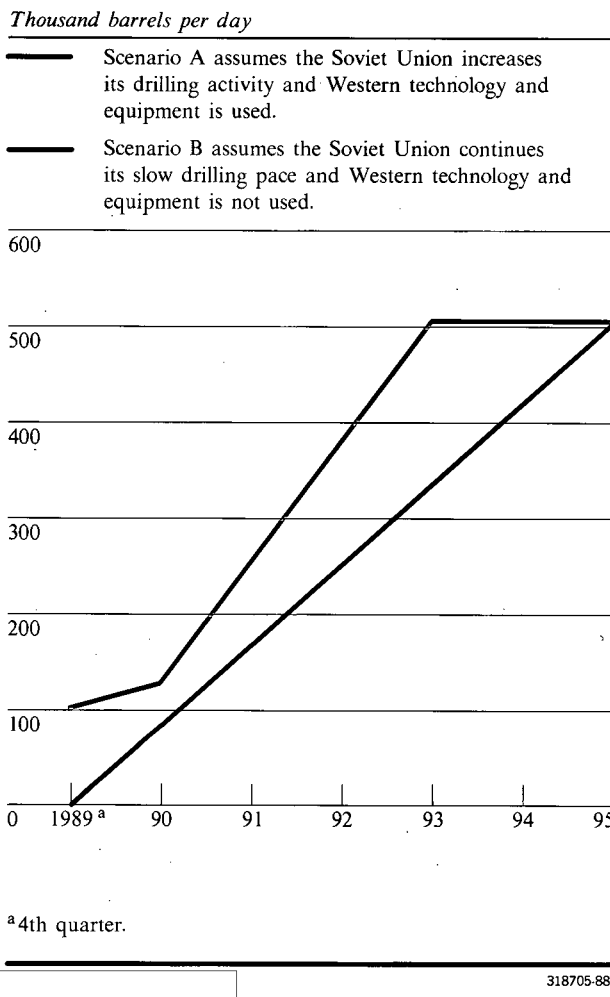
- Purchases of large quantities of drilling pipe, well-heads, and drilling mud.
- Construction of field processing equipment such as gas-oil separators and connecting flowlines.
- Trenching and pipeline-laying activity on a large scale.
- Construction of export facilities along the coast near Bi'r 'Ali including storage tanks or the positioning of floating storage facilities.

If the 100,000-b/d production level is reached by late 1989, production capacity could be expanded to slightly more than 125,000 b/d by 1990, and then increased steadily to 500,000 b/d by 1993, a production rate we believe the Shabwah oilfields could sustain comfortably.

Oil Revenue Projections

South Yemen's oil earnings will be modest during the first two years of oil exports. Although we have little information about the relative allocation of oil between Moscow and Aden, industry and US Embassy reporting suggest the Soviet Union will receive up to 40 percent of the oil to pay for exploration, development, and production costs, and at least 20 percent of the remaining oil as its share of the profits. Only one-third of the oil will be available for export after royalties and domestic oil consumption are taken into

Figure 4
South Yemen: Oil Production Capacity Possibilities, 1989-95



account. Aden's share probably will increase steadily to about 50 percent by 1993 as the amount of oil paid to cover Soviet costs declines.

If Aden's share of oil exports averages 43,000 b/d in 1990 and 104,000 b/d in 1991, the government would earn about \$283 million and \$721 million in those

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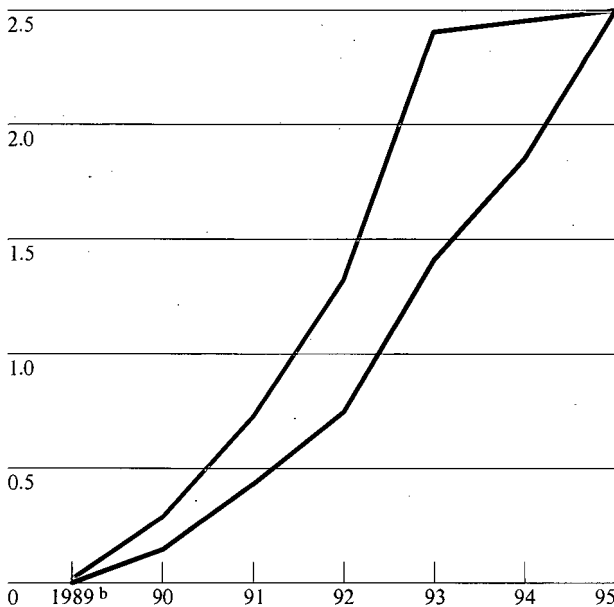
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Figure 5
South Yemen: Oil Revenue Scenarios,
1989-95^a

Billion US \$

- Scenario A assumes the Soviet Union increases its drilling activity and Western technology and equipment is used.
- Scenario B assumes the Soviet Union continues its slow drilling pace and Western technology and equipment is not used.



^aThe government's share of oil revenues.
^b4th quarter.

[Redacted]

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years, respectively. Government revenues could total nearly \$2.5 billion annually if production reaches 500,000 b/d in 1993. [Redacted]

Domestic Impact of Oil Development

The oil find is a boon to South Yemen, which is heavily dependent on foreign goods and financing. Increased oil revenues will ease Aden's tight financial

position and will also give the regime the resources to begin reversing the deep spending cuts of the past few years that have stifled economic development. The government recently announced it intends to reinvest most of its additional revenues into the oil sector—which Aden estimates at \$1-2 billion over the next 12 years. But senior officials also have indicated to the International Monetary Fund that South Yemen's economic priorities include upgrading the country's basic infrastructure—transportation, power, water, sanitation, and communications networks—and expanding industrial and agricultural production. The government probably will also increase efforts to improve the social welfare, education, and health care systems. [Redacted]

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Although the need for development is greater outside Aden, immediate efforts are likely to focus on repairing the capital, which was damaged during the January 1986 coup. As oil revenues increase, the regime is likely to devote more resources to rural development, but South Yemen's dispersed population will hinder this effort. [Redacted]

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Increasing the output and productivity of the industrial and agricultural sectors will require a large investment of capital and time. Aden will probably want to concentrate new manufacturing investment on food processing, construction materials, and light consumer goods and will increase imports of machinery, equipment, and raw materials. In addition, it has stated that it wants to increase wages and benefits to boost worker incentives and morale. [Redacted]

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Aden is likely to take a more focused approach in agricultural matters and try to increase self-sufficiency in certain crops, such as fruits and vegetables, as well as meat and dairy products. Part of the new investment probably will be devoted to irrigation schemes and dam construction to increase the amount of cultivable land and to supplement low rainfall. The regime is likely to increase imports of fertilizers, tractors, and other farm machinery to improve productivity. The fishing sector probably will receive

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South Yemen's Economy: Barely Getting By

South Yemen is among the most underdeveloped countries in the world. Except for oil, the country is poorly endowed with natural resources, and potentially cultivable land is less than 5 percent of the country's total area. Although agriculture accounts for nearly 15 percent of gross domestic product and employs about 50 percent of the work force, South Yemen has to import about two-thirds of its food requirements. The country suffers from a manpower shortage, primarily because about 20 percent of its total labor force works abroad, according to the International Monetary Fund. [redacted]

A narrow resource base and a largely unskilled labor force have severely hampered the development of South Yemen's productive capacity. As a result, the economy relies heavily on imports. Since 1982, imports have averaged \$650 million annually as compared with only \$43 million per year in exports. Most of the gap has been financed by remittances from Yemenis working abroad—primarily in Saudi Arabia—and foreign grants and loans from the Soviet Bloc, China, the Arab Gulf states, and multilateral organizations. [redacted]

The economy has been battered, moreover, by the drop in world oil prices during the past five years:

- The significant decline in economic activity in the Gulf oil-producing states has reduced the flow of worker remittances to South Yemen as thousands of Yemenis have been dismissed from their jobs and those remaining now receive lower wages. Workers' remittances in 1987—totaling about \$287 million—were down almost 40 percent from their 1984 peak.

- Official grants from foreign governments fell to an estimated \$41 million in 1987, compared with 1982's peak of \$125 million.
- Activity at the Aden refinery—South Yemen's largest industrial establishment—and the Aden port has declined significantly, costing the regime badly needed foreign exchange and contributing to a current account deficit that has averaged \$607 million annually since 1983.
- Prices of imports have risen significantly since 1986 because of the depreciation of the South Yemeni dinar against the currencies of Aden's main trading partners.
- Import duties and profits from public-sector companies have dropped by one-third since 1985 because of lower imports and the decline in domestic economic activity, exacerbating the budget deficit that has averaged \$375 million since 1985. [redacted]

South Yemen has dramatically increased its international and domestic borrowing to cope with the decline in foreign exchange earnings. External debt has increased about 150 percent since 1980 to approximately \$1.8 billion. Central Bank claims on the government have risen from \$648 million in 1982 to \$1.7 billion in 1987. Despite the increased borrowing, South Yemen since 1982 has had to draw down its foreign reserves 43 percent to \$223 million—four months' worth of imports—to help cover the deficit. [redacted]

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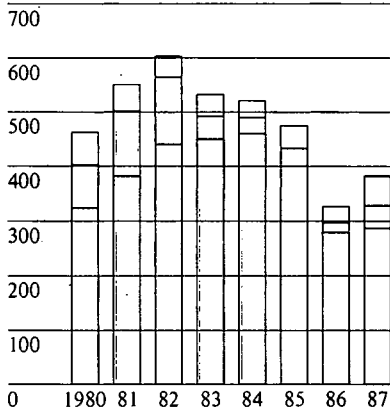
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Figure 6
South Yemen: Economic Trends, 1980-87

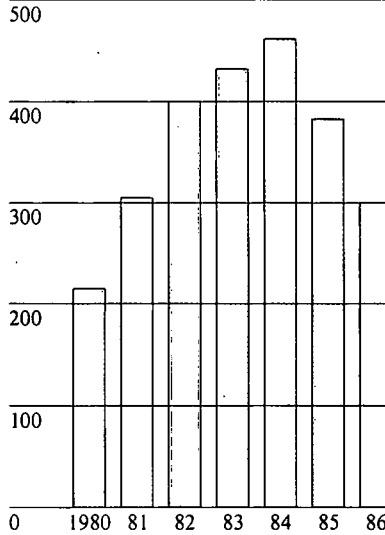
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Foreign Exchange Receipts
 Million US \$

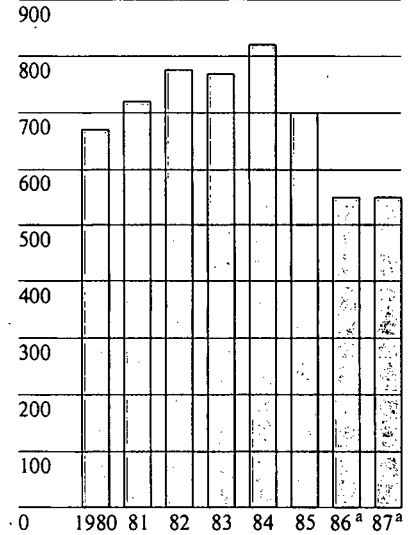
- Exports
- Official foreign grants
- Worker remittances



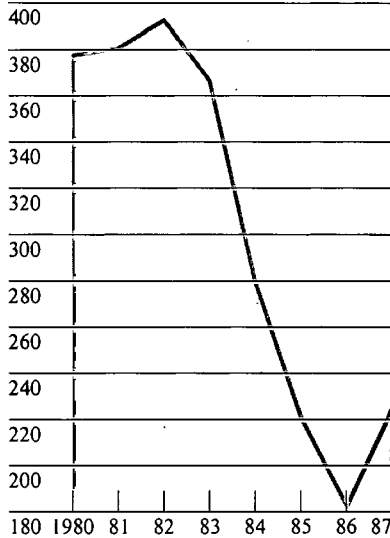
Development Expenditures
 Million US \$



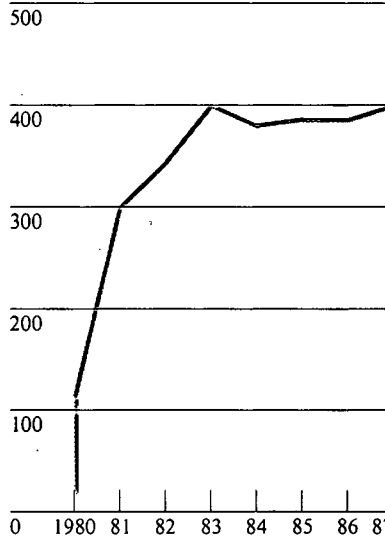
Imports of Goods
 Million US \$



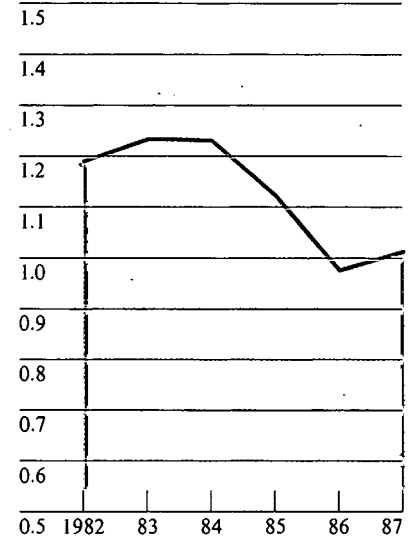
Yearend Foreign Assets
 Million US \$



Budget Deficits
 Million US \$



Real GNP
 Billion US \$



^a Estimated.



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much attention because South Yemen's lengthy coast and wide variety of exploitable fish resources give this sector good potential as a source of foreign exchange.

Spending Constraints

We believe that the projected amount of oil revenues, along with deep-seated domestic problems, will prevent the regime from meeting many of its development goals. Aden will have to wait until the mid-1990s—when oil revenues could approach \$2.5 billion annually—before it gains any degree of financial independence and the ability to noticeably boost its economic development:

- The return of some of South Yemen's 100,000 overseas workers hoping to share in the country's oil wealth will add to the regime's economic burden. The expansion of the oil industry probably will provide only limited direct-employment opportunities, and new jobs in other sectors of the economy—such as construction—will take time to develop.
- Poor economic management, a shortage of capable technocrats, and the structural rigidity and heavy bureaucracy of South Yemen's centrally planned economy will diminish the benefits of additional financial resources.
- As factions in the regime jockey to control the oil wealth, economic policy makers will probably be increasingly pressured to accommodate factional interests, rather than the country's long-term economic development.
- Foreign donors may reduce aid to South Yemen as oil revenues grow; creditors probably will press Aden to make payments on nearly \$2 billion of military and civilian debt, largely Soviet, as well as to make larger downpayments for any new purchases.

Social Impact

Although we believe that the Aden regime faces no significant threat of domestic rebellion, the leadership is concerned about growing popular discontent fueled by economic hardships

For example, the government followed up the discovery of oil with a publicity campaign to announce that economic hardships would ease once oil exports begin.

Despite the promise, the South Yemeni populace is likely to be disappointed by the lack of immediate benefits from the country's oil wealth. Oil revenues will allow the regime to increase imports, but we believe living standards will improve only slowly. Meanwhile, the government will have to deal with the increased expectations of its citizens. We believe that Aden will not hesitate to employ additional repressive measures to maintain control, although it would prefer to ease some of the austerity measures that have contributed to the erosion of South Yemeni living standards, already among the lowest in the world.

Implications for Internal Politics

More than two years after the bloody civil war that toppled President Ali Nasir, the political situation in South Yemen remains fluid as the post-civil-war leadership struggle persists. Ideological differences, personal rivalries, and tribal antagonisms continue to threaten the jerry-rigged ruling coalition, forcing the regime to publicly deny allegations of a power struggle. Despite numerous indications of Politburo differences over fundamental issues, however, the factions apparently are enjoying a temporary coincidence of interest over the development of oil resources, probably because all recognize Aden's desperate need for new revenues.

The Yemeni Socialist Party—the country's nominal ruling party—will try to use the new wealth to consolidate its political control. It probably will give top priority to expanding its authority over all institutions

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Figure 7
Selected Demographic and Social Indicators



South Yemen is likely to use its new oil wealth to promote self-sufficiency in certain crops—such as fruit—and livestock products.



Oil revenue will enable South Yemen to devote more resources to rural development, such as improving rudimentary education systems.



Oil revenues will accelerate the development of South Yemen's fishing sector, a potentially important source of foreign exchange.

Area:	112,075 square miles (about the size of Nevada)
Population:	2.1 million (1985)
Population growth rate:	2.6 percent
Urban population:	37 percent
Religion:	91 percent Sunni Muslim 9 percent Christian and Hindu
Official language:	Arabic, but English widely understood
Literacy:	39 percent
Life expectancy:	46 years
Infant mortality rate:	145 per 1,000
GNP per capita:	\$480 (1986)

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Life expectancy, currently at 46, is likely to improve with oil development.

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of the state, particularly the South Yemeni military, which is its greatest political rival. We expect the party to try to conciliate the military with better pay and benefits and more equipment and training. At the same time, it will probably seek to upgrade its own paramilitary force as a counterweight to the military's monopoly on power. Oil wealth also will allow the party to extend its influence into the countryside, where it is weak and still competes with the vestiges of tribalism. For example, Aden is likely to increase the budgets of local party organizations, particularly funding for development projects, so that they can better compete with the tribal welfare system still in place in many areas of the country. Aden probably also will increase direct payments to local and tribal leaders as inducements for political support. [redacted]

Despite these efforts, it is our judgment that oil wealth will deepen existing political and regional divisions and intensify chronic leadership problems. Competition for top jobs—made more attractive by the prospect of oil revenues—will increase, and the regime's administrative style, which tends to rely on trusted personal agents bypassing both party and state bureaucracies, is likely to lead to increased corruption and contribute to the mismanagement of oil revenues. Aden's political elite—who, despite their professed commitment to socialism, still draw upon tribal and regional loyalties as readymade bases of power—will compete for funds for their traditional constituencies. [redacted]

The present alignment among the senior South Yemeni leaders, although inherently unstable, may endure for the near term. The lessons learned from the bloody civil war in January 1986 probably will act as a deterrent to a premature bid for power by any of the leaders. Nonetheless, as time goes on, we believe the underlying political instability will lead to a reshuffle of leaders, further hindering the leadership's ability to cope with economic problems. A more radical regime has an outside chance of again coming to power, but, in our view, the trend in South Yemeni domestic politics appears to be toward a more pragmatic, less dogmatic leadership. Future South Yemeni regimes probably will not be any more stable than their predecessors, however, because of continuing tribal and regional rivalries. [redacted]

The Role of Factionalism in Domestic Politics

Factionalism is an endemic feature of South Yemeni political life, and it will continue to heavily influence domestic politics and foreign policy. All South Yemeni factions claim adherence to the principles of Marxism-Leninism, but their precise interpretations and their degree of commitment differ. The ideological spectrum ranges among strict ideologues, pragmatic socialists, and leftist-leaning nationalists. The influence of tribal and regional politics also blurs factional lines. Those running the country tend to view their own tribes as readymade power bases to be used for personal political advancement. Recruitment for key institutions such as national party organs, the armed forces, the militia, and intelligence and security services invariably takes on a tribal dimension. Tribal and regional divisions will probably continue to play an important role in South Yemeni politics. In addition to regional affiliations, personal relationships also play a key role. Leading personalities often shift back and forth between factional groupings, depending on the issue. [redacted]

Oil Development and Foreign Policy

The current regime is continuing the more pragmatic foreign policy of its predecessor, primarily because of Aden's desperate need for economic and technical assistance. The regime gradually has been improving relations with moderate Arab and West European states—including Egypt, Saudi Arabia, Norway, and the United Kingdom—to maximize its access to foreign assistance and to balance its ties to the Soviet Union. [redacted]

Progress thus far has been modest, but oil wealth could prompt a more permanent restructuring of South Yemen's foreign policy to one that more closely resembles the nonaligned foreign policy of North Yemen. The Aden regime probably realizes that the political price tag for increased Arab and Western

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assistance is its continued moderation in its foreign policy. We do not believe, primarily because Aden's leaders perceive no ready alternative to Soviet or East European assistance at current levels, that South Yemen's oil will eliminate its dependence on Bloc aid or significantly weaken Soviet influence over its affairs. The Aden regime, moreover, is convinced that its survival is dependent on Soviet security and military assistance. [redacted]

South Yemen's foreign policy remains closely tied to the shifts in its internal politics. In the unlikely event that a more radical leadership takes hold, oil wealth would provide the regime with the means to try once again to export South Yemen's revolution to regional states, reestablish closer ties to radical groups involved in terrorism, and increase support to regional insurgent groups that it has backed in the past. [redacted]

Oil and Regional Politics

Oil may complicate South Yemen's relations with its more conservative neighbors, which already distrust Aden's intentions because of its socialist orientation. In our view, the moderate Arab Gulf states probably fear that a South Yemen strengthened by oil revenues may again engage in a confrontational foreign policy toward its neighbors, undermining the stability of the peninsula. Their nervousness will be heightened in the likely event that South Yemen uses its oil wealth to buy more arms even if its intention is to improve its ability to defend its borders and its oil production and export facilities. Although the Aden regime professes moderation, border clashes with North Yemen and Oman within the last year and the recent sentencing to death in absentia of former President Ali Nasir belie this assertion and raise questions about the regime's ability to control its more hardline factions. Furthermore, the uncertain outcome of the occasionally violent leadership struggles also lends a degree of unpredictability to the Aden leadership's future political orientation and intentions. [redacted]

It is our judgment, however, that Aden will continue to pursue its policy of Arab rapprochement, motivated by the realization that oil will not provide immediate financial independence. Aden's continued moderation will be subject to the vicissitudes of South Yemeni

internal politics and the recurrence of border disputes that inevitably will flare up, but setbacks are likely to prove temporary. We believe Aden's neighbors recognize the advantages of some sort of accommodation. According to US Embassy reporting, the Gulf Arabs view closer ties to Aden as an opportunity to influence its domestic and foreign policies, despite their suspicion that Aden's moderation is a tactic to obtain financial assistance. South Yemen and Oman early this spring exchanged resident ambassadors, and [redacted]

[redacted] Aden and Riyadh are gradually expanding economic and political contacts. Kuwait has long provided some aid to Aden and is heavily involved in exploring for oil in South Yemen and sends about 20,000 b/d of oil to be refined at the Aden refinery. [redacted]

Relations With North Yemen

Relations between the two Yemens can best be characterized as malevolently ambivalent and are unlikely to change in the foreseeable future regardless of the amount of new oil revenues. On balance, we believe the discovery of oil in both Yemens and the presence of oil in the disputed triborder area adjoining North and South Yemen and Saudi Arabia is more likely to spawn conflict than cooperation. Aden and Sanaa recently announced they had drawn an accord to turn the disputed area into a neutral zone for joint development. Nevertheless, we believe the two sides will have difficulty overcoming a tradition of distrust to make this a permanent agreement. [redacted]

South Yemen, the financially weaker of the two, will have particular difficulty sustaining amicable relations with Sanaa not only because of its longstanding animosity toward the north, but also because of the strong rivalry between the two for Gulf economic aid and Soviet military assistance. This rivalry probably will intensify as each country races to develop and protect its oilfields. Major hostilities are unlikely, however, because of the shared financial interest in exploiting the neutral zone. The mutual realization that each has the capability to damage the other's oil installations also may act as a deterrent. [redacted]

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The Yemeni Border Dispute: No Easy Solution

The border between North and South Yemen has never been fully defined and remains in dispute. The dividing line between the two countries stems largely from a 1902 boundary settlement, but the British-Turkish demarcation team, tired of harassment by tribal elements, left the area with their work unfinished. A 1914 treaty established the "violet line" and extended the border into the Rub' al Khali. In 1955 the British unilaterally imposed a boundary from south of Ma'rib to Jabal Thaniyah and east, but the then ruling Imam of North Yemen refused to recognize it. The Yemens have had two wars over the border, in 1972 and 1979, and border clashes are frequent.

The presence of oil deposits along their disputed border has raised the stakes for Aden and Sanaa. To defuse tensions over conflicting oil claims that threatened a repeat of the border wars, they earlier this year agreed to turn 2,200 square kilometers of the disputed area into a neutral zone that would be developed jointly, according to press reports. It took six months of intense, high-level negotiations—which were frequently interrupted by armed clashes—before the two sides hammered out an agreement that at least temporarily papers over their differences. According to the US Embassy in Sanaa, the Soviet

Union apparently used its leverage as the major arms supplier to both countries to broker the border settlement and gain the inside track to explore and develop the neutral zone.

We doubt that the accord will be long lasting. According to the US Embassy in Sanaa both sides have withdrawn their forces from the neutral zone, but remain within easy striking distance. Moreover, both countries' politically powerful militaries are unhappy with the terms of the accord, according to US Embassy and

and could hinder its implementation. Another potential roadblock is Saudi Arabia's claim along the undemarcated eastern border with the Yemens that includes all of the newly established neutral zone. Riyadh so far has not taken issue with the accord, but we believe that it will press its claim if it perceives that cooperation between the two Yemens threatens Saudi hegemony on the peninsula.



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Relations With the Soviet Union

The Soviet Union is South Yemen's main benefactor, providing virtually all of Aden's military aid and a large part of its economic assistance—which totals several hundred million dollars annually. Since 1967, South Yemen has looked to Moscow for protection and arms and, in return, has given strong support to Moscow's regional objectives. The close ties between the two countries were strengthened in October 1979 with the signing of a 20-year treaty of friendship and cooperation. The Soviet presence has allowed Moscow to influence the course of Aden's development and to gain strategic assets in South Yemen—Soviet

maritime reconnaissance aircraft are stationed at Aden, and the Soviets use South Yemeni port facilities to supplement logistic support for their Indian Ocean squadron.

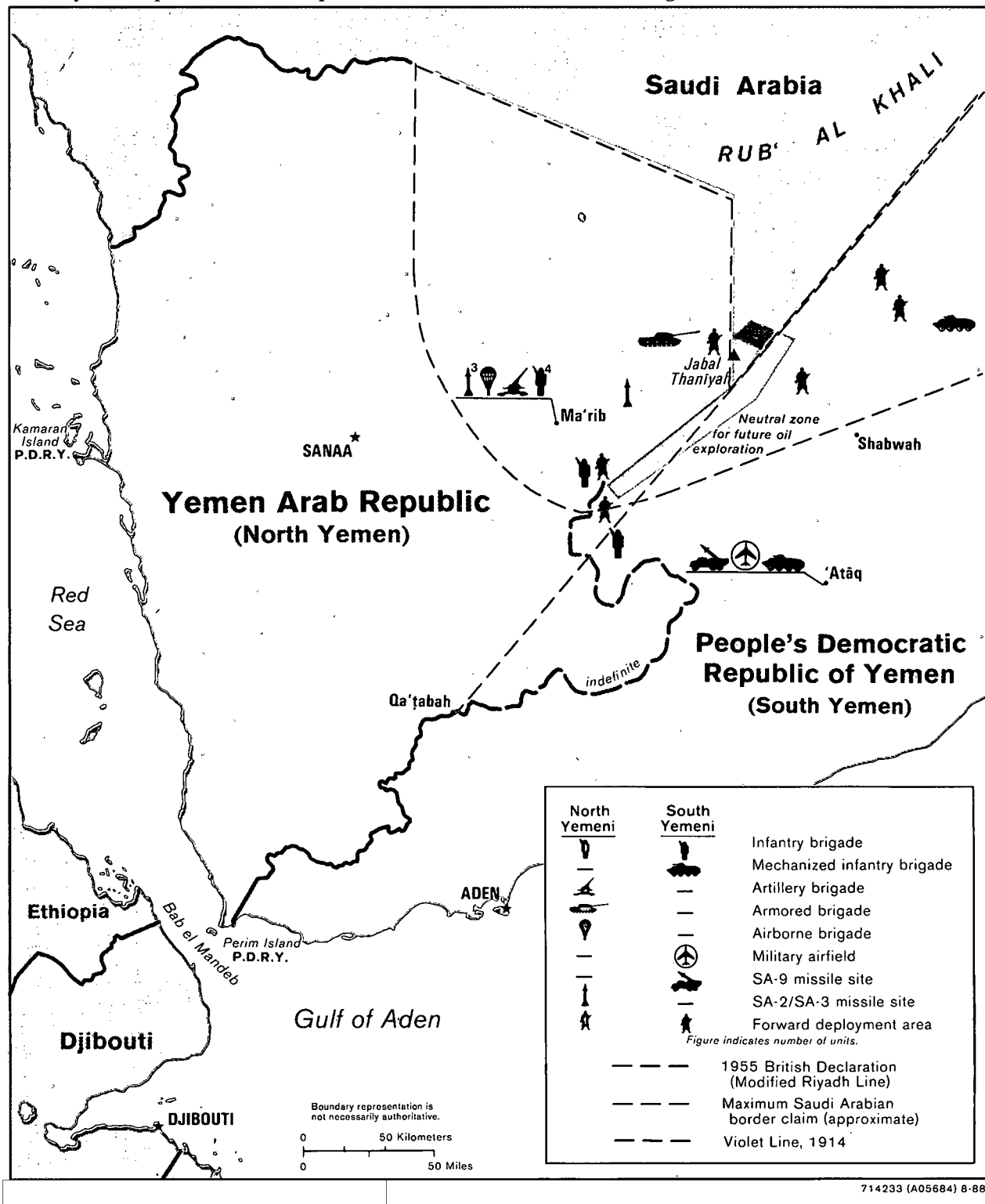
Nonetheless, South Yemen is troubled by many aspects of its client relationship with the Soviet Union, especially the Soviet role in exploiting South Yemen's oil. The majority of South Yemenis resent the substantial

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Figure 8
Military Buildup and Border Disputes in the Ma'rib-Shabwah Oil Region



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Figure 9. Yemeni Socialist Party Secretary meets with Soviet leader Gorbachev in February 1987. Despite frictions, South Yemen is unlikely to significantly alter its relationship with Moscow because of its new oil wealth.

Soviet presence and the disparity between the lifestyles of resident Soviets and themselves. Many South Yemeni officials consider Soviet financial assistance insufficient for Aden's development needs and regard Moscow's terms as politically stringent. They also are increasingly concerned about growing Soviet meddling in South Yemeni domestic affairs; are weary of Soviet performance, especially in the oil sector; and are upset with the large share of oil production that Moscow will receive initially. They believe that Soviet foot-dragging is intentional and reflects Moscow's desire to maintain Aden's dependence on Soviet largess.

The South Yemenis are exerting a growing degree of independence, despite Moscow's strong influence. Aden's quest for greater Western involvement in its oil development probably has drawn protests from the Soviets.

Aden continues to stall Moscow's longstanding request for formal basing rights.

In our view, a South Yemen strengthened by oil eventually may be even less inclined to support Soviet policy when it conflicts directly with South Yemen's

national or Arab interests. Aden is especially likely to push for greater independence if it believes that Moscow is using its economic and military leverage to dictate the terms of South Yemen's oil development and gain a greater percentage of future oil revenues. The Aden regime already has frequently felt the need to assert publicly that any oil found belongs to the government.

Despite these frictions, South Yemen is unlikely to significantly alter its relationship with Moscow as long as it is convinced it needs Soviet security, oil, and financial assistance. Furthermore, any South Yemeni leader whose actions are perceived to seriously jeopardize that aid probably would face strong internal opposition. For its part, we expect Moscow will monitor Aden to ensure that it does not pursue a foreign policy that would jeopardize Soviet political and strategic regional interests. In our view, as long as the South Yemeni regime maintains good relations with the Soviet Union and does not further restrict Moscow's access to South Yemen's port facilities and airbases, Moscow will tolerate South Yemen's expansion of economic and political ties to the moderate Arabs and the West.

Implications for the West

Aden's immediate objective is to acquire advanced Western oilfield technology and equipment to expand its oil industry more rapidly than can the Soviets. Over the longer term, we believe Aden will seek Western equipment, technology, and financial assistance to develop other sectors of its economy. To attract such aid and improve economic performance, it may accelerate its sluggish efforts to liberalize the economy and loosen restrictions on foreign investment. In addition, it probably will support the development of commercial and political ties to Western countries that offer economic assistance.

As South Yemen's oil revenues grow, the regime will have greater financial flexibility to diversify its military and civilian trade. Aden's interest in expanding

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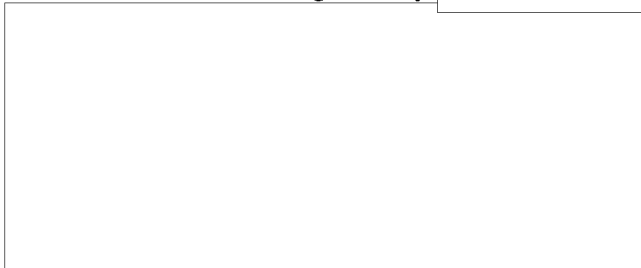
Non-Soviet Participation in South Yemen's Oil Development

Although the Soviet Union is the dominant player in South Yemen's oil development, the participation of Western and other oil companies is growing:

- *According to press reports, France's CFP-Total oil company signed a six-year production-sharing agreement last year to explore and develop a 16,000-square-kilometer area in eastern Shabwah Province contiguous to an area under exploration by the Soviet Union. CFP-Total subsequently sold a 40-percent stake in the concession to a US oil company, Union Oil of California, and a 20-percent stake to the Kuwait Petroleum Company.*
- *Another French oil company, Elf-Aquitaine, in January 1987 obtained a six-year production-sharing concession for over 19,000 square kilometers of onshore and offshore areas in the Aden/Abyan area. Elf-Aquitaine then sold an interest in the concession to two British oil companies, according to press reports.*
- *Kuwait's Independent Petroleum Group (IPG) has onshore and offshore concessions that include part of the Balhaf Basin. The Yemen Exploration Petroleum Company (YEPC), an affiliate of Hunt International Petroleum Company, has a 50-percent interest in the concession, according to press reports. Drilling began in June 1988.*
- *Canadian Occidental Petroleum, Ltd., a subsidiary of a US oil company, and Lebanon's Consolidated Contractors Company acquired a 36,000-square-kilometer concession in the southern part of the Hadhramaut region in April 1987. This concession was previously held by a group of Brazilian, Spanish, and British companies, according to press reports.*
- *Three US oil companies—Hunt International Petroleum, Amoco, and Texaco—have expressed interest in obtaining concessions in areas adjacent to the Soviet-discovered fields. Hunt International is working through its YEPC subsidiary to negotiate an agreement with Aden. Amoco, which has been pursuing a concession in South Yemen since 1984, has seven applications for review and is most interested in an area north of the Soviets' Shabwah concession, according to the US Embassy in Sanaa.*

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its economic relations with the West has been constrained by its preoccupation with political infighting and its reliance on Soviet generosity.



Opportunities for the United States

The participation of US oil companies in South Yemen's oil development, although limited, probably will encourage Aden to increase economic and political contacts with Washington. The rapid development of North Yemen's oil resources by US companies probably has impressed the South Yemeni leadership and made it less reluctant to accept US assistance.

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Aden's leaders probably see utility in at least low-level political ties to the United States. Aden probably would be receptive to an overture from Washington or may even tentatively approach the United States if it believes that renewed relations would bring economic benefits, facilitate access to Western aid organizations, and provide it with a psychological advantage in its dealings with Moscow. In our view, however, Aden would not be receptive to a US overture if its leaders believe they have to make significant political concessions to obtain renewed relations. [redacted]

In any event, we believe that South Yemen will be cautious in its dealings with the United States because of more than two decades of distrust and sharp ideological differences. Aden's leaders probably believe it would be more difficult for South Yemen to sustain relations with the United States than with

West European countries because of a wide range of separate interests. South Yemen is particularly hostile to the US military relationship with Oman and may view a resumption of US-Omani joint military exercises as a threat to its interests. Moreover, we believe many in the Aden leadership are not convinced that the political risks of renewed ties to the United States are outweighed by any likely benefits. They do not believe that Washington would be willing to offer South Yemen what it wants the most—arms and large amounts of financial aid. These same officials are also concerned that hastily established ties might worsen factional strife, perhaps provoking a violent move by regime hardliners against the more pragmatic factions advocating the restoration of relations. [redacted]

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Appendix

Technical Methodology

South Yemen's petroleum basins are still poorly explored, making it difficult to assess their petroleum potential. Consequently, our analysis of South Yemen's petroleum potential relies heavily on geochemical theory—which provides a basis for analyzing the oil and gas potential in areas of sparse geologic and geophysical data—and contract studies that estimate the quantity of recoverable oil and gas resources through the use of photogeology and industry-standard methods of subsurface geologic analysis.

Source Rock Assessment

The critical portion of our methodology is the geochemical analysis of the petroleum source rocks, which are commonly organic-rich marine shales or limestones. A geochemical analysis provides an estimate of both the type (oil, gas, or condensate) and quantity of hydrocarbons that will be generated and expelled from the source rocks. When the source rocks are buried by younger sediments, heat decomposes the organic matter to petroleum. Oil usually forms first, followed by gas, as temperature increases. Therefore, if the source rock contains a high organic carbon content, substantial quantities of hydrocarbons can be generated under appropriate time and temperature conditions.

We have little data on the organic carbon content of source rocks in South Yemen, but we are reasonably confident about our estimates of carbon content. Our estimates are based on analogy to geologically similar basins and rock types in the region. The geologic history of the area is known well enough to determine the thermal history of the basins. Moreover, because of the conservative assumptions used to estimate the organic carbon content, we believe that the actual amount of petroleum generated from the source rocks is not likely to be less than the amount we have estimated.

The most important source rocks in South Yemen are the marine shales and limestones in the East and West Shabwah, Balhaf, and Hadhramaut Basins, and possibly the Aden/Abyan Basin. The relatively high estimated organic carbon content and moderate temperature history in the East Shabwah Basin suggest that the basin contains large amounts of oil. The West Shabwah Basin also has a high estimated organic carbon content, but, because its temperature is higher, the basin probably contains less oil than the East Shabwah Basin. The Balhaf and Hadhramaut Basins are less promising than the Shabwah Basins because of thinner source rocks in the Balhaf Basin and possibly insufficient heating for oil generation in the Hadhramaut Basin. The Aden/Abyan Basin probably has the least petroleum potential of South Yemen's basins because source rocks probably are thin and excessive heat could have partially decomposed any petroleum that was generated.

Petroleum Accumulation and Extraction

Only a small portion of the petroleum generated from the source rock is trapped and available for recovery. Therefore, we reduce the estimated amount of generated hydrocarbons by an accumulation factor to account for losses during migration into the reservoir rocks and subsequent trapping and accumulation. This factor depends on the geologic history of an area and the likelihood that reservoir rocks and traps are present to hold the petroleum. A recovery factor—which depends mainly on reservoir conditions and production practices—is then applied to the trapped, or "in-place," petroleum to yield an estimate of the recoverable oil and gas.

We believe that our estimates for the accumulation and recovery factors are reasonable. The geologic history of South Yemen is well known, and reservoir

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rocks are common in the basins. The recovery factors are based on production histories elsewhere in the Arabian Peninsula. These histories indicate that South Yemen can expect to recover between 20 and 40 percent of its oil-in-place, but our calculations used a more conservative value of approximately 25 percent for the recovery factor.

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Our analysis consistently uses conservative-to-moderate factors, and we are confident about the general magnitude of the estimated recoverable oil. Indeed, our conservative approach suggests that South Yemen could have substantially more recoverable oil and gas than predicted by our estimate.

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