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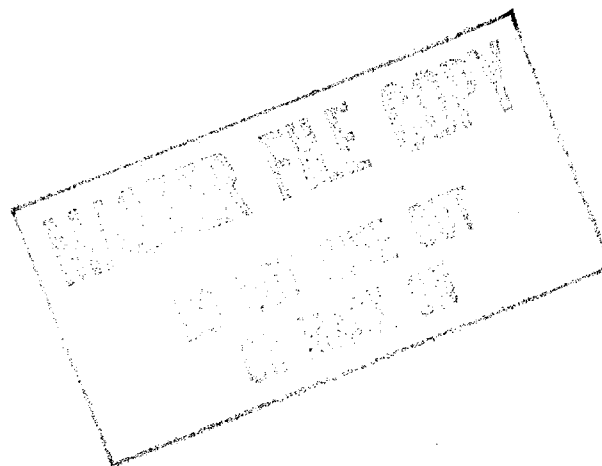
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China: Early Offshore Oil Results



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An Intelligence Assessment



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EA 84-10163
September 1984

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China: Early Offshore Oil Results

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An Intelligence Assessment

This paper was prepared by [Redacted]
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**China:
Early Offshore Oil Results** [Redacted]

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Key Judgments

*Information available
as of 9 August 1984
was used in this report.*

Results in the first year of China's major offshore oil exploration drive have been disappointing—both to the Chinese and to many of the 30 participating Western oil firms. Several firms have already sharply reduced their expectations for major offshore discoveries. Exxon and its joint-venture partner, Royal Dutch Shell, may have made one potential commercial discovery. But it appears to us that, with about 10 dry wells already drilled on some of the best prospects in the South China Sea, chances are against discoveries large enough to have a big impact on China's oil production. [Redacted]

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Chinese officials have also privately expressed considerable concern over the lack of early success. While it is still too soon to predict how much oil China will eventually produce from its continental shelf, it now appears that initial projections by several oil companies of a total of 1 million barrels per day by the mid-1990s, let alone Chinese predictions of 2 million b/d, are too high. This could cause major problems for the Chinese economy in the 1990s, including the possibility that oil exports—20 percent of current hard currency earnings—might have to be eliminated or even that China might be forced to import oil. [Redacted]

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Beijing now faces a difficult decision scheduling a new round of bidding for the large areas not included or not taken in the first round in 1983. At least one large-sized prospect remains to be drilled in the area already leased. There are also many moderate-sized prospects that could yield profitable oilfields. A major discovery before the second round began would help stimulate interest so that Beijing could avoid easing its heretofore strict contract terms. Many companies, however, are trying to convince the Chinese that, if Beijing waits until too many dry wells have been drilled, Western interest in the offshore regions may weaken [Redacted]

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The Japanese, who along with two French companies were the first to sign exploration agreements with China in 1980, have recorded some success in the Bohai. They have decided to go ahead with construction of an early production system for their first discovery. Development decisions on three other discoveries are expected this fall. Production from the Bohai, about half of which will be exported to Japan, could, thus, reach 50,000 b/d or more by 1990. [Redacted]

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The French, in contrast, have abandoned their Bohai lease after three dry wells and only grudgingly have agreed to go ahead with a pilot development project on an oilfield discovered in their Gulf of Tonkin block. They would have abandoned that block also, but Beijing improved the terms of the contract. [REDACTED]

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Atlantic Richfield has made a potentially huge natural gas discovery south of Hainan Island. ARCO also signed its lease ahead of the main 1983 bidding contest and now must decide whether the gas is marketable. It is currently considering building a multibillion-dollar urea fertilizer complex on Hainan that would use the gas as feedstock. However, ARCO needs to gain extensive participation from other foreign investors. [REDACTED]

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China's purchases of US oil technology, particularly for onshore work, will continue to increase even without major offshore discoveries. The Minister of Petroleum's visit to the United States in September underlines Beijing's awareness that it needs new technology to enhance production from its mature onshore fields and that it needs to speed up its search for new oil reserves. We, and many in the industry, however, have considered the energy sector—and particularly offshore oil—the best opportunity for long-term US investment in China. Lack of success in finding major oil deposits, especially if combined with continued problems in expanding cooperation in nuclear power and coal mining, would limit the prospects for deepening Sino-US economic relationships. [REDACTED]

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Figure 1
Oil and Gas Basins



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**China:
Early Offshore Oil Results**

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During May-December 1983, China signed contracts with Western oil companies, setting in motion the first intensive effort to find oil in China's continental shelf. Initial drilling results from this program, and more complete results from several smaller tracts leased since 1979 have now given us a better understanding of China's offshore potential. These results, except in the Bohai where Japanese firms are operating, have not been good and are causing concern both among Chinese officials responsible for maintaining China's oil self-sufficiency and among the companies, which have already spent over \$1.2 billion in China and are obligated to spend at least another \$1 billion.

crew—although the ultimate responsibility lies with the US operator. With the establishment of at least 10 joint ventures servicing offshore drilling rigs, operations now appear more efficient, and the costs of drilling each well—about \$10 million—are coming down. In contrast to the Java Sea incident, this past July a new Chinese offshore weather service accurately predicted the path of a typhoon in the Yellow Sea, and the crew of a British Petroleum drilling rig was safely evacuated by helicopter before the storm struck.

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Exploration Results

Currently there are a record 11 or 12 drilling rigs working off the China coast, including four owned and operated by US firms, five or six owned by the Chinese but leased to foreign companies, and two being operated by the Chinese Ministry of Petroleum. Foreign firms are now working in all but one of China's offshore basins—the East China Sea Basin is the exception—and the Chinese Ministry of Geology is expected to renew its stalled exploration program in that basin this fall. The pace of exploration is speeding up and by late this year 15 to 20 rigs will be operating. So far the foreign companies have drilled about 40 wildcat exploration wells¹ in addition to about 50 wildcat wells that the Chinese drilled between 1967 and 1983. By the end of next year, 40 to 50 more wells could be drilled, offering a good idea of the continental shelf's oil potential.

The Bohai—Japanese Success but French Failure.

The Japan-China Oil Development Corporation—a joint venture formed by a large consortium of Japanese industrial firms led by the Japan National Oil Company and the Chinese National Offshore Oil Corporation (CNOOC)—is moving aggressively to complete exploration of its large Bohai lease by the end of 1986. So far, 17 of the 24 wildcat wells agreed upon in the 1980 contract have been drilled; seven oil and gas fields have been discovered—at least three appear commercially viable. A decision to go ahead with early but limited development of the first field, BZ-28-1,² was reached last year, and it is scheduled to come on line in 1987. In addition, the Japanese are well along in the development of a small field discovered by the Chinese in the early 1970s; it is scheduled to start producing by the middle of 1985. So far the Japanese have spent about \$500 million for exploratory drilling and \$100 million for development. In addition, CNOOC has spent about \$100 million for its share of development costs, borrowed from the Japanese Ex-Im Bank under a long-term low-interest loan facility.

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Foreign companies had expressed considerable doubt as to whether China could set up the support infrastructure to allow them to operate efficiently. As might be expected, the first operators, especially the French, encountered many difficulties. In October 1983, poor weather forecasting and untried rescue operations played a role in the sinking of the Glomar Java Sea, the first US rig to work offshore, and the loss of the entire 80-man American and Chinese

² For Bozhong (central Bohai) grid number 28, prospect number one. In Chinese well nomenclature, a third digit, such as BZ 28-1-2, represents the number of a given well on that structure—in this example, the second well.

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¹ The initial exploration well on a given prospect or structure.

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Table 1
China: Offshore Oil Leases

Area	Share (percent)	Date Signed	Blocks	Status
Bohai				
Japan National Oil Co.	100	29 May 1980	South, West	Sixteen exploration wells drilled. (Seven discoveries, with two development projects under way.)
Elf Aquitaine (France)	75	29 May 1980	Central	Three dry wells drilled.
Total Exploration (France)	25			Lease abandoned.
Yellow Sea				
British Petroleum	45	10 May 1983	23/06	One well under way.
Broken Hill Proprietary (Australia)	20			
Petrobras (Brazil)	15			
Ranger Oil (Canada)	10			
Petro-Canada	10			
Chevron (US)	50	2 December	24/11	
Texaco (US)	50	1983		
Cluff (UK)	100	29 October 1983	10/36	
Pearl River Basin				
British Petroleum	45	10 May 1983	14/29	Five wells drilled.
Broken Hill	20		27/31	(Four dry wells and one show well.)
Petrobras	15		28/27	
Ranger Oil	10		26/14	
Petro-Canada	10			
Occidental Petroleum (US)	55	6 August 1983	28/23	One dry well.
Hispanoil (Spain)	15			
Ampol (UK)	10			
CRS (Australia)	10			
Tricentrol (UK)	10			
Occidental Petroleum	55	6 August 1983	26/79	Two dry wells.
Elf Aquitaine (France)	22			
Tricentrol (UK)	10			
Total (France)	7			
Promet (Singapore)	6			
Exxon (US)	50	23 August 1983	40/01	Two show wells and one dry well.
Royal Dutch Shell (Netherlands)	50		04/27	
Japan National Oil Co.	100	5 September	28/14	First well planned for October 1984
		1983		
Japan National Oil Co.	33	29 October 1983	15/53	
Getty (US)	31			
Sun (US)	20			
Texas Eastern (US)	16			
Phillips (US)	50	29 November	15/11	
Pecten (US)	50	1983		
Chevron (US)	33	2 December	16/08	
Texaco (US)	33	1983		
Agip (Italy)	33			
Yinggehai				
ARCO (US)	80	19 September	50/35	Two dry wells and two gas wells drilled.
Santa Fe (Kuwait)	20	1982		

Table 1 (continued)

Area	Share (percent)	Date Signed	Blocks	Status
Beibu (Tonkin) Gulf				
Total Exploration (France)	50	29 May 1980	09/28	Fourteen wells drilled—including seven wildcats, four of which found oil. One development program under way.
Elf Aquitaine (France)	30			
Idemitsu (Japan)	20			
Idemitsu (Japan)	62	5 September	22/22	First well planned for August 1984.
Natomas (US)	33	1983		
Cluff (UK)	5			
Pennzoil (US)	44	15 November	22/36	First well planned for October 1984.
Sun (US)	36	1983		
Ampol (Australia)	10			
Hispanoil (Spain)	10			
Sun (US)	36	15 November	23/25	First well planned for December 1984.
Pennzoil (US)	44	1983		
Ampol (Australia)	10			
Hispanoil (Spain)	10			

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The Ministry of Petroleum, buoyed by the Japanese success, set an ambitious output target of 160,000 to 200,000 b/d of oil production in the Bohai in the mid-1990s. The Japanese Ex-Im Bank, which ultimately will finance most of the effort, concurs in this assessment and estimates it will cost about \$5 billion. Private Japanese firms would provide about \$1 billion; the Japan National Oil Company, about \$1.5 billion; and the Ex-Im Bank would make available to China a \$2.5 billion long-term, low-interest loan. [redacted]

Japanese industry officials warn that the drilling results may not be as promising as they look on paper. Structural and stratigraphic traps in the Bohai tend to be of only moderate size and are heavily faulted, while potential reservoir rock layers are discontinuous—a result of their continental and lakebed origins rather than the usually more prolific marine beds. These factors led several large US firms to turn down opportunities to explore in the Bohai. Positive signs, on the other hand, include high test flow rates and a crude oil type that is much lighter than that found in onshore portions of the Bohai Basin. [redacted]

Following extraordinary drilling success in 1981 when their first four wildcat wells each hit oil, the Japanese agreed to raise their exploration commitment from \$210 million to \$600 million and to extend the exploration period by two years to 1987, in order to allow for sufficient appraisal wells to prove their discoveries. A total of 24 appraisal wells are now scheduled through 1986; about 15 have already been drilled. The appraisal work has been difficult, however, because of the complex geology, and the Japanese still profess to have little idea of how large the potential reserves are. Ironically, only five of the first eight appraisal wells hit oil, a worse record than the wildcat drilling. Even with the results of four appraisal wells on the BZ-28-1 field—one of which was dry—there is some doubt about the field's commercial viability. A sixth well on the site is now under way. [redacted]

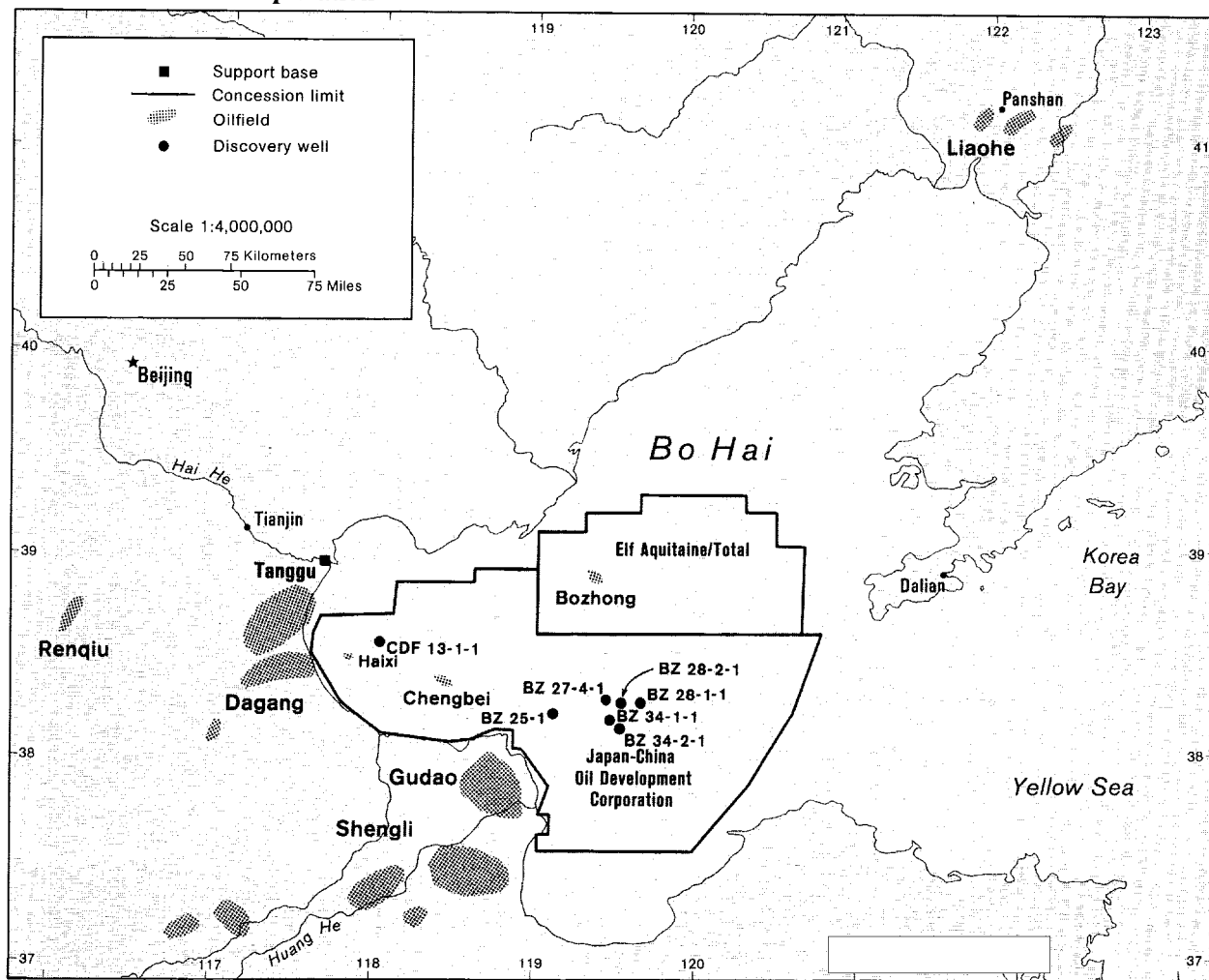
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Figure 2
China: Bo Hai Oil Exploration



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Tang Ke, the Minister of Petroleum, has reportedly put intense pressure on the Japanese to go ahead rapidly with development of the BZ-28-1 field because of a need to demonstrate to doubters in Beijing, and to the worldwide oil industry, the viability of the offshore program. A compromise with the more cautious Japanese was worked out last year: the field will be developed early, but only in part, so initial production may well be considerably below the field's ultimate capacity. Based on the reported design capacity of the storage facility, the field's output will be less than 20,000 b/d. While costing much less than the

billion dollars or more that a full development would cost, it could work to the Japanese disadvantage if the field turns out to be a large one—and it has a potential of several hundred million barrels. Under the terms of their contract, the Japanese have rights to a share of production for only the first 15 years after start of production.

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Table 2
Japanese Oil Discoveries in the Bohai

Field	Date Completed	Oil Test (b/d)	Gas Test (million cubic feet per day)	API (degrees)
BZ 28-1-1	May 1981	7,560	21.2	38.2
Appraisal-2	May 1982	4,400	3.5	40.7
-3	October 1982	1,500	22.2	39.0
-4	November 1983	NA	NA	NA
-5	December 1983	Dry		
-6	Under way			
BZ 25-1-1	October 1981	2,700	0.99	33.5
Appraisal-2	December 1982	1,400	0.60	34.0
-3	November 1983	NA	NA	35.0
-4	December 1983	NA	NA	39.0
CFD 13-1-1	November 1981	2,000	1.3	34.7
Appraisal-2	NA	NA	NA	NA
-3	November 1983	NA	NA	NA
BZ 28-2-1	February 1983	1,800	0.32	30.3
BZ 34-2-1	February 1983	12,200	6.7	36-38
BZ 27-4-1	May 1983	4,000	74	NA
BZ 34-1-1	April 1984	3,800	60	NA

Other fields discovered by the Japanese are included in table 2 and in figure 2. Feasibility studies on two of the discoveries—BZ 25-1 and CFD 13-1—are scheduled to be completed this fall. The Japanese are also studying the possibility of developing the prolific BZ 34-2 field in conjunction with the BZ 28-1 field. Bids from Japanese and US engineering firms have been requested for a single-point mooring system (SPM) that would serve both fields. Small tankers will unload the oil from a permanently moored tanker that will serve as the main storage facility. [redacted]

In addition to developing their own discoveries, the Japanese agreed in 1980 to rework the small Chengbei field, which the Chinese had discovered in the early 1970s but had been unable to develop. The Chinese production platform has been torn down and new platforms—one built in Japan, the other built in

Tangu under Japanese supervision—have been installed. The drilling of production wells is almost complete and production should begin late next year at a rate of about 10,000 b/d of heavy, poor-quality oil. [redacted]

Half the development work for both the Chengbei field and the BZ fields is being financed by the Japanese industrial consortium—most of which in turn is guaranteed by the government-owned Japan Oil Company—and half by the Japanese Ex-Im Bank, which has designated at least \$500 million out of a 1979 \$2 billion “energy” loan to China to cover the Chinese share of development costs. [redacted]

Because the loan was offered on concessionary terms—6.25 percent and a 10-year grace period on repayment—the Japanese agreed to the OECD “Gentlemen’s Agreement” principle that it not be tied to purchases of Japanese products. Japanese firms still have a major competitive advantage in bidding for projects, but in several cases US firms successfully competed against Japanese firms, including contracts for a storage platform and a workover rig for the Chengbei field. One of these US firms, largely because it is participating in a joint venture with the Chinese Offshore Platform Engineering Company, also has a good chance of winning the SPM contract. [redacted]

In contrast to the Japanese success, two French firms, Total Exploration and Elf Aquitaine, which also signed an exploration contract with the Ministry of Petroleum in 1980 for a large part of the Bohai, drilled three dry wells during 1981-83. Early this year they announced they were abandoning the block and writing off their \$50 million investment. The Ministry of Petroleum has taken back the rig leased to the French and is now drilling a well in the northern part of the Bohai. The French continue to operate in the Gulf of Tonkin and in the Pearl River Mouth Basin. [redacted]

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Beibu Gulf—French Frustrations. In May 1980, at the same time that the Japanese and French firms signed exploration contracts for the Bohai, the French also signed a lease for a large section of the Beibu (Tonkin Gulf). Substantial Chinese drilling and seismic surveys had already shown considerable oil potential. The French drilling program has run into many equipment and personnel difficulties, including the crash of a light airplane that killed the French project manager and several other Frenchmen. Nevertheless, 14 French wells were drilled by last summer, at which point exploration was halted pending an evaluation of the results. [redacted]

[redacted] The French had hoped to develop at least one of the two fields the Chinese had discovered—Wushi 16-1 or Wei 12-1. Four appraisal wells, however, proved neither field is large enough for commercial development. New wildcat drilling in the meantime turned up at least two more fields—Wei 10-3 and Wei 11-1. Again, costly appraisal wells demonstrated only small oil reservoirs. [redacted]

In late 1983, the French firms—which by this point had been joined by a group of Japanese firms which contributed \$50 million to the effort—told the Ministry of Petroleum they would abandon their lease unless the Chinese agreed to sweeten their contract. Specifically, they stated that the Wei 11-1 field was not commercial and that the commercial value of the Wei 10-3 field could only be determined after a year's production history was obtained. The foreign firms agreed to help develop the field on a trial basis using a permanently fixed jack-up rig—from which six production wells would be drilled—and a storage tanker. In return the Chinese were asked to agree to a three-year, 49-51 split of the oil instead of the 25-75 basis under the original contract. Oil production could begin by the end of 1986. After one year of production the companies would decide whether to construct a more permanent platform which could be on line by 1990. The output split from that platform would revert to the original contract plan. [redacted]

Beijing agreed to this change in the contract despite the precedent it sets for other companies wishing to renegotiate terms. The firms also extended their

exploration contract for two years and agreed to drill four to six more wildcat wells. [redacted]

Even with the contract adjustment, the foreign partners probably will not recover their \$150 million exploration costs and what we estimate will be about \$100 million for their half of the pilot development project costs unless they come up with a larger discovery. Total Exploration, the operator for the project, estimates recoverable oil reserves at between 26 million and 62 million barrels and acknowledges that only at the higher end of the estimate would earnings exceed development costs enough to allow partial recovery of the exploration costs. The field will probably produce only about 15,000 b/d and that for only two or three years if oil reserves turn out to be in the lower range of the French estimate. The foreign share of the oil will be exported to Japan. [redacted]

The Chinese, at least publicly, are more optimistic about the area. US Consulate officials in Guangzhou, for instance, report that the Chinese believe the Wei 10-3 field holds about 150 million barrels of recoverable oil. The Chinese also have asked the French to relinquish the the Wei 11-1 field so that they can develop it on their own. [redacted]

The Chinese also included eight smaller blocks south of the French concession in their 1983 competitive bidding program. Two were picked up by Sun and Pennzoil, which will operate in a partnership, and a third was signed by another US firm, Natomas, in partnership with a Japanese firm, Idemitsu, and a British firm, Cluff Oil. Drilling will begin in each of these three blocks this fall. The firms remain optimistic about finding modest-sized, yet profitable oilfields, but they have said that there is little chance of major discoveries. The other blocks remain open. [redacted]

Yinggehai—ARCO Considering Natural Gas Development. Atlantic Richfield, which reached an exploration and development agreement with China in 1982, before the competitive bidding program was set up, has drilled three of its seven promised wildcat

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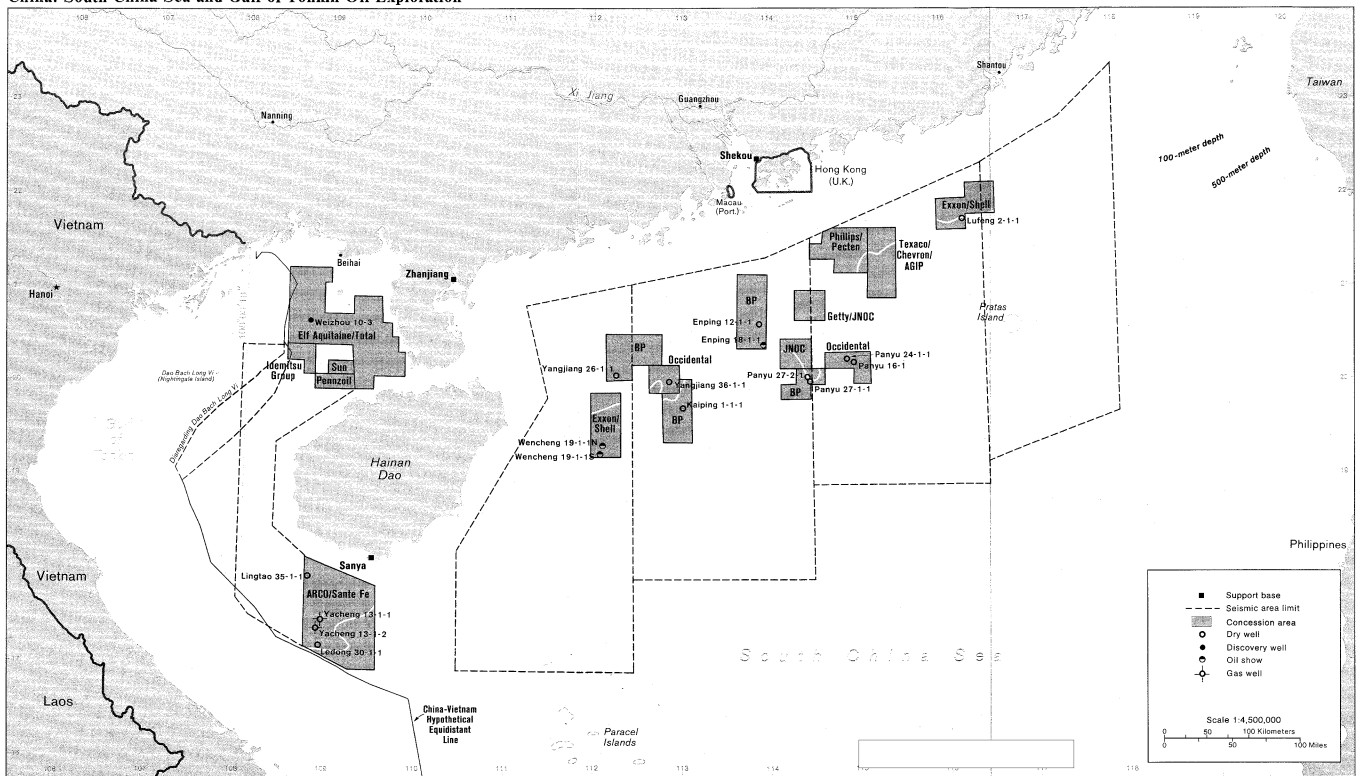
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Figure 3
China: South China Sea and Gulf of Tonkin Oil Exploration



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Table 3
South China Sea Wells

	Well	Date	Block	Status
Yinggehai				
Atlantic Richfield	Yacheng 8-2-1	January 1983		Dry
	Yacheng 13-1-1	August 1983		Gas discovery
	Ledong 30-1-1	July 1984		Suspended
	Yacheng 13-1-2	August 1984		Gas confirmation
	Lingtao 35-1-1	August 1984		Dry
Pearl River Mouth				
British Petroleum	Enping 18-1-1	November 1983	14/29	Oil show
	Kaiping 1-1-1	February 1983	27/31	Dry
	Yangjiang 26-1-1		26/14	Dry
	Panyu 27-1-1	May 1984	28/27	Dry
	Enping 12-1-1	July 1984	14/29	Dry
	Panyu 27-2-1	Under way	28/27	
Occidental	Yangjiang 36-1-1	April 1984	26/29	Dry
	Panyu 16-1-1	May 1984		Dry
	Panyu 24-1-1	Under way	28/23	Dry
Exxon	Wen 19-1-1		40-01	Show
	Lufeng 2	June 1984	4-27	Dry
	Wen 19-2-1	Under way	40-01	Show

wells and has made what may be a very large natural gas discovery. A successful appraisal well was completed in August 8 kilometers south of the gas discovery well—Yacheng 13-1-1—to help delimit the field. The company estimates gas reserves could be as high as 200 billion cubic meters, enough to produce at a 5-billion-cubic-meter annual rate. China's total gas production currently is only 12 billion cubic meters a year.

A critical factor in any decision to develop even a huge offshore gasfield, however, is the marketability of the gas. Gas transportation costs are very high and, because ARCO and the Chinese have already ruled out costly LNG facilities, a local market for the gas must be found or developed before it makes sense to develop the gasfield. Studies have shown, moreover, that the gas will be too expensive to replace coal-fired power or industrial plants, and building a widespread distribution system for the gas would be prohibitively expensive.

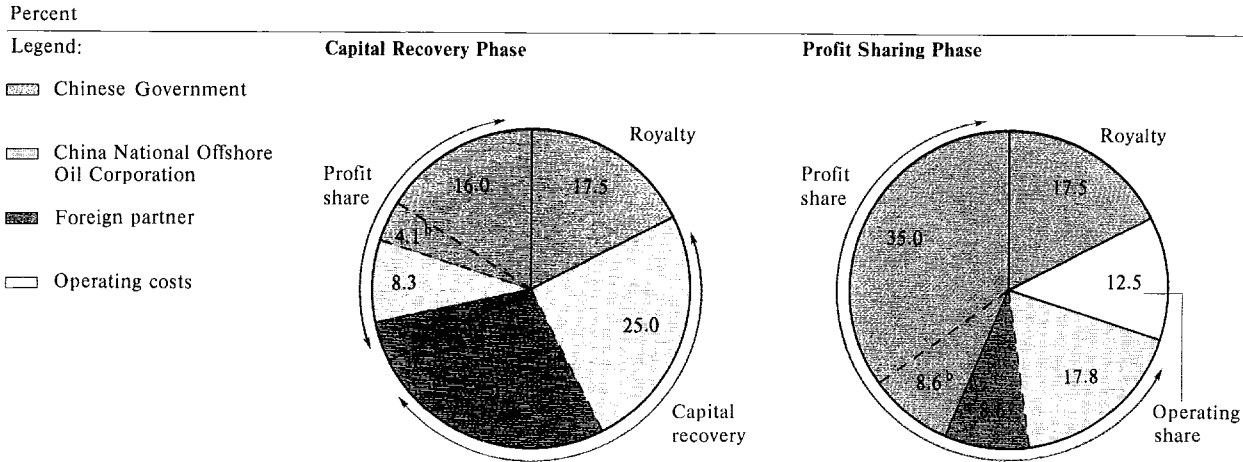
In December 1983, ARCO proposed that a fertilizer complex with a capacity of 7 million tons of urea per year, by far the largest urea plant in the world, be constructed on Hainan Island. It would use the natural gas as its feedstock. Specifically it suggested that two joint ventures be formed: one with extensive ARCO participation would develop the gasfield and build a distribution system at a cost of about \$500 million; the second between the Ministry of Petroleum or CNOOC and unspecified foreign chemical or industrial firms would build and operate the \$3-4 billion fertilizer complex, purchasing the gas from ARCO on a US dollar basis.

Petroleum Minister Tang Ke and Premier Zhao Ziyang enthusiastically endorsed the fertilizer concept but suggested a single joint venture be set up, with ARCO taking the lead, and that an even more expensive compound fertilizer plant be considered instead of simply an ammonia/urea complex. They also stated that, because of the project's prospective size and the Ministry of Petroleum's foreign exchange constraint, China would waive the usual requirement for majority Chinese ownership.

ARCO is currently considering the Chinese proposal and is searching for industrial firms willing to invest billions of dollars in such a venture. The World Bank and British and Japanese firms have been approached, and at least one group of Japanese firms—including C. Itoh and Mitsubishi—appear interested. A major question is whether the now-depressed world market could absorb a big increase in synthetic fertilizer output in the 1990s. The urea plant would increase China's urea production capacity by 40 percent and

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Figure 4
China: Production-Sharing Contracts^a



^a This assumes an x factor of 50 which divides the profit oil evenly between the Chinese Government and the joint venture. It also assumes CNOOC participates in the joint venture at a maximum 51-percent share.

^b Income tax to Chinese Government.

[Redacted]

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might eliminate China's urea imports, most of which come from the United States and Japan. Alternatively, the plant might export fertilizer to earn foreign exchange needed by the foreign partners of the joint venture. [Redacted]

Pearl River Mouth Basin—Dry Wells Cloud Prospects. Oil companies have been interested in the Pearl River Basin since seismic surveys were completed there in 1979. Company geologists have estimated the area may ultimately yield 5-10 billion barrels of oil from the approximately 130 prospective field locations identified in seismic analysis. This is greater than the combined potential of all of China's other offshore basins excluding the East China Sea Basin. Several large anticlinal formations combined with proven hydrocarbon source rocks and what appear to be good reservoir rocks suggested the possibility of giant-sized fields that could each produce hundreds of thousands of barrels per day. [Redacted]

of these blocks, encompassing virtually all those in shallow and moderately deep water, had been accepted and the round was closed. The 10 remaining blocks are in water too deep to warrant exploration unless large discoveries are made closer to shore. Many attractive prospects remain, however, in close-in areas not included in the first round of bidding. [Redacted]

British Petroleum—which is leading a group of four Canadian, Australian, and Brazilian oil companies—won four Pearl River Basin blocks and one block in the Yellow Sea. Two of the Pearl River Basin blocks are considered among the six best blocks, as ranked by one major US firm. British Petroleum was the first to sign in May 1983 and began what probably will amount to a \$200 million drilling program in September. The company has already drilled five wells in the Pearl River Basin and is currently drilling a sixth there and the first well in its Yellow Sea block. [Redacted]

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In March 1983, in its first round of international bidding, China opened about one-third of the basin area in 23 separate blocks. By December, bids for 13

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The Contracts—A Form of Production Sharing

Japanese and French oil companies were the first to negotiate offshore drilling rights in 1979 and 1980, and their contracts served as a model for an ARCO contract signed in 1982 and for the 18 contracts signed last year. In all cases, the foreign firms have agreed to pay 100 percent of exploration expenses—defined as a specified number of wells per lease. The exploration phase is in most cases divided into three intervals—usually three, two, and two years. At the end of each interval the contracting firm can abandon the lease with no further obligations; otherwise, it must agree to a specified number of new exploratory wells or proceed with the development phase. [redacted]

If commercial-scale quantities of oil are discovered, the Western firms will enter into a joint venture with the Chinese National Offshore Oil Corporation (CNOOC) for development. CNOOC can participate at anywhere up to a 51-percent share in the joint venture and will be responsible for that share of development costs. It is generally expected that CNOOC will choose the maximum 51-percent share in all development projects and that it will request foreign loans to cover a portion of its equity requirements. This has been the case in the joint ventures already signed with the Japanese and the French. [redacted]

When production begins, 17.5 percent of the oil will go to the Chinese Government in the form of a royalty; 50 percent will go to the joint venture to repay capital costs for as long as that takes—about four years in a successful scenario; a percentage of

the remainder, known as the X factor, will go to the joint venture as its profit share for 15 years. After that, all ownership and operations revert to the Chinese. The size of the X factor or profit share—which constituted the major part of each company's bid—is further complicated in that the bids are differentiated with respect to the productivity of individual fields. For small fields the firms could specify a profit share close to 100, while for large fields they were obligated to specify much lower X factors. As in the case of the oil share going to capital recovery, the foreign firms will split the profit share with CNOOC on the basis of CNOOC's participation in the joint venture. The foreign firm's profits are then taxed at a 50-percent income tax rate. This tax is generally credited against income tax in the companies' home countries. [redacted] 25X1

Beijing has instructed the companies to hold details on the X factor bids very closely. But, from what we know of prior negotiations, we have an approximate idea of the profit share. At a late stage in the negotiations, Beijing was holding out for a 50-percent X factor for fields producing 50,000 to 100,000 b/d—the range firms believe is most likely to apply. This would allow the firms a before-tax profit share of about 8 percent of the oil until capital costs are repaid and about 17 percent after that. The firms also may be asked to market CNOOC's capital recovery and profit oil on the world market so that a total of 30 to 50 percent of the oil might be exported. [redacted] 25X1

Results have been very disappointing. The first well hit oil but in noncommercial quantities. The other four have been dry. [redacted] it appears to us that BP has already drilled into the best prospect within each of its two best blocks. In April, a BP official publicly reacted to adverse publicity coming out of Hong Kong on the third well. He argued that it was far too early to write off the blocks and that at least another year of drilling would be required to determine whether the blocks have commercial potential. No private commentary by BP is available. [redacted]

Occidental Petroleum is the lead company in two separate consortiums, each of which won one Pearl River Basin block. It has drilled three dry wells and a fourth well is scheduled to be drilled this fall. We have little specific data on these blocks. One company report, even before the third dry well was completed in August, stated that Occidental no longer holds high [redacted] 25X1

expectations for the area. A company spokesman stated, for instance, that the first hole was the "driest" he had ever seen. [redacted]

other parts of the basin, the company has reduced its expectations of finding a commercial-scale oilfield from 1 in 6 to 1 in 20. [redacted]

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25X1

Exxon and its partner, Royal Dutch Shell, have drilled two wells into the Wen 19-1 prospect in their western block, which all the major companies felt was the most promising in the Pearl River Basin. Not only was the structure considered large enough to hold a billion-barrel field or larger, seismic anomalies had been noted that often indicate the presence of hydrocarbons. The first well, even though it encountered some oil, was very disappointing. The company reported it found only thin hydrocarbon source rocks, an absence of good cap rocks, and heavy faulting, which it says diminishes prospects for the entire western half of the basin. Oil had at one time been in the structure but—probably because of the faulting—had long since migrated elsewhere. [redacted]

Chinese Reactions

[redacted]

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[redacted] Following the first particularly disappointing well drilled by Exxon, Qin Wencai, director of CNOOC, called a special meeting of Chinese oil officials in Guangzhou. The consensus of the meeting, [redacted] was that the oil companies should be drilling deeper and that the results were not as bad as might appear. Nevertheless, many participants in the meeting stated that the Chinese must be careful not to exaggerate the oil potential of the Pearl River Basin. Chinese press releases have consistently stretched the truth about what is known regarding potential offshore oil resources and about the results of individual wells. [redacted]

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Full results of the second well are not yet available although they may be more positive. It was drilled just south of the first well where, according to the company, chances of a discovery are greater. Drilling encountered some oil at a relatively shallow depth and, thus, was reported as a "major" discovery by the Chinese. Some company officers and Chinese geologists also believe that oil will be found in a structure that underlies the Wen 19-1 structure, which—combined with the shallow reservoir—may make commercial development feasible although probably not on the scale originally hoped for that field. The company states that the results of the well show the need for more careful analysis of the very complex deeper stratum. Five more wells are slated for that block. Exxon has also drilled one dry well in its eastern block. The contract with CNOOC calls for a total of five wells in that block. [redacted]

[redacted]

The Chinese are now faced with a dilemma of whether to quickly open up a new set of leases before—as one company says—the bottom falls out of the market. If a new round of bidding occurs before a major discovery, there is little doubt that the Chinese will have to allow the firms a much higher X factor. A higher X factor combined with only modest discoveries, however, could mean that a substantial share of the offshore production would end up as the foreign companies' capital recovery oil and profit oil. [redacted]

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In a nation still suspicious of Western capitalism, this could become a serious political liability, particularly if the Chinese economy were strained as a result of stagnant onshore oil production. As reported by the US commercial officer in Guangzhou, Qin Wencai and State Counselor Kang Shien (the previous energy czar) favor an immediate opening of the second round, while the Minister of Petroleum Tang Ke leads a group that favors delaying the round until some positive results appear. [redacted]

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Drilling is scheduled to begin in the remaining five blocks this fall and winter. The Japan National Oil Company is the lead company for two blocks, one of which includes Sun Oil and Getty. A Caltex (Chevron/Texaco) joint venture with Italy's Agip won two blocks, which were merged into one because they were contiguous. It includes a large number of moderate-sized prospects and one potential giant field. Phillips and Pecten have one block that looked like it had good potential, at least originally. [redacted]

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[redacted] because of the poor results in

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Outlook

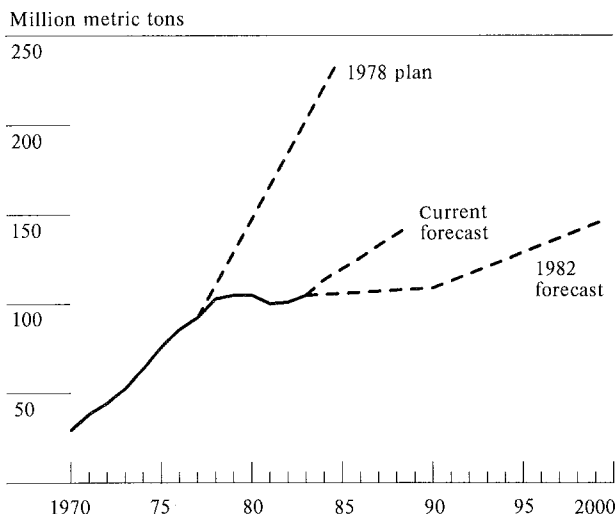
The companies emphasize that only about 10 of the more than 100 prospective field locations have been drilled in the most highly regarded Pearl River Mouth Basin and that in other offshore areas—the North Sea, for example—scores of wells were drilled before commercial discoveries were made.

three of the four potential giant-sized prospects (greater than 500 million barrels reserves) that were offered by the Chinese have already been drilled with poor results. One of these—the Exxon discovery—may yield a more modest-sized oilfield, and about a dozen good-sized prospects (200-400 million barrels) remain to be drilled. It thus appears that if commercial discoveries are found it will be in these moderate-sized fields, but these are not likely, in the aggregate, to yield the 1 million b/d that several firms had projected for offshore China, let alone the 2 million b/d the Chinese have predicted.

Continued poor offshore findings would have little impact on China's oil production through the rest of the 1980s. Beijing, in fact, has recently raised its expectations of short-term production because of apparent new discoveries in the onshore Shengli producing area. Departing from the consensus view held by the Chinese leadership since 1979 that oil output would remain flat at 2.1 million b/d until 1990, when offshore oil was expected to come on line, Premier Zhao Ziyang this spring stated that he thought oil output would increase by 5 percent per year through the 1980s. Such forecasts have often been far off the mark in the past, however, and we remain unconvinced that enough new reserves have been found to sustain that rate of growth.

Regardless of short-term trends, a large shortfall from the expectations of offshore production will hurt the Chinese economy in the 1990s. China would probably gradually reduce or eliminate its 400,000 b/d of oil exports—20 percent of foreign exchange earnings—and step up its exploration of the promising far western basins in hopes of staving off a necessity for

Figure 5
China: Oil Production, 1970-2000



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importing oil. Development of the west, however, could take decades and tens of billions of dollars.

The offshore oil program is important also because it represents Beijing's first acceptance of large-scale foreign investment since 1949. This investment could eventually total well over \$20 billion, far more than is likely in any other sector of the Chinese economy, but it depends entirely upon successful exploration.

The program is particularly important for Sino-US commercial relations. US oil firms already are playing a prominent role in the exploration program. Of the 70,000 square kilometers leased by China, 11 US firms hold rights to 20,000 square kilometers, more than any other country. They stand to invest billions of dollars in China if they find oil. This could help set a solid base for US investment in other sectors and

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allow a gradual extension of US economic influence in China. Without major discoveries, however, the long-term linkages between the US oil industry and China could be severely limited. China certainly needs improved technology to exploit its onshore deposits, and Petroleum Minister Tang Ke recently stated that China would welcome further Western participation in secondary recovery projects and might even open up some new onshore fields to foreign firms for development. These projects are less likely, however, to involve large amounts of foreign investment—and long-term production-sharing agreements—than would a successful offshore development program.

[Redacted]

One option for Beijing is to restart its own offshore exploration program, particularly in the promising East China Sea Basin. The launching of China's first domestically produced semisubmersible rig this summer—after at least six years of construction—under the auspices of the Ministry of Geology, and resumed drilling by the Ministry of Petroleum in the Bohai and in shallow waters near Hainan Island, may be signs that this is occurring. China's indigenous exploration program in the 1970s was a costly failure, but, aided by a great deal of new equipment and experience gained by working with the Western companies, Beijing may now be feeling more confident. Also, the lack of immediate success by the big oil companies and major blunders such as the sinking of the Glomar Java Sea ⁴ may be providing some satisfaction for those in the Chinese oil industry that never wanted to give up their own offshore effort in the first place.

[Redacted]

⁴ A similar incident in the Bohai in 1979 in which a Chinese jack-up rig capsized with a loss of the entire 70-man crew caused a major shakeup in the Ministry of Petroleum and undoubtedly helped to remove resistance to Western firms taking over the offshore exploration effort. [Redacted]

Even if China resumes its own offshore exploration effort, we believe it will do everything possible to keep Western firms active offshore. China still has little experience in developing offshore oilfields once they are found, and we doubt Beijing feels it can afford to slow the effort. We estimate—conservatively, we feel—that China's demand for oil will rise from the current 1.7 million b/d to about 2 million b/d in 1990 and to 3 million b/d by the year 2000.⁵ The mature Daqing oilfield, which currently produces 1 million b/d—half of the country's oil—will probably begin to decline before 1988 and will almost certainly be in decline during the decade of the 1990s. Other than the offshore basins, there appears to be little likelihood of large enough discoveries in eastern or southern China to offset that decline, let alone allow a million-b/d increase in production. [Redacted]

[Redacted]

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