

THE CHINA BUSINESS REVIEW

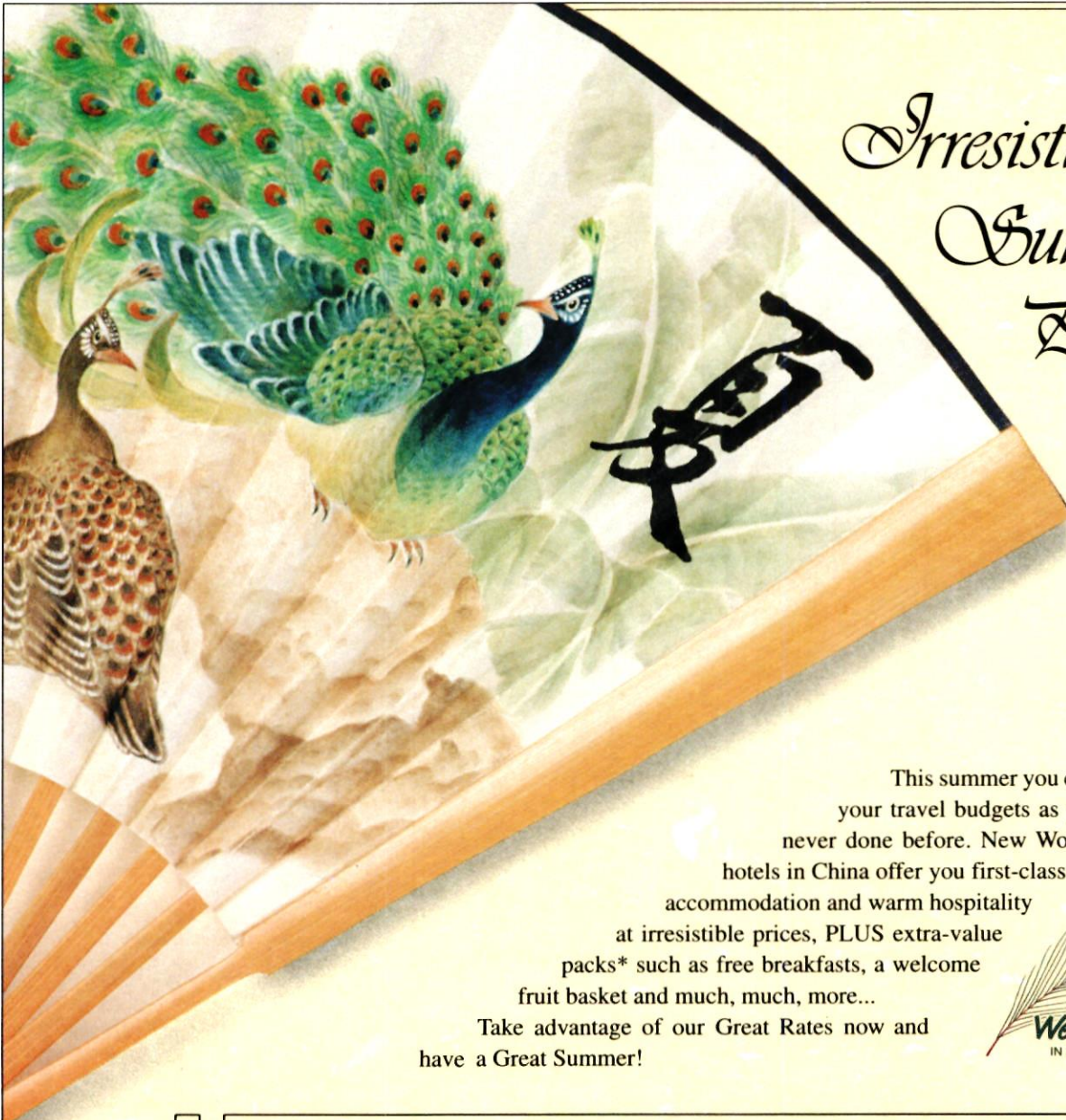
JULY-AUGUST 1994

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July-August
1994

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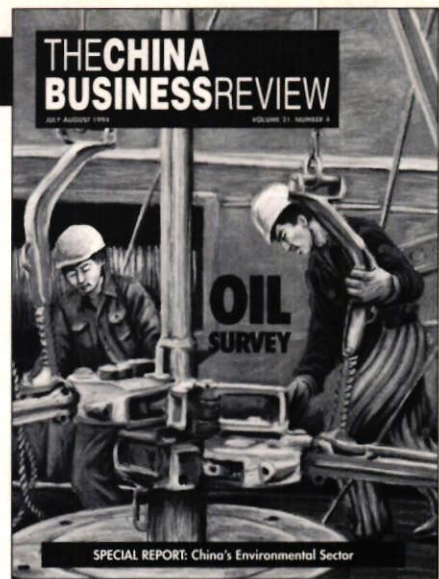
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MFN Hydra Finally Slain?

After US politicians, businesspeople, and the media once again this spring slugged it out in the tense and tiresome debate over China's Most Favored Nation (MFN) status, President Clinton on May 26 announced he will extend MFN status to China for another year and will delink human rights criteria from the MFN renewal process. Claiming the imposition of human rights conditions on MFN (see *The CBR* July-August 1993, p.6) had been a constructive but no longer useful policy, Clinton noted "the Chinese did not achieve overall significant progress in all the areas outlined in the executive order....The question for us now is...how can we best advance the cause of human rights and the other profound interests the United States has in our relationship with China?"

Answering his own question, Clinton stated engagement with China offers the best way to lay the groundwork for long-term, sustainable progress in human rights there. Clinton's new China strategy includes both old and new initiatives designed to strengthen the overall relationship without returning it entirely to "business as usual":

- A ban on imports of Chinese munitions
- Continuation of existing Tiananmen sanctions (prohibition of Trade and Development Agency (TDA), Overseas Private Investment Corp. (OPIC), and US-

Asia Environmental Partnership (US-AEP) programs in China; opposition to non basic-human need loans to China by the World Bank and other multilateral agencies; suspension of weapons sales to China; and denial of export licenses for dual-use and munitions-list items)

- Increased radio broadcasts to China (including VOA and Radio Free Asia)
- Increased support of non-governmental organizations working on human rights in China
- Revitalized attempts to multilateralize efforts to improve the human rights situation in China
- A pledge to "develop with American business leaders a voluntary set of principles for business activity in China."

China's Ministry of Foreign Affairs issued a statement that the President's decision was a welcome move which will improve bilateral relations. China further urged the White House to lift the remaining Tiananmen sanctions.

Pelosi introduces legislative sanctions

Supporters of MFN revocation were angered by Clinton's decision. To register his discontent, Rep. Jerry Solomon (R-NY) introduced in the House a resolution of disapproval that, if passed, would terminate China's MFN status within 60 days. Solomon's gesture is primarily for

show; the resolution has virtually no chance of passing either house. Legislation introduced on June 16, by representatives Nancy Pelosi (D-CA), Richard Gephardt (D-MO), David Bonior (D-MI), and 38 co-sponsors, however, presents a greater threat. The Pelosi bill would revoke MFN tariff treatment for PRC goods that are produced, manufactured, or exported by any unit of the People's Liberation Army, a State-owned enterprise, or a Chinese defense industry trading company. The bill also requires the Secretary of Treasury to encourage American businesses to adopt a "voluntary" code of conduct.

The Pelosi sanctions bill has only a slim chance of passing. The US Customs service has already declared it is impossible to list accurately which PRC organizations are State-owned, PLA-run or defense industry trading companies. Many on Capitol Hill, meanwhile, are weary of the MFN issue and support the White House's delinking of trade and human rights issues.

The majority of lawmakers in Washington seem finally to accept that MFN is the wrong weapon with which to pursue US national interests in China—a realization that might dissuade Congress from re-introducing MFN-related legislation in the wake of future, inevitable downturns in US-China relations. —Richard Brecher

SHORT TAKES

No Free Education

Beginning this year, 10 of Beijing's top universities will charge students tuition. Students at Beijing University, Qinghua University, Chinese People's University, Beijing Teachers' University, Beijing Foreign Studies University and five other schools will pay annual tuition fees of ¥1,000-1,500. The universities will be required to set up scholarship and loan programs to help needy students.

Birth Control for the '90s

In a sharp departure from existing policy, Chinese family planning officials may soon allow unmarried individuals to acquire birth control devices. Officially, only married couples may engage in sex or obtain contraceptives, but recent statistics indicate that unmarried women account for nearly 20 percent of all abortions performed in China. To help cut the rate of unwanted pregnancies, a new vending machine dispensing birth control pills, condoms, spermicidal cream, and cigarettes was recently unveiled in Shanghai.

The Customer as Emperor

Shopkeepers will have to toe the line on consumer rights, according to China's first consumer protection regulations, released January 1. Shop managers are now required to take full responsibility for repairing or exchanging faulty products. And, in a government effort to crack down on the sale of substandard goods falsely advertised as higher quality products, State-owned stores may now display only authentic trademarks and brand names.

High Property Prices Again Rock Hong Kong

High operating expenses for both office rentals and expat residential housing are driving some foreign companies to seek alternative sites for their regional headquarters. Foreign companies operating in the territory continue to face.

Property prices in Hong Kong have soared by 200 per cent in the last three years and by 30 percent in the first quarter of this year alone. In March, the sales price of office space in one of the most prestigious addresses in Hong Kong's Central business district, Exchange Square, surpassed HK\$10,000 (\$1,300)/sq ft; by early June, the asking price had soared to nearly HK\$12,000 (\$1,500)/sq ft. Setting up an office in Hong Kong is now more expensive than doing so in Tokyo.

Companies with a strong focus on China may find it necessary to maintain their China operations in Hong Kong despite the high costs. But some multina-



Commercial rents in Hong Kong are among the highest in the world—and show no sign of declining.

tionals concentrating on other countries in the region are moving their regional headquarters to Singapore. Rents are up to 70 percent lower than in Hong Kong and the city provides a good base for operations targeting newly opened Vietnam.

Many local Hong Kong companies have reacted to rising office costs by moving less essential, "back room" operations such as data entry to neighboring Shenzhen, where they take advantage of the lower rental and labor costs on the mainland. Other companies, particularly those not involved in the financial sector, have

relocated from Central to cheaper office space in Wanchai, Causeway Bay, and Quarry Bay. And some companies are looking to move into the "I/O" (industrial/office) buildings in industrial districts like Chai Wan, where rental costs can run as low as one-tenth those in Central.

On the residential front, a special government task force in June announced new measures to quell real estate speculation, including a ban on the resale of uncompleted flats. Though the measures have helped quiet the residential property market considerably, it is unclear whether the government will step in to slow office rental-rate increases.

The staggering profits to be made by real estate development in Hong Kong are leading to a frenzy of building and demolition. For instance, the China Harbourview Hotel, a luxury property built less than 10 years ago, was recently torn down to make way for construction of an office tower. Property tycoon Li Kashing, meanwhile, is believed likely to announce plans to raze the Hilton Hotel in order to develop more office space.

Through that scheme and others, Li has certainly benefited from the real estate spiral: The Chinese language edition of *Forbes* estimates the recent rise in Hong Kong's property rates has pushed the magnate's total value to \$7 billion, making him the world's richest Chinese. Hong Kong's tourism industry, in the meantime, is voicing its concerns over hotel closures, fearing future room shortages. Many of the territory's hotels have occupancy rates above 80 percent—a few top 90 percent.

Foreign companies should not expect the headache of finding—and keeping—reasonably priced rental space to abate any time soon. The limited amount of space in the territory and Hong Kong's proximity to China and position as a regional financial center virtually assure strong demand for office and residential space. Most analysts forecast that commercial and residential property prices in Hong Kong will rise through 1997.

—Karina Lam

THE CHINA BUSINESS REVIEW

The magazine of the US-China Business Council

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PRINTED IN THE USA

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The China Business Review, ISSN No. 0163-7169, is published bimonthly by the China Business Forum, 1818 N St., NW, Washington, DC, 20036-5559, USA (Tel: 202/429-0340), a nonprofit organization incorporated under the laws of Delaware. Second class postage paid at Washington, DC, and additional mailing offices. Postmaster, please send address changes to *The China Business Review*, 1818 N Street, NW, Suite 500, Washington, DC 20036-5559, USA.

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Annual subscription rates: \$96 US/Canada; \$150 international. Single copy issues: \$16, airmail \$25; issues over 1 yr: \$8, airmail \$12.50. DC residents add 7% sales tax.

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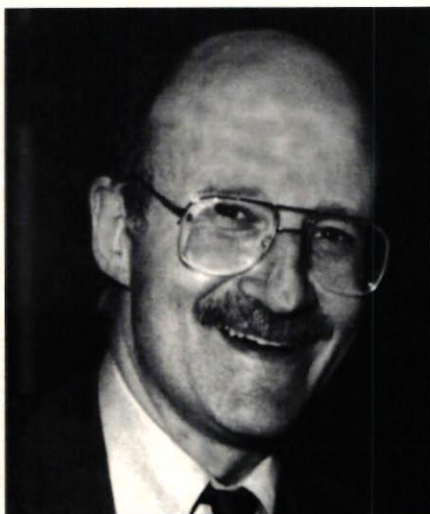
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Moving Beyond MFN

The war is won, but other battles loom

As I write this second letter to *CBR* readers, we have reached the end of the war over renewal of China's Most Favored Nation (MFN) trading status. President Clinton has announced his decision to renew MFN trade status for China without attaching conditions; in plain terms, the President has shown real leadership on an extremely difficult issue and has placed both US-China trade and the much larger US-China relationship on a more stable footing. From the welter of conflicting voices and demands that is the surest sign of the dynamism of the American political system, the President has sighted and served the national interest.

Of course, the US-China Business Council had advocated this year, as in earlier years, the very course the President ultimately adopted. Acting on its own, and in concert with other leading business organizations through the joint Business Coalition for US-China Trade, the Council made the rounds in Congress and the Administration, testified before Congress, wrote editorials for the press, sent educational literature to everyone, and from time to time went head to head

with articulate and vigorous exponents of opposing views. In the end, the expenditure of Council resources contributed to a successful outcome. We hope that President Clinton's courageous decision this June will finally free China trade from the annual threat of a catastrophe borne of US domestic political struggle.

Lessons learned

As the MFN battle winds down, a few observations are in order—not necessarily in order of importance:

First, the significance of the President's May 26 decision lies less in the inauguration of some sort of "new era" in US-China relations than it does in averting the onset of a colder and darker "ice age." What lies before us now is not the creation of a new US-China relationship, but the recovery and the continuation of a relationship already started but recently imperiled by the annual MFN upheaval. Both sides need to live up to their mutual recognition that future disputes can be better handled without the threat of MFN meltdown or recourse to a new round of brinkmanship.

Second, the MFN morass was typical of the pattern of US-China contacts for the

last century and a half: mutual moralizing, foolish assumptions of US responsibility for China's domestic affairs, and the susceptibility of US-China issues to crude political manipulation and misrepresentation at the popular level. Advocates for strong US-China trade and economic relations must therefore scrutinize the starting assumptions and the terminologies casually employed by partisans to the China policy debate as well as by journalistic observers. Example: "Trade vs. human rights"—easy to say, but a fallacious dichotomy which, if allowed to go unchallenged, instantly forces pro-trade advocates into an unwarranted and defensive "damage control" position.

Similarly, the familiar and unexamined terms "business lobbyist" vs. "human rights activist"—not so fast! The hip-shot dichotomy of these labels has moral overtones: "business lobbyists" use political muscle for pecuniary purposes, while "human rights activists" pursue ethical goals above the political fray. The annual MFN struggle in Washington, more this year than ever before, saw partisans on both sides fighting in the political trenches. The power and skill of the forces supporting severe US economic

action against China were impressive, and we can truthfully and respectfully refer to “lobbyists” among the human rights organizations.

And finally, we must challenge such phrases as “butchers of Beijing,” “big business bankrolling dictators,” and so on. Sound bites are a poor substitute for serious policy debate, and a miserable basis for understanding US-China relations. While the business community should be careful not to create its own hyperbolic jargon just to feed the media, this spring’s MFN struggle suggests that it is important to contest the negative caricatures and stereotypes of businesspeople painted in the press. The substantial effort of American firms to make clear the constructive and socially positive role that they fulfill in their China activities was an important factor in the final MFN decision; President Clinton, in his May 26 statement of policy, made clear that his Administration recognized and applauded that role.

Moving forward

Ahead lies hard work. The raw feelings created by years of MFN tension, both at the government-to-government level and among many private citizens, will not automatically heal overnight. As both sides realize, new disagreements and differences of national viewpoint will face us regularly on many fronts. The United States and China share a shifting and unstable world; both countries are feeling their way forward, cloaking pragmatic experimentation in lofty political rhetoric. It will take real effort and commitment by both governments to restore a climate of confidence and cooperation. The Clinton policy of engagement, which began in the fall of 1993 and spawned several high-level Chinese visits in April and May of this year, will now continue, and will meet, we hope, with a strong and affirmative Chinese response.

The leftovers of this year’s MFN battle—the pledges from certain members of Congress to proceed with legislative action either to disapprove the President’s decision or to impose costly new trade sanctions on China—will not help in fostering a new climate of trust between the two sides. In addition, the “Tiananmen sanctions” preserved by President Clinton, including the proscription on China activi-

Both sides need to live up to their mutual recognition that future disputes can be better handled without the threat of MFN meltdown or recourse to a new round of brinkmanship.

ties of US trade-assistance bodies such as the Overseas Private Investment Corp. (OPIC) and the Trade and Development Agency (TDA), will at the very least leave a thorn in the side of US-China relations (see p.4). The Administration and supporters of its MFN decision must encourage Beijing to retain a sense of proper perspective as it considers these rough edges of the President’s new policy.

For its part, US business should feel more secure in expanding its presence in China, and in so doing should live up to the claims it made in support of MFN renewal. The key element in the business argument for unconditional renewal of MFN this year was that trade and human rights are not only compatible, but positively linked. Company after US company argued that by operating in China under corporate guidelines applied worldwide, US business represented US values in the PRC and thus contributed to the long-term improvement of China’s human rights environment.

The President’s decision to renew MFN picked up on this theme. Clinton expressed his intention to open a dialogue with the US business community on a “set of principles” relating to American business activity in China. The Council, in its public statement on the President’s decision, welcomed his comments and pledged to play a constructive role in any resulting discussions. Our members, with their enormous on-the-ground experience in China, are among the richest resources the United States can call upon to determine what action is feasible and appropriate in this area. They understand the importance of respecting other countries’ laws, traditions, and sovereignty

when operating abroad. They also understand, with particular clarity because they work daily in a challenging and sometimes daunting Chinese environment, what defines and embodies the American identity. We should respect President Clinton’s invitation to American business to join him in a dialogue on how we proceed in China, not just because we have so much at stake, but also because we have so much to contribute.

Business as usual

During this springtime controversy, into which I stepped as the Council’s new president on April 1, I had occasion at one point to say to an advocate from the other side of the MFN debate, “At the US-China Business Council, we’re ready to risk making our living without this issue—are you?” The regrettable truth is that over the years the MFN controversy has nurtured on both sides of the debate a mini-industry of combatants whose livelihoods came to depend as much on the indefinite continuation of the fight as on victory itself. Even for the Council, the realization that we faced another life-or-death struggle a year down the road offered a certain comfort, a kind of grim knowledge that we could always claim our members’ support by pledging to fight the good fight for yet another year.

Nevertheless, I meant what I said in my verbal poke at the speaker from the opposing side. The MFN preoccupation diverted resources of time, energy, and funds into an enervating but essentially defensive campaign year after year, when instead we could have been at work in more positive and creative directions. The US-China Business Council now anticipates a period of expanded and active service to our members—and to US-China relations—in a more stable environment.

Even though the real MFN fight is over, US-China trade and economic relations will likely continue to be politically sensitive for a long time. The US-China Business Council, therefore, will continue to play an active role in helping to popularize the positive contributions of US business to China. We look forward to assisting our members meet the challenges created by the forward progress of US-China trade and economic relations. 完

Black Gold Rush

■ Robert Tansey

By the year 2000,
China may be
importing more than
1 million barrels of
oil per day

China is blessed with abundant reserves of coal, oil, gas, and other energy sources such as hydropower and uranium. But, despite rapid development of the energy sector—especially in the last decade—supply lags at least 25-30 percent behind demand. In the petroleum sector, production has been virtually stagnant for the last few years. China's output of crude oil in 1993 was 2.88 million barrels/day (b/d)—up less than 2 percent from 1992, and forecasters predict no significant increase this year. Demand, in contrast, is expected to increase 7-8 percent annually, reaching 4 million b/d by the year 2000. As only the most optimistic scenario of rapid, highly successful development of the Tarim Basin envisions China reaching that level of production just six years from now, China will likely have to rely on imports for the foreseeable future to make up the shortfall.

Why the gap? For one thing, State-imposed, below-market purchase prices for crude oil have encouraged wasteful consumption and provided little incentive for new investment in exploration. For another, despite a general shortage of investment funds, Beijing has been reluctant to accept foreign investment in some of the more promising geographical areas for petroleum exploration. Traditionally, Beijing has regarded energy as a resource that must remain under government control.



But China's critical need for energy has forced the pace of reform in the petroleum sector over the past two years and created new opportunities for US exploration, processing, equipment, and service companies. China has opened new onshore and offshore areas to exploration by foreign companies and has welcomed increased cooperation with US and other foreign companies in downstream areas as well.

In the last few months, however, this opening has been partially reversed, as Beijing has imposed an import ban, price controls, and other restrictions to re-centralize control over the sector. Chinese government officials insist these measures are temporary, and that efforts to marketize the sector will resume once order has been restored. However, at a June meeting on price monitoring, Vice Premier Zou Jiahua remarked that after price reforms are in place, prices will be primarily determined by supply and demand—but the government will continue to adjust prices of some "essential materials."

This approach and philosophy may give pause to foreign companies looking at large downstream investments. The lack of transparency of the new rules and the willingness of the Chinese government to change the terms of reference for a major industry overnight and without warning will make it difficult for firms planning multi-million dollar projects to feel confident that they can earn a timely

■ Robert Tansey is the energy and resources officer in the economic section of the US embassy in Beijing.

return on their investments. Their resulting caution could in turn lead to delays in major projects. Several years down the road, therefore, China might end up with less refinery capacity than it would have had Beijing maintained more favorable and predictable investment conditions.

Beijing steps in

Beijing's move to re-centralize the petroleum sector was prompted by the inability of State refiner Sinopec and State producer China National Petroleum Corp. (CNPC) to compete with new, smaller traders selling cheap imports. These traders put China on the brink of becoming a net petroleum products importer in 1993 by importing huge quantities of crude and finished products in the last

quarter. The surge was a result of several factors. First, the price of domestic crude not subject to price and allocation controls rose above international prices, which were very low. In addition, anticipated changes to China's tax system led Chinese traders to stockpile cheap foreign oil before the January 1 implementation of the new value-added tax. Some traders may also have had advance warning of the January 1 exchange rate unification and rushed to import oil before the *yuan* was devalued. The inflow of both crude and refined products—which totalled more than in the first three quarters combined—left many State refineries idle and eroded CNPC's margins as well.

Beijing responded by implementing as-yet unpublished regulations that "unify"

domestic petroleum prices, curtail petroleum trading and distribution rights, and ban imports of crude and refined products. In effect since May, the regulations reportedly stipulate no date for removal of these measures, though word has it the import ban will end July 1. Though some southern importers apparently have been able to circumvent the ban, import volume is one-quarter the pre-ban level.

Under the new measures, the government has appointed two State companies, Sinochem and Unipech, as the primary agents for all oil imports (*see box*) once the ban is lifted. CNPC refineries may use the China National United Oil Corp. (Sinoil) as their main agent. Distribution is to be handled by Sinopec, unless special permission is obtained from the State

China's Petroleum Producing Areas



Who's Who in China's Oil Industry

Since the People's Republic was founded, the strategic oil and gas sector has remained almost exclusively government-owned. Despite industry reforms, the central government still exercises a strong degree of control over the sector and a handful of quasi-governmental organizations oversee nearly every aspect of oil production and refining. Here's a quick look at the major players and the structure of the industry.

■ **The China National Petroleum Corp. (CNPC)** is China's major producer of crude oil, accounting for 99 percent of the country's crude oil output in 1990, over 98 percent in 1991, and about 97 percent in 1992. CNPC should continue to produce more than 90 percent of China's crude over the next decade and possibly far beyond. It controls all on-shore oil fields and shallow-water offshore fields up to 5 m deep. The bulk of CNPC production comes from a number of older oil fields, most notably Daqing, which produces almost 40 percent of China's annual output.

CNPC was formed when the former Ministry of Petroleum was dissolved in 1988, an action intended to streamline bureaucracy and rationalize oil production operations. A wholly owned subsidiary, China National Oil and Gas Development Corp. (CNODC), is the contracting agent for CNPC cooperation with foreign companies.

Earlier this year, CNPC President Wang Tao stated that he hopes to restructure CNPC into "an interest-holding company," giving operating units increased responsibility. Wang aims to devolve CNPC's regional bureaus into independent oil, engineering, and service companies. CNPC now permits domestic oil fields and industrial enterprises to bid on exploration and development projects.

Despite its "corporatization," CNPC retains many of the prerogatives of a ministry and its president holds ministerial rank. In addition, CNPC still serves as the major policy adviser to the State Council on oil and gas issues. Much of its output is sold at below-market prices to State enterprises and State planners still have a direct say in how the company operates.

Despite industry reforms, the central government still exercises a strong degree of control over the sector.

The 18 CNPC petroleum administration bureaus (PABs) that administer CNPC's oil fields are holdovers from the days of the Petroleum Ministry. Until recently, each PAB sent all its revenues to the central CNPC administration, which then provided budgets for each field. In 1991, CNPC gave many PABs greater autonomy to make investment decisions and left smaller, less profitable oil fields to fend for themselves. With the exception of the three main producers, Daqing, Shengli and Liaohe—and promising new areas in Xinjiang—most fields now retain their revenues and have to cover operating costs without investment from the center. The big three turn over more of their profits to Beijing, but in return receive direct investment from the central government.

Achieving self-sufficiency may be a struggle for many fields, which, located in remote regions, find it difficult to discontinue the traditional cradle-to-grave services and jobs their employees expect. And with no alternate sources of employment near many oil fields, PABs are reluctant to lay off excess staff. To create jobs, some PABs have expanded downstream into petrochemical processing. Others are hoping to ship workers to the new oil fields in the Tarim and Turpan-Hami basins (see p.14).

Faced with the problem of excess labor and the prospect of having to import 1 million b/d of oil by the year 2000, CNPC in the last two years has established a number of subsidiaries to pursue overseas oil exploration. Subsidiaries are currently engaged in development and recovery operations in Canada, Peru, and Papua New Guinea, and are considering

additional investments in India and Siberia.

■ **The China National Offshore Oil Corp. (CNOOC)**, formed in 1982, controls all offshore oil and gas fields in water more than 5 m deep. While it has developed and operated a number of oil fields on its own, the company generally cooperates with foreign firms. CNOOC is a more commercial operation than CNPC, but appears to have less clout within the Chinese government. CNOOC President Wang Yan, for example, holds a rank equivalent to that of vice minister.

CNOOC is divided into four main subsidiaries. The Nanhai East Oil Corp. in Guangzhou and the Nanhai West Oil Corp. in Zhanjiang oversee operations in the South China Sea. The East Offshore Oil Corp. in Shanghai is responsible for operations in the East China Sea, while the Bohai Oil Corp. in Tianjin controls operations in the Bohai Gulf. A smaller CNOOC subsidiary operates in Hainan Province. The central office in Beijing is actively involved in international contracting and most foreign companies that have worked closely with CNOOC report satisfactory relationships.

CNOOC operates under the same price barriers CNPC does, forcing most international investors to find foreign buyers for their oil or gas finds. For oil this has not proved to be a great difficulty, but transportation and distribution impediments have made natural gas exports more problematic.

Because foreign exploration contracts account for nearly 40 percent of CNOOC's long-term investments and much of its production is exported, CNOOC is in far better financial shape than CNPC. Unlike CNPC, CNOOC publishes an annual report in which it reported total 1992 profits of ¥29.27 million (just over \$5 million at the official 1992 exchange rate).

■ **The China National Petrochemical Corp. (Sinopec)**, China's major refiner and producer of petrochemical products, accounts for almost 90 percent of the country's total refinery output. Formed in 1983, Sinopec, a State-owned company, has operated very much as part of the planned economy, with its inputs deter-

mined by State planners (and by CNPC production) and its output determined by quotas and sold at non-market prices. Almost half of Sinopec's 72 production units are refineries. Others include research institutes; exploration, design and construction units; regional development companies; and schools. While Sinopec has modernized its equipment, low output prices often make it unprofitable for the organization to use advanced refining equipment and processing techniques.

■ **China National Chemicals Import-Export Corp. (Sinochem)**, a trading company under the Ministry of Foreign Trade and Economic Cooperation (MOFTEC), imports and exports oil and gas as part of its international chemicals trade. Sinochem is China's largest trading company. Until recently, it was the only company Beijing permitted to trade petroleum and petrochemical products from onshore sources.

■ **China National United Oil Corp. (China Oil or Sinoil)**, a 50-50 joint venture between Sinochem and CNPC, was formed in January 1993 as part of the

parent companies' effort to diversify and internationalize. China Oil is authorized to import and export crude oil, refined products, and petrochemicals; to import telecommunications equipment used in petroleum exploration and development; to engage in oil refining and petrochemical production; to explore and develop overseas oil fields; and to make other foreign investments related to the petroleum industry.

■ **China International United Petroleum and Chemical Corp. (Unipech)**, a 50-50 joint venture between Sinochem and Sinopec, was formed in February 1993. Unipech is authorized to import both petroleum products and crude oil for Sinopec's refineries. Unipech may give Sinopec more flexibility over its import of crude feedstocks over the next few years. Under the rules put in place in May, Sinopec may designate either Sinochem or Unipech as its agent for imports of crude oil. CNPC refineries may use China Oil as their agent. Other entities are forbidden from importing crude without authorization.

—Robert Tansey

Planning Commission. No entity may resell or barter petroleum to other units. In addition, all crude and product prices are now set by the State.

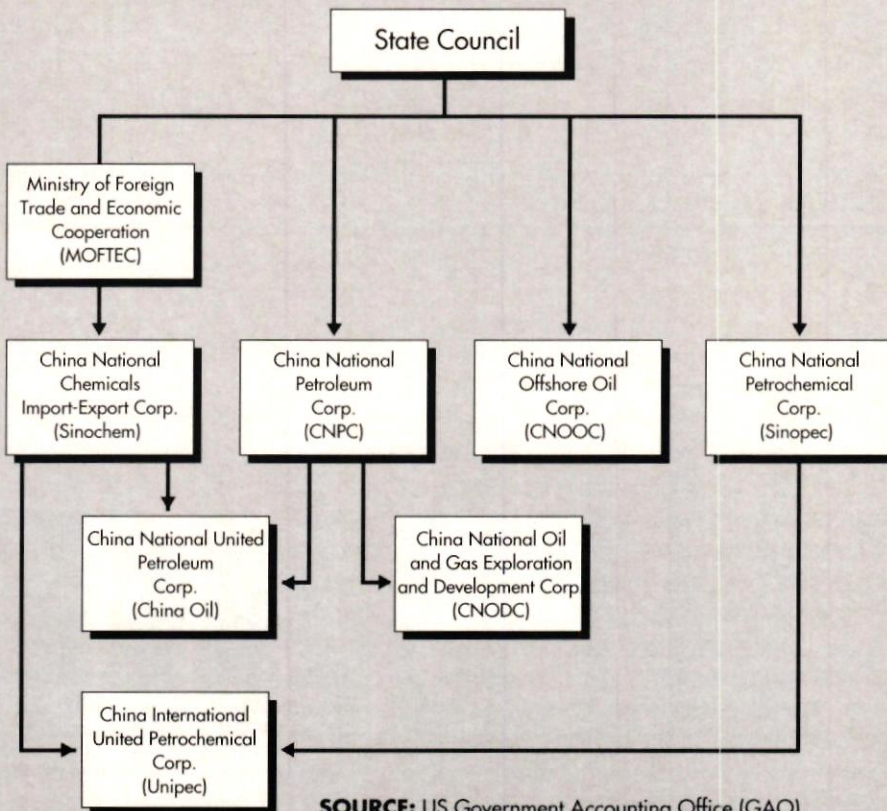
Wholesale prices for crude oil range from ¥684-1,310 (\$77-150) per tonne, depending on where it is produced and whether the enduser operates under the State plan. These prices are nearly double those that existed before the measures were introduced, and should perk up CNPC, which needs cash to fund new exploration. Wholesale and retail prices of oil products vary by location. Some were initially set well above international spot-market prices, but according to an article in the June 20 *China Daily*, retail product prices have since declined nationally because of the "reduction of intermediate links in the distribution of refined oil."

Even if Beijing's new petroleum regulations have calmed the chaos that recently characterized China's petroleum markets, the rules raise questions about transparency and market access, key criteria for China's application for membership in the GATT/World Trade Organization. China's own State Council order 93/63 states that rules affecting trade must be published to have effect, a provision also contained in China's market access memorandum of understanding (MOU) with the United States. Despite these commitments, Beijing has not published the petroleum measures. In addition, under the MOU, crude oil imports cannot be restricted by license or quota after December 31. Finished petroleum products do not have that advantage, however, and US companies should closely follow developments affecting market access for those products.

From global supplier to global importer

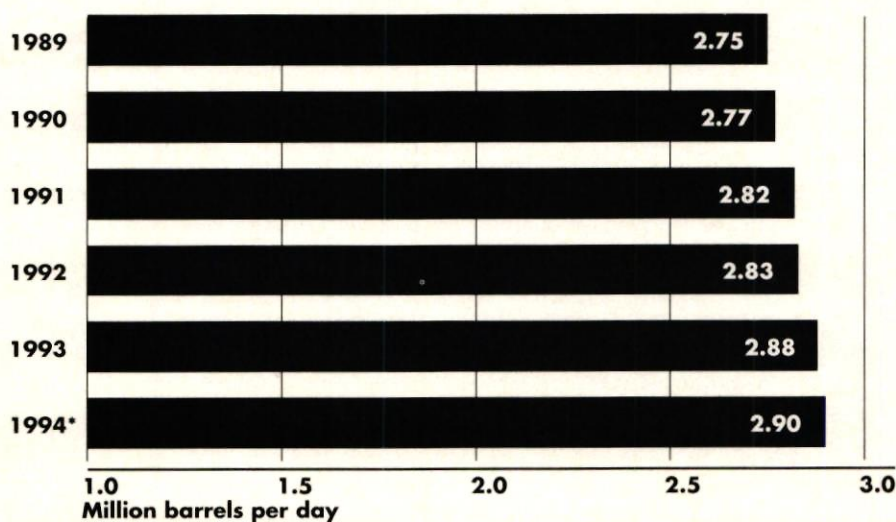
International commitments aside, China's rapid economic growth will impair the government's ability to restrict imports in the future. Industry analysts estimate that each percentage increase in China's gross domestic product leads to a corresponding 0.7 percent increase in consumption of oil products. With production unable to keep pace, China will likely import increasing quantities of petroleum in the future. The State Planning Commission estimates crude oil imports will reach 500,000-700,000 b/d by 1995

China's Oil Industry Structure



SOURCE: US Government Accounting Office (GAO)

China's Crude Oil Production



* estimate

SOURCE: East-West Center, *Oil and Gas Journal*

and Fereidun Fesharaki, director of the East-West Center Program on Resources in Hawaii, predicts the figure will rise to 1.3 million b/d by the year 2000. The bulk of this oil will likely come from the Middle East, which could have implications for Chinese foreign policy.

Crude exports, on the other hand, are expected to decline, from around 380,000 b/d in 1993 to 300,000 b/d in 1995 (see chart). *Oil and Gas Journal* estimates this figure will fall to 200,000 b/d by the year 2000. Exports of refined products will also continue to decline steadily; China became a net importer of refined output in 1992 (see p.17).

To limit China's dependence on foreign oil imports, Beijing has adopted a two-pronged strategy of developing new fields and implementing enhanced oil recovery (EOR) operations in existing ones. Recognition of the industry's need for advanced technology and a major cash infusion has led the government to expand the number of areas in which foreigners may explore. The number of joint development contracts China has signed with foreign companies over the last 18 months indicates many firms are confident about long-term upstream prospects in the PRC.

The story so far

The PRC's first concentrated effort to develop petroleum production occurred in 1959-63, when the Daqing oil field in

Northeast China was found and developed. With major discoveries at Shengli and Liaohe shortly after, China's oil production jumped from 5.2 million tonnes in 1960 to 30.58 million tonnes in 1970 and 105.95 million tonnes in 1980. Over 90 percent of this oil came from fields in China's northeastern basins (see map). As these major fields began to age, annual increases in crude oil output levels dropped from 13 percent in the 1970s to about 2 percent in the 1980s and 1990s (see chart). Moreover, production costs shot up as more expensive recovery tech-

niques had to be employed to keep production at the older fields from declining.

Pressure to boost domestic supplies led Beijing to open the upstream petroleum sector to foreign participation in the early 1980s. Wishing to capitalize on foreign expertise and technology without losing control over major production bases, Beijing initially restricted foreign participation to offshore sites. In 1982 it created a new organization, the China National Offshore Oil Corp. (CNOOC), to work with foreign companies and oversee exploration efforts.

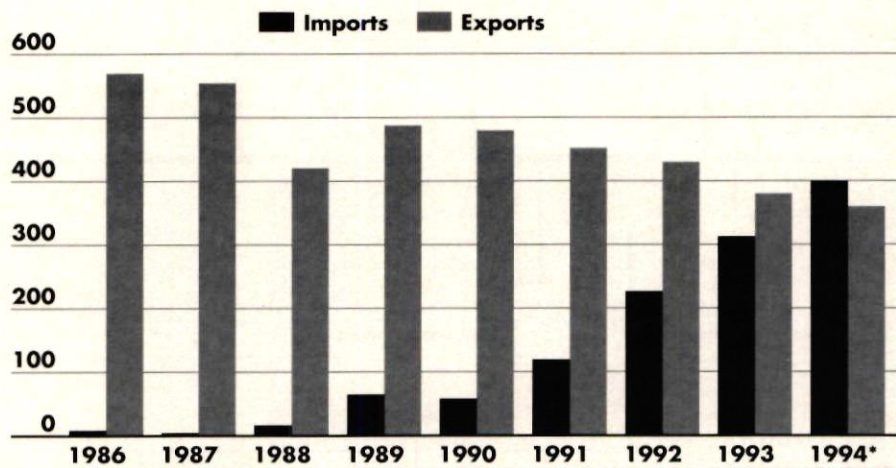
Starting offshore

Since then, CNOOC has conducted four bidding rounds for offshore exploration and development rights—in 1982, 1985, 1989, and 1993-94 (see *The CBR*, March-April 1990, p.24). Any foreign find in offshore areas is jointly developed with CNOOC. To date, nearly two-thirds of all foreign offshore contracts—about 50—have been signed with US companies. Together, foreign firms spent over \$3 billion dollars on offshore exploration and about \$1 billion on offshore development from 1982-93. Through October 1993, US companies had spent \$1.23 billion for exploration and \$300 million for development in these areas (see list).

The earliest offshore blocks open to foreign investors were in the South China Sea. Though exploration efforts in this area have generally yielded disappointing

China's Crude Oil Trade

Thousand barrels per day
700



* estimate

SOURCE: East-West Center



CONTACTS

Oil Honchos

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results, some oil and gas has been discovered and several fields are in production. Two oil fields operated by the ACT Group (Agip, Chevron, and Texaco) are producing 2.5 million tonnes of good quality crude annually, and Arco's Yachen gas field in the Yinggehai Basin is expected to start supplying gas to Hong Kong in 1996.

Subsequent bidding rounds concentrated on the Bohai Gulf, South China Sea (Pearl River Basin), and nearby areas. The Bohai Gulf, located just east of Tianjin, currently produces about 1 million tonnes of oil per year, mainly from CNOOC's own wells. A number of foreign firms, however, including Texaco, British Petroleum, and the Japanese National Oil Co., are now involved in exploration and development in this area. In the Pearl River Basin, both ACT and Amoco have fields scheduled to come onstream next year. ACT's two fields are expected to produce 1.5 million tonnes of petroleum annually, while Amoco anticipates production of 2.5 million tonnes per year. Two other fields, operated by Phillips and Pecten, are should go into production by 1995, with a combined

peak production of 3.1 million tonnes.

The fourth, and latest, round of offshore bidding was for blocks in the hitherto off-limits East China Sea, considered by many industry analysts the most promising area for offshore development. Among the winners of the 13 blocks put up for bid were US companies Texaco (with partners Maersk of Denmark and Agip of Italy), Chevron, and Maxus Energy. In all, 18 contracts involving investments totalling at least \$300 million were signed.

Total offshore production reached 4.6 million tonnes of crude oil in 1993—about 5 percent of all output. Production from existing fields and those currently under construction is expected to peak in 1997 at 12 million tonnes of oil and 4 billion cu m of natural gas. The number of wells CNOOC drills itself has increased significantly since the early 1980s, and by all accounts CNOOC's technical abilities have improved even more.

Onshore prospects

Though offshore production is increasing, onshore sites will provide the vast majority of China's petroleum production

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Tantalizing Tarim

China's Tarim Basin, one of the planet's most inhospitable spots, presents oil companies with one of the toughest challenges they have ever faced—along with the possibility of tremendous rewards. Chinese geologists estimate oil reserves in the Texas-sized area in Northwest China (see map, p.9) may exceed 100 billion barrels. Whatever the estimate, industry experts agree that Tarim has major potential.

Exploration of Tarim, which lies in the southern half of the Xinjiang Uygur Autonomous Region, is critical if China is to limit its increasing dependence on foreign oil. Tarim oil, however, is not easily recovered. The basin's geological structures are complex and its surface conditions worse than perhaps any other on-shore oil basin in the world. The Taklimakan Desert—whose name means "You go in, but you don't come out" in the local dialect—covers more than half of the 560,000 sq km basin. The desert has no oases in its interior and its sand is even finer than that of the Arabian peninsula, making the movement and operation of machinery difficult. Surface temperatures are exceedingly hot in summer and cold in winter. Moreover, the oil is as deep as 6,000 meters, making drilling expensive and technically difficult.

Drilling to date

Tarim is one of the few giant basins in the world yet to be extensively explored and developed. Since 1985, CNPC has been conducting limited testing and drilling in the area and now has 27 seismic crews, 44 rig crews, and 7 major support bases scattered throughout the basin. Chinese crews have discovered five distinct fields, in which they have sunk 33 wells—19 of which contain commercial flows. The five oil fields discovered to date are Lunnan, Sangtamu, Jiefang Qu Dong, Donghetang 1, and Tazhong 4, which is expected to be the largest producer. Last year these fields generated about 1.65 million tonnes of oil—approximately 1 percent of China's total production. CNPC expects the combined output of the five fields to reach 5 million tonnes annually by 1996.

CNPC hopes to produce 2 million tonnes of oil from the Tarim this year,

and 10 million tonnes annually from the area (approximately 200,000 barrels/day) by the year 2000. This goal seems attainable. According to CNPC, Tarim's Tazhong 4 and the Shixi-Mabei area in Xinjiang's Junggar Basin hold reserves of more than 100 million tonnes. Given China's rapidly increasing demand for oil and the stagnation of output at northern fields, CNPC is relying on quick development of discovered reserves. Recognizing that the government lacks the finances to fund the high costs of exploration and development—not to mention infrastructure—CNPC has begun to welcome foreign companies to explore the Tarim.

Opening the door

This dramatic change in policy was announced by Premier Li Peng in early 1993. Before then, Japan's National Oil Corp. had won rights to survey 30,000 sq km in the southwest part of the basin, but exploration activity was off-limits to foreign firms. Following Li Peng's announcement, CNPC initiated the first round of bidding in Tarim. Five southeastern blocks totalling 72,730 sq km were put up for bid. Despite complaints from foreign firms that dividing the basin piecemeal would make it impossible for bidders to assess the risks involved in comprehensive development of these reserves, 68 companies from 17 countries purchased pre-bid data packages.

The first award was announced last December, and went to a consortium led by Esso China (Exxon) that included Sumitomo Corp. and Japanese-held Indonesia Petroleum Ltd. In February, Texaco and partners Agip, Elf, Japan Energy Corp., and Japan Petroleum Exploration won rights to explore Block 1. CNPC may open additional—and possibly more attractive—sections of Tarim for bid within a year.

One of the major obstacles to development of Tarim is its lack of supporting transport infrastructure. Currently, there is no way to transport Tarim crude to coastal markets, some 2,500 km away. CNPC President Wang Tao stated last year that CNPC and the Halliburton Co. had completed a route survey to build a pipeline connecting Tarim to China's

eastern provinces. Since then, other CNPC officials have been quoted as saying they are prepared to build a pipeline from Tarim through Lanzhou in Gansu and on to Luoyang in Henan Province. As the price tag for a pipeline to the coast ranges from \$10-20 billion, China will undoubtedly seek foreign financial assistance to build it, but CNPC has yet to make any final decision on the project.

In the meantime, a short, 250 km pipeline built by a CNPC subsidiary, began operations in July 1992. It carries almost all of the production from the Lunnan fields to the railhead at Korla. While planners would eventually like to see a cross-country pipeline, the government views rail as a feasible alternative until Tarim production increases significantly.

Other potential giants

Tarim is not the only oil-rich basin in Northwest China. Adjacent to it is the Turpan-Hami—or Tuha—Basin, another promising site for oil development. While much smaller than Tarim, the Tuha does not pose the same technical or transport problems; output is shipped by rail to Lanzhou. Tuha production, currently just over 1 million tonnes annually, is expected to increase rapidly in the next few years. At present, no plans have been announced to open up Tuha or Junggar—the basin north of Tuha and Tarim—to foreign participation.

In both Tarim and Tuha, CNPC is placing its headquarters in existing cities and relying on the workforces of the northeastern fields to service the western fields. CNPC's Petroleum Administration Bureaus (PABs) compete for work at the western sites in a bid system. Workers go to Xinjiang without their families, work very hard, and then are given generous terms of leave to return home. This system helps CNPC to maintain employment at the older fields in spite of their declining output.

Because construction and exploration efforts at Tarim will probably extend into the next century, it is highly unlikely that the basin can solve China's petroleum shortfall in the next few years. Over the long term, however, Tarim is a major prospect for development by both CNPC and foreign companies.—Robert Tansey



DEALS

Foreign Participation in Exploration and Development of China's Petroleum Sector

Agip (Overseas) Ltd. (Italy), **Texaco China B.V.**, a subsidiary of Texaco (US), **Elf Hydrocarbures Chine** (France), **Japan Petroleum Exploration Co. Ltd.** (Japan), and **Japan Exploration Consortium** (Japan) signed a contract to explore for oil in a 9,814 sq km block in the Tarim Basin. 2/94.

Esso China Ltd., a subsidiary of Exxon Corp. (US), **Sumitomo Corp.** (Japan), and **Indonesia Petroleum** (Indonesia) signed a contract to explore for oil in a 14,475 sq km area in the Tarim Basin. 12/93.

Japan Petroleum Exploration Co. (Japan) and **Teikoku Oil Co.** (Japan) obtained rights to explore for oil in East China Sea. 12/93.

Royal Dutch/Shell Group (Netherlands/UK) signed a contract to explore for oil in East China Sea. 12/93.

Esso China Ltd., a subsidiary of Exxon Corp. (US), signed a contract to explore for oil and gas deposits in East China Sea. 12/93.

Chevron Corp. (US) Signed a contract to explore for oil and natural gas in the East China Sea. 11/93.

This list is not intended to be comprehensive and has not been independently verified by The CBR.

Maxus Energy Corp. (US) signed two contracts for oil exploration in East China Sea. 11/93.

Texaco Inc. (US), **Agip SpA** (Italy), and **Maersk Oil China** (Denmark) signed a \$100 million contract to explore for oil in the East China Sea. (US:40%, Italy:30%, Denmark:30%). 10/93.

Agip SpA (Italy) signed an agreement to develop oil resources in the Tarim Basin in Xinjiang Province. 7/93.

Amoco Corp. (US) and China Offshore Oil Nanhai East Corp. will develop the Lihua oil field in the South China Sea. \$1.5 billion. (US:49%-PRC:51%). 4/93.

Phillips Petroleum Co. (US) will explore two sites in the Pearl River estuary. \$600 million. 3/93.

Atlantic-Richfield Co. (US) will explore for natural gas in the western section of the Qingdingnan Basin of the South China Sea. 4/93.

Exploration Co. of Louisiana (US) and China National Oil and Gas Exploration and Development Corp. formed a \$14 million, 22-year joint venture for offshore exploration in the Bohai Gulf. 2/93.

Royal Dutch/Shell Group (Netherlands/UK) signed a 7-year contract to explore for oil and gas in an 8,900 sq km area in Jiangsu Province. 2/93.

Japan China Oil Development Corp. (Japan) signed two contracts to explore 480 sq mi area in the northern Bohai Sea. 8/92.

Amoco Oriental Oil Co. (US) signed a 30-year cooperative oil development contract with China Oil Development Co. 6/92.

Amoplex Orient Inc., a subsidiary of Amoplex Ltd. (Australia), signed a contract to explore for oil in the 120 km, 17-22 oil field in the South China Sea. 4/92.

Texaco Inc. (US) and **BHP Petroleum Inc.** (Australia) signed an agreement to explore for oil and gas in a 5,000 sq km area of Bohai Bay. 12/91.

Japan National Oil Corp. signed an agreement to explore for oil in southern Jiangsu Province. 6/91.

BP Exploration Operating Co. Ltd., a subsidiary of British Petroleum Co. PLC (UK), signed an oil exploration agreement for an offshore zone south of Guangdong Province. 4/91.

for the foreseeable future. Currently, over 70 percent of China's total production is generated by Daqing, Shengli, and Liaohe—all of which are around 30 years old. Given the age of these fields and the high rate of drilling at them over the years, all are likely to see production fall in the short to medium term.

Faced with the prospect of declining production at existing fields, China decided to open 11 provinces and regions in South China to foreign participation in 1985. In April 1992, Amoco Petroleum Far East Ltd. became the first foreign major to win the right to engage in onshore

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production in China when it signed a contract with CNPC for the Fuyang block in Anhui Province.

In February 1993, CNPC announced another 10 regions would be opened to foreign exploration. In line with its current slogan, "stabilize the East, develop the West," CNPC included western regions in this list, and auctioned off blocks in Xinjiang's promising Tarim Basin last year (see p.14). A second onshore bidding round for 26 blocks totalling 217,000 sq km commenced in January. Blocks for joint exploitation are located in Gansu, Hebei, Heilongjiang, Henan, Hubei, Inner Mongolia, Ningxia, Qinghai, and Shandong. Also being offered are 11 EOR projects in eastern oil fields. The deadline for bids is September 28.

CNPC, which is much less experienced in joint exploitation efforts than CNOOC, has basically followed the latter's lead in developing terms for onshore cooperation. According to regulations promulgated by the central government last October, foreign oil companies bear all exploration costs, while finds are jointly developed and proceeds determined as stipulated in

If a foreign company wishes to sell oil extracted in China on the domestic market, it must sell the oil to CNPC, which maintains monopoly purchasing rights.

the foreign company's contract. If a foreign company wishes to sell oil extracted in China on the domestic market, it must sell the oil to CNPC, which maintains monopoly purchasing rights.

Perhaps the most controversial measures of the regulations are articles 5 and 9. Article 5 entitles the PRC, under "special conditions," to requisition the oil prospected by foreign companies in return for "fair" compensation. Article 9

stipulates that foreign companies conducting evaluations in an area later contracted for cooperation with a different company must leave the area and sell all relevant prospecting data to CNPC.

Down the road

These provisions, however, do not seem to top the list of critical issues for foreign companies considering investments in China's upstream petroleum industry. More important are questions about Beijing's long-term commitment to reform and opening of the sector, eventual convertibility of the *renminbi*, and of course, prospects for striking oil and earning a satisfactory return. Companies considering investing in exploration in China should seek multiple sources of data and inquire about the drilling history of the site they are examining. Companies new to China must make sure that their prospective Chinese partners become familiar with their firm's history, qualifications, and business methods if they are to compete successfully with more established players. 完

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Looking Downstream

■ Paul Woodward and Ann Amelia Flynn

Despite confusion in China's oil markets, opportunities exist for ambitious companies looking long term

■ Paul Woodward is managing director of Asian Strategies Ltd., a Hong Kong-based consulting firm. He has studied developments in China's petroleum industry for several major oil companies. Ann Amelia Flynn is assistant editor of *The CBR*.

It's a story common to many sectors of China's economy. Ambitious expansion plans to meet soaring domestic demand are constrained only by shortages of money and know-how. But in China's downstream petroleum sector, the need for foreign capital and technology is particularly acute. As China continues to feverishly build new refineries, upgrade and retool existing petrochemical facilities, and improve product distribution, foreign petrochemical companies are diving in to help—and to position themselves for future market share. For as the story goes in most Chinese sectors, foreign firms must hold steady in the face of short-term obstacles to enjoy long-term gain.

Mise en scene

The focus of both foreign and Chinese government attention is the refining and petrochemical industries. Both come under the domain of the China National Petrochemical Corp. (Sinopec), created by Beijing in 1983 to consolidate refining and petrochemical activities. The corporation dominates downstream industries. In 1993, Sinopec accounted for 93 percent of China's total ethylene capacity, and with a distillation capacity of 2.9 million barrels per day (b/d), processed 2.2 million b/d of crude oil—88 percent of all oil refined in China that year. Sinopec refineries are generally designed to process domestic crudes, which tend to have high paraffin content and low sulfur



content. Most refineries are located in the Northeast, near China's main oil fields.

Over \$7.5 billion has been invested in China's refining sector over the past five years. Even as refining capacity has climbed, demand for refined products has soared higher. According to *Oil & Gas Journal*, refined product consumption jumped 14 percent in 1993 alone. To meet demand, China, long a net importer of petrochemical products, has had to import growing amounts of petrochemicals and, with domestic crude output stagnant, greater amounts of oil as well. Last year China imported 348,000 b/d of refined products—a 127 percent increase over 1992 levels—making the country a 274,000 b/d net product importer. Sinopec processed about 400,000 b/d of imported crude in 1993—15 percent of its crude run.

Goals and targets

Because petrochemicals is one of China's pillar industries, the sector receives a great amount of government attention. China's petrochemical industry got its start only in the late 1950s, with the establishment of the Gaoqiao Petrochemical Co. in Shanghai and the Lanzhou Chemical Industry Co. in Gansu Province. The industry developed largely in isolation, utilizing domestic technology and feedstocks.

In 1976, China began production at its first modern ethylene plant, the 300,000

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tonne per year (tpy) Yanshan Petroleum Corp. in Beijing. A period of rapid growth followed. Refineries and plants to supply petrochemical feedstocks were installed at Daqing, Qilu, Yangzi, and Shanghai. Between 1983-92, China's petrochemical output increased dramatically. Output of intermediate petrochemicals such as ethylene increased at an average annual rate of 13.2 percent. Output of propylene, another petrochemical building block, increased by an average rate of 16.5 percent per year, and butadiene and benzene increased at rates of 8.6 and 7.6 percent, respectively. The increase in feedstocks spurred production of plastics, synthetics, foams, and other products.

In the 1990s, Beijing and Sinopec officials are pressing for a wholesale overhaul of the refining a petrochemical industries, with the goal of obtaining self-sufficiency. The plan boils down to creating greater distillation and secondary capacity by building new, large refineries, processing crude more intensely and efficiently, and tightening integration of upstream and downstream sectors.

Sinopec plans to upgrade and expand in two phases. By the year 2000, it hopes to boost crude runs to 4.3 million b/d; ethylene output to 5 million tpy; plastics output to 7-8 million tpy; fiber output to 3.5-3.7 million tpy; and rubber to 700,000-1 million tpy. By 2010, crude runs should rise to 6.4-7.4 million b/d, and ethylene output to 8-10 million tpy. To create economies of scale, Sinopec wants its refineries to have at least 100,000 b/d capacity and its ethylene crackers to have at least 300,000-450,000 tpy capacity. As part of that goal, China's existing 300,000 tpy ethylene crackers are to be expanded to 450,000-500,000 tpy and upgraded to incorporate the latest technology.

Sinopec also talks of using more modern management techniques, reforming plant process-design models, adopting advanced monitoring and control systems, and doubling the time between maintenance turn around from the current one year. Also on Sinopec's wish list: to raise capital through various kinds of listed, limited liability, and joint-stock shareholding companies.

Sinopec isn't the only agency with ambitious plans. With crude oil sold at artificially low State-controlled prices until recently, the China National Petroleum

Corp. (CNPC), China's largest oil producer, wants to expand into refined products, which generally sell at a premium. The corporation in 1993 refined about 200,000 b/d of crude at its 30 plants and is revamping its refineries at the Dagang and Liaohe oil fields to boost processing capacity to 500,000 b/d. CNPC wants to build new plants in Sichuan and Xinjiang to refine Tarim crudes.

Enter foreigners

China has set a tall order for itself—one which industry leaders realize they can not accomplish alone. Recognizing its need for external supplies of capital and technology, Beijing in 1991 began to allow foreign investment in such previously off-limits downstream activities as refining and retailing. China also began actively seeking foreign investment, technology, and equipment for expansion of its petrochemical sector, especially after Deng Xiaoping's 1992 call to speed the pace of economic reform.

Foreign companies have responded to the market opening. Shell's \$5 billion

Guangdong refinery is the most prominent foreign investment in this area to date. The plant, which began construction in 1992, should come into operation in 1994-95 and help slake the province's almost unquenchable thirst for imported petroleum products. A number of other foreign companies, including Elf Aquitaine of France, are also considering building oil refineries in China (see list). Sinopec expects to sign several contracts with foreign companies for petrochemical revamp and expansion projects.

According to the East-West Center in Hawaii, Sinopec had negotiated 63 joint ventures with foreign investors, with a total of \$200 million utilized, by the end of 1993. The World Bank Group's International Finance Corp. (IFC) reportedly is considering investing an additional \$200-300 million in refinery projects in China.

Taking known projects into account, China's refining capacity should reach 3.7 million b/d by the year 2000—lower than Beijing anticipated, as completion of certain projects will extend beyond the turn of the century. East-West Center Re-

searcher Kang Wu forecasts demand for oil products will reach 4.2 million b/d by that time. Given China's high demand for petrochemical products and the relatively long lead time it takes to build ethylene and other petrochemical plants, China will likely have to continue to import significant amounts of petrochemicals until the early 21st century.

Other niches for foreigners

Capital and technology are not the only things China seeks from overseas. With domestic crude production stagnant, the country also needs foreign oil. To feed refineries, especially in the South, China will have to import increasing amounts of crude oil from other nations. Most will probably come from the Middle East. To accommodate these imports, existing refineries will have to revamp to handle the higher sulfur crudes.

At the same time, China is working to get crude supplies and petrochemical feedstocks to plants more efficiently. About 70-75 percent of the new refining capacity to be added in China will be in

Eye on Ethylene

One measure of a country's refining sector is its output of ethylene, one of the primary petrochemical building blocks. After a decade of 13.3 percent annual growth, China's 1993 ethylene production reached 1.95 million tonnes per year (tpy), or 93 percent of total capacity. Total capacity a decade before was only 654,000 tpy.

According to State plans, Beijing seeks to build an additional 19 ethylene crackers by the end of the century. Seven have already been approved, most with average capacity of 140,000 tpy. While this small size runs counter to Beijing's stated desire to build 300,000 tpy plants to attain economies of scale, the projects will still boost China's petrochemical ca-

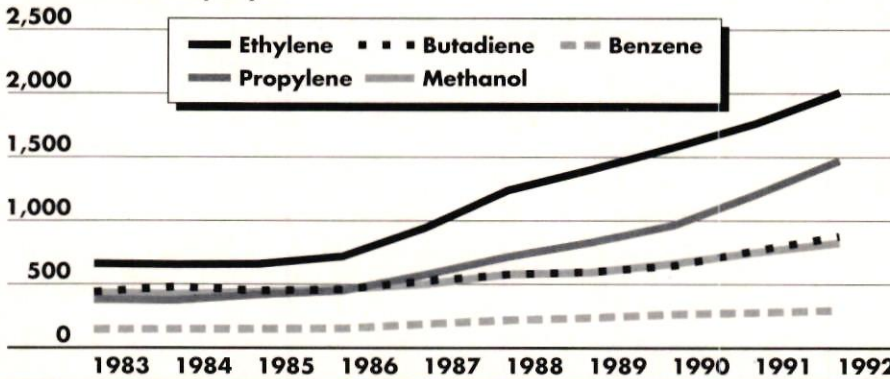
capacity significantly. Analysts at the East-West Center estimate that China could add anywhere from 935,000-2.2 million tpy in capacity by the end of the decade, depending on how many planned projects are completed. New/expansion projects scheduled to come on line in 1995 include the Yanshan, Beijing (150,000 tpy); Dushanzi, Xinjiang (140,000 tpy); and Tianjin (140,000 tpy) plants. Projects to start up in 2000 are the Jilin (300,000 tpy), Lanzhou (80,000 tpy), Guangzhou (115,000 tpy), Maoming (300,000 tpy), and Zhongyuan (140,000 tpy) plants.

China's State Planning Commission has frozen expansion projects that could add an additional 1,165,000 tpy of capacity until further study is conducted. Moreover, recent government moves to recentralize control over pricing and distribution of petroleum products might make potential foreign investors wary of the China market, which could set back Beijing's expansion plans.

—AAF

China's Petrochemical Output

Thousand tonnes per year



SOURCE: East-West Center



DEALS

Foreign Involvement in China's Downstream Petroleum Sector

Investments:

Allied Industries International Ltd. (US) and Jilian Chemical Industrial Corp. established three joint ventures to produce acrylic acid and esters, ethylene oxide, and ethoxylates. 1/94.

Yukong Ltd. (South Korea), China National Petroleum Corp. (CNPC), and the Shenzhen city government will build a \$1.5 billion, 100,000-150,000 b/d joint-venture refinery in Shenzhen. (South Korea:40%-PRC:60%)

Huntsman Conti Corp. (US), Sinopec Great Wall Lube Oil Co. (PRC), and China Petrochemical International Co. (PRC) formed the \$9 million Huntsman Great Wall Co. to manufacture polystyrene packaging in Beijing. (US:60%-PRC:40%). 12/93.

Royal Dutch/Shell Group (Netherlands/UK), CNOOC, Sinopec, and China Merchants Holding Co. will construct a \$4 billion refinery joint venture in Huizhou, Guangdong Province. (Netherlands/UK:50%-PRC:50%). 11/93.

Itochu International Inc. (Japan), **Chisso** (Japan), and Shanghai Petrochemical Co. Ltd. will establish a \$9.5 million joint-venture plastics and resin plant. (Japan:40%-PRC:60%). 10/93.

Ciba-Geigy (Switzerland) will form a joint venture in Shanghai to produce refining chemicals for plastics. 9/93.

Vitol (Hong Kong) and Maoming Petroleum Chemical Co. will build a \$30 million, 100,000 b/d refinery to produce gas, oil, and a fuel distillate. 6/93.

Mitsui Petrochemical Corp. (Japan) and Tianjin Petrochemical Corp., a Sinopec subsidiary, will establish a \$258.6 million, 250,000 tpy petrochemical joint venture in Tianjin to produce pure terephthalic acid (PTA). 2/93.

Mitsui & Co. and Mitsui Engineering and Shipbuilding Co. (Japan) will build a \$40.1 million, 40,000 tpy polypropylene plant near the Daqing crude oil field with loans provided by the Export-Import Bank of Japan. 12/92.

Kuok Kerry Group (Malaysia) will build a \$2.6 billion oil refinery and petrochemical complex in Beihai City. 10/92.

Samsung Group (South Korea), **C. Itoh Co. Ltd.** (Japan), **Linde AG** (Germany), and National Technical Import-Export Corp. will construct a \$200 million, 300,000 tpy ethylene plant in Jilin Province. 9/92.

Beston Petrochemical Co., a subsidiary of Chia Tai Co. Ltd. (Thailand), will establish the \$11.25 million wholly foreign-owned Ningbo Beston Petrochemical Co. to produce polyvinyl chloride powder. 11/91.

BASF (Germany) and Shanghai Gaoqiao Petrochemical Corp. established a joint venture to produce polymer dispersions for use in the paper, textile, and leather industries. 10/91.

Imperial Chemical Industries PLC (UK) will establish a \$1 million wholly foreign-owned enterprise to develop new polyurethane products in Shanghai. 7/91.

TOTAL Compagnie Francaise des Petroles (France), Dalian Economic & Technical Development Corp., China National Chemical Import-Export Corp., Daqing city, and a unit of the Ministry of Chemical Industry will establish the \$470 million Dalian West Pacific Petrochemical Co. joint venture to build and operate a 5 million tpy refinery. (France:20%-PRC:80%). 6/91.

Technimont, a subsidiary of Gruppo Ferruzzi-Montedison (Italy), and **Intecsa-Udhe Industrial** (Spain) will build a \$60 million, 70,000 tpy polypropylene plant

at Dushanzi in Xinjiang. 6/91.

Maya Manufacturing & Trading Co. Ltd. (Singapore) and Shanghai Municipal Produce Co. established a \$5 million joint venture to produce polystyrene resin for export. 10/90.

Sales

Badger Co. Inc., a subsidiary of Raytheon Co. (US) and Fluor Corp. (US) will sell the Guangzhou municipal government equipment and technology for an ethylene project under construction in Guangzhou. \$60 million. 1/93.

Asia Badger Inc., subsidiary of Raytheon Co. (US) will sell Sinopec \$30 million in process equipment and engineering services for construction of a petrochemical plant with a loan from the US Export-Import Bank. 10/92.

Mitsubishi Group (Japan) will supply Daqing Oil Administration Agency with \$40.4 million in equipment to build a 50,000 tpy acrylamide tertiary recovery chemical plant at the Daqing oil field. 9/92.

Toyo Engineering Corp. and Mitsui Engineering & Shipbuilding Co. Ltd. (Japan) will sell Sinopec \$120 million worth of polyethylene and polypropylene equipment for the Guangzhou Ethylene Project. 8/92.

Technimont Engineering Co. (Italy) will supply Dalian West Pacific Petrochemical Co. with technology and equipment to produce 6,000 tpy of polypropylene. 11/91.

Snamprogetti Corp. (Italy) will sell \$50 million worth of equipment to the 115,000 tpy Beijing Ethylene Project for production of EVA resin. 11/91.

This list is not intended to be comprehensive and has not been independently verified by The CBR.

the coastal southeastern provinces, where consumption growth has far outstripped that in the northeast provinces. Since refineries traditionally were built near crude oil supplies, China currently has significant overcapacity in the Northeast and undercapacity in the Southeast. Many land-locked central provinces are also feeling the pinch.

Eager for supplies, many southern refiners have been looking overseas. In some Guangdong cities, imports of refined products accounted for as much as 70 percent of supply in the first months of 1994. Over the past couple of years, independent traders exploited the supply imbalance and the State controlled pricing system to buy both crude and products at low State prices and divert them from the State sector to the open market, where they charged up to two times the State prices. Beijing imposed a temporary price freeze and import ban in May to gain control of the increasingly chaotic distribution and price system (see p.8).

Despite China's demand for foreign oil supplies, its tanker terminals are underuti-

lized. The country's 10 crude tanker terminals can each handle at least 90,000 b/d, and another four terminals are under construction or awaiting approval for expansion plans. The overcapacity results from Sinopec's desire to eliminate transfer fees, which lead it to build its own terminals rather than lease capacity at third-party terminals. Sinopec's terminals generally are built without proper consideration for support infrastructure, which often falls under the jurisdiction of the Ministry of Transportation. Storage facilities and interior rail and road infrastructure are inadequate to handle the volumes of crude the terminals are designed for.

Nevertheless, Sinopec is likely to keep building. Bigger terminals mean better economies of scale. And with most of China's imported crude forecast to come from the Middle East in the future, lowering transportation fees—and outflows of hard currency—is a priority.

Distribution snafus

Foreign companies not wishing to invest the hundreds of millions of dollars it

takes to build a refinery or petrochemical plant are investing in other downstream areas, such as service station operations. Sinopec officially predicts that gasoline demand will increase 66 percent to around 40 million tonnes by the year 2000, up from some 25 million tonnes in 1993. Ye Ping, vice president of the Shanghai Automobile Industry Corp., has suggested that China's vehicle population could rise from 5.8 million in 1990 to some 20 million by the end of the century, and to 48 million vehicles by 2010. This dramatic increase will necessitate expansion of and improvements in China's current gasoline distribution network.

Major international oil companies already operate more than 85 service stations in Shenzhen, Zhuhai, and special development zones in Guangzhou, and are beginning to expand into other parts of the Pearl River Delta. Over 75 percent of the foreign-invested stations sport the Mobil name, which has become the dominant foreign brand in China.

It is unclear at this point what impact China's new petroleum regulations will

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have on the ability of foreign companies to engage in retail distribution. The wholesale petroleum products market, however, will likely remain off limits to foreigners for the foreseeable future.

If prospects in refining and service stations right now are hazy, they are considerably brighter in the development of fuel distribution facilities. Marine bunkering facilities, which provide fuel for ocean-going ships, are few in number, especially along the Pearl River. Many vessels have to detour to Hong Kong—or even further afield—to fuel up. At least one major European company is already investing in a marine bunker terminal in Guangzhou and another is considering investing in a terminal at the mouth of the Pearl River. There are still opportunities for further investments in the newly developed ports around Shenzhen.

The construction and operation of distribution facilities for liquid petroleum gas (LPG) might also hold promise for foreign investors. In more developed cities such as Shenzhen and Guangzhou, LPG has all but displaced kerosene as the main fuel for household use. Even in the countryside in Guangdong and some of the other coastal provinces, wealthier villages and townships are switching to LPG from coal briquettes, kerosene, and wood.

LPG has been treated by the government as less strategic than fuel oil or diesel as it has fewer uses in the key

transportation and power generation sectors. As such, foreign companies may find it easier to participate in this area than in other distribution-related projects. One major European oil company reportedly is including LPG distribution facilities in the marine terminal it is building in the Pearl River estuary, and British Petroleum (BP), Singapore's Hong Leong group, and the Fuzhou Gas Corp. signed a joint-venture agreement in mid-1993 to build a \$15.5 million LPG plant in Fuzhou. The plant, which will have an initial capacity of 30 million tonnes and will include a sea-fed storage terminal and bottling plant, is due for completion by the end of this year.

Another promising niche area is in the provision and distribution of aviation gas (avgas) and jet fuel, demand for which is expected to grow 20-30 percent a year through the end of the decade. Existing systems and airport infrastructure are no longer adequate to meet the demands of China's aviation sector (see *The CBR*, May-June 1993, p.12). Aviation fuel imports in 1992 totalled almost 1 million tonnes, and some estimate this figure could hit 7.5 million by 2000. In April, the China Aviation Oil Supply Corp. (CAOSC) began inviting foreign firms to upgrade China's avgas distribution system in five key regions. BP, Elf Aquitaine, Vitol, and the United Kingdom's Fortune Oil in October 1993 signed letters of in-

tent with CAOSC for improvement projects. Vitol and Fortune were reported to have inked a \$250 million-plus deal to upgrade the aviation fuel infrastructure in as many as 14 airports. BP was awarded projects in the Northeast, including Beijing, with projects in northern China offered to Elf.

In June 1993, Singapore's national shipping company, Neptune Orient Lines, announced the formation of a joint venture with Sinotrans and CAOSC that will trade and transport avgas and jet fuel for all of China's major airports. The company, Sino Aviation Oil Transportation (Singapore) Pte Ltd., will be based in Singapore. The extent to which this agreement might overlap with any of the October deals remains unclear, as does the attitude of Chinese aviation authorities to additional deals in this area.

Denouement?

Although capital, material, and technical restraints may prohibit full realization of some of Beijing's plans of self sufficiency, there is no question that in the next decade China will greatly increase its capacity to produce ethylene, propylene, and downstream derivatives, eventually offsetting significant amounts of imports. In the meantime, however, China's rapid economic growth will force the country to import large amounts of oil and petrochemicals.

How Beijing resolves important issues of pricing, market access, and supervision of the petroleum sector will determine to a large extent the comfort level of potential foreign investors, whose cash and technology will be critical to China's goals of modernizing and expanding downstream output. Even if Beijing proves reluctant to open and reform the petroleum sector further, in the near term, market pressure will force it to make exceptions and cut deals with some foreign companies. Foreign firms, then, would be wise to continue to explore sales and investment opportunities in China's downstream petroleum sector, taking into consideration the country's great needs and the relatively long lead-time it takes to get projects up and running. 完

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Whither China's Environment?

A look at the mainland's problems and how foreign companies can help Beijing tackle them

No one who visits China these days can fail to be struck by the dramatic transformation of its cities and countryside. New skyscrapers spring up almost overnight, rural enterprises churn out much-wanted consumer goods, and trucks and taxis clog the roads. But also hard to miss is the impact of this modernization on China's environment. Rarely can a visitor in downtown Beijing see through the perpetual haze to the Western Hills anymore, and the entire province of Guangdong seems blanketed with a film of soot. Many foreign visitors return home from the mainland with respiratory infections.

Statistics compiled by the United Nations and other international agencies indicate China's environmental problems are growing more severe. According to the World Resources Institute, these problems affect both urban and rural areas, and include:

■ **Air pollution** Coal dust, diesel exhaust from trucks, and wind-blown sand give Chinese cities some of the world's highest readings for suspended particulates and carbon dioxide. The toll on human health is high; the death rate from chronic obstructive pulmonary disease in China is five times higher than in the United States. Moreover, a predicted large-scale shift from bicycles to fueled vehicles would substantially increase such pollutants as hydrocarbons, carbon monoxide, and nitrous oxide.

■ **Water pollution** About 80 percent of China's urban river water is polluted to some degree, commonly with ammonium nitrate, volatile phenol, and oxygen-consuming organic matter. Over 30 percent of industrial wastewater and 80 percent of municipal wastewater is dumped into rivers, lakes, and seas without treatment. There have been some reports of arsenic poisoning caused by the drinking of city water.

■ **Agricultural pollution** Traditional reliance on organic recycling, crop rotation, and draft animals has decreased dramatically. Over 60 percent of fertilizers used by Chinese farmers are

now chemically derived; run-off contributes to water pollution. The waning of crop rotation is depleting the amount of organic matter and nutrients in soil and aggravating pest and disease outbreaks.

■ **Industrial pollution** Town and village enterprises (TVEs) tend to use outdated technology and generally are not well-designed or built. Most lack pollution control equipment; if they do have such equipment, it is usually ineffective. The brick and tile, porcelain and pottery, cement, and pulp and paper industries account for the lion's share of TVE pollution.

An ambitious agenda

Awareness of these dangers—and determination to stop them from worsening—is growing both in and outside China. As in other areas, the key obstacle to China's successful implementation of rigorous environmental standards is lack of technology and finances. Innovative new programs designed by Beijing and others, however, may help bridge the gap. In this Special *CBR* Report, we'll introduce you to a few of these programs. You'll find analysis of how Beijing plans to improve environmental protection in China, as well as descriptions of specific projects and programs that hold potential for foreign firms seeking to do business in China's environmental sector. The greening of China could generate greenbacks for astute companies with the right goods.

—Editor

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Agenda for Change

On March 25, China's State Council approved its "Agenda 21" for sustainable development. The plan, a follow up to the 1992 UN Conference on Environment and Development (UNCED) in Rio, is an extensive 15-year program detailing China's sustainable development strategy. China claims to be the first country to prepare a development plan in accordance with the post-UNCED goal of establishing a global agenda for sustainable development in the 21st century.

China's plan and component projects were formulated by a State Science and Technology Commission (SSTC) leading group chaired by Deng Nan, SSTC vice chair. Agenda 21 deals with overall strategies to develop both Chinese society and the PRC economy while protecting natural resources. The UN Development Programme and other international organizations provided financial assistance and advice on the program, which includes 62 "priority projects" to be incorpo-

rated into the Ninth Five-Year Plan (1996-2000). In May, SSTC teams visited several industrialized nations, including the United States, to seek foreign financial support for the projects.

Backing for China's Agenda 21 plan appears strong within the Chinese leadership. Beijing has pledged to provide 60 percent of the estimated \$4 billion needed by the year 2000 to implement the first 62 projects. The remaining funds are expected to come from foreign sources. The projects on the list are not entirely new, however, as some are already underway, having obtained funding commitments from bilateral or multilateral aid programs.

Specific project details are expected to be worked out at a July SSTC Agenda 21 Roundtable meeting in Beijing. At this point, however, SSTC officials are eager to meet with private companies interested in participating in the following projects:

Environmental Education, Standards, and Facilities

Enact and Amend Laws for Sustainable Development
Cost: \$1 million (PRC:\$500,000, international funds: \$500,000)

Establish International Training Center for Sustainable Development
Cost: \$7.88 million

Investigate and Enforce Measures for Sustainable Development
Cost: \$3.5 million (PRC:\$1.75 million, international funds \$1.75 million)

Formulate Sustainable Development Indicators
Cost: \$2.1 million (PRC:\$1.1 million, international funds: \$1 million)

Promote Education for Sustainable Development
Cost: \$9.95 million. (PRC:\$4.95 million, international funds: \$2 million, US: \$3 million)

Sustainable Agricultural Policies

Develop Biological Pesticides and "Green" Foods
Cost: \$64.54 million (PRC: \$31.8 million, soft loans: \$31.8 million, other international funds: \$940,000)

Develop Strategy for Sustainable Agriculture and Demonstration Projects in 10 Counties
Cost: \$83.25 million (PRC: \$42.5 million, international funds: \$40.75 million)

Develop and Manage Farming Systems in Mountain-River-Lake Region of Jiangxi Province
Cost: \$107.1 million

Manage Water Resources for Agriculture and Develop Demonstration Project
Cost: \$109 million

Promote Agriculture and Environmental Protection in South China
Cost: \$65.4 million (PRC: \$33 million, international funds: \$32.4 million)

Promote Agriculture in Rural Areas of Huang-Huai Hai Plain
Cost: \$39.4 million (PRC: \$20 million, international funds: \$19.4 million)

Promote Sustainable Development of Small Town in Huai River Flood Plain
Cost: \$8.4 million (PRC: \$5.47 million, international funds: \$2.93 million)

Cleaner Industrial Production

Construct Demonstration Project for Cleaner Chemical-Fiber Pulp Production
Cost: \$16 million

Construct Demonstration Project for Cleaner Steel Production
Cost: \$34 million (PRC: \$18 million, international funds: \$16 million)

Construct a Dry Scrubber System to Control Industrial Emissions
Cost: \$15.56 million (PRC: \$4.5 million, international funds: \$11.06 million)

Construct and Manage China Yixing Industrial Park for Environmental Science and Technology
Cost: \$2.31 billion (PRC: \$1.15 billion, international funds: \$1.16 billion)

Construct Straw Pulp and Paper Manufacturing Plant
Cost: \$6.4 million (PRC: \$3.2 million, international funds: \$3.2 million)

Enhance Management, Policies, and Regulations for Cleaner Industrial Production

Cost: \$2 million (PRC: \$1 million, international funds: \$1 million)

Promote Development and Management Capacity of Environmental Protection Equipment Industry

Cost: \$2 million (PRC: \$1 million, international funds: \$1 million)

Promote Sustainable Development through Industrial Transformation and Cleaner Production in Benxi, Liaoning Province

Cost: \$37 million

Promote Sustainable Development of Shenyang's Shenhe District

Cost: \$20 million

Clean Energy and Transportation

Construct 150 MW Pressurized Fluidized Bed Combustion Combined-Cycle Demonstration Plant

Cost: \$87 million

Construct Integrated Gasification Combined-Cycle Demonstration Power Plant

Cost: \$311 million.

Construct Nuclear Heating Plant and Improve Nuclear Engineering Safety

Cost: \$72 million

Develop Wind Turbine Generators and Demonstration Wind Farm

Cost: \$19.64 million

Exploit, Utilize, and Demonstrate Biomass Energy Projects

Cost: \$12.73 million

Improve Emissions Control, Economic Efficiency, and Safety of Auto Products

Cost: \$50 million

Improve Transport Planning and Management and Develop a Pilot Light Rail Project

Cost: \$15.5 million

Increase Energy Efficiency in Buildings

Cost: \$15.8 million

Utilize Solar, Thermal, and Photovoltaic Power

Cost: \$29 million

Conservation of Natural Resources

Develop Natural Resource Accounting System

Cost: \$3.5 million (PRC: \$2 million, international funds: \$1.5 million)

Develop Sustainable Resource Plan for Xinjiang's Tarim Basin

Cost: \$4 million (PRC: \$500,000, international grants: \$1 million, other international funds: \$2.5 million)

Manage and Reclaim Mine Tailings

Cost: \$20.8 million (PRC: \$9 million, soft loans: \$6 million, other international funds: \$5.8 million)

Prevent and Control Soil Erosion and Land Degradation in Middle and Upper Regions of Yangtze River

Cost: \$600 million (PRC: \$400 million, soft loans: \$150 million, other international funds: \$50 million)

Water Pollution, Solid Waste, and Hazardous Waste

Construct Radioactive Waste Disposal Technology Demonstration Project

Cost: \$35 million (PRC: \$15 million, international funds: \$20 million)

Control Water Pollution and Protect Water Resources in Sanya City, Hainan Island

Cost: \$18 million

Develop Integrated Water Management in Jingsha Urban Area

Cost: \$56.4 million

Control Water Pollution and Conduct Demonstration Project in Dianchi Lake, Yunnan Province

Cost: \$4.82 million (PRC: \$3.02 million, international funds: \$1.8 million)

Control Water Pollution and Use of Resources in Baiyangdian Lake

Cost: \$3.55 million (PRC: \$1.81 million, international funds: \$1.74 million)

Establish Solid Waste Management Systems and Technical Standards

Cost: \$5.8 million (PRC: \$4 million, international funds: \$1.8 million)

Manage Radioactive Wastes

Cost: \$4 million (PRC: \$2.1 million, international funds: \$1.9 million)

Prevent and Control Marine Oil Spills

Cost: \$10 million (PRC: \$7 million, international funds: \$3 million)

Promote Conservation of Bosteng Lake in Xinjiang

Cost: \$11.12 million (PRC: \$7.5 million, international funds: \$3.62 million)

Promote Development of Waste Reclamation Industry

Cost: \$25.8 million (PRC: \$18.5 million, soft loans: \$6 million, other international funds: \$1.3 million)

Promote Technical Support and Demonstration Project for Disposal of Hazardous Wastes and Toxic Materials
Cost: \$18.8 million (PRC: \$10.9 million, international funds: \$7.9 million)

Develop Wastewater Treatment Project in Luohe City, Henan Province
Cost: \$42.16 million (PRC: \$20.76 million, international funds: \$21.4 million)

Develop Water Treatment Project in Northern Jiangsu
Cost: \$325.3 million (PRC: \$154 million, international funds: \$171.3 million)

Poverty Alleviation and Regional Development

Abate Poverty, Erosion, and Pollution in Upstream East Liaohe Basin
Cost: \$67 million. (PRC: \$41 million, international funds: \$26 million)

Alleviate Poverty in North China
Cost: \$466 million

Develop Lancang-Mekong Border Area
Cost: \$11.9 million (PRC: \$4.9 million, international funds: \$7 million)

Promote Economic Development and Conservation in Hanas Border Area in Northwest China
Cost: \$13.2 million (PRC: \$6.7 million, international funds: \$6.5 million)

Eliminate Poverty/Land Degradation in Karst Areas of Southwest China
Cost: \$120.9 million

Promote Development and Conservation in Yellow River Delta
Cost: \$226.9 million

Promote Rural Women's Participation in Development in Five Northwest Provinces
Cost: \$5 million (PRC: \$3 million, international funds: \$2 million)

Research Sustainable Development along Euro-Asian Rail Link in China
Cost: \$90 million

Reverse Impoverishment and Degradation in Jinshanmen Area (Shanxi/Shaanxi/Inner Mongolia)
Cost: \$40.28 million

Population and Health

Enhance Women's Status in Hainan Province
Cost: \$1.5 million (PRC: \$750,000, international funds: \$750,000)

Establish Disaster Prevention and Management Center in Pudong New Area, Shanghai
Cost: \$9 million

Establish Nationally Integrated Assessment, Prevention, and Response Program for Natural Disasters
Cost: \$5.3 million (PRC: \$2.9 million, international funds: \$2.4 million)

Establish Rural Health Insurance System
Cost: \$4 million (PRC: \$2 million, international funds: \$2 million)

Prevent Occupational Diseases and Protect Working Environment in Mining Industry
Cost: \$4.4 million

Protect Endangered Species Used in Traditional Medicines and Develop Alternatives
Cost: \$9.6 million (PRC: \$5.9 million, international funds: \$3.7 million)

Research and Develop Contraceptive Vaccine
Cost: \$9.25 million. (PRC: \$5.15 million, international funds: \$4.1 million)

Global Change and Biodiversity

Develop Methods for Conservation and Restoration of Tropical Rain Forest in South China
Cost: \$3.5 million

Establish a Biodiversity Network to Promote Conservation of Endangered Species
Cost: \$9.1 million (soft loans: \$3.8 million, other international funds: \$5.3 million)

Establish a Demonstration Project on Preventing Desertification
Cost: \$36.5 million (PRC: \$14 million, international funds: \$22.5 million)

Establish East Asia Center for Global Change
Cost: \$15.8 million

Establish National Climate Center for China
Cost: \$5 million (PRC: \$3 million, international funds: \$2 million)



CONTACTS

For further information on any of these projects, contact:

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Ms. Lu and Ms. Li, our staff at the Business Centre, didn't hesitate.

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It was by a long process of deduction that they managed to return the money to our relieved guest before he'd even noticed it was missing.

It goes without saying, that after ten years in China our staff are quite used to helping our guests in the most unusual ways.

Which may explain why some of them have stayed with us continuously for more than five years.



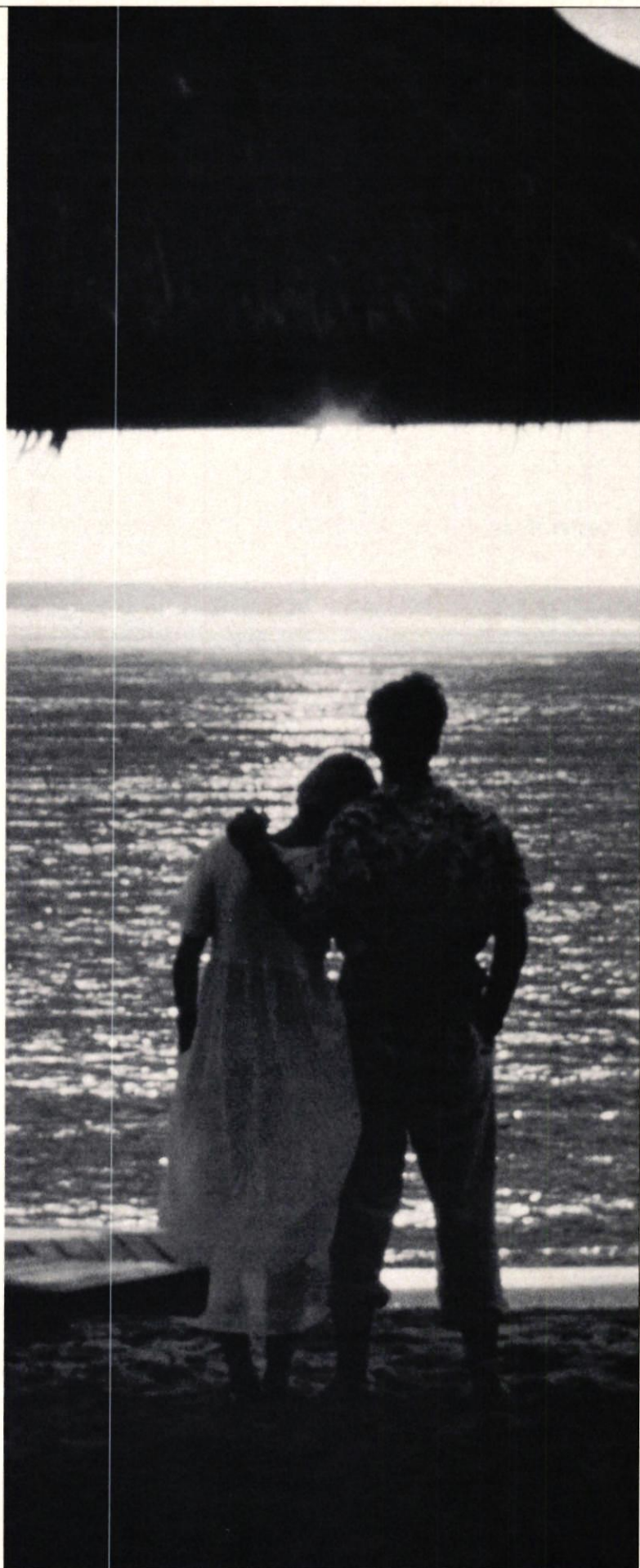
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The Next Wave of Environmental Legislation

■ Lester Ross

Tougher rules could have a significant impact on key Chinese sectors

■ Lester Ross, an attorney in the New York office of Chadbourne & Parke, specializes in project finance, banking law, and environmental law. He is the author of two books, *Environmental Policy in China* and *Environmental Law and Policy in the People's Republic of China*.

For years, China's environmental authorities have been like a muzzled dog: plenty of bark but little bite. But that may be about to change.

The newly renamed Environment and Resources Protection Committee (ERPC) of China's National People's Congress (NPC), plans to introduce a number of ambitious changes to China's environmental regulatory regime. ERPC Chairman Qu Geping, who served as director of China's National Environmental Protection Agency (NEPA) for many years, announced at the March NPC meeting that the ERPC would approve over the next few years 14 new or revised environmental laws for enactment by the NPC. And China's State Council and administrative agencies are likely to draft stricter regulations and standards to give muscle to the new statutes.

Despite some resistance from industrial ministries, the proposed environmental legislation is likely to create a substantially tougher environmental regulatory regime. Local governments, along with foreign-invested and domestic enterprises in China, may well face more complex compliance requirements on a wide range of environmental issues.

As always, the key question is whether the legislation will be effectively enforced. In 1993, the State Council issued a directive calling for stricter enforcement of environmental laws and a focus of the new legislative activity is to facilitate enforcement. Ultimately, enforcement ef-

forts will be largely determined by the regulations and standards the State Council and administrative agencies issue to support the NPC legislation.

A sound base

China already has in place fairly extensive environmental protection legislation. Article 26 of China's constitution establishes the State's duty to protect and improve the environment and preserve forests. Article 9 establishes the State's duty to conserve natural resources and wildlife, and Article 10 establishes the duty of persons and organizations to ensure rational land use.

Building on this strong constitutional foundation, the NPC over the past 15 years has enacted a series of laws on environmental protection and natural resource conservation. The State Council, NEPA, and various ministries have promulgated additional regulations, while ministries have also issued over 300 environmental standards of varying scope. The first relevant laws to be passed by the NPC were the Forestry Law and the Environmental Protection Law (EPL), drafted for trial implementation in 1979 and enacted in 1984 and 1989, respectively. Subsequent statutes address air and water pollution as well as soil conservation, land use, fisheries and grasslands management, mineral resources, wildlife conservation, and maritime protection (see table).

The existing regulatory regime has accomplished much in a short period of time. New regulatory agencies, created virtually from scratch, now have over 80,000 personnel. After studying the systems used in the United States and other advanced industrial countries, environmental officials introduced new means of implementing environmental legislation. Chinese officials have also worked to educate government agencies, enterprises, and the general populace—all of which were culturally unfamiliar and even averse to laws of any kind—on the content of environmental laws and the public's obligation to obey them. Officials have prosecuted some violators of environmental laws, while victims of pollution have been empowered to seek compensation for damages.

Some serious holes

Despite these accomplishments, China's environmental protection efforts suffer from weak, non-comprehensive regulations and standards and inadequate enforcement of regulations that do exist. Many gaps occur because environmental laws are still framed in terms of the State plan. For example, some provisions of the EPL—specifically, those conferring liability for use of polluting technologies (Article 34) and for disabling pollution controls (Article 37)—can be interpreted to apply only to government work units, or *danwei*. Entrepreneurs and regulators themselves are often not certain whether and how these provisions apply to non-State enterprises and private businesses.

Other provisions of the EPL—Article 12, on the setting of environmental goals;

Foreign-invested and domestic enterprises in China may well face more complex compliance requirements on a wide range of environmental issues.

and Article 39, on the imposition of shutdown orders—require the local government, which is typically more concerned with economic development and government revenues than with environmental standards, to grant approval before the environmental protection bureau can act.

Some issues, most notably solid and hazardous waste management, are not even covered by specific legislation. While the water pollution and land management laws can be applied to some aspects of waste management, unregulated disposal methods and dumps are the norm.

China also needs more legal tools to hold polluters fully accountable for their actions. Although several individuals have been convicted under the Criminal Law for environment-related offenses, particularly in connection with forestry infractions and wildlife poaching, the lack of a specific criminal provision for environmental pollution handicaps application of the Criminal Law. Moreover, the law's lack of specific penalties and provisions for environmental offenses makes criminal justice agencies reluctant to prosecute

cases in which environmental harm has occurred as a by-product of otherwise lawful economic activity.

Finally, legislative changes are needed to strengthen a number of outdated regulations. For example, China relies heavily on pollution or effluent fees to discourage industrial pollution. The great disparity between the marginal amount of the fees and the marginal costs of implementing pollution control measures, however, limits their effectiveness. The effluent fees also apply only to a single pollutant, leaving other pollutants discharged by the same enterprise unregulated.

Tightening up

To overcome the shortcomings of the current legal regime, NEPA, which long felt handicapped by its weak legislative mandate, has strongly urged the government to pass more comprehensive and stringent laws to enhance environmental protection. Unlike years past, however, NEPA now enjoys strong support from the SSTC. SSTC Chair Song Jian, who concurrently chairs the State Environmental Protection Committee under the State Council, has been a vocal supporter of tougher environmental protection.

So has Qu Geping, new head of the ERPC. Even ministries that had fought against environmental codes in the past now appear ready to sign on to tougher laws. For example, the Ministry of Coal Industry, which traditionally has opposed stronger air pollution controls, now stresses the importance of balancing the costs of cleaner technology and the benefits of environmental protection with the need to promote industrial development, according to statements made by Vice-Minister Fan Weitang in March. The ministry is currently exploring cooperation with foreign governments and businesses to implement cleaner, affordable technology. However, there is bound to be strong resistance to certain legislative proposals, such as the revision of the Criminal Law to apply to environmental offenses—including possible application of the death penalty.

Domestic requirements aside, China also needs to make changes to its environmental law regime to reflect the PRC's increased involvement in recent years in a number of international environmental protocols. China participated in the 1992

China's Environmental Protection Laws

Law	Date enacted
Marine Environmental Protection Law	1982
Forestry Law	1984
Water Pollution Prevention and Control Law	1984
Grasslands Law	1985
Fisheries Law	1986
Mineral Resources Law	1986
Air Pollution Prevention and Control Law	1987
Land Management Law	1988
Water Law	1988
Wildlife Conservation Law	1988
Environmental Protection Law	1989
Water and Soil Conservation Law	1992
Agriculture Law	1993

SOURCE: Lester Ross

United Nations Conference on Environment and Development (UNCED) and acceded to several international conventions, including the 1973 Convention on International Trade in Endangered Species (CITES, in 1981), the 1985 Vienna Convention for the Protection of the Ozone Layer (in 1991), the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer (in 1991) (see p.34), the 1992 UN Framework Convention on Climate Change (in 1993), the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (in 1991), the 1975 Convention on Wetlands of International Importance as Waterfowl Habitat (in 1992), and the 1992 UN Convention on Biological Diversity (in 1993).

China accedes to such conventions in part because of a desire to be recognized as part of the international community, and in part because involvement in international environmental efforts raises the domestic stature of NEPA and other Chinese advocates of more stringent environmental regulation. These officials can point to the need to adhere to binding international agreements as a way of strengthening domestic enforcement of environmental regulations. In some instances, such as the Vienna Convention and Montreal Protocol, failure to enact and enforce domestic legislation could deprive China of trade privileges in products made with regulated substances. In other instances, such as CITES, negative publicity as well as trade sanctions could result if treaty obligations are not met.

China's impetus for international environmental participation is also economic. China reports that through the end of 1993, it had received \$1.1 billion in World Bank and Asian Development Bank loans for large environmental protection projects. Chinese officials also recognize that environmental issues affect international trade: Beijing may feel that the costs of not participating in international conventions exceed those of joining. The Montreal Protocol, for example, offers technology and funding to certain signatories.

A call for action

The ERPC has formulated a three-part action strategy to fill holes and shore up weak points in China's existing legislation. On the domestic front, officials plan

Beijing is anxious to establish uniform national regulations that will cover China's growing nuclear industry.

both to enact new legislation and revise existing laws to boost pollution control efforts. On the international side, they aim to add new statutes to uphold China's obligations under international law.

Among the most important new statutes on the horizon is a solid waste management law that will address the mounting problem of urban and industrial waste. The new law will likely regulate the location of dump sites and require generators, operators, and others in the disposal chain to obtain dumping and related permits. The final version of the law could include measures to encourage the use of secure landfills and incinerators, though the higher costs of these options are likely to restrain activity in this area.

The new waste legislation should result in a dramatic departure from the current situation, in which solid waste is dumped haphazardly and in direct contradiction to State policies protecting waterways and fisheries. The law, which must be passed by the NPC, is being drafted by NEPA, the Wuhan University Environmental Law Institute, and other institutions.

The NPC, meanwhile, is drafting safety legislation for civilian nuclear power plants and the handling of nuclear waste. Beijing is anxious to establish uniform, national regulations that will cover China's growing nuclear industry.

Other legislation in the works includes a noise control law, which will address the most common environmental complaint of ordinary Chinese citizens. The ERPC is also likely to introduce an agricultural environmental protection law to promote the conservation of arable land and to reduce China's reliance on the intensive application of chemical fertilizers and pesticides.

In addition to these new statutes, existing ones will be revised and strengthened. New regulations, if not laws, are

expected to call for the assessment of fees on multiple pollutants, instead of the single pollutant policy currently in place. Control of water pollutants by density or concentration will gradually be replaced by control over total amounts of released pollutants. The impact of the resultant higher fees will vary according to economic sector and the amount and nature of a facility's discharges.

New legislation will also toughen existing air pollution rules to eliminate an inconsistency in which fees are levied only on pollution that exceeds the applicable emissions standard. The new ERPC statute, which will change the fee structure, requires approval by the NPC or its Standing Committee.

On the international front, the ERPC will draft and approve statutes needed to help China implement its obligations under international law. The Global Climate Change Convention, for example, requires each signatory party to prepare and release inventories of its anthropogenic emissions of greenhouse gases along with a detailed description of domestic policies to mitigate climate change and an estimate of their effectiveness.

Boon—or bane—to economic growth?

Beijing has cast its current environmental legislative agenda against its long-term goal of sustainable development in accordance with the recommendations of the 1992 UNCED meeting in Rio de Janeiro. After the UNCED meeting, each participating country was asked to draw up a long-term proposal for development with minimal environmental impact. The State Council approved China's White Paper on Population, Environment, and Development in the 21st Century—also known as China's Agenda 21—in March (see p.26).

While the content of China's Agenda 21 consists largely of projects and policies that had been in existence for some time, the plan's release has shifted the center of gravity in the environment/development debate further in the direction of environmental protection. Although some leaders in Beijing fear that emphasis on environmental protection will slow economic growth and are poised to challenge potential rules and regulations, overall tightening of China's environmental regime is likely in the not-distant future.

The impact on foreign business

Until the new pieces of legislation are actually enacted, their potential impact on foreign business activities will remain unclear. However, most sectors will feature more complex pollution control compliance requirements. Though existing facilities may not necessarily require retrofits, new industrial facilities or expansion projects may be held to a higher standard. Even smaller Southeast and East Asian-funded enterprises, many of which have escaped regulation in the past, may feel the impact of the new regulations if enforcement is stepped up.

A few sectors will certainly feel the effects of the new regulations. For example, China is considering tightening its power plant emission standards. The new rules will likely determine whether China's power industry will have to adopt scrubbers and other effective but expensive emissions control technologies. And, as NEPA generally considers expansion projects new projects, the agency might require that an existing plant satisfy new source standards—

Demand for technologies involved in the treatment and disposal of solid and hazardous wastes should increase significantly.

meaning costly retrofits—even if only a portion of the plant is being expanded. This policy, if it holds, would tend to encourage the development of entirely new, cleaner plants over the expansion of older, more polluting ones.

China's new environmental legislation could also create more sales opportunities for low-polluting technologies in a number of manufacturing sectors. In particular, demand for technologies involved in the recovery, treatment, recycling, and disposal of solid and hazardous wastes, should in-

crease significantly. Heightened regulation will also increase the demand for equipment to monitor air and water quality.

China will have to rely to a great extent on foreign sources for many of these technologies, and US companies are particularly competitive on many of these fronts. Furthermore, China's success in reducing its own pollution, particularly of greenhouse gases, will reduce the economic burdens of the United States and other advanced industrialized countries that currently fund global reduction efforts.

For all of these reasons, China's new environmental legislation and regulations warrant the close attention of the business community in the months to come. Both the World Bank and the Asian Development Bank are likely to be involved in advising Chinese environmental officials on implementation of the new statutes. The Asian Development Bank may also be involved in the formulation of the laws, but because of the general lack of transparency of the Chinese legislative process, many questions will be answered only after the laws are promulgated. 完

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The CFC Challenge

■ Jessica Poppele

With support from the international community, China hopes to eliminate its consumption of ozone-depleting substances by 2010

■ Jessica Poppele is ozone operations coordinator for Asia in the Global Environment Coordination Division of the World Bank's Environment Department. Prior to joining the Bank in 1992, she spent four years working on US Environmental Protection Agency-funded ozone-protection initiatives in China.

China's appetite for foam mattresses, office chairs, air conditioners, household refrigerators, and supermarket freezer cases has some dangerous consequences. To meet rising demand for these and other sought-after products, China currently consumes about 60,000 tonnes of ozone-depleting substances (ODS) annually. With ODS use projected to grow an average 11 percent each year between now and the year 2000, China's annual ODS consumption will nearly double to just under 120,000 tonnes by the end of the decade. As industrialized nations scramble to adopt benign substitutes for ODS to avert further damage to the earth's ozone layer, China is poised to become the largest global consumer of ODS by 1996.

Chinese policymakers, like their Western counterparts, are aware of the harmful affects of ODS and have committed to eliminating their use. However, Beijing claims that this goal can be achieved only if industrialized countries are forthcoming with technical and financial assistance. Developed nations have responded, and if foreign help, particularly funding, continues to accelerate, foreign companies with technologies or products that are ozone-friendly will eventually find the China market among the world's largest.

The vital layer

The ozone layer envelops the globe about 25 km above the earth's surface,

shielding the world's inhabitants from the harmful effects of ultra-violet radiation. However, chlorofluorocarbons (CFCs), halons, and other compounds used in industrial production processes have been eating away at the earth's protective ozone covering, resulting in damage to plants and forests and increased human susceptibility to such problems as skin cancer, cataracts, and immune system disorders.

In 1985, scientists discovered a hole in the ozone layer above Antarctica. Alarmed that the hole was growing larger, the international community responded in 1987 to this looming threat with unprecedented cooperation. Twenty-four countries, led by the industrialized nations, hammered out the Montreal Protocol on Substances that Deplete the Ozone Layer, a consensual promise to reduce production and consumption of ODS by 50 percent by the end of the century.

Shortly after the Protocol was drafted, evidence emerged that damage to the ozone layer was proceeding faster than had been predicted. In response, the Montreal Protocol group at a second meeting in 1990 strengthened its promise to reduce ODS to a pledge to phase out completely the most potent and widely used substances. Two years later, the group decided that recent breakthroughs in the development of substitutes made it possible for devel-

oped nations to eliminate ODS production and consumption by year-end 1995. Without substitute technology, elimination of ODS would have meant sacrificing air conditioners, refrigerators, and other modern conveniences. Still, the transition to non-ODS would require significant effort and financial resources.

Striking a bargain

When the Montreal Protocol was first negotiated, developing countries—including China—accounted for only about 10 percent of global ODS consumption, which was estimated at just under 1.2 million tonnes in 1986. The United States, in contrast, accounted for around 25 percent of global ODS consumption prior to phase-out initiatives. Protocol negotiators were sensitive to the fact that developing countries had had minimal impact on ozone depletion up to that time. However, they also recognized that the rapidly growing economies of Asia and Latin America posed a significant future threat to the ozone layer.

China soon made a worst-case scenario look all too possible. The recent history of the nation's aerosol industry—in which use of CFC-12 grew 10-fold between 1988-90—demonstrated how China's booming economy could eventually undo the effects of phase-outs elsewhere. This realization was a critical factor in convincing Montreal Protocol signatories to incorporate the demands of developing countries into the agreement.

Developing nations wanted confirmation that the industrialized countries would provide assistance for the adoption and application of ODS substitutes. At a Montreal Protocol meeting in 1989, Chinese authorities acknowledged the hazards of ozone depletion and the necessity of curtailing ODS emissions, but one National Environmental Protection Agency (NEPA) official noted that "developed countries are responsible for most of the damage to the ozone layer so they should do most to clean up the problem." The official went on to explain that unless technical and financial assistance were forthcoming, developing countries such as China would be forced to expand their use of the dangerous chemicals to meet pressing development objectives.

In response to the cries of China, India, and other developing nations, the parties to the Montreal Protocol amended the agreement in June 1990 and created the Interim Multilateral Fund for the Im-

China is poised
to become the
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plementation of the Montreal Protocol (MLF). The MLF was formed to assist the 40 developing countries that had signed the agreement and had limited their ODS consumption to under 0.3 kg per capita comply with Montreal Protocol controls. The Fund became permanent in 1993, and over 60 nations are now eligible to request its assistance.

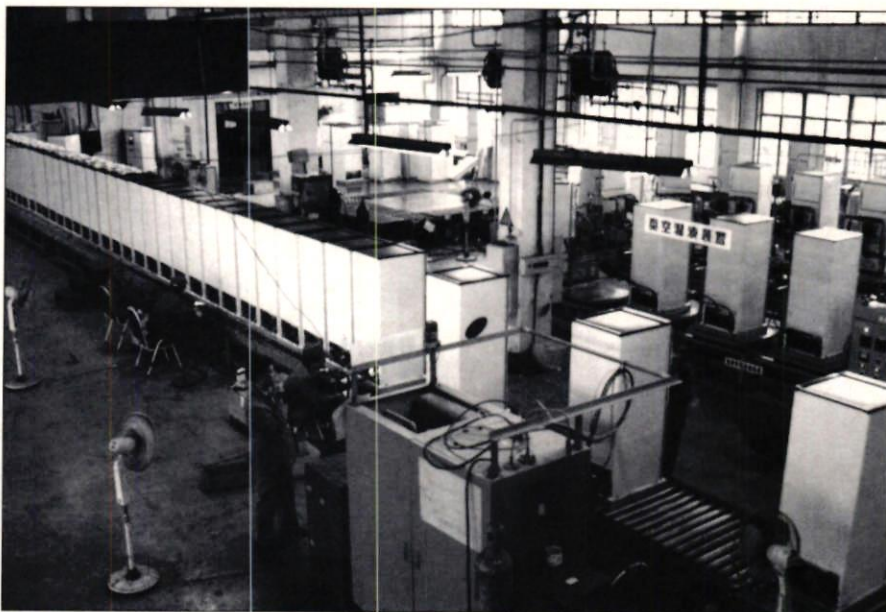
How the MLF works

The Montreal-based MLF Secretariat became operational in February 1991. Funding comes from the 46 signatories

whose annual ODS consumption exceeds the 0.3/kg per capita threshold. From 1991-93, \$240 million in grant funds was available to finance projects. The fund was replenished for approximately \$510 million for 1994-96, including about \$55 million left over from the 1991-93 period.

The Fund's Executive Committee, composed of government representatives from seven developing and seven developed countries and currently chaired by Malaysia, examines and approves comprehensive ODS reduction schemes—called country programs—for countries requesting funds, and approves individual investment and technical assistance projects. The chair rotates between developed and developing countries every year and this year's vice-chair, Australia, is expected to assume the job in 1995. Donor countries to the MLF may use up to 20 percent of their required contributions for bilateral activities approved by the Executive Committee. The United States, which contributes \$38 million annually, is the only country involved in bilateral projects to any significant degree. The United States currently allocates \$1.6 million each year to its Environmental Protection Agency for bilateral programs.

The Executive Committee also approves the work programs of the four implementing agencies that execute MLF programs: the UN Development Programme (UNDP), the UN Environment



The Montreal Protocol's MLF has targeted China's refrigeration industry, a large user of ozone-depleting substances, for several technology projects.

Photo courtesy of Jessica Poppele

Programme (UNEP), the World Bank, and the UN Industrial Development Programme (UNIDO). Due to its experience designing and implementing investment projects in developing countries, the World Bank has been given primary responsibility for investment operations implemented under the MLF. UNDP mainly provides technical assistance for training and supports demonstration projects, UNEP hosts regional workshops and coordinates the exchange of technical information, and UNIDO takes the lead on formulating and implementing small-scale projects as well as on preparing feasibility studies.

The bottom line

The MLF is intended to meet, through grant financing, the incremental, or additional, costs an enterprise bears for converting from the use of ODS to safer substitutes. These costs are calculated for a given industry by estimating the financial burden of shifting from use of ODS to non-ODS to produce or process goods. Calculating the incremental cost of ODS phase-out has proven a complicated task, as many variables must be considered. To make the process easier, both the MLF Executive Committee and the World Bank have produced documents to help project applicants determine incremental costs and grant eligibility.

In general, MLF provides financing for both one-time expenses—such as acquisition of new manufacturing equipment—and additional operating costs incurred by using ODS substitutes. As many ODS substitutes, such as the refrigerant HFC-134a, are more expensive to use than the compounds they replace, the MLF fund will pay the additional costs incurred for a transitional period—usually four years—based on what it would have cost the factory to continue operations using the ODS. In cases in which the changeover to non-ODS products and processes results in a cost savings, such as when cheap hydrocarbons are substituted for CFCs in aerosol production, the projected savings are deducted from the one-time capital costs to arrive at the project's incremental costs. Firms with a share of foreign ownership are only eligible to receive funding for incremental costs based on the local share of the business.

The MLF allocates funding based on the amount of ODS that can be eliminated for the incremental cost of a given phase-out project. To help it compare projects, the World Bank has developed a formula for calculating the cost of removing a unit of ODS. Projects with low "unit abatement costs" and large ODS reductions are favored for immediate funding. As experience with replacement technologies is gained, costs should

China estimates
that to eliminate
ODS by 2010, the
country will require
\$1.4 billion in MLF
resources.

drop, making projects that today have high unit abatement costs less expensive in the future.

The first amendment to the Montreal Protocol granted developing nations a 10-year grace period, until 2010, to phase out ODS. During the grace period, these countries could, in principle, increase ODS consumption up to the 0.3 kg per capita limit to meet domestic needs. The 1992 Montreal Protocol revisions, which pushed the phase-out target date for industrialized countries up five years to 1995, did not alter the 2010 date for developing countries. In 1992, no one was sure if these nations would have sufficient access to non-ODS chemicals and technologies to make elimination of ODS possible before 2010. The entire Montreal Protocol membership is scheduled to meet in late 1995 to decide whether to move up the developing country phase-out date.

Getting with the program

Following creation of the MLF, China ratified the Montreal Protocol in June 1991. Within a year, Chinese officials, under pressure from ministries and local enterprises that wanted prompt access to MLF monies, had prepared and submit-

ted a country program. In March 1993, the MLF Executive Committee approved China's "Country Program for the Phase Out of Ozone-Depleting Substances Under the Montreal Protocol," which describes China's 15-year program to eliminate production and consumption of all ODS. China's country program includes phased-in limits on ODS production and imports, controls and bans on ODS production by industrial subsectors, and tax incentives and penalties to encourage use of non-ODS. So far, controls on ODS use in both the aerosol and fire-equipment production sectors have been put into place.

In its program, China estimates that to eliminate ODS by 2010, the country will require \$1.4 billion in MLF resources. But, while China clearly will need significant assistance to eliminate ODS, the total phase-out price tag will only be certain with time. Because China's country program was written so quickly, many of the approaches and projects included in the program were selected based on limited awareness of new and emerging phase-out technologies. National considerations of how to allocate resources among sectors and support key enterprises/research facilities may also have led officials to include projects which may not meet MLF eligibility criteria. Finally, the country program gives insufficient consideration to the transitional role imports could play in offsetting conversion costs.

Nevertheless, China's country program meets Executive Committee requirements, which recognize that country programs will evolve with new developments in substitute technologies. The working groups that helped shape China's country program are aware that better ODS replacements are now available and these groups are working with the World Bank, UNDP, and UNIDO to update sector-wide strategies and revise project proposals to take advantage of the new, cheaper substitutes.

The Chinese team

China recently formed a Leading Group for Ozone Layer Protection to guide China's ozone-protection strategy. The group is co-chaired by the State Science and Technology Commission (SSTC), the State Planning Commission (SPC), and the

ministries of Finance and Foreign Affairs. Seven other ministries involved in ODS production and consumption and the General Administration of Customs also participate. NEPA's Coordinating Group for Ozone Layer Protection oversees implementation of the Protocol; its tasks in-

clude working out the details of international cooperation efforts, establishing relevant regulations, and inspecting organizations involved in the production, import, export, or consumption of ODS.

Under NEPA's guidance, the seven industrial Leading Group ministries, divided

into eight sectoral working groups— aerosols, chemical substitutes, foams, halons, recycling and recovery, commercial refrigeration and air-conditioning, household refrigeration, and solvents—are responsible for developing and implementing ODS phase-out strategies and

In the Works

Many of the MLF-funded ODS substitution projects in China are being administered by the World Bank. To date, 15 projects have been approved. The first 5 were passed in October under one World Bank project; the second group of 10 projects was approved this June. In addition, by the end of this year the MLF is expected to endorse a \$60 million project for China which will include 20-40 sub-projects to be implemented over the next two years.

The first group of five projects being carried out by the World Bank includes grants to the following industrial facilities:

■ **Beijing Fire Fighting Equipment Factory** \$930,000 in Montreal Protocol grant support was approved for this factory to boost current production of sodium acid carbonate dry powder (BC powder) and develop a 3,000-ton amorphous dry powder chemical (ABC powder) production facility. Following an open tender, FRC, an American fire protection equipment firm, was recently awarded the first contract. FRC will supply engineering drawings, equipment, formula, and methods for manufacturing dry powder.

■ **Tianjin First Daily Use Chemical Factory** \$2.77 million in grant support was approved for the Tianjin factory to establish a facility to purify liquid petroleum gas (LPG), with the end product to replace CFC-12 in a large portion of China's fast-growing aerosol industry. Grant financing will also support a new aerosol filling center, where proper safety precautions will be used to inject flammable hydrocarbon propellants into hair-care, insecticide, and other spray cans. Open tender for the project is being conducted together with the Ja Le Shanghai project.

■ **Shanghai Ja Le Aerosol Factory** \$2.31 million in grant support is available to this new factory to implement a project with the same scope as that of the Tianjin project just described. Bid evaluations were completed in mid-June.

■ **Zhejiang Fire Fighting Equipment Factory** \$730,000 in grant support will help this factory switch its fire extinguisher production line from halon to ABC powder extinguishers, a non-ODS alternative. The tender process for equipment and technology is expected to take place this summer.

■ **Zhejiang Plastics Pilot Plant** \$993,000 in grant support will be used to continue the plant's manufacture of polystyrene (PS) and polyethylene (PE)—the white material used in foam cups and take-out food containers—with butane instead of CFC-12. The Zhejiang plant, China's largest PS/PE producer, has already reorganized the facility to allow for safe butane handling. The tender process for imported equipment will likely proceed this summer along with the Zhejiang fire-fighting project.

The next group of projects got underway at the end of 1993. Second-round grants include:

□ **Liming Chemical Industry Research Institute** \$457,000 in grant support will allow Liming to improve its new polyol production process to manufacture polyurethane foam that uses about half the amount of CFC-11 previously required to produce polyols. As part of the project, Liming will in turn provide technical assistance to other enterprises which either produce or use reduced-CFC foam.

□ **Shenyang Petrochemical Factory and the Wuxi KZ Foam Factory** These two factories will receive \$152,000 and \$264,000, respectively, to convert their

polyol operations to production of the new polyol. Only a limited amount of additional equipment will be required to change the production process. This equipment will likely be purchased over the summer through an open bidding process.

□ **Chengde Commercial Machinery Company, Dalian Refrigerator Works, and Tianjin Polyurethane Factory** \$163,000, \$275,000, and \$400,000 in grant funds, respectively, were approved to help these three factories manufacture polyurethane panel insulation with about half the previously needed amount of CFC-11. The Tianjin plant will also receive grant support to produce the new polyol. While most of these conversions rely on technical know-how and significant funding is budgeted for consultants and trials, some factories will need new equipment to reduce CFC-11 content. The projects will get underway this summer and will be completed by the end of 1994.

□ **Qindaohaier Refrigerator Factory, the Henan Xinfei Electric Appliance Group, the Shanghai Shangling General Refrigerator Factory, and the Shuangyan General Refrigerator Factory** These four household refrigerator manufacturers will receive \$476,000, \$1,042,000, \$958,000, and \$485,000 respectively to help them reduce by 50 percent the amount of CFC-11 used to manufacture cabinet insulation foam. As in the panel projects, funds will be used primarily for consultants, training, and production trials, rather than for the purchase of equipment. In addition, a significant portion of grant funds will be used to cover increased costs that result from using the reduced CFC formula.

—Jessica Poppele

schedules in their respective industries. The working groups use reporting and enforcement mechanisms to track and control the use and production of ODS. The groups work directly with Chinese enterprises to select and prepare projects for application to the MLF.

An MLF-financed project's implementing agency determines the procurement process for new equipment and technology. For example, projects funded through the World Bank are executed in accordance with Bank procurement guidelines, while UNDP projects follow UN procedures. To date, the task of overseeing project procurement for World Bank MLF operations has been assigned to the China Investment Bank (CIB). The China International Tendering Co. and China Instrument Import-Export Co. handle international bidding packages as well as contracts for im-

ported equipment. As China reorganizes its financial sector, CIB's role in implementation of MLF grants will likely shift to another body. UNDP-administered projects are handled by an internal NEPA unit.

The MLF in China

Since it first approved funding for ODS phase-out activities in China in February 1992, the MLF has allocated nearly \$22 million to the PRC. Almost half of the funds have gone toward initiatives in China's foam industry, with minimal amounts spent in refrigeration, where substitute technologies are less mature. In addition, just under \$3 million has gone toward development of NEPA's program management capability, the country program, sectoral phase-out strategies, individual project proposals, and conferences.

The World Bank effort currently includes 15 ODS-reduction projects (see box), while UNDP is using just under \$5 million in grant funds to implement another six initiatives—five in solvent conversion and one large foam-production demonstration project at the Tianjin Polyurethane Plastic Factory.

At its March meeting, the MLF Executive Committee endorsed about \$15 million in grant support for nine new projects in China, but final approval is pending additional details on funding eligibility. Of the nine projects, one is in the Guangdong aerosol sector, six will help household refrigerator manufacturers adopt non-CFC coolants, and the largest aims to convert the Shanghai Chlor-Alkali Chemical Co.'s CFC-11 and CFC-12 production facility to the manufacture of HCFC-22. Several other projects in foams, fire protection, and commercial refrigeration and air-conditioning are also in the final stages of preparation.

Domestic support

Awareness of the dangers posed by ODS and the need to phase out these substances is growing in China. Whether it is out of environmental concern; a wish to keep up with international technology trends; a desire to expand export markets in Japan, Europe, and the United States; or some combination of these motives, Beijing has championed the ODS phase-out campaign. For example, even as the Chinese government wrestled with the decision on whether to join the Montreal Protocol, the then-Ministry of Machinery and Electronics Industry was helping the Jingdezhen Huayi Electric Appliance General Co. negotiate a deal to import a household compressor production line that would use the more expensive CFC-12 alternative, HFC-134a.

As China's provinces continue to build new factories and refurbish old State enterprises, some firms inevitably will use technologies that rely on ozone-destroying chemicals. But a greater number are expected to use newer, safer products. Through MLF-funded projects or through ongoing market expansion, the Chinese market for modern, ozone-safe production methods and equipment should steadily expand. 完



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General information about the Montreal Protocol phase-out program can be obtained from the Secretariat in Montreal. For information on China's phase-out efforts, contact China's National Environmental Protection Agency or the World Bank officers involved in these projects.

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Japan's Green Aid

■ Peter Evans

Tokyo has taken the lead in introducing environmental technologies in China

Though its market for environmental goods and services is still quite small, China holds strong prospects for US companies. While domestic prohibitions restrict certain US government agencies from engaging in activities in the PRC, projects undertaken by the World Bank, Asian Development Bank, and UN agencies offer US firms an entree to the market (see *The CBR*, September-October 1992, p.30). A few bilateral projects also offer opportunities. For its own part, China, in a somewhat overstated claim, pledged last year to spend over \$35 billion on environmental projects by the year 2000.

Anticipating stronger Chinese demand for such goods as water-treatment equipment and clean-coal technologies, Japanese and US companies in particular are seeking guidance and the promise of bilateral assistance from their respective governments. Within the Clinton Administration and Congress, many officials recognize the need for the United States to fashion a long-term presence in the expanding global market for environmental goods. While evidence of this new thinking emerged in the Administration's November 1993 export strategy for environmental technologies, major gaps still remain with respect to China.

As the Administration continues to craft its export policy, US firms should keep a sharp eye on Japan's efforts in China's environmental sector. Japanese

industry and government officials are working together to commercialize environmental technologies in a number of Asian countries. In China, the Japanese efforts include long-term training to develop local human resources, demonstrations of a range of Japanese technologies, and concessional financing to support technology transfer. This type of government-supported assistance, though clearly welcomed by China, places US firms at a disadvantage as long as similar US bilateral assistance remains hamstrung.

The greening of Japanese aid

During the 1980s, Japan's bilateral assistance to China focused almost exclusively on large infrastructure projects. Japan's Overseas Economic Cooperation Fund (OECF), the largest source of bilateral loans to China, did not provide any significant loans for environmental projects (see *The CBR*, May-June 1993, p.30). Even grant aid administered by the Japan International Cooperation Agency (JICA) provided minimal funding for environmental projects.

Since 1991, however, Japanese government support for environment-related research, training, personnel exchanges, and technology transfer has grown rapidly, through both the overall Overseas Development Assistance (ODA) program and specialized technology transfer programs supported by the Ministry of International Trade and Industry (MITI).

■ Peter Evans, a consultant based in Washington, DC, is the author of a study on MITI's Green Aid Plan to be published by the Center for Strategic and International Studies.

These efforts coincide with and reinforce initiatives taken by Japan's private sector.

Several factors account for the change in Japanese policy. First, Chinese officials became more willing to undertake environmental investments, making it easier for Japanese aid officials to designate funds for these types of projects. Second, the lure of business opportunities and the need to combat the threat of acid rain from China's growing use of coal prompted greater Japanese attention to solving Chinese environmental problems. Finally, increasing its environmental assistance to Asia was a way for Tokyo to respond to Western pressure for Japan to play a more prominent role in global politics. Japan is now the world's largest bilateral donor of environment-related assistance, a growing portion of which is being funneled to China. In 1992, Japan spent \$2.8 billion on foreign environmental projects—approximately 17 percent of the entire Japanese foreign assistance program.

As a strong signal of its new role in global environmental matters, Japan in 1991 announced it would establish the Japan-China Friendship Environmental Protection Center in Beijing. The center, funded with a \$100 million grant from Japan's ODA budget, is currently in the start-up phase. Once it is fully staffed, it will serve as China's first comprehensive facility for the monitoring and enforcement of national standards for water, air, noise, and hazardous materials. Japanese authorities with expertise in pollution control, along with officials from JICA and the Japanese Environmental Protection Agency, will train Chinese provincial and local officials.

Although it is still premature to predict whether the facility will be a success, Japanese officials are enthusiastic that it will enhance China's capacity to manage environmental monitoring and enforcement. US analysts, however, are concerned that the Japanese center will tilt Chinese environmental requirements toward Japanese technical standards, particularly as the facility will feature Japanese testing and monitoring equipment.

The MITI touch

In terms of the transfer and commercialization of cleaner and more efficient technologies, Japan has developed a particularly strong China program. At the

Green Aid projects facilitate the development of long-term partnerships with domestic Chinese manufacturers.

core of this effort are the many projects under MITI's Green Aid Plan, which began operating in 1992 (see table). Under this plan, MITI funds sector studies, personnel exchanges, and the establishment of joint research and demonstration (R&D) projects throughout China. The MITI program is currently focused on improving the energy efficiency of large energy consumers such as steel plants and using clean-coal technologies to reduce sulfur emissions from power plants and medium-sized industrial boilers.

MITI has budgeted \$183.2 million for 14 Green Aid R&D projects over the next six years. According to MITI officials, the projects are designed to support the development of less expensive environmental technologies and encourage the development of China's own environmental equipment manufacturing capacity. Japan will provide long-term technical support to the projects; in some cases, Japanese engineers will be stationed on-site for up to seven years.

Japanese manufacturers find the MITI projects attractive not only because the costs and risks of adapting and testing

technologies on the China market are underwritten, but also because the projects foster the development of long-term partnerships with domestic Chinese manufacturers. Japanese government and industry officials are hopeful that the demonstration projects will lead to joint ventures and licensing agreements with Chinese manufacturers.

Japan's New Energy and Industrial Technology Development Organization (NEDO) selects which technologies will be demonstrated in China. NEDO, established in 1980 by MITI and Japanese industry to support the commercialization of energy technologies that reduce Japan's dependence on imported oil, has recently become more active in international cooperation efforts. It signed a formal protocol with China's State Planning Commission to implement the Green Aid energy and environment-related demonstration projects last December.

The Green Aid framework

MITI's China program is guided by a number of principles:

■ **Work through Japanese industry associations** These groups play a central role at each level of the Green Aid Plan by organizing study missions, coordinating training visits for Chinese engineers, and dispatching Japanese personnel to China. Industry associations also provide critical input on the types of technologies to be targeted.

In recent years, Japan's leading business associations have established special committees to promote international cooperation and environmental technology

MITI-Sponsored Joint Demonstration Projects in China

	Number of projects	MITI budget (\$ millions*)
Coal biomass composite briquette fuel	1	11.4
Simplified desulfurization system (power plant)	2	69.5
Soot removal to improve boiler efficiency (power plant)	1	1.2
Variable-speed clutch (power plant)	1	3.1
Biotechnology for industrial wastewater treatment	1	19.0
Blast furnace waste heat recovery system (steel plant)	1	6.7
Coal moisture control equipment (steel plant)	1	20.0
Fluidized bed industrial boiler	2	19.0
Simplified flue gas desulfurization system (coal-fired boiler)	3	14.3
Oil refinery efficiency improvement system	1	19.0
TOTAL	14	183.2

* \$1 = ¥105

SOURCE: MITI and NEDO

transfer to developing countries. The associations active in China include the Japan Society of Industrial Machinery Manufacturers, the Japan Iron and Steel Federation, the Center for Coal Utilization of Japan, and the Japan-China Association on Economy and Trade. Representatives of each of the associations participate in MITI's Green Aid Plan Coordinating Committee and have played an important role in negotiations between NEDO and the Chinese government over specific projects. Most of these groups have strong networks in China and hold regular meetings to discuss technology transfer arrangements and specific requests of Chinese officials.

■ **Promote widespread industry participation** NEDO, in most cases, will monitor and evaluate each demonstration project for up to eight years. These results are then disseminated to Japanese industry through the Green Aid Plan Coordinating Committee and industry associations, in order to ensure that the industry as a whole shares knowledge gained through each demonstration project.

MITI further ensures widespread industry participation by funding several projects that demonstrate similar technologies in different countries. To showcase Japanese sulfur scrubbers, for example, MITI is providing funds for two

systems in China, one in Indonesia, and a fourth project in an as-yet undisclosed location. This strategy gives each of Japan's top air-pollution control vendors an opportunity to demonstrate its technology and establish a direct presence in a foreign market.

■ **Tailor technology to local conditions** There is a general consensus in Japan that government and industry should focus on adapting and simplifying proven technologies. Recognizing that China's limited financial, technical, and human resources inhibit commercialization of advanced technologies at this stage of China's economic development, MITI is concentrating on developing a

The MITI Approach

A good example of Japan's approach to disseminating environmental technologies in China is its support for simplified, less costly flue-gas desulfurization (FGD) technology. By lowering concentrations of sulfur dioxide (SO₂) a power plant releases into the atmosphere, FGD technology helps reduce the incidence of acid rain and respiratory problems among humans. The principal impediment to wider adoption of this technology is its high cost: installation of a state-of-the-art FGD system typically adds 20-25 percent to the cost of a power plant in developing countries. Thus, a medium-sized (\$500 million) power plant would cost an additional \$125 million to build with FGD technology, and operational and maintenance costs would also be higher thereafter.

China's power-planning officials are currently under strong pressure to expand power generation capacity as rapidly as possible to meet the PRC's surging demand for electricity. Over the next decade, China plans to build as many as 100 new power plants, most of which will be coal-fired. Given the limited capital available for power plant investment, power officials have resisted installing high-cost FGD systems. Currently, less than 4 percent of China's coal-fired power plants are fitted with this technology.

To overcome the financial barriers to Chinese adoption of FGD technology,

Japan's Ministry of International Trade and Investment (MITI) is currently sponsoring two different FGD demonstration projects in China aimed at making the technology significantly more affordable. The Huangdao power generating project, located on the coast of Shandong Province, got underway in May 1993 and uses a simplified semi-dry FGD system developed by Mitsubishi Heavy Industries. Using redesigned equipment and a high level of local inputs, the FGD system should be able to remove 70 percent of the plant's SO₂ emissions at roughly 60 percent the cost of a standard FGD system in Japan. The Huangdao facility is expected to be operational later this year.

The second project, located at the Taiyuan power complex in Shanxi Province, will use a simplified wet limestone gypsum process developed by Babcock-Hitachi. Construction began in May 1994 on the power complex's newest 300 MW unit, which is expected to achieve a removal efficiency of approximately 80 percent at about half the cost of a standard wet FGD system.

MITI's budget for the two projects is ¥7.3 billion (\$70 million). MITI funding covers the feasibility and design studies, as well as the actual equipment transfer and other project costs. The Japanese companies involved in these projects absorb many of the staff costs in negotiat-

ing and managing the projects, while Chinese organizations, including the Ministry of Electric Power and provincial power bureaus, provide land, personnel, utilities, and other services set forth in a joint agreement negotiated for each project. Japanese engineers will be on-site at each project through the year 2000.

Whether these technologies become widely adopted in China over the next 15 years will depend in part on the availability of financing. Loans provided by Japan's Overseas Economic Cooperation Fund (OECF) could play a significant role in this process, as the fund has already signaled its interest in providing concessional financing for FGD systems. In the fall of 1993, OECF approved a \$150 million loan at 3 percent interest over 25 years to finance the installation of FGD technology at the Mae Moh power complex in northern Thailand.

OECF loans to China are untied (i.e., open to international competitive bidding), though the systems developed in China through the Green Aid Plan projects could give Japanese firms and their local partners a significant price advantage in future bids. This advantage might also extend to other emerging markets if simplified FGD systems were eventually made in China for export.

—Peter Evans

US Environmental Programs in China

US government agencies able to operate in China's environmental sector—namely the Environmental Protection Agency (EPA), the Department of Commerce (DOC), and the Department of Energy (DOE)—have begun to pay closer attention to market opportunities there as well as to their own roles in helping US industry gain a foothold in the PRC. In recent years, EPA has been particularly active, though DOE and DOC programs are now gaining momentum.

■ Active programs

With the groundwork laid by the Environmental Cooperation Protocol signed between EPA and China's National Environmental Protection Agency (NEPA) in 1980, EPA is currently supporting 12 China projects in such areas as air and water pollution, water pollution, ozone protection, and environmental management. One project involves research, feasibility studies, and model site development for coalbed methane recovery and use. Another project seeks to assist Chinese refrigerator factories develop more efficient non-ozone-depleting products.

This year, DOE and DOC are sponsoring a series of seminar/trade missions to address clean-coal technologies, demand-side management, and other topics related to power generation. DOE expects 10-12 companies to participate in each mission:

July 11-19 This mission to Beijing, Shanghai, and Guangzhou will enable US companies to discuss electric power generation, including conservation and demand-side management issues in meetings with potential business partners.

September 5-13 This mission to Guangzhou and other cities will explore business opportunities in electricity transmission and distribution, with a focus on high-voltage lines.

October 17-21 A joint DOC/DOE mission will participate in the Electric Power '94 Exhibition in Beijing, which will feature a panel on retrofitting existing Chinese power plants to meet national environmental standards.

November 28-December 6 A mission on nuclear safety and waste management

technologies will visit Beijing, Shanghai, and Guangzhou.

February 20-28, 1995 A seminar/trade mission to Beijing and Guangzhou will include presentations by US and Chinese environmental experts on regulatory and technological issues.

DOE is also providing funds for the newly established Beijing Energy Efficiency Center (see *The CBR*, September-October 1993, p.42).

■ Proposed projects

Several China projects proposed by DOE and EPA await congressional approval. EPA has proposed spending \$1.6 million over the next two years to address climate change issues in China. A team visited Beijing in March to complete the budget and preliminary negotiations for the study, which, if approved, would begin within a year.

EPA has also proposed to demonstrate US flue-gas cleaning technology in China under the US Technology for International Environmental Solutions (US TIES) program. An initial three-year, \$1.25 million budget would be paid in part by EPA, DOE, and the Chinese government, though participating US companies would also be asked to share in the project's costs.

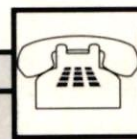
Perhaps the most ambitious US environmental project proposal is DOE's plan to establish a demonstration integrated gasification combined-cycle (IGCC) power plant. This plant utilizes US advanced coal electric generation technology developed through DOE's Clean Coal Technology Demonstration Program. In its 1995 budget request, DOE asked Congress to allow it to use \$50 million of unappropriated program funds to support the IGCC demonstration project in China. A congressional decision on the program is pending.

Some US analysts, however, question the appropriateness of DOE's support for the IGCC project. Private-sector project developers recently back from China report that Chinese officials are interested in clean-coal technologies but balk at their high cost. Charles Johnson, a China energy expert at the East-West Center in

Hawaii and author of several studies on China's power market, contends that even over the next 15 years the market potential of IGCC in China is "small." Others, such as Ben Yamagata of the Clean Coal Technology Coalition, an industry working group, support the idea of a DOE demonstration project in China as long as further funding for the project does not undercut allocations for the US domestic clean-coal development program.

The debate surrounding DOE's proposal suggests that US government and industry, though in basic accord on the need to promote US company activity in China's environmental sector, have yet to agree on the types of technologies that have the most potential for success in the China market, and the ways in which US government assistance can be most effective.

—Peter Evans



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range of intermediate technologies that Beijing can more easily afford.

Few funding worries

Perhaps MITI's most significant advantage over other bilateral demonstration projects in China and other countries is its relatively secure source of long-term funding. MITI finances its Green Aid demonstration projects by tapping into a special energy account established in response to the oil shocks that buffeted Japan in the 1970s. Funds generated by producer taxes on oil and electricity provide the bulk of Japan's annual \$3 billion energy R&D budget.

Though the Ministry of Finance initially resisted MITI's attempts to divert these funds to international projects, MITI prevailed. With the present arrangement, MITI is likely to spend approximately \$1.6 billion over 10 years for demonstration projects in China and other countries. Unlike MITI, the Department of Energy (DOE) and other US government agencies cannot be sure what will happen to their budgets from one year to the next.

MITI officials argue that the Green Aid Plan is not an export-promotion program, but rather part of Japan's "international contribution." In a narrow sense, this is true, as the program does not focus on promoting turnkey projects or immediate sales. Instead, it focuses on adapting Japanese technologies to the Chinese market and facilitating long-term partnerships between Japanese and Chinese companies. In many ways, it is a highly pragmatic approach that puts the private sector at the center of the effort to disseminate environmental technologies in China.

As the MITI program in China is barely two years old, it is too early to gauge whether its long-term goals will be met. Japanese companies participating in the projects say they are not making any money at this point, but view their efforts as important to developing a long-term presence in China. While US companies are not likely to be able to tap into MITI funds for China demonstration projects, they should certainly be keeping an eye on the projects to determine how their outcome might affect US firms' own long-term prospects.

MITI is concentrating
on developing
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Implications for US policy

Over time, Japanese assistance could help China emerge as an important supplier of low-cost environmental technologies not only for its own market, but also for other developing countries. Japanese firms, upon whose technology such equipment would be based, would stand to profit handsomely. US firms, already at a disadvantage due to government limitations on US bilateral programs, would be the clear losers.

While some US government-sponsored activities in China are underway and several others have been proposed (see box), greater assistance will be necessary for US companies to gain a meaningful presence in the China environmental market. At the very least, restrictions should be removed on US agencies that support the transfer of environmental technologies, such as the US-Asia Environmental Partnership program (see p.44). US officials must also establish regular, long-term contacts with Chinese officials to discuss ways to overcome barriers to trade and investment in the environmental sector. At this point, the United States needs to formulate a well-coordinated bilateral environmental technology program for China. The inter-agency Trade Promotion Coordinating Committee's Environmental Technologies Exports Working Group—which authored the US export strategy document last fall—could take the lead in this regard. This group has recently been charged with developing a commercial strategic plan over the next six months for five key US export markets. As *The CBR* goes to press, these top five countries have not been named, though many inside and outside

the Administration feel that China should be on this list.

Looking longer term, Congress should consider matching the \$182 million that Japan is using to support demonstration projects in China. The US government must prioritize the technologies that offer the best US sales opportunities in China, and provide assistance, when appropriate, to US companies that need to adapt their technologies to make them competitive in the Chinese market.

Though Japan now appears to have taken the lead in introducing environmental technologies in China, it is far from establishing a firm lock on the market. Indeed, China's growing need for environmental technologies offers ample opportunities for US and Japanese firms alike. Still, experience in Asia suggests that an early presence is essential to secure a long-term market share. The longer the United States dallies, the harder it will be for US firms to participate fully in what could one day become the world's largest market for environmental goods and services. 完

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A Cleaner Tiger

■ Vanessa Lide Whitcomb



A new initiative is matching US environmental technologies and services with Hong Kong buyers

In March, the Hong Kong government announced it expected to run a \$2 billion budget surplus for the 1994 fiscal year—a feat that must have made leaders in debt-ridden Beijing and Washington envious. Hong Kong's proposed 1995 budget, cushioned by the surplus, is slated to include not only up to \$1 billion in tax cuts, but also an increase in spending in a number of areas. By far the biggest budgetary increase—a jump of 48 percent—will be allocated to the territory's environmental clean-up efforts.

The budget hike will add considerable resources to Hong Kong's comprehensive environmental program (see *The CBR*, September-October, 1992, p.39). Much of the added resources will go toward Hong Kong's Strategic Sewage Disposal Scheme (SSDS), an ambitious program to clean up Victoria Harbor and surrounding waters by 1997.

With Hong Kong likely to spend as much as \$3 billion on this one program alone in the next four years, US companies are eager to tap into the territory's extended list of environmental projects. Aside from the SSDS, which will require tunnel-boring machinery, sludge and sewage treatment facilities, process controls, management consulting, and other technologies and services, other Hong Kong environmental efforts include projects that focus on chlorofluorocarbon reclamation, recycling technologies, energy-efficient lighting, radioactive waste,

and indoor air pollution. Getting information on these and other projects to US companies is just one of the goals of the newly operational US-Asia Environmental Partnership (US-AEP) and its Technology Cooperation Office in Hong Kong.

US-AEP's mandate

Inaugurated in January 1992 by President George Bush, the US-AEP initiative received \$100 million in core funding for 1992-97 to establish regional offices in Asia and fund the many other components of the program. The US-AEP's goal is to improve environmental conditions throughout Asia by promoting US exports of environmental goods and services to the region. According to US government analysts, the Asian environmental market could mean up to \$10 billion in US exports this decade.

Led by the US Agency for International Development (USAID), the US-AEP program involves 34 Asia/Pacific nations and territories, and coordinates the activities of 25 US government agencies and departments and thousands of government and non-governmental organizations in Asia. As core funding for US-AEP comes from USAID, the program cannot operate in mainland China, which is off-limits to AID funding. US-AEP now has nine offices in Asia, which are run by the Department of Commerce's US and Foreign Commercial Service. The program focuses on four specific areas:

■ **CBR Associate Editor Vanessa Lide Whitcomb tracks financial and environmental matters in Greater China. She last wrote on the new OECD guidelines for concessional lending to the PRC.**

■ **Develop human and organizational resources**

Through partnerships with local professional and trade organizations, US-AEP seeks to increase US understanding of Asian environmental issues and promote US environmental goods and services. US-AEP programs include training, fellowships, and exchanges for Asian environmental professionals to visit the United States, as well as similar opportunities for US environmental professionals to visit Asia.

■ **Promote technology cooperation**

US-AEP offices throughout Asia identify trade leads for dissemination to US companies and provide opportunities for local buyers and investors to contact US environmental product and service providers.

■ **Build and finance Asia's environmental and energy infrastructure**

US-AEP tracks specific environmental projects in Asia and the public and private funding options that can boost participation by US companies in these projects. US-AEP also helps companies link up with US government funding for both small- and large-scale projects in Asia.

■ **Preserve regional biodiversity**

The US-AEP Biodiversity Conservation Network works with US and Asian organizations to support sound resource management and conservation. A competitive grants program supports site-specific conservation research and development activities related to biodiversity.

US-AEP in Hong Kong

Since it opened in December 1993, the US-AEP Hong Kong office has been busy working on all four program areas, though biodiversity is a minor concern in a territory with relatively few endangered species or threatened forests. Most of the office's work is concentrated in the areas of training and education and identification of trade leads.

To boost familiarity with US environmental goods and services in the territory, US-AEP Hong Kong works closely with Hong Kong business associations. The office has arranged seminars on electric vehicles and demand-side management for the Hong Kong government, major utilities, and several local universities, and is currently working with the American Chamber of Commerce's Environmental Committee to heighten awareness in

Hong Kong of air pollution abatement methods. In July, US-AEP will co-sponsor a three-day seminar on clean manufacturing technologies for Hong Kong's electroplating, electronics, bleaching and dyeing, and food production industries.

Future educational activities include an October conference on air toxics, co-sponsored with the California Trade and Commerce Agency, the California Air Resources Board, and the Hong Kong Pro-

US-AEP's goal is to improve environmental conditions throughout Asia by promoting US exports of environmental goods and services to the region.

ductivity Council. Through such activities, US-AEP seeks to enlighten the Hong Kong government and private sector on the latest scientific and technological advances in these areas, as well as provide an entry point for the many US environmental companies exploring sales, investment, and other types of business arrangements in the territory.

On the training front, US-AEP Hong Kong has selected a number of candidates for environmental education programs in the United States. The US-AEP environmental fellowship program, which is administered by the San Francisco-based Asia Foundation, has placed six Hong Kong individuals from both the public and private sectors in 1-4 month fellowships (which cover travel and living expenses) with state and federal-level environmental protection agencies, research laboratories, and, in one case, a solid waste management firm. A Hong Kong government official responsible for formulating the territory's policy on air quality, for example, will spend several months at Lawrence Berkeley Laboratory assessing US technologies for electric vehicles and other state-of-the-art clean air programs.

Another senior government official spent a month last year at the Massachusetts Water Resources Authority studying how the Boston harbor clean-up program can be used as a model for the SSDS.

Another three Hong Kong participants are expected to be approved for fellowships in 1994, and more placements are possible if the Hong Kong government agrees to greater cost sharing. The program as a whole has brought over 100 individuals from Asia to the United States in the past two years. US individuals are also eligible for US-AEP fellowships to Asia, though no awards for study in Hong Kong have been issued.

The US Environmental Training Institute, initiated by US businesses and the Environmental Protection Agency in 1991, administers another component of the US-AEP training program. Asian environmental professionals participate in two-week training sessions on such topics as air pollution reduction methods, medical waste management, wastewater treatment, and demand-side management. The courses, held in both the United States and Asia, feature sessions with private-sector technical and management experts. In some cases, US companies provide on-site training at their own corporate headquarters. Five participants from Hong Kong have gone through the training programs thus far.

Another US-AEP program provides for business exchanges between US and Asian industry. The program, administered by the World Environment Center, a non-profit organization with offices in Washington, New York, Jakarta, and Bangkok, allows Asian industry representatives to learn the latest US developments in various areas of pollution control and environmental problem-solving. Through this program, US industry experts have conducted over a hundred environmental assessments of factories throughout Asia. No Hong Kong information exchanges, however, have been arranged to date.

Most US company contact with the US-AEP program comes through the trade leads generated by its nine Asia offices. Through its close ties with Hong Kong leaders and business organizations, US-AEP is able to collect useful sectoral data and identify valuable sales opportunities, which it funnels back to the United States. By registering their particular areas

of expertise with US-AEP's Environmental Technology Network for Asia, companies receive free trade leads tailored to their goods and services (see box).

In February, for instance, 5 of the 15 trade leads compiled by the Hong Kong office were matched with 253 US companies. In March, posted trade leads came from the Hong Kong Drainage Services Department for sewage treatment equipment; the Hong Kong Provisional Airport Authority for renewable or recyclable building materials; consulting engineers for subcontracts on sewage infrastructure projects; and trading companies involved in wastewater treatment. To get this information out to US companies, the Hong Kong office also distributes trade leads to state development organizations and US-based trade associations in various industry sectors.

Though the Hong Kong office, like the other US-AEP programs, is precluded from engaging in any direct activities on

Through its close ties with Hong Kong leaders and business organizations, US-AEP is able to collect useful sectoral data and identify valuable sales opportunities.

the mainland, it encourages Hong Kong trading companies and consulting firms to market US goods and services throughout Asia. US-AEP has no means of tracking the actual endusers of US equipment, but some US environmental products probably end up in Hong Kong-owned companies operating in Guangdong Province.

Greasing the wheels

The US-AEP's Hong Kong office can help US environmental companies generate business in the territory in other critical ways. The office can advise US firms on the availability of US government-sponsored programs that can help them compete overseas. In some cases, companies are referred to the US-AEP's Washington-based Infrastructure Finance Advisory Service, which provides information on funds available from such programs as the Small Business Association, US Export-Import Bank, the Overseas Private Investment Corp. (OPIC), and the Trade and Development Agency (TDA). Later this year, for example, TDA will sponsor visits by Hong Kong SSDS officials who want to meet with US producers of wastewater control systems. Companies might also be referred to the US-AEP's Access to Capital Program, where trade specialists help companies locate commercial sources of export financing.

Hong Kong Trade Leads

Each month, US-AEP's Hong Kong office compiles trade leads, which are dispatched to Washington for dissemination to US firms. Companies that have registered their specific technologies or services with US-AEP receive faxed trade leads tailored to their products (see p.47). Other companies can access the trade leads via Department of Commerce databases and export promotion programs. The following leads, which appear here in condensed form, were posted in late June:

Services/Equipment Needed

Co: Energy Resources Management

Tel: 852/528-2285

Fax: 852/866-06223

Contact: Robert Allender, managing director

Seeks: Computer-based environmental audit and management software for hotels and commercial buildings.

Co: Inline Technology Ltd.

Tel: 852/505-4089

Fax: 852/505-8780

Contact: Cannon Ng

Seeks: Laboratory equipment to perform approximate analysis, ultimate analysis, calorific analysis, ash content, and combustion rate analysis for municipal garbage incinerators in Shenzhen. Also seeks hand-carried combustion gas analyzer and software for use in the field.

Co: Hong Kong Hospital Authority

Tel: 852/805-6892

Fax: 852/882-4371

Contact: P.L. Yuen, senior engineer

Seeks: Energy-efficiency auditing and modeling techniques/services for 12-year-old hospital building with 1,200 beds.

Co: Axis Environmental Consultants Ltd.

Tel: 852/802-7008

Fax: 852/827-2891

Contact: Mark Purcell

Seeks: Collection, storage, and treatment facilities for ship-borne marine pollution.

Co: TYW Guan Group Ltd.

Tel: 852/770-2693

Fax: 852/782-1266

Contact: Wallace Tsang

Seeks: Electrostatic precipitators to reduce air pollution from Chinese restaurants.

Co: Hong Kong Industry Department

Tel: 852/737-2220

Fax: 852/730-1771

Contact: Karen Kwan

Seeks: Software/equipment to implement a bilingual information hotline to provide technical advice on environmental standards and affordable pollution control measures.

Co: Binnie-Eckenfelder

Tel: 852/601-1000

Fax: 852/601-3331

Contact: Richard Baker

Seeks: Sludge blending and storage tanks, sludge dewatering plant, and facilities for sludge and scum reception.

In other cases, US-AEP contributes to special funds earmarked for environmental grants to US companies. For instance, the Environmental/Energy Technology Fund, a joint initiative of US-AEP and the National Association of State Development Agencies, works with state and local trade groups and other nonprofits to provide grant funds for US small and medium-sized environmental companies. The Fund offers grants of up to \$20,000 to offset the costs of business development missions, technology seminars, and equipment demonstrations. A group of 24 small US pollution-control equipment manufacturers used a Technology Fund grant last year to locate and train distributors for their products in Hong Kong and South Korea. To date, the companies report more than \$15 million in sales pending to Hong Kong. Another group, organized by the Alabama Export Council, used part of its Technology Fund grant to translate into Chinese the marketing videos and product literature of six Alabama companies looking to export their waste collection/hauling systems.

Another US-AEP fund, the \$1 million Environmental Enterprises Development Initiative organized under OPIC, provides a maximum of \$100,000 in pre-investment assistance grants to US companies looking to expand their environmental operations to certain countries in Asia. The funds cover development of business plans, technology assessments and adaptation, prototype project implementation, and other project-preparation activities. Though Hong Kong is ineligible for OPIC funding, the initiative, which has been operational less than three months, has received proposals for projects in the Philippines, Thailand, and India.

A range of services

Whether for scoping out trade leads or getting advice on financing, the US-AEP Hong Kong office is open to any US company looking to market clean energy technologies and environmental goods and services in Asia. The staff is available to provide brief counseling sessions on the Hong Kong market, and will also share market information on environmental opportunities in South Korea, Taiwan, Thailand, Singapore, India, Malaysia, and the Philippines. For a \$250 fee, US-AEP Hong

Kong will conduct an "Agent/Distributor Search" to identify local engineering and consulting firms likely to be interested in representing a US firm's products in Hong Kong and elsewhere in the region. A "Green Key" service is also available for an additional \$250 per day. For this fee, the US-AEP office will arrange business appointments with potential clients, distributors, and joint-venture partners, and supply an interpreter for these meetings.

US-AEP trade leads and programs have already helped generate a number of US business deals. Last fall, the Hong Kong Environmental Protection Department purchased a \$175,000 remote-sensing unit to measure auto emissions, and expects to purchase several more units this year. According to Donald Stedman, the inventor of the equipment, the deal was made possible by a \$20,000 Environmental/Energy Technology Fund Grant to the Denver World Trade Center, which organized a trade mission to Hong Kong and other Asian cities. Other US companies, including Texas-based Hydrolab, and Massachusetts-based firms API and Wedding Associates, enlisted US-AEP's help in locating Hong Kong trading firms to represent their business there. US-AEP has also been working with China Light and Power to encourage the Hong Kong util-

ity to import electric vehicles for commercial use in the territory.

For US companies unsure about their chances in the Hong Kong market, US-AEP/Hong Kong Director of Technical Cooperation Gerald A. Sanders points out that environmental equipment and service sales to Hong Kong are driven by the market, rather than by government regulations and enforcement efforts. Sanders therefore advises US companies seeking to win contracts in Hong Kong to focus on "coming up with the best way of solving the pollution problem at the source. Define clearly the costs of pollution recovery and aim for a short payback period."

The critics' corner

On the whole, companies who have sought to use the Hong Kong office of the US-AEP speak highly of its services. Others, however, remain skeptical that the program is putting US resources to work effectively. Some companies, particularly those already active in foreign markets, feel that the details the US-AEP provides on trade opportunities tend to be too basic. Others believe that the general pool of US-AEP funds would be better spent in providing individual grants to US companies for feasibility studies and project preparation work.



CONTACTS

Tapping into the US-AEP

For an introduction to the US-AEP and to register to receive trade leads, companies should contact the US-AEP headquarters in Washington, DC. The Department of Commerce's Trade Information Center can also provide materials on the US-AEP program, along with general exporting information and sources to consult for foreign trade leads. Companies looking to export environmental goods and services to Hong Kong should plan to stop by the Hong Kong US-AEP office.

US-AEP
1133 20th Street, NW, Suite 300
Washington, DC 20036

Tel: 202/835-0333

Fax: 202/835-0366

Trade Information Center
Department of Commerce
14th and Constitution Avenue, NW
Washington, DC 20230

Tel: 1-800-USA-TRADE

Fax: 202/482-4473

US-AEP Office of Technology
Cooperation in Hong Kong
21/F, St. John's Building
33 Garden Road
Central, Hong Kong

Tel: 852/776-0015

Fax: 852/779-2963

As the US-AEP's Hong Kong office is less than a year old, such criticisms are probably premature. The long-term question is how effective the overall US-AEP program can be if it continues to exclude direct involvement in China—the fastest growing polluter in Asia and perhaps the largest long-term market for US environmental goods and services. Moreover, given the close geographic and business links between Hong Kong and South China, US efforts to help clean up Hong Kong's harbor that do not consider pollution sources

Sales of environmental equipment and services to Hong Kong are driven by the market, rather than by government regulations and enforcement efforts.

further upstream on the mainland simply don't make sense over the long run.

Another unresolved issue is what happens to US-AEP post-1997, when Hong Kong reverts to Chinese rule. Many environmental analysts are optimistic that US-AEP/USAID policy will change be-

fore that date to include China. Some Clinton Administration officials have even hinted that a breakthrough could be forthcoming since the US-AEP in China question need no longer be held hostage by the debate over China's Most Favored Nation status.

In any event, the Hong Kong government is working hard to push a great number of environmental projects through before the June 30, 1997 change of sovereignty—and the Hong Kong US-AEP office is working just as fast to help US companies who want in. 完

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Mark Van Fleet, International Division, US Chamber of Commerce

1615 H Street NW, Washington, DC 20062-2000

Tel: 202/463-5486

Fax: 202/463-3114

China and Western Non-Ferrous Metal Markets: Threats or Opportunities

by Carmine Nappi. Kingston, Ontario: Centre for Resource Studies at Queens University, 1993. 204 pp. \$35, softcover.

Carmine Nappi's analysis of China's mining and metallurgical industry is geared toward the specialist. After a brief overview of the sector, Nappi, an economics professor in Montreal, examines China's mining, refining, use, and projected demand for aluminum, copper, lead, nickel, and zinc in detail.

The work explores three key issues related to Chinese mining and metallurgy: the structural, geological, and economic factors affecting mining; Beijing's strategy for developing identified reserves; and China's participation in international markets. Nappi finds that costs of mining, refining, and end-product manufacture in China are well above the world average, due to poor-quality reserves, outdated refining techniques, and general inefficiency. He then asks the

question: should China spend the resources to develop its reserves, or should it access the world market and encourage substitution (e.g. optical fiber for copper) and increased efficiency instead?

While Nappi reserves judgment on the direction China should take, the latter option is probably the more realistic path, as demand is growing faster than the resources available to undertake the massive investment needed to upgrade the mining and metallurgical sectors. At present, China is devoting far more resources to the development of substitute industries, such as petrochemicals and plastics, than to mining. Much of the money it is investing is going toward the purchase of higher quality mineral reserves abroad. This is the point of the entire book; that far from being a threat to world producers, China is actually a rapidly growing market for world exporters of non-ferrous metals.

While the book is well organized, with plenty of graphs, projections, and a number of maps, it covers just a few metals—the result of the limited amount of Chinese statistical data available and the specific mining interests of Canada. The major limitation of the study, however, is its lack of analysis of the impact of central government policy on China's mining and metallurgy sectors. Recent changes in the value of the Chinese currency and the cost of electricity, for instance, as well as the mid-1993 ban on aluminum imports, have all had a dramatic impact on the non-ferrous metals industry. In short, government policy is as important to the future of China's mining and metallurgy sectors as are the size of China's reserves and the extent of its growth potential.

These shortcomings aside, Carmine Nappi provides a good tool for those wishing to comprehend how China's non-ferrous metals markets operate.

—Antoine Pompe van Meerdervoort

Antoine Pompe van Meerdervoort is business development specialist at FMC Asia Pacific, Inc. in Hong Kong.

The Seven Military Classics of Ancient China

Translation and commentary by Ralph D. and Mei-chun Sawyer. Boulder, CO: Westview Press, 1993. 568 pp. \$29.95 softcover.

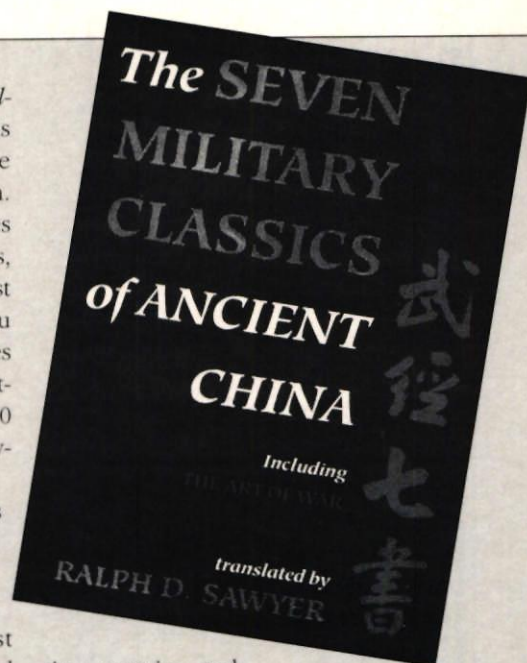
A mid-Western businessman whose company is quite successful in the United States recently stopped by the Council's Washington, DC office. After receiving a briefing on Council services and an overview of the investment situation in China, he opened his briefcase to put away his notes. Inside lay the first book he had chosen to read about doing business in China: Sun-Tzu's *The Art of War*.

A businessperson who finds the teachings of Sun-Tzu useful in his study of

China may be interested in *The Seven Military Classics of Ancient China*. Until this volume's publication, the bulk of these writings were not available in English. Much debate exists over the exact dates and authorship of these classic writings, but five of the seven works were most likely written between the late Zhou (1025-256 BC) and the late Warring States periods (500-221 BC), with the sixth dating from the Han Dynasty (202 BC-220 AD) and the seventh from the Tang Dynasty (618-907 AD).

At one time, China's military classics were the equivalent of top-secret documents. Few copies existed and only the elite could possess them. "Tai Kung's Six Secret Teachings" was the most highly classified because it advocated revolution. Tai Kung advises King Wu, who wishes to overthrow the Shang Dynasty, to startle the enemy with decep-

tion, surprise, and unorthodox tactics. Tai Kung also expounds on how to choose generals, how to treat the soldiers and the people, and



China's Far West

by A. Doak Barnett. Boulder, CO: Westview Press, 1993. 660 pp. \$39.95, hardcover.

Between 1947-49, sinologist A. Doak Barnett had a rare opportunity to travel to remote regions of China and get a first-hand look at areas that would be virtually off-limits to Americans for the next three decades. Based on that experience, the young scholar and journalist wrote his classic book, *China on the Eve of Communist Takeover*.

Forty years later, Barnett—now professor emeritus of Chinese studies at the Johns Hopkins School for Advanced International Studies and senior fellow emeritus at the Brookings Institution—revisited many of these areas and wrote an enormous work detailing the changes he observed. The book, *China's Far West*, should prove a useful reference for anyone interested in traveling to or investing in that part of the country.

Most of the research for the book was conducted in 1988, when Barnett took several trips to Inner Mongolia, Ningxia,

Gansu, Qinghai, Xinjiang, Yunnan, and the Tibetan areas of Sichuan. Through hundreds of interviews with top- and mid-level cadres and bureaucrats, Barnett cobbles together a rough picture of how these cities and provinces are organized, their level of industrialization, and how they have changed over the past 40 years. He also examines relations between the dominant Han ethnic group and the minorities, assessing how strongly the local leadership is committed to Beijing's program of modernization.

By and large, Barnett likes what he sees in the West, constantly pointing out how much more "modern" the area has become over the past 40 years and noting that it also seems more stable. He finds young, capable leaders committed to reform and impressive signs of industrialization. With the 1940s-era warlords defeated and amends made for Han attacks on minorities during the Cultural Revolution, Barnett reports few serious tensions in the regions he visited.

Long interested in political organization, Barnett's descriptions of political structure in these regions are admirable. However, *China's Far West* is overly long

and dense, with the author readily regurgitating reams of Chinese statistics. Moreover, unlike Barnett's first journey off the beaten track, his recent sojourn was organized by government officials. Many of his interviews were with cadres and he had limited access to "ordinary people." Barnett claims that he constantly fought for more independence to choose his interview subjects, but most of his requests were denied. Barnett's view is naturally shaped by the people he met; thus, while he gives an authoritative description of the regions' political-bureaucratic-industrial structures, his ability to gauge objectively the Han-minority rift and degree of political freedom/oppression was severely limited.

These shortcomings, however, do not prevent the book from fulfilling its goals. China's western regions have long been closed to foreigners—even during the current period of relative openness. Thanks to Barnett, however, visitors now have a useful map of the political and economic structure of these areas.

—Ian Johnson

Ian Johnson is chief of the Baltimore Sun's Beijing bureau.

how to mete out rewards and punishments—advice which could well profit today's political and business leaders.

The "Methods of the Ssu-ma" is more concerned with administration and organization than with battlefield tactics. Investors in China today might take particular heed of the Ssu-ma's emphasis on the importance of understanding and adjusting to regional differences: "Men from each [of the four quarters] have their own nature. Character differs from region to region..."

The best known of the classics, Sun-Tzu's *The Art of War*, is startling in both its simplicity and its depth. Sun-Tzu was highly cognizant of the gravity of warfare and urged that it be undertaken only after careful planning and thorough strategizing. Flexibility and the willingness to use unorthodox tactics creatively, in Sun Tzu's mind, were crucial to attaining

one's goal. "Water configures its flow in accord with the terrain; the army controls its victory in accord with the enemy." It is easy to envision corporate study sessions built around Sun-Tzu's writings.

The other classics deal primarily with the need for states to have sound laws and policies based on Confucian values, as well as the importance of well-motivated troops. According to Wu-tzu, credibility and commitment are key to victory. Huang Shih-Kung meanwhile, delves into the need to motivate officers and their troops—insights readily applicable to today's corporations.

Non-scholars may have difficulty understanding the contested interpretation of some of the texts, not to mention tracking the lesser-known historical events mentioned in this volume. Many readers may also find the editors' use of endnotes rather annoying; with scores of

information-laden notes per chapter, the reader is constantly flipping to the back of the book to gain a clearer understanding of many points. And the inclusion of maps indicating the areas claimed by various states or kingdoms would have greatly benefited readers unfamiliar with the fluid political geography of ancient China.

Taken as a whole, this presentation of the seven military classics is accessible, enjoyable, and thought-provoking. The translators, both international consultants, have rendered a considerable service to English speakers who wish to understand the theories that have guided Chinese military thought for more than two millennia—theories which continue to influence the modern-day business community both within and without China.

—Sheila Melvin

World Class Training: How to Outdistance the Global Competition

by Bren D. White. Dallas, TX: Odenwald Press, 1992. 154 pp. \$19.95 softcover.

Global Training: How to Design a Program for the Multinational Corporation

by Sylvia B. Odenwald. Co-published by the American Society for Training and Development: Alexandria, VA and Business One Irwin: Homewood, IL, 1993. 222 pp. \$30 hardcover.

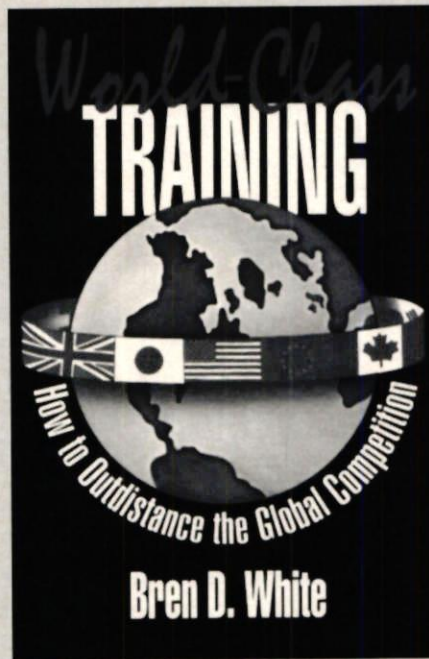
A Manager's Guide to Globalization: Six Keys to Success in a Changing World

by Stephen H. Rhinesmith. Co-published by the American Society for Training and Development: Alexandria, VA and Business One Irwin: Homewood, IL, 1993. 240 pp. \$25 hardcover.

"Globalization has arrived in the world," says Stephen Rhinesmith in *A Manager's Guide to Globalization*, "but not in most of the world's organizations." The authors of these three books advise corporate managers to overcome this shortcoming by adopting global strategies that incorporate human resource development. All emphasize that in a changing world, managers must become both multilingual and multicultural.

Rhinesmith is an international management consultant and chairman of the Department of Organizational Sociology at Moscow State University in Russia. His

book, supposedly aimed at mid- and upper-level managers of large international firms, reads more like a textbook of busi-



ness buzzwords (diversity, team building, global interdependence, and shifting paradigms, to name a few). The book's greatest strength is its broad scope—Rhinesmith seeks to integrate the thoughts of numerous writers on numerous topics—but as a consequence, not all subjects are covered with as much depth and insight as one might desire.

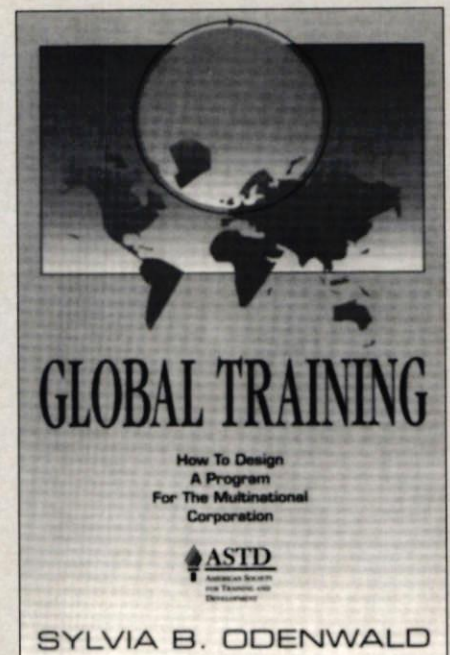
According to Rhinesmith, to globalize successfully a company must manage six key areas: competitiveness, complexity, organizational adaptability, multicultural teams, uncertainty, and learning. He asserts that companies must constantly be "redefining and reinventing" their global strategies—a message that certainly holds true in the case of China. Rhinesmith also presents a yin/yang analysis of global trends that is particularly relevant to China managers, including centralization vs. decentralization of economic decisionmaking, cost vs. quality of production, and central control over business activity vs. entrepreneurial anarchy.

Global Training's author, Odenwald, a former board member of the American Society for Training and Development, designed and managed training programs for Texas Instruments. Aimed at human resource professionals, *Global Training* is not too difficult a read for other man-

agers. Odenwald goes beyond explaining the need for a global mindset to how to set up the actual training process within a corporation. She suggests that companies build training alliances with universities, governments, and local leaders, including local experts in foreign countries where they operate. She provides examples and case studies of model corporate training programs at companies such as Johnson & Johnson, Motorola Inc., and ABB Inc., and even includes a valuable series of tips on how trainers can work with interpreters.

White, author of *World Class Training*, has a background in operations management, human resources, and training and development in Fortune 500 corporations. A conversational tone and clear, concise presentation make his book the most accessible of the three. You could easily toss this book in your briefcase and read it on a trans-Pacific flight.

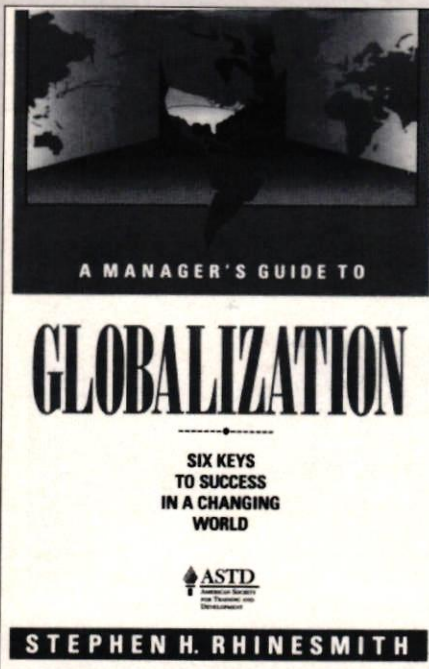
White offers mini-profiles of companies that he believes have the right approach to training. If a company is serious about investing in people, he argues, it should be allocating 1 percent or more of company sales to training and mandat-



ing a minimum number of hours of training for each employee per year. (Both IBM and Motorola, for example, require each employee to undergo 40 hours of training annually.) White emphasizes the

need to train not just top-level or international marketing personnel in cross-cultural training, but also those who design and manufacture products sold abroad.

If these three books share a com-



mon flaw, it is that they all focus overwhelmingly on Europe. Japan is discussed a bit, but virtually nothing is said about China, the fastest-growing economy in the world. While the authors exhort readers to be savvy about global opportunities, they themselves largely neglect Asia, both in the text and recommended resources. The bibliographies of all three books, likewise, are heavily Euro-centric.

That said, many examples in the books apply to China, even if they're not China-specific. And, occasionally, an example relates directly to China. My favorite is an anecdote that adeptly summarizes the lack of firm rules and constantly changing nature of China's business environment. It involves a man who dreams up a game called Chinese baseball. The game "is played just like American baseball, except that when the ball is in the air, anyone is allowed to pick up any base and move it—anywhere!"

—Karen Kullgren Jub

Karen Kullgren Jub is vice president of the US-China Business Council.

Mr. China's Son

by He Liyi. Boulder, CO: Westview Press, 1993. 271 pp. \$55.00 hardcover, \$16.95 softcover.

In recent years, many autobiographies have revealed the traumatic impact of modern Chinese history on Chinese intellectuals. *Mr. China's Son*, a compelling autobiographical account of the life of He Liyi, is one of the latest of this genre. Although He's tribulations under the thumb of "Mr. China"—the Communist regime—are not unusual by Chinese standards, until recently his life consisted of a bitter struggle to feed his family and maintain his self-respect. Ultimately, his book proves a testament to the enduring resilience and entrepreneurial spirit of the Chinese people.

The story begins in 1956, when He, a member of the Bai minority and a recent college graduate with a specialty in Chinese and foreign languages, begins work in Kunming at the Research Institute for National Minority People's Social History. Almost immediately he becomes the target of "The Struggle Against Rightists" movement. Local communist authorities pinpoint him a "poisonous weed" because of his "landlord" family and because he once criticized Soviet light industry as inferior to that of the United States. He Liyi is stunned by his first experience with public humiliation and the self-criticism sessions he is required to attend.

Soon, he is taken to a forced labor camp for four years of "re-education." He loses hope of marrying the woman he left behind in Kunming and of using his English language skills. After his release, He Liyi returns to his hometown in the northern corner of Yunnan Province, reconciled to living the life of a simple peasant. He marries a village woman and together they have two sons, for whom both parents work long hours to earn money and grain coupons for food.

He faces even tougher times during the Cultural Revolution. Because the economy was so weak, money was scarce and food coupons few. He Liyi, like many others, became a secret entrepreneur in order to survive. In one of the most descriptive passages of the book,

He details how he became the most enterprising collector of human excrement in his unit. Stealing nightsoil from bus stations, hospitals, and theaters and selling it to farmers for manure, he earns sufficient money to care for his family. At the same time, He also starts up an underground woodshop where he and his wife make wooden chairs to sell on the black market. Eventually, his entrepreneurial instincts and educated background capture the eye of the village leader. He again suffers public humiliation in 1976, when he is labelled a "capitalist," "bad element," "rightist," "landlord's son," and "running dog."

Still, He Liyi manages to land on his feet. As the political climate in China grows more friendly in the late 1970s, He begins again to dream of being a "chalk-eater"—a teacher. Eventually, he begins teaching English in a middle school. He retired in 1988 after nine years, and now writes full time.

Through the story of He Liyi and his family, the reader learns not only about the chaotic and tragic history of modern China, but about communal culture and daily life. He discusses foods, festivals, and rituals in great detail. However, at times his prose is colloquial and difficult to follow. Though footnotes are provided for reference, some of the Chinese phrases simply don't translate well into English.

Mr. China's Son will help businesspeople and others with an interest in China comprehend the traumas suffered by the Chinese people during the first three decades of the PRC. Ironically, the deprivations endured by many Chinese under communism forced them to develop entrepreneurial instincts in order to survive. He Liyi's story gives Western readers a framework for understanding the bizarre history which created many of today's successful Chinese businesspeople.

—Caitlin Stewart Harris

Caitlin Stewart Harris is circulation manager of The CBR.

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Full Speed Ahead

Affirming the importance of US-China business ties, over 150 representatives of member companies attended the Council's 21st Annual Meeting on June 8 in Washington, DC. With President Clinton's late May decision to renew China's Most Favored Nation (MFN) status and eliminate linkage of the trade status to human rights, much of the session focused on future directions of US-China policy and how recent changes in Chinese society affect the conduct of business in the PRC.

Council President Robert A. Kapp opened the meeting by praising the Administration's MFN decision but warned members that "legislative aftershocks" may arise from MFN opponents in Congress (see p.4). Turning to management issues, Kapp reaffirmed the Council's commitment to represent the interests of member companies in future policy de-



According to Professor Thomas Gold, China's economy may be modernizing, but its society is clinging to traditional values.

bates on issues such as APEC; China's accession to the GATT; and the role of trade with respect to the environment, human rights, and labor issues. Kapp then stressed the need for the Council's

membership growth to continue, adding that under his stewardship, he hopes to expand membership on the West coast. Kapp also cited the many activities that occupied the Council this spring, noting meetings with such senior Chinese officials as Trade Minister Wu Yi, Vice Premier Zou Jiahua, and State Councillor Song Jian.

Anne Stevenson-Yang, director of the Council's China Operations in Beijing, next described China's challenging task of reform. She noted that beneath the outward prosperity generated by reforms, tensions over their pace and proceeds are manifest in the growing number of State enterprises unable to pay their employees without government bailouts; the growing gap between rich and poor; and the increasing frequency of labor unrest and worker-retention problems. She cautioned members to keep an eye on inflation, the new swap system and banking reforms, and the central government's attempts to reassert control over the petroleum, automobile, and chemical sectors in the months ahead.

None of these measures will end the "boom-bust" cycles of business in China, Stevenson-Yang asserted, and she told US investors not to regard periodic setbacks in the reform process as a sign of Beijing's lack of commitment to reform, but rather as a logical part "of the difficult political process of inducing structural change."

Thomas B. Gold, professor of sociology at the University of California at Berkeley, closed the morning session with an analysis of the dominant characteristics of Chinese society and how these factors affect foreign business operations. In particular, Gold told members that they should understand the acceptance and assumption of hierarchy in China, as well as the importance of tradition and *guanxi*, or personal connections. Gold concluded that the Communist's inability to sustain a stable political system has resulted in the



Director of China Operations Anne Stevenson-Yang alerted members of China's ongoing FIE unionization drive.

resurgence of traditional norms and values. Hence, companies doing business in China must pay attention to specific situations and contexts to predict the behavior of their Chinese counterparts and how they themselves should respond.

Following the afternoon reception and luncheon, Council members heard from W. Bowman Cutter, deputy assistant to the President for economic policy. Cutter stressed the importance of renewing China's MFN status, conceding that the President had found this a difficult decision to make. He also suggested four areas on which the United States must work to secure a stable future relationship with China: full engagement, mutually beneficial bilateral economic relations, joint security, and environmental protection. Cutter stated that US businesses will play a central role in ensuring that each of these goals is met. While the United States will continue to monitor human rights in China, Cutter reaffirmed the need to be realistic about the importance of the US-China economic relationship. "We've made a turn toward Asia," he said, and it is the responsibility of the United

States "to be an actor in the game and caretaker of the game."

After lunch, members attended one of four concurrent workshops. In the workshop on "China and the GATT," Assistant MOFTEC Minister Long Yongtu briefed members on the status of the GATT negotiations he was conducting with the Office of the US Trade Representative (USTR). Long asserted that the two sides had made progress, especially on agricultural issues, with China agreeing to remove all restrictions on agricultural imports upon entry into the World Trade Organization. After Long darted back to USTR for the next round of negotiations, Christopher Beede, economic/commercial officer in the Office of Bilateral Trade Affairs at the State Department, discussed the US negotiating position, and Tim Bennett, former US trade negotiator for Mexico at USTR, compared China's accession process to that of Mexico. Bennett negotiated Mexico's protocol of accession in 1986.

The session on "Business, China, and the Media: A Long-Term Challenge" addressed the American business community's struggle to receive favorable publicity on its activities in China. Les Blumenthal, a reporter for McClatchy Newspapers, and Steve Musson, the new Beijing correspondent for *The Washington Post*, discussed their commitment to provide balanced coverage of China in their articles. Other speakers included former US Ambassador to China Leonard Woodcock, who shared his own experiences of dealing with the media while serving in Beijing from 1977-1982, and Chris Padilla of AT&T. Council attendees expressed their desire to increase media awareness of the positive impact their businesses are having in China.

At an afternoon workshop on doing business in the interior, representatives of firms operating in Kunming, Jinan, Lanzhou and other inland Chinese cities shared their experiences and fielded questions from Council members. Edward Ewald, vice president China Ventures at Hoechst Celanese Corp., noted that labor and housing costs were lower in Kunming than they were in Zhuhai, the site of other Hoechst Celanese facilities on the mainland. The "poaching" of skilled personnel was also less of a problem in Kunming which has not yet developed a labor pool.

Cutter reaffirmed the need to be realistic about the importance of the US-China economic relationship.



Deputy Assistant to the President W. Bowman Cutter chastised the press for drawing an arbitrary distinction between the pursuit of economic and human rights goals.

Alex Palmer, international operations manager Asia at Eaton Corp., said his firm was able to use its status as a Western company to gain concessions and tax breaks in negotiations with its joint-venture partner and local officials in Jinan,

Shandong Province. Palmer emphasized that it is important to stress business fundamentals when hammering out terms with inland officials who do not have the business savvy of their counterparts on the coast. Serge Verma, president of SinoKellogg Joint Venture emphasized the need to ensure potential partners have the clout needed to get necessary central-level approvals.

The "New Capital Sources in China" workshop focused on infrastructure finance, venture capital, and China's burgeoning securities markets. Chris Tewell, managing director of GE Capital East Asia, explained the purpose of his firm's new \$2.5 billion infrastructure fund, noting that there may be opportunities for US companies to cooperate with GE on infrastructure-related projects.

Alan Rappaport, executive vice president of Oppenheimer & Co., discussed ways in which US companies can utilize Oppenheimer's venture capital to launch new China projects. Timothy A. Steinert, an attorney with Coudert Brothers, commented on China's new company law and the potential for joint ventures in China to restructure their operations. By restructuring as a company limited by shares, a firm might improve its ability to raise capital and assign sale of assets, but such a conversion might jeopardize special tax advantages, access to foreign exchange, and the right to engage in direct trade.

Council Expands Board

At the June 8 annual meeting, member company representatives approved 12 new representatives to the Council's board of directors, bringing the total to 26. Elected for three-year terms expiring in June 1997 were: Michael R. Bon-signore, chairman and chief executive officer, Honeywell, Inc.; Douglas N. Daft, president, Pacific Group, Coca-Cola International; George David, president and chief executive officer, United Technologies Corp.; Robert J. A. Fraser, senior vice president, International and Science & Technology, Hercules Inc.; Edgar Hotard, president, Praxair, Inc.; Dale P. Jones, president,

Halliburton Co.; Stephen K. Lambright, vice president and group executive, Anheuser-Busch Co.; Leslie G. McCraw, chairman and chief executive officer, Fluor Corp.; Frank Shrontz, chairman and chief executive officer, The Boeing Co.; Donald Staheli, president and chief executive officer, Continental Grain Co.; Alex Trotman, chairman, president, and chief executive officer, Ford Motor Co.; William J. Warwick, chairman and chief executive officer, AT&T China, Inc.

A full listing of the board of directors appears on p.63.

Council Hosts Top Chinese, Hong Kong Officials

The Council welcomed several high-ranking delegations to the United States this Spring. Hong Kong Chief Secretary Anson Chan met with Council members at an April luncheon at the Willard Hotel in Washington, DC. Chan shared her impressions of her recently concluded meetings with top Administration and congressional officials and thanked the

been moving forward. Though China has yet to officially approve the new airport, half the land area for the site has already been reclaimed and the connecting road and rail bridge—the world's longest—is already under construction.

On May 2, Vice Premier Zou Jiahua met with US-China Business Council members to discuss China's economic

Member companies interested in Dalian and Shenzhen benefited from visits by delegations from these areas in May and June. Dalian Mayor Bo Xilai told members that more than 300 US foreign-invested enterprises (FIEs) currently operate in his city today, but they number far fewer than those from Japan. Bo stated that Dalian, with its significant industrial base



Chairman Maurice Greenberg hosted the Council's reception for Vice Premier Zou Jiahua.

Council and its members for their hard work in the Most Favored Nation (MFN) renewal fight.

Turning to Hong Kong politics, Chan said the bottom line in the election-issue imbroglio between China and British-run Hong Kong is that the people of Hong Kong support fair and open elections. And even though China has raged over Governor Chris Patten's reform proposals for over a year-and-a-half, officials on both sides of the border continue to cooperate on practical issues. The Chek Lap Kok Airport construction and Wharf 9 development projects, for example, have

goals. Zou highlighted China's need for foreign investment in such areas as energy, transportation, telecommunications, agriculture, and water conservation. He also expressed his hope for government support in furthering US-China economic cooperation, stating, "The Chinese and US governments have the duty to encourage and support businesspeople to conduct mutually beneficial cooperation, thus creating favorable conditions for closer bilateral relations." After the speech, Council members were able to speak with Zou and his delegation about their business interests in China.

Zou highlighted China's need for foreign investment in such areas as energy, transportation, telecom, agriculture, and water conservation.

and well-trained work, seeks to attract US investment in such areas as power generation, transportation, and textiles.

In mid-June, the Council welcomed a delegation from the Shenzhen stock exchange, led by Deputy Commissioner Liu Xiuhua. Liu said that the city's securities market, which fell from a high of 360 to 133 in the last six months, had now corrected itself. Currently, 22 companies issue foreign-denominated B-shares on the Shenzhen market, and a new group of enterprises is expected to list soon, which should improve B-share liquidity.

Good Chemistry

The "Chemical Industry Working Group" held its first substantive meeting on June 7 in the Council's Washington office. Hercules Inc.'s Senior Vice President for International and Science and Technology Robert Fraser chaired the meeting, which featured case studies of PPG Industries, DuPont, and Hoechst

Celanese's experiences establishing multiple investments in China. Animated discussion followed the presentations, with participants touching on such topics as joint-venture partner relations, quality control, protection of intellectual property rights, and financial management of multiple investment projects.

Over 20 company representatives attended the meeting. Due to such strong interest, the working group decided to convene more frequently than its originally planned bi-annual meetings. The next working group meeting is slated for September and will address intellectual property rights issues.

■ Meredith Gavin

The following tables contain recent press reports of business contracts and negotiations exclusive of those listed in previous issues. For the most part, the accuracy of these reports is not independently confirmed by *The CBR*. Contracts denominated in foreign currencies are converted into US dollars at the most recent monthly rate quoted in the International Monetary Fund's *International Financial Statistics*.

Firms whose sales and other business arrangements with China do not normally appear in press reports may have them published in *The CBR* by sending the information to the attention of the editor.

SALES AND INVESTMENT THROUGH April 15, 1994
Foreign party/Chinese party Arrangement, value, and date reported

Accounting and Insurance

OTHER

Cigna Corp. (US)

Will open representative office in Beijing. 3/94.

Colonial Mutual Group (Australia)

Will open representative office in Beijing. 3/94.

Federal Insurance Co., a member of The Chubb Group of Insurance Companies. (US)

Will open representative office in Beijing. 3/94.

Agricultural Commodities and Technology

INVESTMENTS IN CHINA

NA (Australia)/China Textile Resources Corp., Huaxin Group (Wujiang)

Formed Huazhou Aquatic Breeding Co. joint venture to breed soft-shell turtles. 3/94.

OTHER

World Bank

Will provide IDA credit for soil-reclamation project and agro-processing enterprises in South China. \$150 million. 3/94.

Banking and Finance

CHINA'S ACTIVITIES ABROAD

Agricultural Bank of China

Will open representative office in Tokyo. 4/94.

Bank of China

Will issue bonds in Japan to finance Chinese energy and transportation development. \$312 million. 4/94.

Guangdong Development Bank

Will open representative office in Hong Kong. 3/94.

Industrial and Commercial Bank of China

Established representative office in Seoul. 3/94.

OTHER

Chase Manhattan Bank (US)

Opened representative office in Tianjin. 4/94.

First National Bank of Boston (US)

Opened representative office in Shanghai. 4/94.

Maybank (Malaysia)

Opened representative office in Beijing. 4/94.

GE Capital Corp., a unit of General Electric Co. (US)

Launched fund to make direct investments in industrial projects in China. \$50 million. 3/94.

Goldman, Sachs & Co. (US)

Opened representative office in Beijing. 3/94.

Keppel Bank (Singapore)

Will open representative office in China. 3/94.

Merrill Lynch & Co., Inc. (US)

Opened representative office in Beijing. 3/94.

Morgan-Stanley Group (US)

Opened representative office in Shanghai. 3/94.

Nedbank (S. Africa)

Opened representative office in Beijing. 3/94.

Chemicals, Petrochemicals, and Related Equipment

INVESTMENTS IN CHINA

Bayer AG (Germany)/Tianjin Bohai Chemical Industry Group

Will establish joint venture to manufacture caustic soda and chlorine products. \$50 million. 4/94.

Abbreviations used throughout text: BOC: Bank of China; CAAC: Civil Aviation Administration of China; CNAIEC: China National Automotive Import-Export Corp.; CATIC: China National Aero-Technology Import-Export Corp.; CITIC: China International Trust and Investment Corp.; CITS: China International Travel Service; CNOOC: China National Offshore Oil Corp.; ETDZ: Economic and Technological Development Zone; ICBC: Industrial and Commercial Bank of China; MPT: Ministry of Posts and Telecommunications; NA: Not Available; NORINCO: China North Industries Corp.; P&T: Post and Telecommunications; PBOC: People's Bank of China; SEZ: Special Economic Zone; SINOCHEM: China National Chemicals Import-Export Corp.; SINOPEC: China National Petrochemical Corp.; SINOTRANS: China National Foreign Trade Transportation Corp.; SPC: State Planning Commission; UNDP: United Nations Development Program.

Itochu International Corp. (Japan)/Shanghai Petrochemical, Shanghai No. 2 Packaging Material Plant, Shanghai Packaging Material Co. Ltd.

Formed Jin Pu Plastic Material Co. Ltd. joint venture to produce polypropylene products. \$29 million. (Japan:30%-PRC:70%). 4/94.

Iwanti International Corp. (Japan), Iwanti Gas Co. (Japan)/Shanghai Petrochemical, Shanghai Jindong Petrochemical Industrial Co. Ltd.

Formed Shanghai Petrochem-Iwanti Gases Development Co. Ltd. joint venture to produce food-grade carbon dioxide and sharp cutting gas. \$7.43 million. (Japan:60%-PRC:40%). 4/94.

PB Chemicals Inc. (US)/Daqing Technology Import-Export Corp.

Signed agreement to license maleic anhydride technology for unsaturated polyester resins. 4/94.

Amoco Orient Co., a subsidiary of Amoco Corp. (US)/NA (Zhuhai)

Will launch chemical manufacturing joint venture. 3/94.

Formosa Plastics Group (Taiwan)

Will build naphtha cracking units in Guangzhou and Shanghai to produce ethylene. 3/94.

Foseco Metallurgical Chemicals, a division of Burmah Castrol (UK)/Shenzhen Jinke

Formed Foseco Jinke joint venture to manufacture and market products for the aluminum industry. \$900,000. (UK:50%-PRC:50%). 3/94.

Kansai Paint Co. (Japan)/Shenyang Paint Plant

Formed Shenyang Kansai Paint Co. joint venture to manufacture paint. \$5 million. (Japan:40%-PRC:60%). 3/94.

Nan Ya Plastics, flagship company of Formosa Plastics Group (Taiwan)/NA

Will build joint-venture petrochemical plants in Shandong, Anhui, and Fujian provinces. \$34.2 million. (Taiwan:65%-PRC:35%). 3/94.

Consumer Goods

INVESTMENTS IN CHINA

Fujimaru Industry Co. Ltd. (Japan), Nichimen Machinery Trade Ltd. (Japan)/Shanghai Yuejin Stainless Steel Products Corp.

Will form joint venture to produce kitchen utensils. \$3.6 million. (Japan:45%, 15%-PRC:40%). 3/94.

Goldstar Co. Ltd. (S. Korea)/Shanghai Tape Recording Equipment Factory

Formed joint venture to produce video cameras and cassette recorders. \$19.5 million. 3/94.

Sanyo Electric Co. (Japan), Toyota Tsusho Corp., a trading company affiliated with Toyota Motor Corp. (Japan)/Great Wall Trading Co. Ltd., General Washing Machine Factory (Anhui)

Formed joint venture to manufacture washing machines. \$15 million. (Japan:50%-PRC:50%). 3/94.

CHINA'S INVESTMENTS ABROAD

Empresas La Moderna, a subsidiary of Cigarrera La Moderna (Mexico)/China National Tobacco Corp.

Will co-develop a Chinese herb cigarette in Mexico for the North American market. 3/94.

OTHER

SITI, a ceramics company (Italy)

Opened representative office in Guangzhou. 3/94.

Electronics and Computer Software

CHINA'S IMPORTS

Borland International, Inc. (UK)/NA

Will sell 6 Chinese-language database management programs, including a version of dBase. 3/94.

Digital Equipment Co. (US)/Pudong Software Park Development Co. (Shanghai)

Will provide network systems integration and other technical and management expertise. 3/94.

Unix China Ltd., a subsidiary of UNIX (US)/ICBC

Will sell Unix SVR 4.2/CE computer software. \$345,000. 3/94.

INVESTMENTS IN CHINA

Computervision Corp. (US)/China Aerospace Corp.

Formed CV Technology Corp. joint venture to develop software for computer-aided design. 4/94.

Murata Manufacturing Co. Ltd. (Japan)/NA (Beijing)

Established Beijing Murata Electronics Co. Ltd. to produce chip multi-layer proclaim capacitors. \$30 million. (Japan:77%-PRC:23%). 4/94.

Yamatate Honeywell Co. (Japan)/Shanghai Petrochemical, Sichuan Instrument Factory

Formed Shanghai Jin Shan Yamatate Control Instrument Co. Ltd. joint venture to manufacture and distribute instruments and specialized control devices. \$700,000. (Japan:60%-PRC:40%). 4/94.

Goldstar Co. Ltd. (S. Korea)/Shuguang Electron Group Corp. (Hunan)

Formed joint venture to produce color-television picture tubes and electron guns. \$140 million. (S. Korea:51%-PRC:49%). 3/94.

Intel Corp. (US)/Huajing Electronics Group, a unit of China Electronics Corp.

Signed agreement to test and assemble Intel 386 SX microprocessors delivered in wafer form. 3/94.

National Semiconductor Corp. (US)/Shanghai Sunrise Technology Ltd.

Will form joint venture to manufacture subscriber-line interface modules. \$4 million. 3/94.

NEC Corp. (Japan)/Shanghai Changjiang (Holdings) Ltd.

Will form joint venture to manufacture workstations and other computer equipment. 3/94.

United Development Inc. (Israel), Cvalim Electric Wire & Cable Co. of Israel/MPT, Shanghai Shengguang Communication Industrial Co., and Shanghai Zijiang Group

Formed joint venture to manufacture optical cable. (Israel:51%-PRC:49%). 3/94.

OTHER

Hitachi Ltd. (Japan)

Will open representative offices in Guangzhou and Shanghai. 3/94.

ICL, a computer systems company (UK)

Opened representative offices in Beijing and Shanghai. 3/94.

IBM China Inc., a subsidiary of IBM Corp. (US)/Shanghai Engineering University, Shanghai University of Science and Technology

Will donate computer equipment, a work station, and software as well as help establish a teaching center for computer software engineering. \$575,000. 3/94.

National Semiconductor Corp. (US)

Opened liaison office in Beijing. 3/94.

Texas Instruments Inc. (US)

Will shift Asia-Pacific headquarters from Hong Kong to Taiwan. 3/94.

Engineering and Construction

INVESTMENTS IN CHINA

Itochu International Corp. (Japan), Uchiyama Advance Co. (Japan), and Yamaichi Kosan Co. (Japan)/NA (Shenzhen)

Will establish joint venture to produce concrete. \$3.5 million. 4/94.

Law Companies Group, Inc. (US)/NA (Nanjing)

Will design infrastructure for light industrial, commercial, and residential areas. \$1.6 million. 4/94.

American Standard Inc. (US)/Hua Mei Sanitary Ware Co.

Will jointly manufacture and distribute plumbing and toilet fixtures, fittings, bathtubs, and water heaters. 3/94.

OTHER

Export Development Corp. (Canada)

Will provide financing to Fuller-F.L. Smith Canada Ltd. for sale of machinery, equipment, and services to cement plant in Sichuan Province. \$23.5 million. 3/94.

Environmental Technology and Equipment

CHINA'S IMPORTS

Degremont Group (France)/Xiamen Water Works

Will sell equipment to expand drinking water supply. \$13.6 million. 4/94.

Thompson Kennicott, a subsidiary of Rolls-Royce PLC (UK)/Shajiao Power Station (Guangdong)

Will sell water-supply treatment complex. \$1.5 million. 3/94.

INVESTMENTS IN CHINA

Ecology & Environment Inc. (US)/Beijing Shuang Yi Engineering Co.

Formed Beijing Yiyi Ecology & Environment Engineering Co. joint venture to improve environmental protection in Beijing. \$600,000. (US:50%-PRC:50%). 3/94.

OTHER

Konkor Forest Products Co. (US)

Opened representative office in Beijing. 4/94.

Law Companies Group, Inc. (US)/NA (Tianjin)

Will study industrial wastewater treatment under UK soft loan. 3/94.

Food and Food Processing

INVESTMENTS IN CHINA

Cheng Keng Trading Co. (Macao), Polytek Engineering Corp. (HK), NA (Portugal)/NA (Hebei)

Will establish Hebei Sino-Portuguese Winery joint venture to produce white wine. \$9 million. (Macao, HK, Portugal:40%-PRC:60%). 3/94.

Indian National Dairy Development Board (India)/NA (Nanning)

Will establish joint-venture dairy farm. \$1 million. 3/94.

Nestle Co. (Switzerland)/Qingdao Dairy Farm Co.

Established two joint ventures to produce and sell condensed milk, milk powder, and ice cream. \$45 million. 3/94.

OTHER

APV PLC, a food and beverage processing equipment manufacturer (UK)

Will open representative office in Guangzhou. 4/94.

Foreign Assistance**Dai-ichi Kangyo Bank Ltd. (Japan)/Agricultural Bank of China**

Will provide loan for industrial projects. \$21.8 million. 4/94.

World Bank

Approved loan for dam, hydropower facility, and flood control in Xiaolangdi region along the Yellow River. \$460 million. 4/94.

Machinery and Machine Tools

CHINA'S IMPORTS

Paul Wurth S.A. (Luxembourg)/Anshan Iron and Steel Plant (Liaoning)

Will provide technology to modernize plant and increase output. 3/94.

Tecnicas Reunidas International SA (Spain), Eurocontrol SA (Spain)/Wuhan Iron and Steel Corp.

Will sell a continuous casting machine to increase steel output. \$82.1 million. 3/94.

INVESTMENTS IN CHINA

Cormer Machinery Ltd. (Ireland)/Beijing Steel New Materials Corp.

Established Beijing Chicor Engineering Technology Co. Ltd. joint venture to manufacture textile machinery parts. 4/94.

Hyundai Motor Service Co. Ltd. (S. Korea)/China International Exhibition Center, North Star Group

Formed Beijing Hyundai Motor Service Co. Ltd. joint venture to manufacture, sell, and repair spare parts for motors and elevators. \$1.8 million. 4/94.

Caterpillar Inc. (US)/Shanghai Diesel Engine Co. Ltd.

Formed Caterpillar Shanghai Engine Co. Ltd. joint venture to build mid-size motors. (US:55%-PRC:45%). 3/94.

NA (Singapore)/Shandong Bulldozer Engineering Machinery Shareholding Co. Ltd.

Formed joint venture to produce and sell small-pitch caterpillar band unit assemblage and carrier assemblage. \$1.4 million. 3/94.

Ohyama Lighting Co. Ltd. (Japan)/NA (Dalian)

Will establish joint venture to manufacture glass parts for lights. 3/94.

CHINA'S INVESTMENTS ABROAD**Jinan First Machine Tool Works (Shandong)/NA (US)**

Opened joint-venture plant in Alabama to assemble computerized lathes and machine tools. 3/94.

Hangzhou Dunpai Chain Transmission (Group) Co./NA (HK), NA (Italy)

Will form joint venture to manufacture escalators for sale in Europe. \$2 million. (PRC:50%-HK:40%, Italy:10%). 3/94.

OTHER**Triconex Corp., an industrial safety control-systems company (US)**

Will open representative office in Beijing. 3/94.

Metals, Minerals, and Mining**CHINA'S IMPORTS****United Engineering PLC (UK)/NA**

Sold Brymbo Steel Mill from North Wales and will reassemble it in Suzhou. 3/94.

INVESTMENTS IN CHINA**Itochu International Corp. (Japan), Tecnicas Reunidas SA (Spain), Demag GmbH (Germany)**

Will build continuous steel casting plant in Wuhan. \$80 million. 3/94.

Medical Equipment and Devices**INVESTMENTS IN CHINA****NA (Australia)/Bank of China Trust & Consultancy Co., China National Arts & Crafts Import-Export Corp., and Wenyang Import-Export Trading Co.**

Established joint venture in Beijing to produce wheelchairs for disabled children. 4/94.

OTHER**NA (Japan)**

Donated money to modernize medical services and drinking water supply systems in Hebei, Hunan, and Shandong provinces. \$114,000. 3/94.

World Health Organization/Beijing Union Medical College Hospital

Established a human reproduction research center to diagnose and treat infertility and endocrine disorders, research contraceptive techniques, and provide consulting services and training to doctors. 3/94.

Packaging, Pulp, and Paper**INVESTMENTS IN CHINA****Singapore Overseas Development Co. Ltd. (Singapore)/Hangzhou Huafeng Paper Mill**

Will form joint venture to produce cigarette paper. \$24.6 million. (Singapore:65%-PRC:35%). 3/94.

CHINA'S INVESTMENTS ABROAD**Yi Xing Light Industry Machinery Corp./Ghassan Bedour (Syria)**

Formed joint venture to build aluminum can factory near Damascus. \$9 million. (PRC:49%-Syria:51%). 4/94.

Petroleum, Natural Gas, and Related Equipment**INVESTMENTS IN CHINA****Sunkyong Industries (S. Korea)/SINOPEC**

Will build joint-venture oil refinery in Shenzhen. \$1.5 billion. (S. Korea:40%-PRC: 60%). 3/94.

OTHER**British Petroleum PLC (UK), Itochu International Corp. (Japan), Mitsubishi Corp. (Japan), Mitsui & Co. (Japan), and Nippon Oil (Japan)/China National Petroleum Corp.**

Signed agreement to conduct seismic surveys and develop No. 4 oil exploration block in Tarim Basin. (UK: 55%, Japan:45%). 3/94.

World Bank

Will provide loan to double production of natural gas in Sichuan Province. \$255 million. 3/94.

Ports and Shipping**CHINA'S IMPORTS****Tomen Corp. (Japan)/China National Technical Import-Export Corp.**

Signed contract to supply handling equipment for coal terminal in Hebei Province. \$96 million. 4/94.

INVESTMENTS IN CHINA**Hutchison Whampoa Co. Ltd. (HK)/NA (Zhuhai)**

Will jointly operate two shipping berths at Zhuhai Port. 4/94.

Yamaha Motor Co. (Japan)/Hainan Scientific & Technological Industrial Park Co., Rongda Enterprise Co.

Established Hainan Kedaya Yacht Manufacturing Co. joint venture to introduce technology, drawings, molds, and equipment for production of yachts, motor boats, and fishing boats. 4/94.

OTHER**Port of Los Angeles (US)**

Opened marketing offices in Guangzhou and Tianjin. 4/94.

Power Generation Equipment**CHINA'S IMPORTS****General Electric Co. (Canada)/China National Technical Import-Export Corp., Ertan Hydraulic Development Corp.**

Will supply turbine engine generators for the Ertan Hydropower Station. \$100 million. 4/94.

Asea Brown Boveri Group (Switzerland), Itochu Corp. (Japan)/China National Technical Import-Export Corp. (Hubei)

Will supply turbines and electrical appliances for Ezhou Power Plant. 3/94.

INVESTMENTS IN CHINA

AES Co. (US)/Fujian Electric Power Bureau

Established Yangpu Electric Power Plant joint venture. \$500 million. 4/94.

China Resources Co. Ltd. (HK)/State Energy Investment Corp., Jiangsu Investment Corp., and Xuzhou Investment Corp.

Formed joint venture to build power station. \$212 million. (HK:35%-PRC:65%). 4/94.

Interglobe, Ltd. (US)/Shanghai Electric Power Construction Bureau, a State enterprise of the Ministry of Electric Power

Formed Shanghai Huaxin Consulting Co. joint venture to introduce foreign investors and suppliers of equipment and services to China's power market. 4/94.

Westinghouse Electric Co. (US)/NA (Shandong)

Established Zouxian Power Supply Factory joint venture. \$16 million. 4/94.

World Bank

Approved loan to finance 1,200 mw Yangzhou power project in Jiangsu Province. \$350 million. 3/94.

Property Management and Development

INVESTMENTS IN CHINA

NDC International Corp. (US)/NA (Shaanxi)

Will develop China Huangdi Memorial Park to exhibit historical Chinese memorabilia and provide tourist services. \$40.6 million. (US:83%-PRC:17%). 4/94.

Thailand Chinese Business Organization (Thailand)/Hainan Sun Group Ltd.

Created Thai-Hainan Townsman Resort Village in Haikou to build houses for overseas Chinese. \$30 million. 4/94.

China Honest, a member of Lei Shing Hong Group. (HK)/Dongcheng District (Beijing)

Will jointly participate in area redevelopment project. \$150 million. 3/94.

Jinro Business Group (S. Korea)/Beijing North Star Industrial Group

Established joint venture to build business center with office buildings, apartments, and shopping centers. \$800 million. (S. Korea:50%-PRC:50%). 3/94.

Unicorn Co. (S. Korea)/Beijing-Asia TV City Co. Ltd.

Signed agreement to build an international park in Xiangshan. \$150 million. 3/94.

Telecommunications

CHINA'S IMPORTS

Compression Labs Inc. (US)/MPT

Will jointly install nationwide video-conferencing network. \$3.5 million. 3/94.

Motorola Inc. (US)/Beijing CATCH Communications Group Co.

Will provide advanced digital mobile communications system. \$100 million. 3/94.

PCBX Systems, Inc. (US)/China Business Associates

Will sell PCBX add-in boards to improve telephone management. 3/94.

INVESTMENTS IN CHINA

Hongkong Telecom (HK), Cable & Wireless (UK)/MPT

Formed joint venture to develop, install, and maintain international submarine cables. \$27 million. (HK, UK:49%-PRC:51%). 4/94.

Kohap Group (S. Korea)/NA

Will form Beijing Jing Koh Integrated Telecommunications Equipment Co. joint venture to produce and sell multiplexing technology. \$2.1 million. (S. Korea:50%-PRC:50%). 4/94.

Shindengen Electric Manufacturing Co. (HK)/China National Posts & Telecommunication Industry Corp.

Established joint venture to produce rectifiers for telephone switching systems. \$3.5 million. 4/94.

AT&T Inc. (US), S. Megga Telecommunications Products Ltd. (HK)/Post and Telecommunications Industrial Corp.

Formed AT&T Consumer Telecommunications Products, Beijing Ltd. joint venture to manufacture and sell telephone equipment. (US:53%, HK:17%-PRC:30%). 3/94.

Ericsson A/S (Sweden)/Guangdong Machinery Import-Export Corp.

Signed contract to expand mobile telephone network with mobile switching centers, radio-based stations, and operation and maintenance systems. \$212.5 million. 3/94.

GPT Data Systems (UK)/MPT

Will provide synchronous digital hierarchy and fiber-optic cables for telecommunications line between Wuhan and Chongqing. \$59 million. 3/94.

Textiles and Apparel

INVESTMENTS IN CHINA

Kanebo, Ltd. (Japan)/Shanghai Cotton Mill No. 15

Established joint venture to produce yarn and fabric. \$23.2 million. (Japan:50%-PRC:50%). 4/94.

Kong Wan Hsin Co. Ltd. (HK)/Beijing Garments Import-Export Corp. Inc., Daxingzhuang Township Economic United Co. (Beijing)

Formed Beijing Wan Hsin Garments Co. Ltd. joint venture to manufacture clothing. \$1.7 million. (HK:25%-PRC:75%). 4/94.

G-III Apparel Group Ltd. (US)/NA

Will jointly own a leather apparel factory and market products in North China. (US:39%-PRC:61%). 3/94.

OTHER

W. Schlafhorst & Co., a textile machinery manufacturer (Germany)

Opened representative office in Beijing. 3/94.

Transportation

CHINA'S IMPORTS

The Boeing Co. (US)/China Southwest Airlines

Will sell six jets. 3/94.

The Boeing Co. (US)/China Southern Airlines

Will sell Boeing 777 flight simulator. \$20 million. 3/94.

INVESTMENTS IN CHINA

Auto Strategy Investment Co. (US)/China Auto Industrial Corp., China North Industrial Corp., Changchun Autoparts Manufacture

Established Changchun China joint venture to import technology, management, and equipment for auto-parts production. \$160 million. 4/94.

Ford Motor Co. (US)/Shanghai Automotive Industry Corp.

Established joint venture to produce plastic auto parts. 4/94.

Goodyear Tire & Rubber Co. (US)/Dalian Rubber General Factory

Formed Goodyear Dalian joint venture to manufacture tires. \$30 million. (US:75%-PRC:25%). 4/94.

Kyunghan Express Co. (S. Korea)/NA

Established joint venture to provide express bus service from Beijing to Tianjin. \$1.5 million. 4/94.

Nissho Iwai Corp. (Japan), Suzuki Motor Corp. (Japan)/NA

Established joint venture to manufacture motorcycles in China. \$12 million. (Japan:40%-PRC:60%). 4/94.

Steyr Nutzfahrzeuge AG (Austria)/NA

Will establish two joint ventures to build trucks and manufacture WD612 Steyr diesel engines. 4/94.

Ford Motor Co. (US)/Shanghai Automotive Industry Corp.

Will form joint venture to produce automotive parts, including interior trim, seats, and instrument panels. 3/94.

General Motors Corp. (US), Saginaw Overseas Corp. (US), Packard Electric (US)/Yubei Machinery Works (Henan), Fuxin Hydraulics (Liaoning)

Will develop and manufacture steering, automotive power, and signal distribution systems. 3/94.

RADA Electronic Industries Ltd. (Israel)/Beijing Tianzhu Forestry Development Co.

Formed joint venture to repair aircraft. \$13 million. (Israel:80%-PRC:20%). 3/94.

Saturn Electronics & Engineering (US)/The Beinei Group (Beijing)

Established Beijing Saturn Electronics Ltd. joint venture to manufacture voltage regulators and other electronic parts for vehicles. (US:57%-PRC:43%). 3/94.

S.P International Co., Ltd. (Thailand)/Nanning Machinery Plant

Established joint venture to produce motorcycles. 3/94.

Suzuki Co. (Japan)/Nanning Machinery Plant

Will form joint venture to manufacture Suzuki motorcycles. \$29.55 million. 3/94.

CHINA'S INVESTMENTS ABROAD

Great Wall Industry Corp./Ghassan Bedour (Syria)

Formed joint venture to produce spark plugs. \$9 million. (PRC:55%-Syria:45%). 4/94.

OTHER

First National Bank of Chicago/BOC

Will finance purchase of seven Boeing 737 aircraft by China Southern Airlines. \$261 million. 4/94.

Airbus Industrie (Germany, France, and UK)/China Aviation Supplies Corp.

Signed cooperation agreement to allow Chinese manufacturers to increase production levels of Airbus spare parts. 3/94.

Ford Motor Co. (US)

Formed Ford China Operations to negotiate joint ventures and take responsibility for component manufacturing and vehicle assembly. 3/94.

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