China–U.S. Nuclear Deal Still a Puzzle

Administration delay in forwarding cooperative agreement leaves Congress in suspense, Chinese piqued, companies stalled

The Administration is having serious trouble working out the terms of the China–U.S. nuclear cooperation agreement announced by President Reagan during his visit to China in late April. The Chinese on 20 June released a stiffly worded official statement blaming the United States for raising "unnecessary new issues" and, in effect, for reneging on a commitment to make nuclear technology available to China. Observers here had noted earlier that the Administration's continued delay in sending the text to Congress could prevent the agreement from going into effect this year and thereby dampen prospects for U.S. nuclear industry sales to China.

After maintaining a tight silence on the matter, the White House on 22 June acknowledged that concerns about nuclear proliferation account for the delay. Spokesman Larry Speakes said the Administration was "hopeful" that the Chinese would give the assurances the United States sought, but added that the agreement would be sent to Congress only after "we are satisfied there's a mutual understanding between us and the Chinese, and we're able to meet the requirements of our law."

The flurry of comment on the matter seems to have been precipitated by a Washington *Post* story on 15 June reporting that the agreement had struck snags serious enough to put ultimate approval in doubt. At a briefing session that day, State Department spokesman John Hughes avoided a direct response to questions about the nature of the difficulties, but said that "we will continue to keep working at these points that need to be resolved."

The major hitch is attributed to allegations that China gave assistance to Pakistan in its program to develop nuclear weapons. Attention has centered on reports that the Chinese have assisted Pakistan's uranium enrichment efforts at a plant at Kahuta in northern Pakistan.

Such aid would violate international protocols aimed at preventing the international spread of nuclear weapons. It would, therefore, provoke strong opposition in Congress to the cooperation agreement. A key question on Capitol Hill has been on the degree to which U.S. negotiators obtained Chinese assent to safeguards to prevent the transfer of nuclear materials and technology to countries that do not have nuclear weapons. The critics say that they will insist that the agreement adheres closely to the provisions of the U.S. Nuclear Non-Proliferation Act (NNPA), which requires such safeguards.

There has been no comment from either U.S. or Chinese officials on the question of assistance to Pakistan. Congress has also remained in the dark about details of the agreement, the text of which has been unusually closely held by the Executive.

The 20 June statement from the Chinese foreign ministry indicated that China intends to make no more formal commitments on nonproliferation. The U.S. decision to initial the agreement during the President's visit to China was evidently based on verbal assurances on nonproliferation made by Premier Zhao Ziyang in an after-dinner toast during his visit to Washington in January (*Science*, 27 January, p. 376). Translated as "we do not engage in nuclear proliferation, we do not help other countries develop nuclear weapons," the position was later reaffirmed by Zhao in a report to China's National People's Congress. The foreign ministry statement expressed the view that "All the relevant questions have been fully discussed and resolved in the course of negotiations between China and the U.S. . . ."

While keeping Congress in suspense about terms of the agreement, the Administration has faced a time problem in bringing it to Congress. The law governing such agreements requires that Congress have the text for 60 legislative days before it can go into effect. It now appears that the 60-day provision could be met only if Congress were recalled after the election for a lame-duck session.

The delay and the discontent aired by the Chinese add to the uncertainties for U.S. companies hoping to take advantage of the commercial opportunities a China–U.S. nuclear deal would offer. In April, when President Reagan announced that the agreement would be initialed, he indicated that the way was being cleared for American companies to win contracts to build a dozen nuclear power plants worth some $20 billion over the next two decades. While the three main U.S. nuclear vendors—Combustion Engineering, General Electric, and Westinghouse—expressed enthusiasm about the market potential, their appraisal of the possibilities was considerably more modest.

Westinghouse executives estimate that China's purchases from foreign suppliers are unlikely to exceed six units worth $6 billion to $7 billion. In the background is the awareness of China's declared aim of achieving nuclear self sufficiency, including a capability to be an international supplier of nuclear technology. It is assumed that the Chinese, who are notoriously hard bargainers in international commercial dealings, will keep this aim in view when contracting with foreign nuclear vendors.

This is implicitly recognized in an offer by Westinghouse, also reported in the *Post*, to form a joint venture with the Chinese. This would include creation of an "Orient Nuclear Company," to operate with a mixed staff of Chinese and Americans. The *Post* quoted a letter from Westinghouse chairman Douglas D. Danforth to Shanghai mayor Wang Daoha in which he said, "Our intent would be to develop ONC in such a way that it would be a world-class supplier of nuclear quality systems, equipment and total plants."

Westinghouse officials have expressed confidence about competing for Chinese business. The company's pressurized water reactor has been the dominant design in the nuclear export market and the Chinese are said to regard Westinghouse as technologically the strongest organization in the international nuclear trade. Westinghouse, however, faces strong competition from the other U.S. companies and, particularly, from French and German vendors. In addition to technology, financing is expected to be an important factor in negotiations with the Chinese. The U.S. companies worry that French and German competitors with the support of their governments may be able to offer more attractive financial terms.

Although concerned by the current

turbulence surrounding the agreement, U.S. companies seem to be sanguine about prospects. As one industry source put it, "We feel that the problem's going to be solved." Until a nuclear cooperation agreement goes into effect, the NNPA prohibits the export of U.S. nuclear hardware and some kinds of technical information. Industry officials say that they can live with a further delay if they are permitted to provide the kind of information that will enable them to be active in preliminary negotiations. What is involved is known as "software," which denotes the sort of proprietary or unpublished technical information which, though not covered by the NNPA, is not available to the public. To give such information to the Chinese would require what in nuclear export parlance is called an "810 authorization," after the section of federal regulations which the Department of Energy (DOE) has the main responsibility for administering.

Under the software heading, companies might, for example, want to provide the Chinese information on such things as safety features, operating temperatures, or even the general design of a proposed plant. French and German vendors have apparently furnished the Chinese such software in ample quantities and U.S. companies are eager to do likewise. At present, a number of applications to DOE for authorizations to provide software to China are caught in what one observer called a "de facto freeze." He said that middle-level federal officials who handle the authorizations are aware of the current sensitivity of China–U.S. nuclear negotiations and the inevitable bureaucratic reaction in such cases is no action. U.S. companies immediate hope, therefore, is that the Administration will move to thaw the transfer of software technology.

The transfer of nuclear technology is a central concern on Capitol Hill. The potential opposition in Congress to the cooperation agreement comes mainly from a mixed party of liberal Democrats in the House and Senate and conservative Republicans in the Senate. The Democrats seek to hold the Administration rigorously to the letter and spirit of the NNPA in all matters affecting nuclear proliferation. In the case of China, the Republicans are highly skeptical about transfer of nuclear technology that would give an unwarranted military or economic boost to a Communist government.

Until the text is actually sent to Congress it will not be possible to tell whether even resolving the problem of China's Pakistan connection will clear the way for the agreement. Another possible sticking point is on the matter of U.S. consent rights should the Chinese wish to reprocess nuclear fuel. Reprocessing yields plutonium that can be readily converted to military purposes. Disagreement on consent rights is said to have persisted in negotiations.

When Congress will get a look at the text remains uncertain. At press time for *Science*, State Department sources were still saying that no decision had been made on the timing. And Speakes in his 22 June remarks allowed that the chances of the agreement reaching Congress this year "seem somewhat doubtful."—JOHN WALSH

Nuclear Winter Attracts Additional Scrutiny

Prodded by Congress, the Pentagon begins to examine the impact of soot on nuclear strategy

Last October, in a widely publicized press conference, a group of leading scientists presented an unusually harrowing portrait of the aftermath of a superpower conflict. At its heart was the novel theory that even a limited nuclear war will generate enough soot and dust to shield a substantial portion of the earth from sunlight, perhaps for months, potentially causing the extinction of numerous plants and animals, including man.

Although this announcement generated little government reaction at the time, it has since given rise to a host of official studies and a promise of additional research funds. It has also galvanized the Congress to demand what may effectively be the first formal environmental impact statement on the consequences of a nuclear holocaust. Similar provisions in the House and Senate versions of the latest defense bill order the Pentagon to produce a comprehensive public report by March 1985 on the latest scientific findings and their implications for nuclear weapons planning, procurement, deployment, targeting, and command, as well as for arms control and civil defense.

Congress approved the requirement after the Natural Resources Defense Council (NRDC), an environmental group in Washington, discovered that the government had by and large ignored the "nuclear winter" scenario depicted by the atmospheric and biological scientists last year. According to the scenario, an exchange of weapons with a total explosive force of 5000 megatons would set massive forest fires and generate voracious firestorms in virtually every major city, creating enough dust and soot to plunge the Northern Hemisphere into a lengthy period of icy darkness, with potentially cataclysmic biological consequences.* A climatic model suggested that a smaller exchange of 100 megatons, detonated in large cities, would also lead to a nuclear winter.

Despite the obvious relevance of these scenarios to military planning and civil defense, they were until recently unanticipated by the community of military officials and analysts who set U.S. nuclear strategy. "It really is a new thing," says Charles Zraket, chief operating officer for the MITRE Corporation, one of the Pentagon's principal contractors for nuclear command, control, and communications. "The Pentagon had either been totally unaware of this phenomenon, or it simply failed to consider it during planning. We at MITRE certainly never took it into account; I can say that first-hand." This assessment is corroborated by Richard DeLauer, the Pentagon's top scientist. "We should all perhaps be a little concerned that we did not recognize a little sooner the importance of the smoke to our calculation of nuclear effects," he told Carl Sagan, one of the participants in the nuclear winter study, in a recent letter.

Even after the study was published, few agencies exhibited interest in its implications for their work. "We have not done any work or studies relating to

*The theory is explained in detail in an article by R. P. Turco, O. B. Toon, T. P. Ackerman, J. B. Pollack, and Carl Sagan in the 23 December 1983 issue of *Science*, pages 1283–1292.