New Japanese–American Pact Will Slow Trade Flow with Research Funds

An unprecedented international agreement that would bring as much as $1 billion into American research projects over the next 10 years is about to be completed between the United States and Japan.

At a meeting in Washington in mid-November, officials for the two countries hope to draw up a final list of projects and the amounts by which they will be augmented by Japanese support. Earlier negotiations have already selected fusion and advanced coal research as the two areas of highest priority, and the upcoming meeting will consider proposals for joint research in high energy physics, solar energy applications of photosynthesis, geothermal energy, and deep-sea drilling. Though future joint projects may be undertaken in Japan, most or all of the scientific collaboration being discussed would be carried out through Japanese contributions to planned or existing U.S. projects.

Given the magnitude of the intended investment and the urgency with which the two countries are acting, the Japanese-U.S. cooperation in science and technology represents no small bonus for American researchers. As such they are the beneficiaries of worsening trade relations between the two countries—because the Japanese trade surplus with the United States continues to grow—and of the need for Japan to do something quickly to mollify a powerful and unhappy ally.

The joint research effort, which was proposed by the Japanese, is one result of White House special trade representative Robert Strauss' visit to Tokyo last year and the Carter Administration's vigorous 2-year effort to obtain trade relief. In spite of what many consider noble efforts by the Fukuda government, the Japanese trade surplus grew from $8 billion last year to $13.5 billion this year, and so the Japanese turned to government-to-government actions to alleviate the balance of payments problem. Facing political pressure at home to do something (preferably before the parliamentary elections to be held this fall), the government was groping for a way to funnel money into the United States so that it would have a positive political impact and at the same time some economic utility.

One of the first ideas settled upon was to buy uranium from the American stockpile for use in the future in Japan's rapidly growing nuclear sector. Japan, which does not have indigenous uranium resources, proposed to buy $2 billion worth of uranium and uranium enrichment services. But after much negotiation, the Department of Energy rejected the idea of selling off something as valuable as a uranium cache, when it could create an unwanted precedent for sales to other countries and in any case uranium could be obtained on the open market. Japan nevertheless proceeded to open an account with the U.S. Treasury, depositing $1 billion to cover in advance the cost of enrichment services that it expects to use through the mid-1980's. The uranium discussions were started more than a year ago, and completed this fall with an agreement on 26 September.

Not surprisingly for a country that imports over 90 percent of its oil, Japan's initial suggestion for joint research also focused exclusively on energy.

When the Japanese Prime Minister met with President Carter last 3 May to propose what is now widely called the "Fukuda initiative," the first priority on his list was nuclear fusion. This is a research endeavor in which the United States leads and which promises great benefits to both countries over the long term if successful. What President Carter's reaction was to the fusion proposal is not known, but the reaction of the Energy department, where Secretary Schlesinger has consistently been saying that finding replacements for liquid fuels should be the top U.S. priority, was that fusion alone was not enough.

When the two technical delegations met in Tokyo on 4 to 6 September, the position of the United States delegation, led by John Deutch from the Energy Department, was that its first priority was for coal research, particularly for joint projects in coal liquefaction. "We argued that they should participate in research that would address both near-term and long-term energy problems," says Deutch in explaining the discussions. Out of the September meeting came agreement in principle for Japanese participation in a large fusion project called Doublet III being conducted by the General Atomic Company in San Diego, and for Japanese funding of 25 percent of the cost of a coal liquefaction demonstration plant being built by Gulf Oil in Morgantown, West Virginia. The Japanese contribution to upgrading the fusion project is expected to be $50 million, and the share in the coal liquefaction project will come to at least $175 million. These two are the "big ticket" projects, according to Deutch, but many smaller joint projects will be on the table in the upcoming discussions.

Just how fusion came to be the first Japanese priority is something of a puzzle. Some parties with knowledge of the negotiations say that Fukuda had in fact not cleared the fusion priority with the other ministers, and that the idea for a fusion initiative must have come from "outside the government." There is some support for the notion of ministerial in-fighting from sources on both sides of the negotiations, who note that the powerful Japanese Finance Ministry—analogous to the Office of Management and Budget—has not approved any project yet. An important distinction, however, is that fusion research is carried out under the office of the Prime Minister directly (through the Science and Technology Agency), while research in other areas under discussion is carried out by separate ministries of equal rank. Coal liquefaction research is done by the Ministry of International Trade and Industry, and high energy physics research is done by the Ministry of Education.

Statements by Fukuda himself seem to indicate that he sees fusion research as an opportunity to get an early start on something that could be the basis for a new Japanese technical revolution in the future. In a speech to the National Diet on 20 September Fukuda said that international research efforts were necessary to "realize a new era of technical innovation" and that the creation of new fields of development could provide "a fresh goal for the people." He suggested that the Japanese people should set themselves the target of "commercializing nuclear fusion by at least the early years of the 21st century." Since Japanese industry has an impressive record for setting difficult commercialization goals and achieving them, this is a serious statement. On the other hand, it could also be very good politics by the party leader of an energy-hungry country who is facing a tough election.

The idea that Japan may be trying to buy cheaply the basic ingredients for the

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commercial success of future generations "is only one interpretation," says Deutch. He suggests the operative motivations were to ease tensions between the two countries, to undertake a joint endeavor with a close ally, and to use the country's presently favorable position to build up its relatively weak research base. He notes that one reason the United States delegation did not want to emphasize fusion to the exclusion of other things is that it has a great advantage, and "we don't want to give it away for $50 million." Noting the need for balance in reciprocity, Deutch says, "If we go into this, we want a real collaboration."

The Japanese may not have had much choice about accepting coal research if they wanted the Fukuda initiative to go through. "I think it was pretty much forced on them," says one American adviser to the negotiations. But there is nevertheless evidence of some prior interest, in that a private Japanese consortium had earlier agreed to put up one-sixth of the private funding for an Exxon pilot plant program for another coal liquefaction process at Baytown, Texas.

Although the Japanese do not have much more native coal than uranium, they do have potential access to coal in China and Australia. The United States presented a list of coal technologies, according to Bob Hanfling of the Energy Department, and the Japanese picked the Gulf liquefaction project known as SRC-II (for solvent refined coal) as first choice. It can use both Chinese and Australian coals. The total cost of the SRC-II plant, which will consume 6000 tons of coal per day and produce the equivalent of 20,000 barrels of oil, is expected to be at least $700 million. West Germany had agreed before the Fukuda initiative to fund 25 percent of the SRC plant. Part of the West German agreement was a memorandum of understanding that no other country could come into the project for less than a 25 percent commitment. Thus the minimum Japanese share was determined.

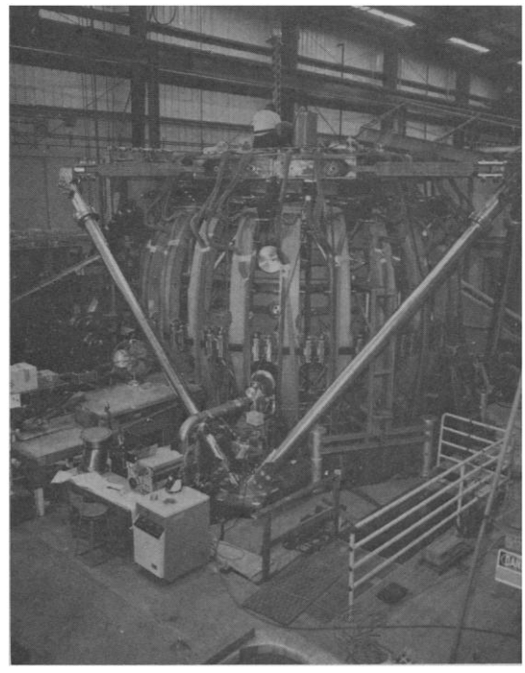
The fusion program that is being proposed only starts with support of the upgraded version of General Atomic's Doublet III, which is a large toroidal magnetic fusion experiment designed to test the effectiveness of certain noncircular magnetic field configurations. The Doublet III cost in excess of $30 million, and the purpose of upgrading it is to reach the so-called Lawson condition of energy breakeven.

The joint work on Doublet III will be the biggest expenditure in the joint fusion program, but some of the other proposals could bring Japanese scientists closer to the mainline of the U.S. work. Among these is the proposals for sharing instrumental techniques and data from the two very large tokamak experiments that are being built—JT 60 in Japan and Princeton's TFTR in the United States—to engage in a joint fusion materials test program which could involve researchers at Oak Ridge and Hanford laboratories with $175 million in Japanese contributions, as well as a proposed joint theoretical institute for the study of plasma physics, with American and Japanese physicists working side-by-side and first-class computer capabilities. Such proposals—if ultimately approved and aggressively implemented—could cover the most demanding experiments, the most difficult engineering problems, and the most challenging theoretical questions in the field.

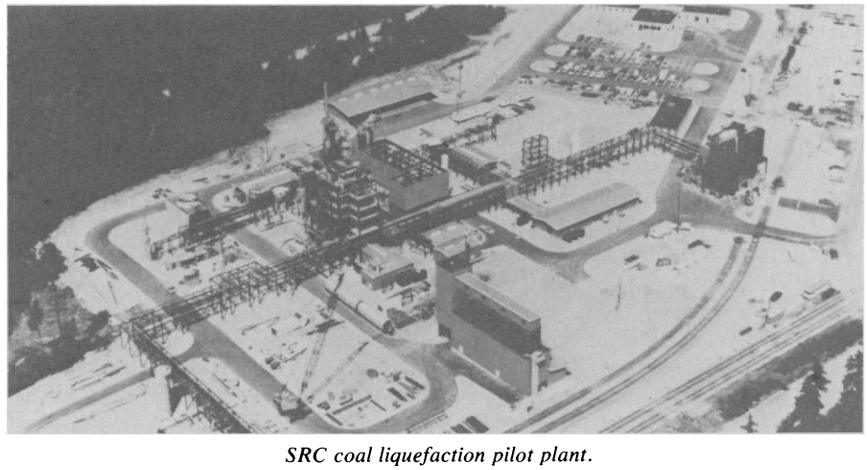
In the area of high energy physics, there is less detail to the proposals but American researchers have received strong signals of interest. Possibilities are Japanese contributions to Fermilab, Stanford, and Brookhaven laboratories, all of which have new accelerator rings in the works and might benefit from extra funding to add to the experiments and experimental facilities needed to go with them. For example, the colliding proton beam rings being planned at Brookhaven, called ISABELLE, will intersect at six locations but the laboratory has only been allotted money to construct experimental laboratories at four locations. In addition, the Japanese themselves have ambitious plans to upgrade their proton accelerator, KEK, raising its energy from 12 to 200 giga-electron volts (Gev). For this reason, they regard exchange of scientists as essential. Preliminary plans for a joint high-energy program suggested the expenditure of $75 million over 5 years.

Due to the amount of tension over the balance of payments issue, both countries are anxious to complete the research agreements as soon as possible, even before the start of the next budget year, and see some money transferred immediately thereafter. For the United States, that means something should be completed by December and for Japan by April. So the pressure is building up, and last-minute bargaining, particularly among the various Japanese ministries which are hoping to enlarge their fiefdoms through the trade-surplus bonus, is becoming intense. According to officials at the Energy Department, a number of the Japanese program representatives are trying to influence the outcome in their favor by sending friends to lobby with the United States side of the bargaining table. These considerations should be wrapped up shortly, and, according to Deutch, "We should have an agreement by the end of the year."

—WILLIAM D. METZ



Doublet III fusion experiment.



SRC coal liquefaction pilot plant.