companies are to make nuclear exports to China.

Negotiations have been proceeding for some time and there were rumors that an agreement might be announced during Zhao's visit. The most substantial development, however, was the comment by Zhao during a formal toast at the state dinner that China "will not engage in nuclear proliferation. We will not help other nations develop nuclear weapons." The NNPA requires that U.S. nuclear technology can be sold only to countries that agree not to export nuclear weapons technology or information. Zhao's remark appeared to remove that issue from contention. Nonproliferation advocates, however, have been pressing the Administration to conclude an agreement only if the Chinese will also insist on the placing of safeguards on any nuclear technology they export.

U.S. sources expect the Administration to push to complete negotiations to make it possible for the agreement to be signed on President Reagan's scheduled trip to Peking in April.

—JOHN WALSH

Europe Eyes U.S. Model on Joint Research Rules

The ten member states of the European Economic Community (EEC), taking a cue from the Reagan Administration's effort to boost technological innovation, are considering a proposal that joint research efforts between high-technology companies in Europe be exempted from the stiff antimonopoly rules contained in the Treaty of Rome, the agreement setting out the code of economic behavior on which the community is based.

In the past, such exemptions have been permitted in individual cases. Last month, for example, the Brussels-based commission of the EEC agreed to allow three West German companies to collaborate in a joint program of research and development on coal gasification. Similar exemptions have also been negotiated for microelectronics research projects carried out under the umbrella of the European Strategic Program for Research and Information Technology (*Science*, 6 Jan., p. 28).

The commission of the EEC, in a draft regulation which is currently being circulated for discussion and is expected to be adopted by the council of ministers within the next few months, is now proposing a blanket exemption for similar research efforts in these and other fields, ranging from textiles to pharmaceuticals.

Some conditions would remain. An exemption would not be allowed, for example, for research projects involving more than one of the three largest European companies in any particular field. Nor would it be permitted when the combined turnover of the companies sponsoring the research exceeded $400 million, an attempt to ensure that the major beneficiaries of the new competition rules are medium-sized companies.

As in the United States, commission officials hope that the main effect of the proposed regulation will be to provide psychological reassurance to research managers that joint research projects will not be subject to a legal challenge from Brussels. At the same time, however, the commission is going further than the Reagan Administration in proposing that the exemption be extended to cover the joint production of new technological products arising from the research.

—DAVID DICKSON

Battelle Predicts Rise in R & D Spending in 1984

Thanks chiefly to a surge in spending by private industry, expenditures on research and development in the United States will climb to $94.2 billion in 1984, according to a forecast by the Battelle Memorial Institute. That would be an 8.9 percent increase over 1983 levels, or a 3.7 percent rise after inflation is taken into account.

According to the usually reliable Battelle figures, industry will spend $48.8 billion, a 10.3 percent increase, and the federal government will spend $42.7 billion, a 7.8 percent rise. The increased federal outlays largely reflect the continuing defense buildup. The Department of Defense is expected to account for 64.5 percent of government R & D expenditures in 1984, up from 58.9 percent in 1983.

—COLIN NORMAN

Guidelines for Artificial Heart Implants Revised

The University of Utah's review committee for research on human subjects has approved a revised and expanded protocol for implanting artificial hearts into patients. Pending review by the Food and Drug Administration, the approval opens the way for introducing an improved version of the artificial heart into patients who are healthier than was the first recipient of an artificial heart, Barney Clark. Clark died in March 1983 112 days after being implanted with such a device.

The revised procedure will allow University of Utah surgeons, directed by William C. DeVries, to select patients who are in less advanced stages of heart failure. Previously, the protocol called for waiting until the eighth week after a patient reaches what the American Heart Association designates as the fourth category of cardiomyopathy. One major difficulty in Clark's case was that his heart disease had caused considerable deterioration in other organ systems. Those complications were his immediate cause of death.

The revised protocol also has expanded the patient's informed consent form so that it now includes information gained from Clark's experiences. The new protocol removes any upper age limit for patients who undergo the experimental procedure, and it specifies that various nutritional and exercise regimes may be studied following the operation. In future implants, the synthetic heart valves will be made of solid titanium without the welds that caused problems in the model Clark received. Also, use of a portable support system during the postoperative period has been approved, potentially allowing future recipients to feel somewhat less encumbered during the recovery period than was Clark.

Two members of the review committee voted against the revised protocol, arguing that the next artificial heart recipients ought to be patients whose hearts have stopped suddenly and thus are not suffering from the multiple and potentially confounding complications seen in patients in the advanced stages of heart failure.

—JEFFREY L. FOX