Soviets Offer Breakeven Fusion Experiment To Los Alamos Lab

The United States and the Soviet Union are on the verge of concluding a historic agreement that could mean construction of a joint breakeven fusion energy experiment that will be successfully tested within the next few months.

According to leading U.S. fusion researchers, during this summer's Joint U.S.-USSR Fusion Power Coordinating Committee Conference, held in Princeton, N.J., Dr. E. Velikhov, director of the Soviet fusion energy research program, suggested that the "magnetic liner" experiment, based on new Soviet breakthroughs, be carried out at the U.S. Los Alamos Scientific Laboratory. A team of scientists from Los Alamos is already scheduled to leave soon for the USSR to work out the details of the proposal which, if implemented, would take years off even the most optimistic existing timetables for online fusion generated power.

Soviet Crash Program

This program underscores the mutual resolve of U.S. and Soviet fusion officials not to let the U.S. program go down the tubes under the budgetary hatchet of energy czar Schlesinger. Even more important, it underscores that no matter what the U.S. decides, the Soviets are on the verge of launching a multifarious crash program to produce fusion energy in the 1980s. This intention is amply documented in internal Soviet reports (excerpted below).

The internal Soviet reports made available at the Princeton meeting detail the startling success of the USSR fusion research program, and their plans for future work. The reports give, for the first time, an economic analysis by the USSR demonstrating the necessity of nuclear fusion power together with the rapid development of the fission fast breeder reactors and hybrid fusion-fission reactors as transitional to near-term development of pure fusion. This combination of development projects is needed, if, according to the Soviets, the "energy needs of mankind, both at the present time and in the foreseeable future are to be met."

The proposed Los Alamos breakeven experiment consists of a small, hollow metal cylinder a few centimeters in diameter, in which a plasma of fusion fuel is injected. The metal cylinder is then rapidly crushed or collapsed with a gigantic pulse of electric current and in the process the plasma is compressed to produce the high densities and temperatures needed to ignite the fusion reaction. The system would produce bursts of fusion energy in a fashion similar to that envisioned in laser and electron beam pellet fusion.

The Soviets have recently calculated that a "collapse" speed of 5 million centimeters per second is needed for a breakeven experiment and a total electrical energy of between 8 to 10 million joules. The ideal fast pulsed, stored electrical power supply system for such an experiment is located at Los Alamos Laboratory in New Mexico. It was previously used on the Scyllac theta pinch experiment which was shut down last year, and is not now in use.

Soviet fusion director Velikhov, recognizing the political importance of such a breakeven fusion experiment in the light of the Carter Administration's cutbacks in fusion research, shortcircuited the normal channels for initiating such proposals and went directly to the head of the U.S. magnetic fusion research effort Dr. Edwin Kintner, and the head of Los Alamos Laboratory.

It is clear that given the experimental successes, future plans, and economic analysis outlined in the reports that the USSR is contemplating not just a crash experimental program for the development of fusion, but a crash effort to bring practical fusion power on line. In particular the hybrid fusion-fission system for the breeding of fuel for fission fast breeders and conventional nuclear fission reactors can certainly be developed within the next decade, practically and economically. The scientific basis for the electron beam pellet and the magnetic liner systems has already been demonstrated and experimental demonstrations for reactor grade systems is between two months to three years away.

The Soviets are clearly making plans to begin the construction of the infrastructure needed for bringing this energy technology on line within the next decade — a technology which on the basis of existing knowhow can have 20 percent rates of *economic* growth.

— Charles B. Stevens