Top U.S. Scientists Asked Carter For 'Apollo' Fusion Program In February

The following letter from two leading fusion researchers to President Carter, dated Feb. 16, shows that the President was well informed about the potential benefits of fusion energy development prior to the fusion program budget cuts he instituted.

John M. Dawson and Burton D. Fried are both professors of physics at the Center for Plasma Physics and Fusion Engineering at the University of California, Los Angeles. Besides calling for a crash fusion program in their letter, they note many of the most significant developments in fusion up to this point.

Dear President Carter:

We wish to applaud your firmly stated intention to establish a national energy policy, a step which is disastrously overdue, and also your plans to emphasize not only conservation and near term energy options but also research on solar energy and other renewable energy sources. These latter programs, being essentially long term in character, tend to get very short shrift compared with efforts to find short term solutions to our incredibly urgent present problems — but in twenty years the near term problems will be even worse than at present if we have failed to press for the long range solutions in the interim. This letter is motivated by our profound concerns regarding the long term aspects of the U.S. energy program.

With your background in nuclear energy, you undoubtedly know that, aside from solar power, controlled fusion is generally considered to be the most promising solution to the energy problem in the long term due to its essential advantages: the virtually unlimited supply of fuel, the freedom from problems of diversion of nuclear material, the greatly reduced generation of radioactive waste products (or even their elimination, through the use of advanced fuel reactions which produce no neutrons). The major disadvantage of fusion simply arises from the severe technical difficulties which must still be overcome in the basic physics, the sophisticated engineering and the high technology required for an economic reactor — but history shows this is just the kind of challenge to which our society can respond so magnificently, given proper leadership. The past 20 years have seen a steady progress in fusion, with the critical parameters — plasma density, plasma temperature and energy confinement time — all increasing, notwithstanding budget levels which have been unrealist-

Recent Significant Advances In Fusion

1. The achievement, in tokamaks, of kilovolt plasma temperatures and confinement times approaching those required in a thermonuclear reactor and, in particular, the achievement of conditions close to those required to get useful energy out of a driven reactor (wet wood burner).

2. New inventions by the University of Wisconsin fusion reactor group for achieving long life of the first wall of a reactor.

3. Recent ideas developed at MIT for very high density tokamak reactors.

4. Experiments at the Lawrence Livermore Laboratory, which demonstrate the generation of a thermonuclear plasma using neutral beam injection into mirror machines.

5. Studies at Los Alamos which indicate that material end plugging of straight systems may be more effective than anticipated.

6. Recent results, obtained by groups at the University of Wisconsin, UCLA and at TRW, showing that reactors of the multipole type may be feasible, and that it may be possible to burn advanced fuels in such reactors, i.e., fuels which produce very few neutrons and, hence, much less radioactivity than even DT reactors.

7. The development, by the Lawrence Livermore Laboratory, of direct energy converters which may be employed on some thermonuclear devices, and the invention, by a group at the University of Washington, of high efficiency heat engines that could be used with thermonuclear reactors.

8. New studies by Westinghouse and Math Sciences Northwest, which indicate that a Fusion-Fission system, using fusion systems presently on the drawing boards, could make very efficient breeders of fission fuel, probably in ways that avoid many of the dangers associated with conventional breeders, and which are more compatible with present electric utility company programs than the conventional breeder program.