



FUSION POWER ASSOCIATES

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WHERE DO WE GO FROM HERE?

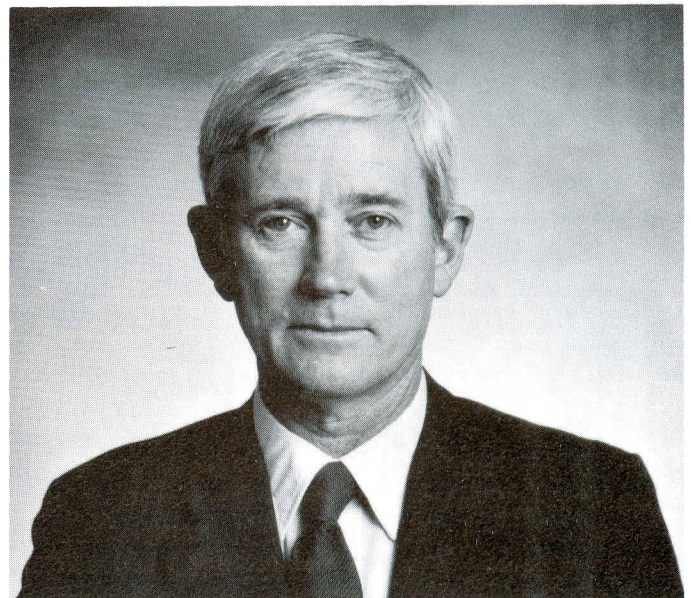
— an exclusive interview with
**Dr. Alvin W. Trivelpiece, Director
 Office of Energy Research, U.S. DOE.**

Congress recently passed an FY 1985 budget for magnetic fusion that was \$43 million less than the President requested. Fusion Power Associates' president Steve Dean discussed the DOE's reactions to the cuts and their vision of the future with DOE Director of Energy Research Alvin W. Trivelpiece.

Dean: Were you surprised when Congress cut the magnetic fusion budget and what do you think was the cause?

Trivelpiece: I was both surprised and disappointed. For some time the fusion program has been funded at less than cost of living increases. The last few years this has been due in part to the overall budget stringencies for federal energy programs. The Congress has generally added funds to the Administration's request for fusion research; however, I was pleased that for FY 1985 the Administration asked for a solid program budget of \$483M. The House authorization committee even favored increasing the President's budget by \$22M. However, the House appropriations committee didn't see it that way. They recommended a \$64M cut. The Senate proposed only a \$10M cut, but in conference they compromised with a \$43M cut which Congress then passed leading to a \$440M FY 1985 budget.

There are many versions of why this happened. It is not productive to speculate which version may be right. However, it is my opinion that several members of Congress felt that the fusion program had not adjusted to the realities of the present



Alvin W. Trivelpiece

energy supply situation and the budget deficits. I was told they "wanted to get our attention." They certainly got it!

Dean: How are you going to accommodate the budget cut?

Trivelpiece: After a careful review of where the program is and how it got there, I decided that the best course of action was to take the cut in three places, but primarily from two large projects: TFTR and MFTF-B.

First, we will delay the D-T burning experiment previously scheduled in TFTR for 1986. This will save program funds in two ways. One, it eliminates certain tritium and

remote handling costs that would have to be incurred before doing the experiments, and two, it eliminates the need to have provided additional funds in FY 1985 that would have been needed to maintain the 1986 D-T goal. The actual cut in the TFTR funding will be \$9M. This delay in D-T burning of a few years will permit critical hydrogen experiments to be done with much greater efficiency and less inconvenience than would be the case after tritium is used since we would then require remote handling. I want to stress that this is merely a delay. Conducting an energy breakeven experiment utilizing DT in the TFTR is still a critical near-term milestone for the U.S. fusion program.

Second, I decided to reduce the MFTF-B operating budget by \$15M. This will delay some of the FY 88 goals to 1989 or 1990. Here again, scientific objectives remain intact; however, we are extending the time frame for their accomplishment.

We have expended a great deal of time, effort and fiscal resources to define and fabricate the hardware necessary to develop the physics of linear and toroidal (tokamak) systems. It would be folly not to exploit the physics capabilities of these devices. As with any program of experimental research, future directions for these systems will depend upon the nature and significance of the scientific results achieved.

Third, I decided to reduce by \$13M those development and technology activities that were not directed to support of the nearer-term aspects of the program. I recognize that we must do systems studies to give us perspective. I don't like taking cuts in the technology programs because it is simplistic to think all the good science in fusion is being done only by plasma physicists. Much of our technology development is outstanding "science" in the broad meaning of the term.

These were difficult choices to make and were not taken lightly. Given the present circumstance, I believe these actions are the best way to preserve the essential course of the program in a reduced budget situation.

Dean: Are we likely to get cut further in FY 86?

Trivelpiece: I hope not. The Department is putting together its FY 86 submission to OMB now and many things can happen between now and when the President submits his budget to Congress. I believe the program can justify the money it is getting in terms of the outstanding scientific progress and the results it has achieved. Fusion is excellent science, forefront technology and is making steady progress.

Dean: I've heard a concern expressed in the community that the fusion program may lose its focus and become a "science-only" program. What's your view on that?

Trivelpiece: The fusion program is a mission-oriented energy program and must remain so. Its aim is to ultimately provide the world with an environmentally attractive energy source. This is its long term goal, and we must remain focused on that goal. However, the need to achieve that goal is some time in the future and in the near-term we have a program that is at the forefront of many areas of advanced science and technology. We intend to emphasize the value of the research. The fact that the fusion program is an excellent research effort has gotten somewhat lost in all the energy rhetoric.

In terms of funding, the key term is "balance." I realize that much of what we do in the technology area is either absolutely essential to the scientific experiments or in many cases is contributing to our progress as a high technology society.

Dean: What about university programs. Are they more important than laboratory or industry programs?

Trivelpiece: Again I want to emphasize our intent to maintain "balance." The fusion program has been one of the outstanding examples of a federal program that consistently provided universities and students opportunities and funding to do forefront research. Since 1965, over 1100 students have received Ph.D.'s as a result of fusion support at the universities. Fusion also supports graduate fellowships in our engineering schools. About half of these 1100

students work in high tech industries that contribute to our national competitiveness and security.

Dean: What about industry? Is there a role for industry in the near-term?

Trivelpiece: Industry has played and will continue to play many, varied roles, from component supplier, to R&D, to manufacturer. It's probably true that without a near-term large construction project the dollar value and visibility of industrial opportunities will be reduced. However, this doesn't mean that industry shouldn't be involved in the program. Quite the contrary, the involvement of industry is essential to the fusion program. I hope the fusion program will retain strong industrial participation, but the budgetary pressures and near-term priorities will slow this up, along with the slowing up that will occur in other parts of the program.

Dean: Do any of your recent actions imply that you are discouraged by the prospects of the tokamak concept and feel that we need to find a better alternative?

Trivelpiece: We must continually look for better ideas and I intend to expand our support of other concepts to develop the most promising approach to fusion. At the same time, there is plenty of evidence that the tokamak provides just as good a starting point for improvement and innovation as other concepts. The tokamak provides a standard and a challenge for those who advocate other concepts.

Dean: You just came back from an economic summit follow-on meeting on fusion cooperation in Brussels. What happened at that meeting and does this mean that an international fusion project is possible?

Trivelpiece: Since the Versaille summit, the economic summit process has focused some attention on science and technology. The Versaille summit defined eighteen areas of science and technology for which international cooperation, or collaboration, would be appropriate. Fusion is one. We have the co-lead in this area along with the Commission of the European Communities. We met at Washington D. C. last November following the Williamsburg summit and in anticipation of the London summit. Based on

guidance from the June London summit, we met in Brussels in July.

What we did at Brussels was to establish three subcommittees. One is to be concerned with collaboration on major future facilities. The other two will deal with administrative and technical problems that could impede cooperation. These subcommittees are to report back to the parent committee by January as part of the preparation for the 1985 economic summit in Bonn.

This summit process has created a new channel of communication and involvement at higher political levels than has existed in the past. At higher political levels there is a general concern that there not be duplication of facilities that cost in excess of \$1 billion.

I believe that we need a plan that outlines steps required to make fusion work without regard to when or where the work is done. The agreement needs to be developed to do the work world-wide in such a way that duplication of effort is avoided. All of this is difficult and time-consuming. The first few steps using the summit process have been taken. This could lead to a program of international collaboration where greater progress can be made without enlarged in-country levels of support. This may take the form of several bi-lateral or multi-lateral programs similar to the one the Japanese have with us on the Doublet program at GA Technologies.

Dean: What about the future?

Trivelpiece: I am confident that fusion is scientifically and technically possible. I believe that it will be an important future energy option. In the near term we need to continue to pursue research to uncover the best ideas. In the long term it has to compete economically with other energy options. The energy crisis of '75 sent us off on a path that would have had fusion reactors operating by the year 2000. But to do that requires a commitment of resources that are not likely to be forthcoming in the present energy and budgetary climate. A revised plan for the program that takes this reality into account and involves international collaboration needs to be developed. Such a planning effort is underway.