

GENERAL DYNAMICS

Space Systems Division

PO Box 85990, San Diego, California 92138 • 619 573 8000

17 February 1992

Professor Robert Conn
University of California at Los Angeles
44-139 Engineering IV
405 Hilgard Ave.
Los Angeles, CA 90024-1597

Dear Professor Conn:

Steve Dean has provided me with a copy of the latest draft of your FEAC letter report to Will Happer. It appears to cover all of the issues that the Subpanel discussed, but it fails to reflect the emphasis that the Subpanel put in its report. In truth, your letter report seems rather bland when discussing some of the issues that are of high importance to the fusion program.

I have learned from Steve that you plan to submit a report that reflects unanimity by the FEAC. This will naturally exclude, almost by definition, what is the indispensable emphasis so that Dr. Happer can get a feel for the relative importance of the different issues discussed by our Subpanel. I also have learned that it is not possible to add any text at this late point in time. However, I would like to share my thoughts with you in the event that either you or I have the opportunity to discuss the issues with DOE management.

I feel that the "parallel path" scenario should have been discussed in the report and that it be clearly connected with an overall reduction in fusion program schedule, cost and risk. This was the topic of extensive and detailed debate (sometimes contentious) in the subpanel deliberations. Our conclusions, with only two dissenters that I know of, clearly indicated that the parallel path represented the least cost, risk and schedule leading to commercial fusion power. The letter and package that you sent to me a few weeks ago reveals that you, too, are sympathetic to this point of view.

A discussion of the parallel path scenario would naturally reflect the perspective of the private sector on these essential issues. I feel that the current version of the letter report is substantially impoverished by the omission of such a discussion. I have attached excerpts (and the entire article) from the most recent publication of "The Economist" that captures the essence of the point of view of the private sector.

I am beginning to lose hope that the fusion community is really interested in developing a commercial fusion power reactor in a reasonable time frame. It is becoming increasingly clear to me that the plasma physicists have no intention of involving the engineers in charting the path of the fusion program. This implies that "reactor relevance" will remain an issue and that the "mundane" fusion nuclear engineering problems will be pushed past the retirement and even lifetimes of the individuals now in the program.

It seems that the current seat of fusion policy power, plasma physics, fails to acknowledge that there are two "tall poles in the tent" - reactor grade physics and fusion reactor technology, particularly blankets and other "in-vessel" components such as PFCs. Success in obtaining reactor-grade plasmas and their control does not lessen the difficulty in developing the needed reactor-grade blankets and related components exposed to the fusion radiation source.

The ITER is based on the successful extrapolation of current plasma physics to reactor-grade plasma conditions - confidence in such an extrapolation is demonstrated by the ITER "process"

alone. But nowhere is there plasma physics support of addressing the other tall pole. The parallel path, possessing a small and affordable technology tokamak, provides this necessary element in the pursuit of commercial fusion power. It seems to me that if we have such confidence in building a high-gain ITER device, then we can be absolutely certain that we can build a much smaller driven tokamak for the essential and parallel development and testing of fusion nuclear technologies.

The foregoing should not suggest that industry and the utilities feel that the ITER will resolve all of the key physics problems leading to a DEMO. There remain nagging issues which may be better addressed in smaller D-D machines (and even in the parallel-path technology tokamak).

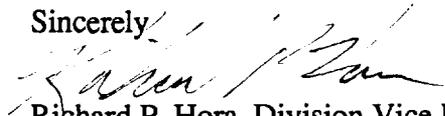
Absent a serious fusion nuclear technology component, it may be evident to the Congress that the fusion endeavor is not an energy program, notwithstanding the stated position of the DOE. The utilities and industry may not continue to support the fusion program under this circumstance. I hope that you are aware of the views of the EPRI and its constituency in this regard.

As you may know, I have presented my concerns to the members of Subpanel 1 - and I feel that this group, at least, has an appreciation of these issues. It is unfortunate that the full FEAC was not a party to these deliberations. Had they been, the FEAC conclusions and recommendations might have been much more reflective of the need for energy relevance and the perspective of industry. For your information, I have enclosed selected charts from these deliberations as well as others that have been shared with the community.

I would very much like to discuss these matters with you at your earliest convenience.

Thank you for your consideration of this matter.

Sincerely,



Richard P. Hora, Division Vice President
and Business Area Director

c.c.: Dave Baldwin, LLNL
Floyd Culler, EPRI
Steve Dean, FPA
Jim Decker, DOE/ER
Dale DeFreece, MDAC
Wil Gauster, SNL
Rulon Linford, LLNL
Dave Overskei, GA
Ron Parker, MIT
Howard Shaffer, WEC
Peter Staudhammer, TRW
Harold Weitzner, NYU