National Research Council Burning Plasma Assessment Committee
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Remarks

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Thank you for inviting me to speak regarding the Administration's view of issues associated with the peaceful exploitation of nuclear fusion. Let me say at the outset that this Administration is supportive of the concept of electrical power generation from nuclear fusion. Determining a national strategy for this concept raises two kinds of issues: technical and economic. The closer we are to a transition from a fusion science program to a fusion device engineering program, the easier it will be to create favorable economic conditions to accelerate the practical implementation of fusion power.

Given the increasing demands for electricity, we will in all likelihood have to expand our electric generation capabilities through traditional approaches: coal, oil, and natural gas. Fission will most likely play an increasing role, as well. This Administration believes that alternative solutions must also be investigated. And, any solution that holds the promise of energy independence is very attractive. So in this sense, **the promise of fusion energy is too great to ignore** – but we also understand that this has been a true statement for the past 50 years.

Our long-term energy needs and environmental issues in the US are not unlike those of our international partners. Countries within the EU like France, Germany, and the UK, as well as countries like Japan and Korea all seek long-term solutions to their energy demands. These countries are all interested in fusion-based power generation.

In addition to the "kind words" for fusion in the National Energy Policy, there have been several very public, high-level pronouncements of support for fusion by this administration. At the recent G8 energy minister's conference in Detroit last May, Secretary Abraham stated:

> "the President is anxious to accelerate fusion power as a realistic source of energy. We are now engaged in serious consultation here in the United States and around the world on how best to pursue a fusion program. President Bush is particularly interested in the potential of the international effort know as ITER and has asked us to seriously consider American participation."

In May of this year, the Joint Statement by President George W. Bush and President Vladimir V. Putin on U.S.-Russian People-To-People Contacts noted:

> "We will promote further expansion of contacts in such areas of cooperation as information technology, the natural and social sciences, and areas of fundamental research, such as fusion energy and high-energy physics."

I believe the fusion community has made a compelling case that **a burning plasma experiment is the essential next scientific step** for fusion research. I am convinced there is no foreseeable path to practical fusion without a burning plasma experiment.

I also believe fusion remains a two-part problem. The first part, as I've already said, is the creation and control of a burning plasma. The second, equally important, part is the search for a commercially optimal containment technology. Other issues, like the development of materials that can withstand 14 MeV neutrons or the design of blanket technologies are only important once the first problem – the creation of a burning plasma – has been solved.

Based on these beliefs, this Administration has several decisions to make:

- Do we enter the ITER negotiation?
- What terms are acceptable for US participation?
- What changes should be made in the Fusion Energy Science Program if we to decide to move in the direction of a burning plasma experiment?

To the first question, I believe the US fusion community needs access to a burning plasma experiment, and the timeframe for the decision to enter into ITER is being driven by ongoing negotiations. The ITER parties are on schedule to reach a consensus on a preferred site, cost sharing arrangements and a Director General in or around April 2003. Should the Administration decide to enter ITER, it would be desirable to have the US enter sooner rather than later.

As to the second question, the Administration is currently discussing its options and developing a position. OSTP and the National Economic Council have been coordinating the development of the Administration position. The Department of Energy is sending a team headed by Dan Lehman to assess the costs of ITER. The Lehman assessment, FESAC reports, and the work of this committee will help inform the Administration's decision.

I understand that this panel will issue an interim report by early to mid December. That report should help to inform the process at a timely juncture. How can you help inform our process?

This is really a two-part task:

> In the near term – by early December if possible, you can evaluate whether the fusion community has made a compelling case for a burning plasma experiment. And if they have, you might usefully comment about the priority of the options currently on the table – ITER, FIRE, IGNITOR. This would satisfy the first component of your statement of task. That is, an assessment

of the importance of a burning plasma experiment to fusion and the development of fusion as an energy source, to plasma physics, and to science in general.

For the final report, you could delve into the second and third components of your statement of task in greater detail. Namely, an assessment of the readiness to undertake a burning plasma experiment and an independent critique of the US plans for a burning plasma experiment and development of fusion energy as described by FESAC.

Finally, we need to understand how a burning plasma program will potentially shift the focus and direction of the Fusion Energy Sciences Program and what aspects of the program will need to change. Regardless of whether the US participates in an international fusion experiment, the US will need to explore alternative confinement configurations so that we will be able to capitalize on the results of any burning plasma experiment.

From my own reviews of recent research on magnetically confined plasmas, I believe this field has benefited, as many other fields have, from the revolutionary improvements in computing power and instrumentation. The ability to predict plasma parameters in realistic simulations, and then test them in detail in actual devices, has changed the character of the entire field substantially. It is fair to say that fusion research today is proceeding with unprecedented theoretical and experimental confidence. The very fact that so many studies have been commissioned in such a short period of time is an indication of the rate of progress in this field.