Dr. Raymond Orbach
Director, Office of Science
U.S. Department of Energy
1000 Independence Avenue, S.W.
Washington, D.C. 20585

Dear Dr. Orbach:

At its meeting in Gaithersburg on July 31-August 1, 2003, the Fusion Energy Sciences Advisory Committee (FESAC) examined the proposed long-term measures and annual performance targets prepared by the Office of Fusion Energy Sciences. We discussed these measures and targets at considerable length, hearing advice from, among others, you, Anne Davies, Michael Holland and Joel Parriott. We then proceeded to revise the list, based on our own sense of program goals and capabilities.

The revised list is attached. It defines ten-year measures that we consider to be sensible, reflective of the FESAC's best scientific judgment, and appropriately ambitious.

FESAC's approval of the revised ten-year measures is unqualified. Regarding the revised short-term targets, FESAC considers operation time to be a useful, but rather limited, measure. While approving the present short-term targets we recommend that future versions of the list be augmented to include a target measuring scientific advance.

Yours truly,

Richard Hazeltine
Chair, Fusion Energy Sciences Advisory Committee

Attachment

cc: N. A. Davies
FESAC

OFES Targets and Measures

Ten Year Measures

Predictive Capability for Burning Plasmas

Develop a predictive capability for key aspects of burning plasmas using advances in theory and simulation benchmarked against a comprehensive experimental database of stability, transport, wave-particle interaction, and edge effects.

- **Minimally Effective Outcome**: Validate predictive models against the database for selected aspects relevant to burning plasma physics (e.g., energetic particles, instabilities, control of impurities, etc.)

- **Successful Outcome**: Major aspects relevant to burning plasma behavior observed in experiments before ITER are predicted with high accuracy and are understood.

Configuration Optimization

Demonstrate enhanced fundamental understanding of magnetic confinement and improved basis for future burning plasma experiments through research on magnetic confinement configuration optimization.

- **Minimally Effective Outcome**: Provide understanding of the basic magnetic confinement issues for a number of the magnetic confinement configurations currently under investigation.

- **Successful Outcome**: Resolve key scientific issues and determine the confinement characteristics of a range of attractive confinement configurations.

Inertial Fusion Energy and High Energy Density Physics

Develop the fundamental understanding and predictability of high energy density plasmas for Inertial Fusion Energy (IFE)

- **Minimally Effective Outcome**: Develop and apply physical theories and mathematical techniques to model the physical processes in high-energy density plasmas and intense beams for inertial fusion energy.

- **Successful Outcome**: With the help of experimentally validated theoretical and computer models, determine the physics limits that constrain the use of IFE drivers in future key integrated experiments needed to resolve the scientific issues for inertial fusion energy and high energy density physics.

F05 Targets

Facility Operations

Achieved operation time of the major national fusion facilities as a percentage of the total planned annual operating time.

Minimally effective outcome: More than 50% of planned operation
Successful Outcome: More than 90% of planned operation

FY05 Construction

Cost-weighted mean percent variance from established cost and schedule baselines for major construction, upgrade, or equipment procurement projects.