Engineering Review Group Main Findings

October 14, 2006

The IAC has been impressed by the speed of progress since the last IAC meeting in October 2003. The IAC noted that successful commissioning of the machine and auxiliary systems has been carried out in a remarkably short time and without significant unforeseen events which is indicative of basically sound designs, good quality assurance applied to production processes and high quality assembly procedures. The IAC considers the start of EAST operation to represent a considerable engineering achievement and wish to commend the EAST Team for their efficient and high quality work.

From the presentations made during the meeting, the IAC considered that EAST construction was very good and suitable for its mission.

EAST is the first Tokamak using superconducting magnet technology similar to that required in ITER. The EAST coils contribute, therefore, to the manufacturing know-how and will provide operational experience for this type of coils in a Tokamak environment. Of particular interest will be the operational experience with quench detection systems, the plasma control capability of the superconducting PF coils and the use of HT_c current leads.

EAST's plan for in-vessel plasma facing surfaces makes it a flexible facility to test various materials for ITER in regard to erosion and re-deposition in long pulse operation. EAST can also develop conditioning methods for plasma facing materials that work with the toroidal magnetic field on, as will be the case in ITER.

The IAC finds that the EAST commissioning for initial plasma operation was very thorough and is fully satisfactory.

The commissioning of the EAST superconducting magnet system already establishes the technical foundation for long pulse Tokamak operation. However further development of the

facility will be necessary, and is planned by the EAST team, to fulfill the project's goals of long-pulse (1,000 s) Tokamak operation, eventually in high-beta, advanced tokamak regimes. Long-pulse heating and current drive, plasma boundary control and plasma control will be important to realize the long-term goals. The installation of additional heating will require an upgrade of the cryoplant to provide the needed increased capacity. The development of the scientific program will benefit from strong collaboration among experiment, theory, simulation, and engineering.

The IAC congratulates the ASIPP team on the first application in fusion of High Critical Temperature superconducting current leads and encourages further development. Machine instrumentation should be further developed to build up a database of mechanical behaviour that will be useful for future upgrades to higher magnetic field.

Finally, the IAC would also like to emphasize that a successful physics program will require a high level of machine reliability and availability. This will require a sustained commitment to maintaining a high quality engineering effort.