NINTH ITER TECHNICAL MEETING ON SAFETY AND ENVIRONMENT

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The work for ITER has always included extended safety and environmental (S&E) assessments to ensure the attractiveness of ITER in particular and of fusion in general. The associated safety guidelines for the project have been based on internationally recognized principles and criteria, most notably ICRP and IAEA recommendations. Starting from this basis, ITER is now being assessed with regard to S&E impact and this comprehensive assessment is being documented in the Generic Site Safety Report (GSSR).

The Ninth Technical Meeting on Safety and Environment, the last in the course of the ITER Engineering Design Activities (EDA), was held at the ITER Garching Joint Work Site, 8 to 10 May, 2001. At this meeting, safety experts from the Home Teams worked together with the members of the Safety, Environment and Health Group (SEHG) of the ITER Joint Central Team (JCT) in the following areas:

- finalization of the GSSR which is considered to be the most important objective of the present work;
- summary of the safety related R&D work done by the Home Teams for ITER during the EDA;
- review of verification and validation (V&V) work done on computer codes being applied for S&E analyses;
- outline of the work considered necessary for improving the S&E data base, quantifying uncertainties of the code results and preparing the adaptation of ITER to a specific site.

Issues presented and discussed

The participants heard a concise presentation of the ITER project status in terms of important meetings held in the recent past, the IAEA letter of invitation to the governments of the ITER partner countries, and the terms of reference for the future Co-ordinated Technical Activities (CTA).

The GSSR editors presented all the volumes whose titles are as follows:

Volume I	Safety Approach	Volume VI	Occupational Safety
Volume II	Safety Design	Volume VII	Analysis of Reference Events
Volume III	Radiological and Energy Source Terms	Volume VIII	Ultimate Safety Margins
Volume IV	Normal Operation	Volume IX	External Hazards Assessment
Volume V	Radioactive Materials, Decommissioning and Waste	Volume X	Sequence Analysis
		Volume XI	Safety Models and Codes

The presentations were focused on the comments received from the Home Team safety experts and on the response to them. Comments and responses referred also to the representation of ITER safety in general and of the GSSR in particular in high level project documents such as the Plant Design Description (PDD), Plant Design Specification (PDS) and Plant Safety Requirements (PSR).

The Home Teams presented the overall summaries, status and results associated with the R&D tasks in the course of the ITER EDA. This work had been orientated by previous planning towards the provision of basic safety data and analyses, and towards benchmarking, verification and validation of computer codes for the safety analyses.

The main areas of work were:

- hydrogen isotope behaviour (accumulation, desorption, permeation) in plasma-facing armour materials (beryllium, carbon-fibre composite and tungsten);
- plasma-facing component erosion product (dust) formation, characterization, mobilization, transport, removal and monitoring under conditions simulating ITER modes of operation;
- chemical interaction of plasma-facing component materials (especially beryllium) with steam and air;
- activation product volatility;
- corrosion product generation and transport;
- decay heat measurement of plasma-facing component materials;
- transient thermal hydraulic phenomena.

This part of the meeting also included a presentation by JCT safety staff of important safety-related R&D results contributed in the past by the US Home Team, in particular in the areas of beryllium-steam chemical reactions, mobilization by steam of hot tungsten and of alloying elements from hot steel, metallic tokamak dust, disruption-induced particles, tritium saturation effect, and safety analyses.

Both Home Team and JCT presenters discussed basic issues with regard to data needs, uncertainty assessments and, in particular, regulatory requirements expected to be imposed on code quality assurance, code validation, and the scope and depth of the safety analyses.

Summary and conclusions

The GSSR together with the elaboration of further design detail will support siting and help in preparing regulatory applications. The computer codes used for the safety analyses are quite well understood and documented. The necessary future work on their benchmarking, validation and verification has been identified in substantial detail, and areas for continued international co-operation to further improve ITER's safety assessments were discussed.

Overall, the meeting provided an important forum for the finalization of the GSSR which, if prepared as discussed, is expected to assist the Home Teams and experts from potential host countries in preparing regulatory submissions. It is understood that the way to ensure ITER safety which is described in the GSSR is not the only acceptable approach but could be flexibly interpreted in the context of siting if kept in line with the safety design principles. The results from the assessments documented in the GSSR can therefore be regarded as providing sufficient technical information for supporting a construction decision and regulatory approval activities in a host country.

Participants in the meeting in front of the ITER building at the Garching JWS

List of Participants

EU Home Team: J. Collen, W. Gulden, R. Meyder, M.-T. Porfiri, P. Sardain, M. Stewart (ITER Canada), N. Taylor (GSSR editor)
JA Home Team: K. Hada, Y. Neyatani, S. O'hira, K. Takase
RF Home Team: D. Davydov, B. Kolbasov, M. Krivosheev
JCT: H. Bartels, V. Chuyanov, C. Gordon, T. Honda, M. Iseli, K. Moshonas (VHTP), J. Raeder, L. Topilski