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fission product behaviour  
in gas cooled reactors***



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## FOREWORD

The Co-ordinated Research Programme (CRP) on Validation of Predictive Methods for Fuel and Fission Product Behaviour was organized within the frame of the International Working Group on Gas Cooled Reactors (IWGGCR). This International Working Group serves as a forum for exchange of information on national programmes, provides advice to the IAEA on international co-operative activities in advanced technologies of gas cooled reactors (GCRs), and supports the conduct of these activities.

Advanced GCR designs currently being developed are predicted to achieve a high degree of safety through reliance on inherent safety features. Such design features should permit the technical demonstration of exceptional public protection with significantly reduced emergency planning requirements. For advanced GCRs, this predicted high degree of safety largely derives from the ability of the ceramic coated fuel particles to retain the fission products under normal and accident conditions, the safe neutron physics behaviour of the core, the chemical stability of the core and the ability of the design to dissipate decay heat by natural heat transport mechanisms without reaching excessive temperatures. Prior to licensing and commercial deployment of advanced GCRs, these features must first be demonstrated under experimental conditions representing realistic reactor conditions, and the methods used to predict the performance of the fuel and reactor must be validated against these experimental data. Within this CRP, the participants addressed the fuel performance and fission product behaviour in GCRs.

The objectives of this CRP were to review and document the status of the experimental data base and of the predictive methods for GCR fuel performance and fission product behaviour; and to verify and validate methodologies for the prediction of fuel performance and fission product transport.

The following Member State national institutions participated in the performance of this CRP:

- Forschungszentrum Jülich (FZJ), Jülich, Germany
- Japan Atomic Energy Research Institute (JAERI), Tokai-mura, Japan
- Oak Ridge National Laboratory (ORNL), Oak Ridge, Tennessee, in co-operation with General Atomics (GA), San Diego, California, USA
- Russian Research Center Kurchatov Institute (RRC-KI), Moscow, Russian Federation
- Centre d'Etudes de Grenoble (CEA-CEG), Grenoble, France
- AEA Technology, Harwell, United Kingdom
- Institute for Nuclear Energy Technology (INET), Tsinghua University, Beijing, China.

This report has been edited by K. Verfondern, FZJ, and documents the CRP activities with respect to the technical areas of fuel performance during normal and accident oxidizing and non-oxidizing conditions, transport of gaseous and metallic fission products during normal and accident conditions, performance of advanced fuels and GCR fuel design and fabrication programmes.

## *EDITORIAL NOTE*

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