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**IAEA Accident Analysis and its Associated Training Programme for the RBMK
1000 Kursk 1 NPP (Phase I)**

S. Chakraborty, Switzerland
M. Clemente, Germany
J. E. Fisher, USA
M.W. Jankowski, IAEA
M. Khatib-Rahbar, USA
E. Knoglinger, IAEA Consultant
A. Krayushkin, Russia
B. D.A. Mikhaylov, Russia
J. Misak, IAEA
C. S. M. Modro, USA

ABSTRACT

This paper summarizes the background, objectives, conduct, findings and recommendations of the Phase I of the International Atomic Energy Agency (IAEA) Accident Analysis and its Associated Training Programme for the RBMK 1000 Kursk 1 NPP. Objective of this project (initiated in May 1999 and completed in November 2001) was to contribute towards enhancing the RBMK accident analysis capability in Russia, and to test the draft IAEA guidelines for transient and accident analysis.

The project has demonstrated that, for the most part, the IAEA RBMK safety analysis draft guidelines are complete, and adequate; however, as part of any future revisions, modifications are recommended in the area of acceptance criteria, QA and documentation requirements, and specific references need to be made to the methods/codes that have been qualified as part of the present project.

The project has successfully developed an independent capability and methodology for RBMK accident analysis. The methodology has been demonstrated through applications to selected scenarios such as postulated accidents, anticipated transients, and beyond design basis accidents. Various computer codes were extensively qualified for use in RBMK transient and accident analysis through limited assessment using some plant data and experimental data. Code modifications were performed to represent better specifics of the RBMK reactors. Also, codes were benchmarked and compared against each other (ATHLET, KOBRA, RELAP, STEPAN, etc). The comparison of the Russian and western computer codes has demonstrated generally acceptable agreement in prediction of key phenomena applicable to RBMK transient and accident analysis. The conducted validation of computer codes does not constitute a complete and comprehensive assessment of these computer codes, and additional experimental validation of these codes is still warranted; nevertheless, the information base that has been gathered as part of this project, will be beneficial to any future validation and assessment studies.

The project benefited from extensive technical exchange amongst a relatively large number of Russian and western experts in transient and accident analysis. As part of this process, the Russian and western experts directly participated in the assessment of the selected methods/computer codes. The Russian experts supported also the modifications of the western codes to extend their range of applicability to RBMK transient and accident analyses. The project has also resulted in an English documentation of the selected Russian codes, and their transfer to IAEA for any future use in RBMK transient and accident analysis. The qualified western codes have been transferred to the Russian participants and will be available for future training activities by IAEA in preparation of transient and accident analysis studies for other RBMKs. The project has contributed to improved understanding of RBMK behavior in accident conditions particularly in areas such as potential for CPS voiding due to radial heat transfer, CPS voiding due to noncondensable gas ingress, as well as to better understanding of RBMK modeling issues including use of 3D kinetics vs point kinetics, critical heat flux, flow instabilities, neutron crosssection generation and generally application of thermal-hydraulic system codes.