



Development of Nuclear Plant Specific Analysis Simulators with ATLAS

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The simulation software ATLAS, based on the best-estimate code ATHLET, has been developed by the GRS for a range of applications in the field of nuclear plant safety analysis. Through application of versatile simulation tools and graphical interfaces the user should be able to analyse with ATLAS all essential accident scenarios.

Detailed analysis simulators for several German and Russian NPPs are being constructed on the basis of ATLAS.

An overview of the ATLAS is presented in the paper, describing its configuration, functions performed by main components and relationships among them.

A significant part of any power plant simulator are the balance-of-plant (BOP) models, not only because all the plant transients and non-LOCA accidents can be initiated by operation of BOP systems, but also because the response of the plant to transients or accidents is strongly influenced by the automatic operation of BOP systems. Modelling aspects of BOP systems are shown in detail, also the interface between the process model and BOP systems.

Special emphasis has been put on the BOP model builder based on the methodology developed in the GRS. The BOP modeller called GCSM-Generator is an object oriented tool which runs on the online expert system G2. It is equipped with utilities to edit the BOP models, to verification them and to generate a GCSM code, specific for the ATLAS.

The communication system of ATLAS presents graphically the results of the simulation and allows interactively influencing the execution of the simulation process (malfunctions, manual control). Displays for communications with simulated processes and presentation of calculations results are also presented.

In the framework of the verification of simulation models different tools are used e.g. the PC-codes MATHCAD for the calculation and documentation, ATLET-Input-Graphic for control of geometry data and the expert system G2 for development of BOP-Models. The validation procedure and selected analyses results compared to measured plant data are presented.

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