

BOHUNICE SIMULATOR DATA COLLECTION PROJECT

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ABSTRACT

The paper describes the way and results of human reliability data analysis collected as a part of the Bohunice Simulator Data Collection Project (BSDCP), which was performed by VUJE Trnava, Inc. with funding support from the U.S. DOE, National Nuclear Security Administration. The goal of the project was to create a methodology for simulator data collection and analysis to support activities in probabilistic safety assessment (PSA) and human reliability assessment for Jaslovské Bohunice nuclear power plant consisting of two sets of twin units: two VVER 440/V-230 (V1) and two VVER 440/V-213 (V2) reactors.

During the project, training of V-2 control room crews was performed at VUJE Trnava simulator. The simulator training and the data collection were done in parallel. The main goal of BSDCP was to collect suitable data of human errors under simulated conditions requiring the use of symptom-based emergency operating procedures (SBEOPs). The subjects of the data collection were scenario progress time data, operator errors, and real-time technological parameters.

The paper contains three main parts. The first part presents preparatory work and semi-automatic computer-based methods used to collect data and to check technological parameters in order to find hidden errors of operators, to be able to retrace the course of each scenario for purposes of further analysis, and to document the whole training process. The first part gives also an overview of collected data scope, human error taxonomy, and state classifications for SBEOP instructions coding.

The second part describes analytical work undertaken to describe time distribution necessary for execution of various kinds of instructions performed by operators according to the classification for coding of SBEOP instructions. It also presents the methods used for determination of probability distribution for various operator errors.

Results from the data evaluation are presented in the last part of the paper. An overview of observed human error probabilities (HEP) according to the developed taxonomy is given. HEP observed during training process were used as reference input data for HRA (Human Reliability Assessment) within existing PSAs performed by VUJE.

Observing two different training seasons offered an opportunity to compare a progress achieved through the training process. This paper shows us how it is possible to make this kind of comparison in order to establish an objective measure of training quality and to determine training weaknesses.

Results gained during the project evoked interest of different NPPs (Nuclear Power Plant) in Slovak Republic to collect and process simulator data for further improvement of human factor safety, operational procedures, training process, etc.