

International conference: „NUSIM 2011”

Organisation: SNUS, ČEZ, ČNS, ÚJV, KTG

Time: Oct. 11.-12, 2011

Participants: Czech Republic, Germany, Slovak Republic)

Presented and published papers:

D. Procházková: Risk Management, Risk Engineering and Nuclear Safety

J. Procházka: Detection of Hazardous Radiation

D. Procházková: RISK MANAGEMENT, RISK ENGINEERING AND NUCLEAR SAFETY

Abstract: The safety of each nuclear and other facility is given by the level of risk management and level of risk engineering that have been followed in design, building, construction and operation. The theory and concepts of risk, risk management and risk engineering have been developed since mid of last century. In harmony with this development the IAEA developed the safety guides including the concepts, approaches and requirements based on advanced knowledge and advanced good engineering practice.

The advanced safety engineering is systematic use of engineering knowledge and experiences for optimising the protection of human lives, environment, property and economic affairs. From the professional view it goes on process seeking all potential conditions that could threaten favourable operation of a given system (e.g. nuclear facility) in all stages of its life cycle, and identifying the capabilities for their defeating by prevention, preparedness, response and renovation. It uses tools, methods and techniques that indicate how we could: texture the problem; determine what we ought to solve; collect and create data sets so they might have a clear evidence to a given problem; select method for data processing so outputs might be relevant to a given problem; interpret the outputs in given conditions.

At present the risk is for engineering practice expressed as probable size of losses, damages and harms on followed assets that are caused by a given disaster with specified size in real site characterised by real vulnerabilities of followed assets, that are rescheduled for certain time unit (usually 1 year) and certain territory unit. The principal attributes of each risk are uncertainty and vagueness, and therefore special approaches and methods must be used if we want to obtain qualified results for practice.

The paper compares three concepts of engineering disciplines based on risk management that have been used at present practice, i.e. the classical risk engineering, the security engineering and the safety engineering. It shows their common features and main disparities that lead to different level of safety of followed facility. It shows how the knowledge development influenced step by step the demands of the IAEA safety guides dealing with earthquakes.

The very advanced safety engineering requires the use of very exact special methods because each facility safety must be solved as the system of systems safety and the uncertainties and vagueness in data must be especially considered.

J. Procházka: DETECTION OF HAZARDOUS RADIATION

Abstract: The paper deals with detectors of hazardous radiation or ionising radiation. As hazardous radiation it is considered roentgen and gamma radiation. Firstly, detectors are divided into several groups according to time complexity of measured information, principle and detection time course. Further, there are characterized important parameters of detection instruments, namely from the both viewpoints, the physical and the user. The paper in detail deals with group of detectors denoted as electronic (ionising, scintillation and semiconductor). At the end there is given extract of recent technological detectors, specifically the CdTe.

Key words: hazardous radiation; detection; detectors; electronic detectors