

Úrad jadrového dozoru SR
Nuclear Regulatory Authority of the Slovak Republic



**Achievements of the Past Years and Anticipated Challenges
in the field of Nuclear Regulation in Slovakia**



Regulatory Information Conference 2014


Marta Ziakova – Chairperson, UJD SR
11-13 March 2014, Bethesda North Marriott Hotel & Conference Center, MD USA

Contents

- Nuclear facilities in Slovakia
- Safety improvement activities before Fukushima Dai-ichi accident
- Safety improvement activities after Fukushima Dai-ichi accident

UJD SR RIC 2014, Bethesda, MD USA 2

Slovakia



Area 49,035 km
18,932 sq mi

Population 5,400,000

UJD SR RIC 2014, Bethesda, MD USA 3

Nuclear Instaltns in Slovakia



Nuclear installations in Slovakia



Name	State	Type	Start of operation	End of operation	License holder
Bohunice site					
Bohunice 1.2 NPP	under decom.	VVER 440 – V230	1978,1980	2006, 2008	JAVYS,a.s.
Bohunice 3.4 NPP	in operation	VVER 440 – V213	1984,1985	-	SE, a.s.
A-1 NPP	under decom.	KS 150	1973	1977	JAVYS,a.s.
Interim spent fuel storage	in operation	wet pool	1987	-	JAVYS,a.s.
RW treatment technologies	in operation	Incineration, cementation, bituminization, ...	From 1994	-	JAVYS,a.s.
Mochovce site					
Mochovce 1.2 NPP	in operation	VVER 440 – V213	1998,2000	-	SE, a. s.
Mochovce 3.04 NPP	under const.	VVER 440 – V213	-	-	SE, a. s.
Final liquid RW treatment	in operation	-	2007	-	JAVYS,a.s.
National RW repository	in operation	Near surface	2001	-	JAVYS,a.s.

Approach to nuclear safety in Slovakia

- Fundamental requirements are established in the Act on Peaceful use of nuclear energy
- Obligations of license holder (among the others)
 - ...continual increase of nuclear safety while meeting the conditions pursuant to special regulations...
 - ...ensure systemic analysis of operational events and experience, development of international safety standards and the latest knowledge gained through research and development, and **use these to improve the safety** of its nuclear installation and its activities,

Safety Improvement Activities before Fukushima Dai-ichi accident

- Program of modernization and safety improvement of NPP Bohunice 3&4 (2001 - 2008)
- Upgrading projects based on periodic safety review (PSR) of NPP Bohunice 3&4 and Mochovce 1&2 (started 2008 resp. 2011)
 - ◆ Management of severe accidents at all NPPs (started 2009 and 2011 resp. - before Fukushima accident)

UJD SR RIC 2014, Bethesda, MD USA 7

Safety Improvement Activities after Fukushima Dai-ichi accident

- EU „stress tests“ as targeted reassessment of the safety margins o nuclear power plants in the light of the event which occurred at Fukushima; ...
- In these extreme situations, sequential loss of the lines of defence is assumed, in the deterministic approach, irrespective of the probability of the loss. In particular, it has to be kept in mind that loss of safety functions and severe accident situations can occur only when several design provisions have failed. In addition, measures to manage these situations will be supposed to be progressively defeated

UJD SR RIC 2014, Bethesda, MD USA 8

Action plan of Slovakia in response to Fukushima accident

- The plan consists from tasks which covers issues identifies by:
 - ◆ EU stress tests
 - ◆ WANO
 - ◆ Recommendations and requirements of UJD SR
- The goal of AP is to enforce levels 3,4, and 5 of DiD, increase resistance against extreme external events (earthquakes, heavy rains, ...) and increase resistance of units against SBO

UJD SR RIC 2014, Bethesda, MD USA 9

**Example of the NAcP activities
Bohunice 3,4 NPP**

SAM Project implementation	Date	status 31.12.2013
Reactor Cavity Flooding	2010	Fulfilled in 2010
PC Depressurization	2012	Fulfilled in 2012
Containment Hydrogen Management	2012	Fulfilled in 2012
Containment Vacuum Breaker	2012	Fulfilled in 2013
Alternative Coolant System	2013	Fulfilled in 2013
Alternative Power Supply System	2013	Fulfilled in 2013
I & C – PAMS, Control	2013	Fulfilled in 2013
Containment Long Term Heat Removal	2013	Fulfilled in 2013
SAMG implementation	2013	Fulfilled in 2013

**Example of the Action Plan activities
Mochovce 1,2 NPP**

SAM Project implementation	Date	status 31.12.2013
Reactor Cavity Flooding	2012	Fulfilled in 2012
PC Depressurization	2015	in progress
Containment Hydrogen Management	2013	Fulfilled in 2013
Containment Vacuum Breaker	2015	in progress
Alternative Coolant System	2015	in progress
Alternative Power Supply System	2015	in progress
I & C – PAMS, Control	2015	in progress
Containment Long Term Heat Removal	2015	in progress
SAMG implementation	2015	in progress

Installation of passive autocatalytic hydrogen recombiners



Bottom part of reactor shielding with floaters for outside cooling of RPV



Containment vacuum breaker



Alternative coolant system - RPV corium flooding and containment spray



Alternative coolant system - RPV corium flooding and containment spray



RIC 2014, Bethesda, MD USA

16

Alternative (seismically qualified) electric power system



RIC 2014, Bethesda, MD USA

17

Battery monitoring system



RIC 2014, Bethesda, MD USA

18

New fire truck with high pressure pump – 1/unit



RIC 2014, Bethesda, MD USA

19

New mobile 0,4kV DG – 1/per unit



RIC 2014, Bethesda, MD USA

20


New bunkered emergency center



RIC 2014, Bethesda, MD USA

21

New bunkered emergency center



U.S. EPRI RIC 2014, Bethesda, MD USA 22

Water supply to steam generators by mobile pump



U.S. EPRI RIC 2014, Bethesda, MD USA 23

Water supply to steam generators by mobile pump



U.S. EPRI RIC 2014, Bethesda, MD USA 24

► Oversight and/or licensing of:

- ♦ Implementation of the National Action Plan (Stress Test)
- ♦ Long term operation of Bohunice 3,4 NPP
- ♦ Decommissioning of 3 units – Bohunice 1,2 NPP; Bohunice A-1 NPP
- ♦ Construction and commissioning of Mochovce 3,4 NPP

New unit at Bohunice site???
NOT DECIDED YET

Thank you for your attention