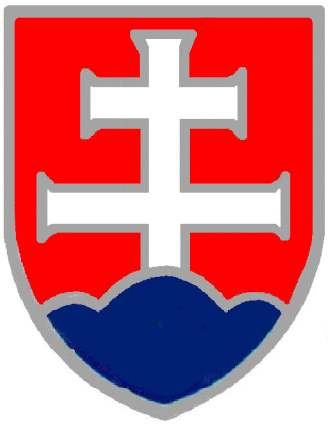
NATIONAL ACTION PLAN
of the
SLOVAK REPUBLIC



REGARDING ACTIONS
TO COMPLY WITH THE CONCLUSIONS FROM THE STRESS TESTS PERFORMED ON NUCLEAR POWER PLANTS

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Content

Abbreviations

AC	Alternating Current
CCS	Central Crisis Staff
DG	Diesel Generator
EBO	Bohunice Power Plant
ECC	Emergency Control Centre
EMO	Mochovce Nuclear Power Plant
EMO1&2	Mochovce Nuclear Power Plant Units 1&2
ENSREG	The European Nuclear Safety Regulators Group
ESFAS	Engineering Safety Features Actuation System
EOP	Emergency Operating Procedures
ERC	Emergency Response Centre
ERO	Emergency Response Organization
ESWS	Essential Service Water System
EU	European Union
HP	High-pressure
IAEA	International Atomic Energy Agency
IPSART	International Probabilistic Safety Assessment Review Team
IRRS	Integrated Regulatory Review Service
MCP	Main Circulation Pump
MOD V-2	Programme on Modernization and Improvement of NPP Bohunice 3&4
NAcP	National Action Plan
NPP	Nuclear Power Plant
NSSS	Nuclear Steam Supply System
OCG	Operational Control Group
OSART	Operational Safety Review Team
PC	Primary Circuit

PRZ	Pressurizer
PSA	Probabilistic Safety Assessment
PSR	Periodic Safety Review
RLS	Reactor Limitation System
RPS	Reactor Protection System
RTS	Reactor Trip System
RPV	Reactor Pressure Vessel
SAM	Severe Accident Management
SAMG	Severe Accident Management Guidelines
SBO	Station Black-out
SG	Steam Generator
SCRMN	Slovak Centre of Radiation Monitoring Network
SEFWS	Super Emergency Feed Water System
SE, a. s.	Slovenské Elektrárne, Inc.
SFP	Spent Fuel Pool
SIRM	Safety Improvement of Mochovce NPP Project Review Mission - occlusions of IAEA mission performed at Mochovce in June 1994
SO	Secondary Circuit
TSSM	Technical Specifications for Safety Measures
UJD SR	Nuclear Regulatory Authority of the SR
UVZ SR	Public Health Authority of the SR
VARVYR	Warning and Notification
WANO	World Association of Nuclear Operators
WENRA	Western European Nuclear Regulators' Association

Introduction

The European Council at its sesstion in March 2011, as a follow up to the Fukushima NPP accident in Japan adopted conclusions according to which safety of all European Union nuclear power plants (hereinafter only as the “EU”) was to be reviewed on the basis of a comprehensive and transparent risk and safety assessment (the “stress tests”). The European Commission (hereinafter only as the “Commission”) in cooperation with the European Nuclear Safety Regulators Group (hereinafter only as “ENSREG”), published a joint statement in May 2011 specifying the scope and the methods for implementation of these tests within a coordinated framework based on lessons learned from the accident in Japan and with full participation of the Member States. At the same time the European Council requested the Commission to invite the neighbouring countries to participate in the process of these stress tests.

The stress tests were defined as targeted review of the safety margins of nucleaer power plants relating to extreme natural disasters threatening the safety of nuclear power plants. These tests were conducted by the independent national authorities and through a peer review process in close cooperation with the operators of nuclear power plants, the regulatory authorities and the Commission.

In Slovakia the implementation of the stress tests started in accordance with the generally accepted schedule from 1 June 2011. In November 2011 the Commission published an interim report on evaluation of the stress tests and on the basis of this report, from January to April 2012 an extensive peer review process took place. The outcome of this process was a summary report from the peer review by ENSREG, which this group approved in April 2012, as well as seventeen independent national reports, including the national report of Slovakia, containing detailed recommendations.

In June 2012 the European Council in its conclusions invited the Member States to ensure the full and timely implementation of the recommendations presented in the report from ENSREG, while the Commission and the ENSREG group agreed that further work is needed in this field. As a follow up, in July 2012 ENSREG agreed that the affected states should elaborate and adopt action plans focusing on actions as a follow-up to implementation of recommendations resulting from the peer review process.

In October 2012 the Commission submitted a report containing conclusions and recommendations resulting from the stress tests.

This report is the implementation of conclusions of the European Council from June 2012, as well as ENSREG conclusions from July 2012.

General information

Currently there are 4 WWER-440/V213 nuclear units in operation in Slovakia, 2 units in Jaslovské Bohunice and another 2 in Mochovce site. In Mochovce there are also two WWER- 440/V213 units with significantly upgraded design under construction. The owner and operator (the holder of the operating permit) of all operating and constructed nuclear units in Slovakia is a stock company Slovenské elektrárne, a. s. (SE, a. s.).

Basic data about all units covered by this report are in the table.

Plant	NPP Bohunice 3&4	EMO1&2 NPP	EMO3&4 NPP
Site	Bohunice	Mochovce	Mochovce
Reactor type	WWER-440/V213	WWER-440/V213	WWER-440/V213
Reactor thermal power, MWt	1471	1471	1375
Gross electric power, MWe	505	470	470
Plant status	In operation	In operation	Under construction
Date of first criticality	1984-85	1998-99	Under construction
Latest update of Safety Analysis Report	2009	2010	2008
Latest update of PSA Level 1/Level 2	2010	2010-2011	2008, update in progress
Last Periodic Safety Review	2008	2009	-

Upgrading of the plants since the original design

The NPPs have been significantly upgraded throughout their operational lifetime. In spite of the robustness of the original design, several modifications dictated by operational experience and by international and domestic safety assessments have already been carried out (see Part II). Improvement of the containment tightness/integrity of existing plants is one of the major achievements.

In accordance with the legal requirements all plants are subject to Periodic Safety Reviews with 10 years periodicity. The latest periodic review in NPP Bohunice 3&4 was completed in 2008, in EMO1&2 in 2009. Based on the results of the review ÚJD SR issued operational permit for subsequent 10 years of operation. The permits are associated with approval of safety upgrading programme of the plants aimed at closer compliance of the safety level with contemporary safety standards. The programmes include also implementation of comprehensive severe accident mitigation measures.

All operating units have been subject of a number of international missions performing independent review of their safety level. Since 1991 there were in total about 20 IAEA missions (site review, design review, OSART, IPSART missions), 6 WANO missions, 2 RISKAUDIT missions and 1 WENRA mission.

Based on WANO recommendations during the period from April to October 2011 the non-standard tests and inspections of equipment important for coping with extreme conditions exceeding the basic design were successfully performed on the operating units. The tests included verification of the long-term run of diesel generators, the possibility for delivery of cooling water from the bubbler-condenser to the spent fuel pool, feedwater supply to steam generators from a mobile source, supplying of water from cooling towers to essential service water system, connection of a back-up power supply from the hydro power plant, and others.

Regulatory Framework

The state regulatory authority performing the state supervision upon the nuclear safety of nuclear installations is the Nuclear Regulatory Authority of the Slovak Republic (ÚJD SR). The state supervision over nuclear safety is performed in accordance with the Atomic Act (No. 541/2004) and subsequent set of regulations, in particular Regulation No. 430/2011 laying down details on requirements for nuclear safety. The whole set of legislative basis has been updated quite recently (in the period 2004-2006), in line with the progress in the development of the IAEA Safety Requirements and established WENRA Reference Levels. Radiation protection is performed by the Public Health Authority (ÚVZ SR) in accordance with the Act No. 355/2007 Coll.

In view of the lessons learned the owner performed so called stress tests on all units in operation or under construction. The National Action Plan (NAcP) was developed by the operator and submitted to ÚJD SR. The document was analysed and served as a bases for regulatory actions towards the operator. Part IV. contains a description of these regulatory actions specified for each nuclear power plant and the deadlines for each action.

I. Generic activities relating to areas 1 – 3 resulting from the document "Compilation of recommendations and suggestions"

Programmes of NPP Bohunice 3&4 safety improvement – historical overview

The Programme on Modernization and Improvement of NPP Bohunice 3&4 (MOD V-2) safety which started in 1994 was not focused only on solving of safety issues but includes also the decision of operational issues connected with 15-years operation of NPP Bohunice 3&4 – physical wearing and moral obsolescence of devices, causing mainly at control systems and electric system problems concerning the operational reliability of devices, spare parts and service. The modernization programme included also measures focused on improvement of technical-economic parameters of NPP Bohunice 3&4 units, first of all the primary and secondary unit output regulation, improvement of efficiency and nominal unit output and improvement of their life of service.

Safety concept

MOD V-2 was based on measures concerning elimination of deficiencies of WWER reactors mentioned in the report IAEA: IAEA EBP-WWER-03 and required by decision No. 4/96 of ÚJD SR. The project change has been prepared since 1998 through elaboration of the Safety concept part 1. (1998 – 2000) and the Safety concept part 2. (2000 – 2001).

By decision No. 214/2000 ÚJD SR imposed to develop terms of reference – project for individual safety measures – to implement safety category III measures by 2004, category II safety measures by 2006 and other measures from the Safety Concept by 2008.

For each task of modernization of NPP Bohunice 3&4, project documentation in compliance with legally binding provisions and standards was made. All tasks performed within modernization were grouped according to their relevance to the problematic and their relation to various technological facilities in order to rank them to several operational files. Measures for elimination of safety problems, for innovation of equipments and for improvement of technical and economical parameters of units are implemented in these tasks.

The program of modernization of NPP Bohunice 3&4 included above 50 main tasks, from which the most important were:

Following table provides a brief description and examples of some areas of the safety measures	
Issue area	**Brief description (example)**
Raising of seismic resistance of buildings, constructions and equipments with the aim:	- to secure necessary resistance, stability, integrity and functionality of buildings, constructions and equipments of seismic class 1 during seismic event on the level of

	maximal calculated earthquake, - to eliminate possible interactions of buildings, constructions and equipments of seismic class 2 with buildings, constructions and equipments of seismic class 1.
Fire protection – measures are aimed at:	- improvement of fire prevention – realization of fire-resistant coating of cables, - improvement of identification and fire extinguishment, - improvement of fire localization and prevention from its spread – replacement of fire-resistant flap valves and fire doors, spray fire-proofing of steel constructions.
Modification of technological systems for improvement of emergency situation course and cooling of reactor unit (i. e.):	- modification of injection into PRZ, relief valve and safety valves of PRZ, - improvement of cooling of MCP seals, - feedwater piping penetrations from MCP deck to SG box, - emergency degasing of PC, - adjustment of sealing assembly of primary SG collectors, - adjustment of emergency feeding of PC and supplement of PC equipments to secure residual heat removal, - transfer of feeding head pieces of SEFWS system from the floor +14,7 m, securing necessary water supply and completion of the 3rd redundancy system, - modification of ESWS system to manage cooling of NPP after seismic event and to improve the system operation,
Replacement and modification of I&C systems to improve the unit management in normal operation, transient and emergency conditions (i. e.):	- modification of functions – algorithms of automatic reactor trip system (RTS), safety system, technological SG protections (ESFAS), automatics of sequential start-up of drives, automatics of section switches, PVII (APS-ESFAS) and their integration into the system of reactor protection system (RPS), - modification of functions – algorithms of automatic power decrease, prohibition of power increase, limitations of reactor power and completion of function of RPV protection against cold pressurizing and their integration into the reactor limitation system (RLS), - replacement of the automatic reactor shutdown systems, the safety system, the technological SG protections, the automatics of sequential start-up of drives, the automatics of section switches, PVII for system RPS, and others.
Replacement and modification of electric systems to improve	- replacement of sectional and subsidiary distributors 0,4 kV of I. and II. category and related cabling, respecting the

the power output and feeding of the unit’s on-site consumption in normal operation, transient and emergency conditions (i. e.):	requirements for separation of safety and operational functions, the requirements for nuclear safety, fire protection and electric safeguarding and selectivity, - replacement of 6 kV switches and adjustment of 6 kV distributors, - replacement and modification of PC and SO automatics panels - replacement of cable hermetic penetrations and replacement of unsatisfactory cables, - replacement of accumulator batteries and completion of battery state monitoring system, - replacement of systems of control, exciting and on-site consumption DG, - replacement of output 400 kV switches and HP compressors, - replacement of electric unit protections and replacement of insulated wires.
Implementation of measures for improvement of operational economics (i.e.):	- implementation of secondary regulation of unit power, - creating preconditions for increase of efficiency and unit’s thermal output to 107 % Nnom.

All tasks of the modernization project were designed and implemented in order to operate at increased power and with extended operation life of NPP Bohunice 3&4 until 2046. Modifications of MOD V-2 were implemented gradually since 2002 and their completion was in 2008.

Periodic Safety Review (PSR) Bohunice NPP

Preparation for V-2 PSR in frame of regulation No. 121/2003 began in May 2004. The significant factor affecting the approach to the method of realization of V-2 PSR project was the fact that the PSR run at the time when the power plant was in transition, resulting from the ongoing project on Modernization and improvement of NPP Bohunice 3&4 (MOD V-2), at different levels of finishing of individual modifications.

The result of evaluation was findings. The operator proposed corrective actions on the identified findings, based on which an integrated plan for implementation of corrective actions was compiled. Such integrated plan of corrective actions was part of the license No. 275/2008 permitting the operation of NPP Bohunice 3&4 for a period of the following ten (10) years. In compliance with this decision the operator is obliged to implement corrective actions identified during the comprehensive periodic safety assessment in a manner, within the scope and the deadlines as follows:

Sixteen integrated corrective actions under the group of accidents up to “Accident management up to the level of severe accidents, emergency planning, emergency control centre“.

Deadline*: 31 December 2013*

Five integrated corrective actions in the group “Design justification, methodology of defence-in-depth application“. Deadline*: 31 December 2013*

Nine integrated corrective actions in the group “Physical condition of equipment and systems“.

Deadline*: 31 December 2010*

Nineteen integrated corrective actions in the group “Demonstration and monitoring of nuclear safety, feedback from failures“. Deadline*: 31 December 2010*

Twenty integrated corrective actions in the group “Quality, management documentation, administration and organization“. Deadline*: 31 December 2010*

Eighteen integrated corrective actions in the group “HR management and training“.

Deadline*: 31 December 2010*

Nine integrated corrective actions in the group “Control of modifications, documentation and change evaluation“. Deadline*: 31 December 2010*

Five integrated corrective actions in the group “Operating procedures, documentation control“.

Deadline*: 31 December 2010*

Three integrated corrective actions in the group “Evaluation of fire resistance and fire risk“.

Deadline*: 31 December 2010*

The operator informs ÚJD SR in writing at yearly intervals on the progress of implementation of these corrective actions.

At the request of the government of the Slovak Republic, an IAEA Operational Safety Review Team (OSART) visited Bohunice 3&4 in 2010. The purpose of the mission was to review operating practices in the areas of Management organization and administration: Operations; Maintenance; Technical Support; Radiation protection; Operating Experience; Chemistry; and Emergency planning and preparedness. At the request of the plant the team also reviewed the Long Term Operation (LTO) programs. In addition, an exchange of technical experience and knowledge took place between the experts and their plant counterparts on how the common goal of excellence in operational safety could be further pursued.

In 2012 an OSART Follow-up took place and concluded that: 9 of the issues had been resolved, 10 issues had made satisfactory progress to date and there was no issue where insufficient progress had been made.

OSART conclusion: “The willingness and motivation of plant management to consider new ideas and implement a comprehensive safety improvement programme was evident. I must be borne in mind that this was accomplished at a time period when the plant workload was greatly increased as a result of actions it had to take following the Fukushima accident”.

Mochovce 1&2 Safety Improvements

The construction of the NPP Mochovce started in 1981. The political and economical changes resulted in the suspension of the construction in early 90´s. In 1996 a “Mochovce NPP Nuclear Safety Improvement Programme” was developed in the frame of unit 1 and 2 completion project.

The NPP Mochovce safety improvement program was based:

- on the document entitled “Safety Issues and their Ranking for NPP WWER-440/V213”;
- outcomes of the safety review conducted by RISKAUDIT in 1994;
- conclusions at the IAEA Safety Improvement of Mochovce NPP Project Review Mission – SIRM taking place at Mochovce in June 1994.

The operator of the plant in cooperation with VUJE, a. s. developed a set of technical specifications for 87 safety measures (TSSM) to be implemented under the “NPP Mochovce Nuclear Safety Improvement Program”, with taking into account specific measures as identified by the RISKAUDIT and SIRM Reports and experience with NPP Bohunice 3&4 and NPP Dukovany units . This has introduced certain differences between the “NPP Mochovce Safety Improvement Program” and the IAEA document “Safety Issues and their Ranking for NPP WWER-440/V213” (certain measures have been added characterized as no-category measures).

Following table provides a brief description and examples of some areas of the safety measures	
Issue area	**Brief description (example)**
General	- question of classification and qualification of components
Reactor core	- risk of undesirable positive reactivity as a consequence of an uncontrolled drop of boric acid concentration in the nuclear steam supply system (NSSS)
Component integrity	- tightness of NSSS components in all operating modes, including emergency modes
Technological systems	- modification of technological systems in order to improve performance of safety functions (piping re-routing, addition of valves at piping lines, etc.)
Instrumentation & Control	- modification of instrumentation and control systems in order to improve performance of safety functions (modifications to emergency protection systems, addition of diagnostic systems, etc.)
Electrical systems	- modification of electrical systems in order to improve performance of safety functions (improvement in reliability of emergency power supply systems – diesel generators, batteries, etc.)

Containment	- comprehensive assessment of the radioactive material confining barrier in case of emergency (thermal-hydraulic calculations of containment conditions in case of accident, strength calculations of the bubble-condenser system in case of accident, etc.)
Internal risks	- minimisation of internal risks which could result in the loss of ability of safety systems to perform their safety functions (fire, internal flooding, turbine missiles, fall of heavy loads, etc.)
External risks	- minimisation of external risks which could result in the loss of ability of safety systems to perform their safety functions (earthquake, aircraft crash, other industrial activities – gas explosion, etc.)
Emergency analyses	- re-calculation of a set of emergency analyses in order to prove the NPP safety in the pre-operational safety analysis report
Operation	- improvement of NPP safety during operation through improvement of procedures used (operating procedures, emergency procedures, performance of tests and inspections, investigation of unusual events, radiation protection of personnel, emergency planning, etc.)

By decision No.: 318/98 ÚJD SR approved the start up of the 1st unit – imposing conditions for its operation (e. g. setting deadlines for additional safety improvement measures).

Periodic safety review (PSR) Mochovce

Periodic review was conducted on the basis of ÚJD SR Decree No. 49/2006 on periodic nuclear safety review.

The result of the review were reported to ÚJD SR in a final report. The operator proposed corrective actions on the identified findings, based on which an integrated plan for implementation of corrective actions was compiled. As for the timing for implementation of integrated corrective actions in individual groups account was taken of the time required for preparation of the design documentation, the practical options for the implementation of individual design changes and of complexity of implementation for individual groups of measures.

The operator is obliged to implement corrective actions identified during the comprehensive periodic safety assessment in a manner and within the scope and deadlines imposed by the ÚJD SR Decision No. 100/2011 as follows:

a) Seventeen integrated corrective actions in the group “Accident management up to the level of severe accidents, emergency planning, emergency control centre“. Deadline: *31 December 2018*
b) Nine integrated corrective actions in the group “Design justification, methodology for defence in depth application“. Deadline: *31 December 2018*
c) Eleven integrated corrective actions in the group “Physical condition of equipment and systems“. Deadline: *31 December 2013*
d) Seventeen integrated corrective actions in the group “Demonstration and monitoring nuclear safety, feedback from failures“. Deadline: *31 December 2013*
e) Twenty integrated corrective actions in the group “Quality, management documentation, administration and organization“. Deadline: *31 December 2013*
f) Twelve integrated corrective actions in the group “HR management and training“. Deadline: *31 December 2013*
g) Three integrated corrective actions in the group “Control of modifications, documenting and change evaluation“. Deadline: *31 December 2013*
h) Twenty two integrated corrective actions in the group “Operating procedures, documentation control“. Deadline: *31 December 2013*
i) Three integrated corrective actions in the group “Evaluation of fire resistance and fire risk“. Deadline: *31 December 2013*
j) To implement seismic resistance at NPP EMO1&2 to a new value of seismic hazard PGA = 0.15g on the basis of review conducted in compliance with the IAEA guide NS-G-2.13 from 2009. Deadline: *31 December 2018*
k) Demonstrate the method for radioactive ion exchangers management including their final disposal. Deadline: *31 July 2011*

The operator shall report to UJD SR at yearly intervals on the progress of implementation of corrective actions.

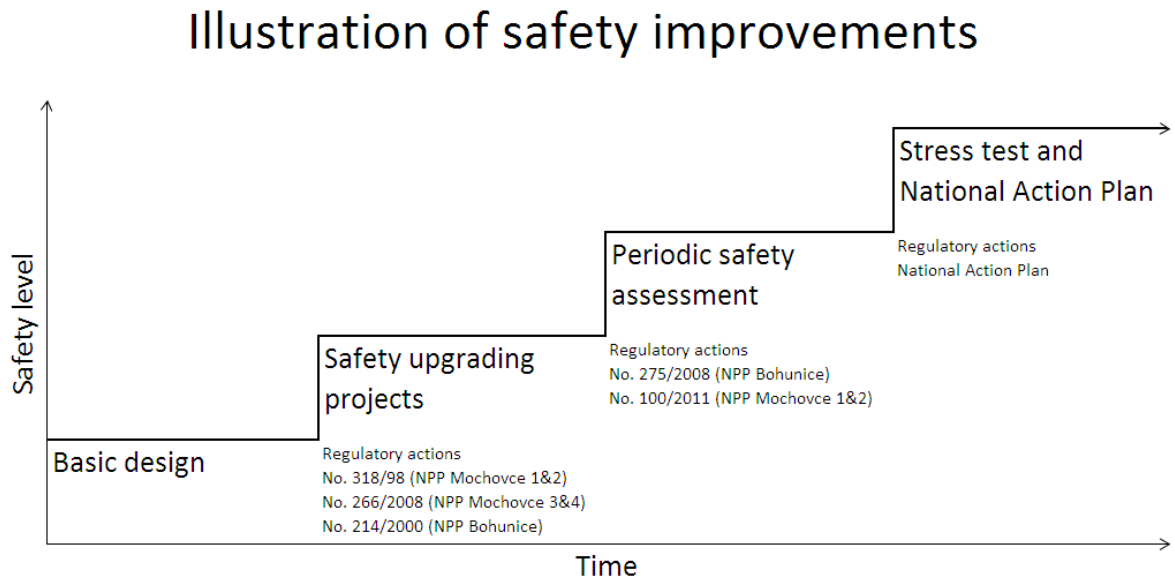
Mochovce 3&4 Safety Improvement

SE, a. s. submitted in 2008 the request to ÚJD SR for issuing consent with realization of project changes according to the Atomic Act (law No. 541/2004). On the same day SE, a. s. submitted to ÚJD SR also request for approval of changes in compliance with the Construction Code (law No. 50/1975).

By its decision No. 246/2008 dated 14 August, 2008 ÚJD SR agreed to the changes proposed. By decisions No. 266/2008 dated 14 August, 2008 ÚJD SR issued the consent with realization of changes of selected equipment influencing the nuclear safety in the extent of initiation project (based on the building code). This decision was conditioned upon fulfilment of specific conditions. By the ÚJD SR decision No. 267/2008 dated 14 August, 2008 ÚJD SR issued (based on the Atomic Act) the consent with realization of changes in the document “Preliminary Safety Report of NPP Mochovce, units 3&4.

Following table provides a brief description and examples of some areas of the safety measures	
Issue area	**Brief description (example)**
I&C Improvements	- increase of control and monitoring capacity of NPP - implementation of predictive and supervision functions - increased redundancies - improved HMI (introduction of the Safety Parameters Display System) - qualification of set of PAMS signals for SA conditions and inclusion of new, dedicated signals for the SAM strategy, etc.
MCR habitability in case of a Severe Accident	- in case of severe accident with radioactive releases reaching the suction of MCR ventilation line: MCR will be isolated and provided with pressurized fresh air from dedicated reservoir tanks to provide slight overpressure in MCR and prevent the penetration of radioactivity or toxic gases from surroundings etc.;
Improved design of electrical systems	- possibility of interconnecting safety bus-bars of corresponding safety divisions of adjacent units (solution for SBO); - creation of a 6-kV highway among 4 units that allows - long-term management of SBO scenarios; - higher flexibility for management of faults of electrical equipment (transformers, etc.); - **goal:** achieve additional, independent and highly-reliable source of power for each Unit; - possibility of feeding I&C safety systems from both DC and AC sources (from inverters) - provision of a SBO Common Diesel Generator for Units 3&4
Improved Fire Protection	- Measures identified to reduce the fire risk in MO34 represent an improvement with respect to EMO1&2: - fire detection system has been improved - all cables will be fire-retardant - safety-classified cables will be fireproof - cable channels and rooms and sensitive parts of the plant (both in nuclear and conventional part) will be equipped with a fixed fire extinguishing system

Seismic upgrade	- upon request of ÚJD SR, the PGA for the seismic upgrade of MO34 has been increased to 0.15g
Protection of Containment Function	- in-vessel retention strategy for the core debris cooling (avoidance of: containment basemat melt-through, containment over-pressurization, direct containment heating, source term reduction) - engineering passive features for hydrogen control (avoidance of: hydrogen uncontrolled burning/detonation) - prevention of high-pressure core-melt scenarios - installation of additional power supply for station-blackout severe accident scenarios (increase the availability of containment protective active systems) - additional instrumentation for severe accident scenarios, etc.



II. Generic activities relating to areas 4 – 6 resulting from the document “Final Report 2nd Extraordinary Meeting“

National Organizations

Nuclear Regulatory Authority of the Slovak Republic (ÚJD SR)

ÚJD SR is a central state administration authority. It executes state regulatory activities in the field of nuclear safety of nuclear installations, including management of radioactive waste, spent fuel and other parts of the fuel cycle, as well as transport and management of nuclear materials including their control and record keeping system. It is responsible for the assessment of goals of nuclear energy program and of quality of the classified equipment, as well as for commitments of the Slovak Republic under international agreements and treaties in the said field.

At the request of the Government of Slovakia, the Integrated Regulatory Review Service (IRRS) mission took place from 28 May to 7 June 2012. The international expert team also met the Public Health Authority of the Slovak Republic (ÚVZ SR), competent organization in the field of radiation safety. However, the mission did not included a comprehensive review of the national regulatory infrastructures for radiation safety of Slovakia, which is planned to be covered in the IRRS follow-up mission.

Among the strengths and good practices identified by the IRRS review team are the followings:

- ÚJD SR has a high degree of independence;
- ÚJD SR has a comprehensive, well-formalized and yet flexible and efficiently implemented strategic approach to informing and consulting interested parties;
- ÚJD SR has developed and implemented a structured approach to training and developing its staff based on the systematic approach to training;
- Detailed legal requirements provide a solid basis for on-site and off-site response in nuclear emergencies coordinated with local authorities; and
- ÚJD SR has established a comprehensive and exhaustive set of regulations and guidance in the area of waste management and decommissioning that encourages waste minimisation;
- ÚJD SR has reacted on the TEPCO Fukushima in time and in proportion to its importance from the point of view of the nuclear safety.

The IRRS Review team identified issues warranting attention or in need of improvement and believed that consideration of these would enhance the overall performance of the regulatory system.

- Division of responsibilities among State Authorities in the area of safety and improvement of planning and coordination of their activities;

- The development of a national policy and strategy for nuclear safety;
- Assessment process of the competence of ÚJD SR consultants and ensure that there is no potential conflict of interest;
- Policy and strategy as regards backend of spent fuel management; and
- A unified national radiation monitoring system to ensure its results could be used by competent authorities in normal situations as well as during emergencies.

As a follow up to the IRRS mission ÚJD SR has elaborated a specific action plan addressing IRRS suggestions and recommendations. Some of these suggestion/recommendations concern also other authorities (ministries) and therefore the government of Slovakia has been requested for approving such specific actions. These actions have been approved by the government on 28th November by Decision No.: 647/2012.

ÚJD´s competencies are twofold: construction authority and state administration authority for nuclear safety. Its decisions are based on its own partial assessment (approval of safety documentation), as well as on the opinion of relevant regulatory authorities - Public Health Care Office of SR (radiation protection), Labour Inspectorate (labor inspection and safety and health protection at work) and other bodies and organizations of state administration (fire prevention, civil defence).

Emergency preparedness & Response, Post-accident Management (off-site) and International Cooperation

National Organization on Emergency Preparedness

As the executive body of the Slovak Government, the Central Crisis Staff (hereinafter referred to as CCS) is the supreme crisis management authority in accordance with Act No. 387/2002 Coll. All government departments and other central authorities of state administration are represented on CCS which co-ordinates activities of state administration, self-government and other components while handling a crisis situation, i.e. in dealing with a nuclear installation incident or accident or during transport. The Crisis Management System (whose part is CCS) consists, in addition to the Government, ministries and other central state administration authorities, of local state administration and self-governing bodies.

To ensure necessary measures to cope with a nuclear installation emergency and measures to protect the public and the economy in an occurrence with environmental impacts, the National Emergency Preparedness Organization is structured into three levels as follows:

The first level is formed by emergency committees of nuclear facilities with the prime function made of management of works and measures on nuclear installation sites so as to enable identification of the technological equipment conditions, and the management of measures to cope with emergency and to mitigate the consequences on personnel, plant, environment, and population.

Another function of this level is the informative function for activities of state administration bodies on the level of local state administration, which will provide for information concerning the equipment conditions and the possible impacts on surrounding.

The second level is organized on the regional level and is formed by crisis staffs of local state administration and corresponding radiation accident committees, whose territory stretches to the area at risk, where danger can be posed to life, health, or property, and where the public protection measures are planned. This territory is determined by a radius of 25 km around NPP V-1 Jaslovské Bohunice, 21 km around NPP Bohunice 3&4 and 20 km around NPP Mochovce.

The third level is formed on the national (state-wide) level by the CCS with its support components (i. e. Emergency Response Centre of ÚJD SR – ERC, Operation Control Group - OCG and The Slovak Centre of Radiation Monitoring Network - SCRMN). The task of CCS is to manage the emergency situation, when its range extends beyond the territory of the district. In the present day also CRA SR exists, whose task is especially to coordinate and manage preparation of measures focusing on protection against consequences of radiological event, when the possibilities on the level of local state administration are trespassed.

Incident Response

a) Bohunice site

Design, installation of the new electronic sirens and construction of a communication infrastructure in the 21 kilometre radius around the Nuclear Power Plants Bohunice 3&4 lasted less than three years and the volume of investment exceeded Euro 11 million. The system of warning and notification secures early warning and notification of all employees and persons within the premises of the power plant through a network of electronic sirens and at the same time also all people around the Nuclear Power Plants Bohunice 3&4. It is fully interlinked with the nationwide system, but if necessary it can be activated and used also locally, for example in case of floods. Technicians of Telegrafia a. s. installed 330 sirens in the area and 23 at the power plant.

After completion of comprehensive tests and trial operation, the new system was put into permanent operation on 1 January 2012, thus becoming another of many comprehensive solutions for early warning and notification of the public in case of natural disasters or technical accidents.

b) Mochovce site

1. a warning system built based on radio controlled electronic sirens. The system can run for 72 hours without connection to the electricity grid, allows for selective control of the sirens, transmission of voice information and continuous control of status and serviceability of the respective sirens.
2. a notification system based on a paging radio network. ERO - EMO members on alert, mayors of municipalities and cities and members of emergency commissions and staffs are equipped with the receivers. The system is also supplemented with a notification server. Both systems at the NPP Mochovce are controlled from the control centre VYR-VAR or the backup control centre VYR-VAR. The shift engineer or the ECC head decides on their start-up. The systems are periodically tested and kept in serviceable condition.

State administration authorities in the emergency planning zone have their own emergency plans. According to these plans, authorities take following measures for public protection:

Period (Phase)	**Measures**
Threat/ Emergency	Notification of emergency staff (Emergency response organization) and preparation for public notification
	Preparation for taking urgent measures in emergency planning zone in early phase of the accident
	Notification of public about measurement taken during emergency phase
Early Phase	Warning of emergency staff (Emergency response organization) and also public warning
	Monitoring of radiological situation
	Access regulation (persons and vehicles)
	Sheltering
	Iodine prophylaxis
	Evacuation
	Use of individual protection means and special individual protection means
	Partial sanitary cleaning of persons and objects
	Ban of non-protected food, water and feed consumption
Intermediate and Late Phase	Control of persons and vehicles movement
	Control of consumption of food, water and feed contaminated by radioactivity
	Relocation of population according to the evaluation of current radiation situation and prognosis of its development
	Deactivation of impacted area

As a post-Fukushima action, on 17 and 18 October 2012 site exercise called HAVRAN 2012 was conducted at the nuclear power plants EBO 3&4 under the auspices of the Ministry of Interior of the Slovak Republic. The objective of this exercise was to practice and examine the interrelationships, preparedness and response of the emergency response staff at all levels of management, at the selected ministries and the self-governments of Trnava, Nitra and Trenčín regions. It involved also the rescue units of the integrated rescue system of Slovakia.

The exercise simulated an event that required protective measures for the staff of the operator and the residents in its vicinity. From the technical and organizational aspect the exercise was prepared by the emergency planning group of EBO 3&4.

The exercise involved 711 staff of the operator and contractor organizations. The exercise engaged also the shift of the operational staff at the simulator at the Training Centre of VUJE in Trnava, the plant fire brigade unit, the doctor and the nurse of the Plant Medical Centre of EBO, drivers of the

evacuation buses, members of the order, medical and shelter teams. At the SE, a. s. headquarters in Bratislava the exercise was managed by the Emergency Response Committee.

Experts from neighbouring countries were invited to take part.

III. Specific activities relating to areas 1 – 3 resulting from the document “Slovakia: Peer review country report“

National Action Plan

In the text below, the main results for the different areas of the Peer Review performed within the stress tests and planed activities are described. Detailed activities and their deadlines are in Part IV.

Earthquakes

There are no tectonic structures located on the territory of the Slovakia and adjacent territories that could cause extremely strong earthquakes comparable to catastrophic earthquake in Japan. Nevertheless, the seismicity is an issue which was seriously considered in design, operation and safety upgrading of the plants and covered by the stress tests. The seismic monitoring system has been implemented and is currently in use around the nuclear sites for early identification of any seismic activity potentially affecting the NPPs.

The assessment of the seismic level of the sites was developed in accordance with IAEA recommendations. It is reflecting the current state of the art and was accepted by several international missions. In subsequent safety upgrading steps, capability of all nuclear units to maintain fundamental safety functions have been significantly increased since the original design. For NPP Bohunice 3&4 the initial design basis value of horizontal acceleration at ground level (PGA) 0,025 g has been increased through PGA=0.25 g (upgrading performed in 1995) up to the current value PGA=0.344 g, with corresponding upgrading completed in 2008. Similarly, in Mochovce the initial site value PGA=0.06 g was increased (based on the IAEA recommendation) to 0.1 g, which was used for the plant construction. During a reassessment in 2003 the value was increased to 0,143 g. By its decision No. 100/2011 ÚJD SR has required to implement seismic resistance at NPP EMO 1&2 to a new value of seismic hazards PGA=0.15 g. Since the upgrading was largely based on conservative approach considering mainly elastic behaviour of the structures, there is a margin even above the increased PGA values. Taking into account properties of materials used for individual safety system components, with increasing loads first the occurrence of plastic deformation should take place and only after exceeding the structural limit values the component damage will occur. However, such assessment is beyond the current regulatory requirements and international standards, and the margin was not quantified yet. More refined analyses are in progress in order to define the extra margin embedded in the original conservative design assumptions. The preliminary estimates indicate that safety margins are well beyond the design values. These margins are expected to be quantified by further evaluations.

In spite of the fact that robustness of the plant against earthquakes has been significantly increased recently and it is considered adequate in accordance with the current requirements, there are

additional safety upgrading measures envisaged including in particular quantification of margins of key SSCs for earthquakes beyond the design basis earthquake and development of a seismic PSA.

Flooding

Floods from surface water sources, failure of dams, effects of underground water and extreme meteorological conditions as potential sources of flooding were thoroughly analyzed. Internal flooding due to rupture of pipelines following the earthquakes was considered in the assessment, too. Due to the inland location of the sites, their distance from the sources of water and the site topography and plant layout conditions, flooding of the site due to the sources of surface water from rivers or lakes can be screened out, similarly as from the ground water. Analysis of potential failures of dams on the rivers Vah and Hron has shown that the induced flooding wave can temporarily disable pumping stations which provide raw water to the plants. These events are conservatively addressed in the stress test report as long-term losses of the ultimate heat sink.

The only meaningful sources of the site flooding are extreme meteorological conditions (strong rain, snow, combination of rain and snow melting). Recently (2011) updated study of extreme meteorological conditions for the Mochovce site was used for the assessment. Flooding of the site due to extreme precipitation is very unlikely; only if extreme precipitation is conservatively combined with blockage of the sewer system and with neglecting any recovery staff actions, up to 10 cm site water level was conservatively estimated for the return period of 10,000 years.

Electrical components/systems are the most vulnerable to flooding, depending on their location/elevation in the relevant civil structures. Proper sealing of the buildings and sufficient elevation of the entrance doors provide an adequate protection against flooding. Detailed verification has demonstrated that in both Mochovce plants large margins (more than 2-times) are already available. In Bohunice, adequate temporary fixing has been implemented and the final permanent protection is in its pre-design stage. In addition, for the situations without any fixing time for flooding safety important components/systems was estimated demonstrating that the time margin to flooding of essential power supply is more than 72 hours. It is important to state that flooding due to precipitation does not occur suddenly and it is not associated with damaging hydrodynamic wave, therefore time margins exist and damaging impact is much less significant.

The measures for further improvements of the current situation include updating the procedures for prevention of the blockage of inlets to the sewer system, completion of the on-going implementation of preventive measures against water entering into the buildings and providing additional fire brigade pumps for removal of water from the flooded area. In addition it is required that the comprehensive assessment of the extreme meteorological conditions will be performed and corresponding parts of the SARs will be updated in order to take into account new meteorological data (for Mochovce and Bohunice), ongoing plant upgrading measures and state of the art methodology.

Extreme meteorological conditions (other than extreme precipitation)

Assessment performed within the stress tests included meteorological events and their combinations, such as extreme temperatures and humidity, extreme drought, ice and snow impact, extreme direct and rotating wind. Feasibility of logistics needed for the emergency preparedness was also evaluated.

Due to location of Slovakia in the mild meteorological region of Europe, extreme conditions were not considered as a major issue in the past, resulting in some cases in limited design information regarding resistance of plant systems, structures and components. Subsequently the evaluations of the effects of extreme meteorological conditions in the stress test report are mostly qualitative (in particular in NPP Bohunice 3&4), based on operating experience and on engineering judgment. Nevertheless, the performed assessment and operational experience has proved that the resistance of the plant against meteorological extremes is acceptable. Extreme drought does not represent serious safety issue since it is a slowly evolving process and the site water inventory is sufficient for more than 10 days of residual heat removal. In addition the upgrading measures implemented with the primary aim to increase seismic resistance contribute also to improved resistance against the wind. Since development of extreme meteorological conditions (except very strong wind) to severe loads on the plant requires certain time, the evaluations also show sufficient time margins for adoption of countermeasures in extreme conditions.

As already stated a new meteorological study has been developed for the Mochovce and Bohunice site. These new site data as well as ongoing plant upgrading measures and state of the art methodology will be taken into account in updating of the corresponding parts of the SARs also regarding extreme weather conditions (i. e. extreme wind, temperatures and humidity, snow amount, freeze and icing, and their combinations). This should include the detailed assessment of impact of extreme meteorological conditions on the vulnerability of high voltage line at the Bohunice and Mochovce sites. Among the prepared operational measures there are changes in plant operating procedures and preventive arrangements including increased frequency for plant walk-down to diesel generator stations during period of low temperatures, snowing and icing, and preventive measures at ambient temperatures bellow design values to maintain the functionality of the required equipment.

Loss of electrical power and loss of ultimate heat sink

Regarding the risk of loss of power supply it may be taken into account that in both sites there are 8 different options (with different vulnerability to external hazards) for providing power supply to plant home consumers (in addition to their redundancies); 5 of these options are independent on the electricity distribution grid. These various options can be activated either automatically or by plant staff within few tens of seconds up to two hours. There are back-up power sources capable to provide power supply for unlimited period of time. The same possibility is offered by connecting the NPPs to the preselected hydro plants. Internal power sources in the plant not dependent on the external grid include 3 x 100 % redundancy emergency DG with fuel reserves for 9 - 10 days. A decision on installation of DG dedicated to management of severe accidents has been made as a result of the conducted PSRs already before the Fukushima accident and implementation is currently in progress.

In addition mobile DGs for recharging the batteries in case of a long-term SBO and loss of all other AC power sources are being procured. Capacity of batteries was demonstrated to be sufficient for 8 - 11 hours and further margins exist in optimization of their use and possibility of their recharging from a DG currently being purchased.

Time margins to irreversible losses vary according the operating regimes and success of individual measures. Large number of combinations were analysed and addressed in the stress test report; only some of them are presented below. It was confirmed that there are inherent safety features of WWER-440/V213 contributing to significant time margins in case of loss of electric power and loss of ultimate heat sink, which include the large thermal inertia due to low power and comparably large amount of water both in primary and secondary system, as well as large volume of water inside the containment stored in the pressure suppression system potentially available for cooling of fuel.

Time margins in case of SBO occurring at full power, using only coolant inventory available in primary and secondary circuit is about 32 hours, using a mobile emergency source would extend the margin to more than 10 days, without any off-site assistance. For shutdown regimes this time interval is extended at least to 2.7 days, and with use of demineralised water emergency tanks up to 13 days. For loss of heat removal from the spent fuel pool, time margins without any operator actions are more than 30 hours for the most conservative case with complete off-loading of the core into the pool, or more than 150 hours for more realistic situations (for partial core unload). These margins can be further extended by about 4-14 hours using coolant from the bubbler condenser trays. Staff interventions by means of the fire trucks would resolve the issue for the unlimited period of time. Containment integrity in case of a complete loss of heat removal will be maintained (without staff actions) for at least 3 - 5 days.

For NPPs in Slovakia the external atmosphere serves as the primary ultimate heat sink, steam dumping to the atmosphere is an alternate mode of heat removal. Although this UHS in principle cannot be lost, the transport of heat to the UHS can be disabled. Such situations were subject to assessment within the stress tests. If normal plant cooling through the secondary circuit and cooling towers is not available, remaining options include direct release of steam from steam generators to atmosphere through the steam by-pass stations, or by primary circuit feed and bleed, or by heat removal through the essential service water system, the last one being qualified also for emergency conditions. Since failure of all essential service water systems could have serious consequences regarding heat removal from the core, from the spent fuel pool and from the containment, this case was analysed in detail in the stress tests as the most conservative one. If the loss of essential service water is not caused by the station black-out discussed above, loss of raw water supply should be considered. However, large water inventory of cooling water in each unit is sufficient for heat removal for about 8 to 16 days and on-site inventory for about a month. The case of a combined station black-out and loss of ultimate heat sink in case of WWER-440/V213 design is in fact covered by the station black-out only, since the station black-out is always connected with the loss of ultimate heat sink.

As described above, the evaluation of safety margins at station black-out proved the ability to ensure protection of safety barriers during considerably long time, thus providing sufficient time for accident

management actions for recovery of the plant power supply. Despite the robustness of the current plant design, the following improvements are still being considered:

- To increase resistance and reliability of AC emergency power supply for beyond design basis accidents by installation of new 6 kV emergency DG for severe accidents,
- To provide 0.4 kV DG for each unit for charging batteries and supplying selected unit consumers during SBO including modifications of the pumps of borated coolant system enabling their use during SBO,
- To provide technical solution and cable pre-preparation in order to facilitate mechanical interconnection of batteries between systems,
- To provide lowering the need for emergency illumination in order to extend life time of batteries (subdivision into sections with the possibility for switching off unnecessary consumers, use of energy saving bulbs),
- To provide monitoring system of capacity of batteries (for NPP Bohunice 3&4),
- To provide mobile measuring instruments able to use stabile measuring sensors without power supply,
- To provide vital power supply for containment drainage valves and hydroaccumulator isolation valves (for EMO),
- To consider possibility to control selected valves without vital power supply by means of small portable motor 3-phase generator 0.4 kV,
- To develop operating procedure for possible use of diesel generators installed in Levice switchyard for SBO event (for EMO),
- To assure long-term serviceability of communication means for MCR operators and shift service staff,

For enhanced resistance of the plant in the case of loss of UHS the following modifications are planned:

- To provide additional mobile high-pressure source of SG feedwater for each site, and to ensure logistics of supplies for the mobile source, with possible use for both EBO and EMO (the same nozzles),
- To establish the logistic system for provision of emergency feedwater to suction of mobile emergency pumps from external pure (potable water) water sources after exhaustion of demineralized water inventory,
- To modify connection of emergency mobile source of coolant to the emergency feedwater system suction and discharge with accessibility from the ground level (in EMO) in order to ensure availability of the source in cases of internal and external floods and fires,

- To construct a fixed line for maintaining the coolant inventory in SFP from a mobile source (fire pumps),
- To consider modifications providing for removal of steam from the SFP to the reactor hall and to the atmosphere is case of coolant boiling,
- To document behaviour of the reactor coolant pump seals at long-term failure of cooling (more than 24 hours) in the UHS loss regime.

Severe Accident Management

Development and implementation of the accident management programme including mitigation of severe accidents has been an on-going process in all nuclear units in Slovakia independently of the Fukushima accident. Symptom-based emergency operating procedures (EOPs) addressing design basis accidents and preventive part of severe accidents were fully implemented in NPP Bohunice 3&4 and EMO1&2 in 1999 (for events initiated during power operation) and in 2006 (for events initiated in the reactor under shutdown or in the spent fuel pool). Plant specific severe accident management guidelines (SAMG) were prepared for NPP Bohunice 3&4 and EMO1&2 during the period from 2002 to 2004. In 2004-2005, an overall study defining technical specification of modifications and extensions of the WWER 213 basic design needed for implementation of SAMG was prepared. The project of implementation of modifications to support the severe accident management on the basis of SAMG was proposed in compliance with all the requirements and recommendations in Slovak legislation in 2006 - 2007. The SAM implementation project was initiated in 2009 as the common NPP Bohunice 3&4 and EMO1&2 project with deadline in 2013 in EBO and the follow-up implementation in EMO1&2 (implementation accelerated after the Fukushima, with the new deadline 2015).

The measures being implemented include dedicated means for the primary circuit depressurization, hydrogen management using passive autocatalytic recombiners, containment under-pressure protection, in-vessel corium retention by strengthening of the reactor cavity and providing for its flooding, dedicated large external tanks with the boric acid solution with dedicated power source and pump aimed at possible spent fuel flooding, and serving as a supplementary source of coolant for the reactor cavity flooding and for washing out the fission products from the containment atmosphere, modifications enabling coolant make-up to the reactor cavity, spent fuel pool and external source tanks using mobile source connected to the external connection point on walls of the reactor building and auxiliary building, and associated I&C needed for severe accident management. The measures are being implemented for possible use of large amount of coolant from the water trays of the bubbler condenser as an additional source of coolant. Implementation of reliable in vessel molten corium retention prevents complicated ex-vessel phenomena associated with core-concrete interaction, direct containment heating, production of non-condensable gases leading to containment over pressurization, etc.; all these phenomena are associated with large uncertainties.

Large part of the required plant modifications has been already implemented (e. g. installation of autocatalytic recombiners, measures for flooding of the reactor cavity). The long term heat removal

from the containment is in the current scope of the SAM project ensured by recovery of service ability of the design basis equipment – the containment spray system.

SAM project being currently implemented in both NPP Bohunice 3&4 and EMO1&2 is based on originally defined scope with assumptions for occurrence of a severe accident on only one of two units. In view of the lessons learned the project completion will be followed by evaluation of a possible extension to management of a severe accident on both units at the same time. Further SAMG improvement and preparation of additional supporting documents for decision making by SAMG and main control room teams will be adopted based on results of validation at the project completion.

In this field the “Peer Review Country Report” contained several specific recommendations in this area.

Other measures resulting from the initiative of ÚJD SR

On the basis of comprehensive assessment of stress tests, the Extraordinary Review Meeting of the Convention on Nuclear Safety, as well as own findings, ÚJD SR proposed additional measures.

Regulatory approach

The available legislation provides for sufficient power and flexibility for the regulatory body to address situations like the Fukushima accident. In particular, the Atomic Act among other requires to reassess the safety level of nuclear facilities and to take adequate countermeasures after obtaining new significant information about the associated risks. The obligation to perform the relevant assessment and implement the countermeasures is put on the licence holder.

The regulatory body gradually updates the relevant legislation in accordance with the progress under the WENRA framework and IAEA Safety Standards.

After Fukushima, several meetings have been held between the operator (SE, a. s.) and ÚJD SR in order to provide for common understanding of the issues. ÚJD SR supported the assessment of the plant´s vulnerabilities and margins against external natural hazards as well as implementation of additional measures for further safety enhancement of the plants.

ÚJD SR is convinced that the process should not be finished by implementation of several individual actions and requires that new challenges as well as required upgrading will be comprehensively evaluated and reflected in the updated Safety Analysis Reports. This requirement applies in particular to the need of updating the Safety Analysis Reports in the area of site characteristics relevant for external and internal hazards as well as plant vulnerabilities and resistance against such hazards. It is specifically required that the comprehensive assessment of the extreme meteorological conditions will be performed and corresponding parts of the SARs will be updated in order to take into account new meteorological data, on-going plant upgrading measures and state of the art methodology.

In addition to existing activities ÚJD SR will ask for further systematic and comprehensive assessment of plant resistance to the station blackout and loss of ultimate heat sink taking into account the measures for increasing robustness of the plants. Similarly, adequacy of already available analyses

for the progression of severe accidents should be assessed. All the assessment should be followed by the evaluation of adequacy of hardware, procedural and organizational provisions for addressing such situations and corrections implemented, as necessary. In particular, occurrence of severe accidents in parallel at several units (up to all of them) in the given site under conditions of severely damaged area infrastructure should be considered. It is recommended to harmonize the approaches with the operators of similar reactor types, taking into account all relevant lessons learned from the stress tests. Completion of such works is preliminary expected in about 3 years.

Approval of the Action Plan

As regards the National Action Plan, this was submitted to the regulatory authority – ÚJD SR. For the purpose of its assessment an ad-hoc working group was established, which:

- considered the document in terms of its completeness when compared to the ENSREG, EC and CNS documents,
- assessed the appropriateness of each measure and its consistency with the previous ÚJD SR decisions,
- fixed the deadlines for individual measures.

After several meetings held between the operator and the ÚJD SR the National Action Plan was finalized.

In compliance with section 27 of the Atomic Act, ÚJD SR by its letter dated 28 December 2012 confirmed the proposed measures aimed at implementation of the National Action Plan.

Monitoring of the Action Plan implementation

Majority of tasks resulting from the National Action Plan are covered by ÚJD SR decisions issued in the past and in particular after completion of the periodic safety assessment of NPPs in the years 2008 and 2011. According to these decisions the operator is obliged to report to ÚJD SR on the course and the results of implementation at yearly intervals. Due to the specific nature of the stress tests ÚJD SR will perform activities within its annual inspection plan – inspections the aim of which will be to ascertain the factual implementation of measures. The annual inspection plan for 2013 was adopted by ÚJD SR on 19th December 2012.

During inspection the inspectors are authorized inter alia, to:

a) Enter at any time and without limitation to premises of licensees and to the nuclear facilities,
b) Carry out control, participate in tests and perform tasks with the aim to establish compliance with the requirements resulting from the law,
c) Request submission of documentation, records or other documentation necessary for performance of inspection activity,
d) Upon notice to the statutory body of the licensee or his authorized employee to take samples of necessary amount of materials or media that are in use,
e) Use technical means for making photo-documentation, video-documentation and audio-documentation necessary for performance of inspections,

f) Require maintaining of equipment, workplaces, constructions and buildings or parts thereof in their original condition until the completion of the screening,
g) Order performance of measurements, controls, tests and other actions needed for performance of inspection,

If any deficiency found during an inspection ÚJD SR can impose measures to remove the deficiencies, including binding deadlines for their fulfilment.

IV. Implementing measures

Several ENSREG recommendations adopted on the basis of the stress tests coincides with the on-going projects on:

1. Severe accidents management (SAM) such as
   - To analyse the necessity of filtered venting of the containment to support SAM
   - To analyse a response to severe accidents at multi units at the same site
2. NPP resistance against risks with very low probability of occurrence (occurrence less than 1.10-4/year)
   - External floods (spreading of floods inside the power plant, drain system capacity etc.)
   - Seismic event

The Action Plan reference documents are:

[1] ENSREG: Compilation of recommendations and suggestions, Peer review of stress tests performed on European nuclear power plants (26/07/2012)

[2] ENSREG: Peer review report Stress tests performed on European nuclear power plants (v12h-2012 04 25)

[3] ENSREG: Country peer review of Slovakia, Final report (March 2012)

[4] Communication from the Commission to the Council and the European Parliament, 4/10/2012, 571 final

[5] ÚJD SR: National report on the stress tests for nuclear power plants in Slovakia, 30 December 2011

[6] Final report on the Stress Tests for NPPs in Slovakia (December 2011)

[7] WANO: SOER 2011-2, 3, 4

[8] 2nd Extraordinary Meeting of the Contracting Parties to the Convention on Nuclear Safety – Final Summary Report

The measures, from which some have been already implemented, are divided into the following groups:

- Short-term – to be finished by 31/12/2013
- Medium-term – to be finished by 31/12/2015
- Additional measures, which may result from analyses defined by medium-term measures, will be implemented after 2015

The short-term measures cover elimination of defects found out during an inspection in the site of both NPPs immediately after the Fukushima accident in compliance with WANO SOER 2011 - 2, 3, 4 documents

RECOMMENDATIONS OF TOPIC 1 (NATURAL RISKS)

ID	Source	Recommendation	Fulfilment of recommendation	EBO3&4	EMO1&2	MO34
1.	ENSREG Compilation of recommendations 2.2	Periodic safety review	Re-assessment of natural risks as a part of periodic safety assessments.	fulfilled	fulfilled	fulfilled
2.	ENSREG Compilation of recommendations 2.3 EC Communication – specific to Slovakia 5.11 XCNS	Confinement integrity	To analyse a necessity of filtered venting of the containment and other potential technical measures for long-term heat removal from the containment and reduction of radiation load of the environment taking into account activities in this area at other operators of WWER-440/V213 NPP types and considering measures implemented within the SAM project.	31/12/2015	31/12/2015	31/12/2015
3.	ENSREG Compilation of recommendations 2.4	Prevention of accidents because of natural risks and limitation of their consequences	The recommendation covers all integrated tasks from the Action Plan.	31/12/2015	31/12/2015	31/12/2015

ID	Source	Recommendation	Fulfilment of recommendation	EBO3&4	EMO1&2	MO34
4.	ENSREG Compilation of recommendations 3.1.1 XCNS	Hazard frequency related to weather	To evaluate resistance of selected systems, structures and components (SSC) at extreme external events (floods caused by heavy rain, high and low external temperatures, direct wind and other relevant events for the given locality) on the basis of updated new studies on meteorological conditions for Jaslovské Bohunice and Mochovce localities, and to consider events with intensity corresponding to the probability of occurrence once per 10,000 years or less; to prepare a plan for implementation of additional measures or to implement them.	to prepare the plan of implementation of additional measures by 31/12/2013	to prepare the plan of implementation of additional measures by 31/12/2013	before put of the respective unit into operation, common EMO structures before put of Unit 3 into operation
5.	EC Communication Annex	Hazard frequency related to seismicity	To analyse seismic margins of selected systems, structures and components (SSC).To evaluate the resistance of selected SSC at a seismic event with intensity corresponding to the probability of occurrence less than once per 10,000 years.	31/12/2013	31/12/2013	before put of the respective unit into operation, common EMO structures before put of Unit 3 into operation

ID	Source	Recommendation	Fulfilment of recommendation	EBO3&4	EMO1&2	MO34
6.	EC Communication Annex EC Communication– specific to Slovakia 5.11	Seismicity – minimum peak ground acceleration 0,1 g	To immediately prepare priorities for determination of an order of actions implemented within the seismic reinforcement of EMO1&2 SSC on the basis of their contribution to safety; to include seismic reinforcement of EMO common structures to actions with the highest priority. To implement the seismic reinforcement of relevant SSC based on the valid UJD SR decision No 100/2011, taking into account the set order.	not relevant (implemented)	to make the seismic reinforcement of structures with the set highest priority by 31/12/2015	included in the basic design
7.	ENSREG Compilation of recommendations 3.1.2	Secondary effects of earthquakes	To prepare a scenario for put of SE units into safe condition after a seismic event.	fulfilled	fulfilled	before put of the respective unit into operation, common EMO structures before put of Unit 3 into operation

ID	Source	Recommendation	Fulfilment of recommendation	EBO3&4	EMO1&2	MO34
8.	ENSREG Compilation of recommendations 3.1.3 Peer review country Report of the SR 4.3 EC Communication Annex EC Communication – specific to Slovakia 5.11	Protection against penetration of water into buildings. Proving of protection against floods for identified rooms and	To evaluate resistance of selected systems, structures and components (SSC) at extreme external events (floods caused by heavy rain, high and low external temperatures, direct wind and other relevant events for the given locality) on the basis of updated new studies on meteorological conditions for Jaslovské Bohunice and Mochovce localities, and to consider events with intensity corresponding to the probability of occurrence once per 10,000 years or less; to prepare a plan for implementation of additional measures or to implement them.	to prepare the plan of implementation of additional measures by 31/12/2013	to prepare the plan of implementation of additional measures by 31/12/2013	before put of the respective unit into operation, common EMO structures before put of Unit 3 into operation
9.	ENSREG Compilation of recommendations 3.1.4	Notices on time warning	To implement the warning and notification system in case of deteriorating weather and to implement procedures of NPP operating staff response.	31/12/2013	31/12/2013	before put of the respective unit into operation
10.	ENSREG Compilation of recommendations 3.1.5 EC Communication Annex	Monitoring of seismicity	Arrangement of Mochovce seismic stations was proposed and built based on detailed seismic and geological survey prepared by the Geophysical Institute of the Slovak Academy of Science and reviewed by IAEA missions in 1998 and 2004.Monitoring results are summarized in quarterly reports. In case of stronger seismic events, the analysis results are prepared within two days from their recording.	completed	completed	completed

ID	Source	Recommendation	Fulfilment of recommendation	EBO3&4	EMO1&2	MO34
11.	ENSREG Compilation of recommendations 3.1.6	Qualified walkdowns	To prepare regulations for qualified walkdowns related to natural risks and to update them after preparation of an international guide.	31/12/2015	31/12/2015	before put of the respective unit into operation
12.	ENSREG Compilation of recommendations 3.1.7	Assessment of reserves for floods	To analyse maximal potential water levels in the locality on the basis of 10,000 annual values. To specify places where water collects. To immediately implement temporary solutions and to propose a final solution.	31/12/2013	31/12/2013	included in the basic design
13.	Peer review country report of the SR 2.3.3	Reserves at external risks	To evaluate resistance of selected systems, structures and components (SSC) at extreme external events (floods caused by heavy rain, high and low external temperatures, direct wind and other relevant events for the given locality) on the basis of updated new studies on meteorological conditions for Jaslovské Bohunice and Mochovce localities, and to consider events with intensity corresponding to the probability of occurrence once per 10,000 years or less; to prepare a plan for implementation of additional measures or to implement them.	to prepare the plan of implementation of additional measures by 31/12/2013	to prepare the plan of implementation of additional measures by 31/12/2013	before put of the respective unit into operation, common EMO structures before put of Unit 3 into operation
14.	ENSREG Compilation of recommendations 3.1.8	Protection against extreme weather conditions	To update the meteorological study for Mochovce and Bohunice localities.	completed	completed	included in the basic design

ID	Source	Recommendation	Fulfilment of recommendation	EBO3&4	EMO1&2	MO34
15.	**Peer review country report of the SR 2.2.3** **EC Communication– specific to Slovakia 5.11** **XCNS**	**Regulatory monitoring of actions (flooding)**	**The activity is subject to regulatory review and inspection**	**annually**	**annually**	**annually**
16	**Peer review country report of the SR 2.3.3** **EC Communication– specific to Slovakia 5.11** **XCNS**	**Regulatory monitoring of actions (extreme weather conditions)**	**The activity is subject to regulatory review and inspection**	**annually**	**annually**	**annually**
17	**Peer review country Report of the SR 2.1.3**	**Regulatory monitoring of actions (seismic upgrade)**	**The activity is subject to regulatory review and inspection**	**annually**	**annually**	**annually**

RECOMMENDATIONS OF TOPIC 2 (LOSS OF SAFETY SYSTEMS)

ID	Source	Recommendation	Fulfilment of recommendation	EBO3&4	EMO1&2	MO34
18.	ENSREG Compilation of recommendations 3.2.1	Alternative cooling and heat sink	To diversify the emergency feedwater source to SG by assurance of mobile high-pressure sources.	31/12/2013	31/12/2013	before put of the respective unit into operation
			To review physical availability of technology needed for gravity filling of SG from feedwater tanks in case of SBO.	31/12/2013	31/12/2013	before put of the respective unit into operation
			To finish required modifications of existing equipment for connection of diverse mobile feedwater and power sources resistant to external events.	31/12/2015	31/12/2015	before put of the respective unit into operation
			To analyse and if needed to ensure means for cooling water make up from in-site and off-site water sources in the case of lack of cooling water, incl. preparation of respective procedures.	31/12/2013	31/12/2013	before put of the respective unit into operation
19.	ENSREG Compilation of recommendations 3.2.2	AC Power supplies	To install a 400 kV circuit breaker in the local substation for disconnection of units from the power grid and thus to enable operation in the home consumption mode in the case of damaged transmission lines.	completed	to submit a time schedule of additional installation of a 400 kV circuit breaker by 31/12/2014	in the basic design

ID	Source	Recommendation	Fulfilment of recommendation	EBO3&4	EMO1&2	MO34
			To update the operating documentation for SG – at DG start and failure of SG connection to the 6 kV section of the emergency power supply of the 2nd category	completed	Fulfilled	before put of the respective unit into operation
			To diversify emergency power sources by assurance of mobile DG.	31/12/2013	31/12/2013	before put of the respective unit into operation
20.	ENSREG Compilation of recommendations 3.2.3	Power supply (DC)	To diversify emergency power sources by assurance of mobile DG for charging of accumulator batteries.	31/12/2013	31/12/2013	before put of the respective unit into operation
21.	ENSREG Compilation of recommendations 3.2.4	Operating and preparation activities	To prepare operating regulations and to implement training programmes for operators of diversity mobile devices.	31/12/2015	31/12/2015	before put of the respective unit into operation
22.	ENSREG Compilation of recommendations 3.2.5	Instrumentation and monitoring	To specify a list of important parameters needed for monitoring of safety functions.	completed	completed	before put of the respective unit into operation
			To analyse the availability of important parameters, and if needed, to ensure mobile measuring units which can use stabile sensors also without standard power supply.	31/12/2015	31./12/2015	before put of the respective unit into operation
23.	ENSREG Compilation of recommendations 3.2.6	Improvement of shutdown	To diversify emergency power sources by assurance of mobile DG.	31/12/2013	31/12/2013	before put of the respective unit into operation

ID	Source	Recommendation	Fulfilment of recommendation	EBO3&4	EMO1&2	MO34
			To finish required modifications of existing equipment to enable connection of diverse feedwater sources and power sources ensuring physical access and resistance under conditions evoked by an external event.	**31/12/2015**	**31/12/2015**	**before put of the respective unit into operation**
24.	**ENSREG Compilation of recommendations 3.2.7**	**Seals of reactor coolant pumps**	**To check if the existing procedures sufficiently solve the situation after de-sealing of RCP glands.**	**completed**	**completed**	**before put of the respective unit into operation**
			To obtain data documenting behaviour of RCP glands at long-term failure of cooling (more than 24 hours) and to prepare a plan of potential necessary measures.	**31/12/2013**	**31/12/2013**	**before put of the respective unit into operation**
25.	**ENSREG Compilation of recommendations 3.2.8**	**Venting**	**To finish required modifications of existing equipment for connection of diverse mobile feedwater and power sources.**	**31/12/2015**	**31/12/2015**	**before put of the respective unit into operation**
			To analyse conditions of the environment of rooms where equipment for control of events with long-term station blackout (SBO) and events with long-term loss of ultimate heat sink (UHS) and severe accidents is situated. To prepare a plan of required measures.	**31/12/2013**	**31/12/2013**	**before put of the respective unit into operation**

ID	Source	Recommendation	Fulfilment of recommendation	EBO3&4	EMO1&2	MO34
26.	ENSREG Compilation of recommendations 3.2.9	Main control room and emergency control room	To diversify emergency power sources by assurance of mobile DG.	31/12/2013	31/12/2013	before put of the respective unit into operation
			To consider the SAM project requiring remote control of selected equipment installed within the project in all EMO units in the on-going project of EMO Emergency Centre modification.	Not relevant	31/12/2015	before put of the respective unit into operation
27.	EC Communication Annex	External hazard safety	To analyse seismic margins of selected systems, structures and components (SSC).To evaluate the resistance of selected SSC at a seismic event with intensity corresponding to the probability of occurrence less than once per 10,000 years.	31/12/2013	31/12/2013	before put of the respective unit into operation, common EMO structures before put of Unit 3 into operation
27.bis	ENSREG Compilation of recommendations 3.2.10	Spent fuel pool	To analyse the SAM project from the viewpoint of severe accident management at multi units (all) at the same site (fuel situated in the reactor core and in the spent fuel pool); to modify the SAM project, if needed, so that sufficient measures can be implemented. To prepare a plan of implementation of additional measures for extension of the SAM project to improve the severe accident manageability at its simultaneous occurrence in all units at the same site.	analysis and plan of implementation of additional measures by 31/12/2014	analysis and plan of implementation of additional measures by 31/12/2014	analysis and plan of implementation of additional measures by 31/12/2014
28.	ENSREG Compilation of recommendations 3.2.11	Isolation and independency	To diversify the emergency feedwater source to SG by assurance of mobile high-pressure sources.	31/12/2013	31/12/2013	before put of the respective unit into operation

ID	Source	Recommendation	Fulfilment of recommendation	EBO3&4	EMO1&2	MO34
			To diversify emergency power sources by assurance of mobile DG.	31/12/2013	31/12/2013	before put of the respective unit into operation
			To finish required modifications of existing equipment to enable connection of diverse feedwater sources and power sources ensuring physical access and resistance under conditions evoked by an external event.	31/12/2015	31/12/2015	before put of the respective unit into operation
29.	ENSREG Compilation of recommendations 3.2.12	Flow path and access availability	To prepare operating regulations and to implement training programmes for operators.	31/12/2015	31/12/2015	before put of the respective unit into operation
			To diversify emergency power sources by assurance of mobile DG.	31/12/2013	31/12/2013	before put of the respective unit into operation
			To finish required modifications of existing equipment to enable connection of diverse feedwater sources and power sources ensuring physical access and resistance under conditions evoked by an external event.	31/12/2015	31 12/2015	before put of the respective unit into operation
			To diversify the emergency feedwater source to SG by assurance of mobile high-pressure sources.	31/12/2013	31/12/2013	before put of the respective unit into operation
30.	ENSREG Compilation of recommendations 3.2.13	Mobile devices	To diversify the emergency feedwater source to SG by assurance of mobile high-pressure sources.	31/12/2013	31/12/2013	before put of the respective unit into operation
			To diversify emergency power sources by assurance of mobile DG.	31/12/2013	31/12/2013	before put of the respective unit into operation

ID	Source	Recommendation	Fulfilment of recommendation	EBO3&4	EMO1&2	MO34
			To finish required modifications of existing equipment to enable connection of diverse feedwater sources and power sources ensuring physical access and resistance under conditions evoked by an external event.	**31/12/2015**	**31/12/2015**	**before put of the respective unit into operation**
			To prepare operating regulations and to implement training programmes for operators of diversity mobile devices.	**31/12/2015**	**31/12/2015**	**before put of the respective unit into operation**
31.	**ENSREG Compilation of recommendations 3.2.14**	**Bunkered/Hardened systems**	**To finish required modifications of existing equipment to enable connection of diverse feedwater sources and power sources ensuring physical access and resistance under conditions evoked by an external event.**	**31/12/2015**	**31/12/2015**	**before put of the respective unit into operation**
32.	**ENSREG Compilation of recommendations 3.2.15**	**Multiple accidents**	**To analyse the SAM project from the viewpoint of severe accident management at multi units(all) at the same site (fuel situated in the reactor core and in the spent fuel pool); to modify the SAM project, if needed, so that sufficient measures can be implemented. To prepare a plan of implementation of additional measures for extension of the SAM project to improve the severe accident manageability at its simultaneous occurrence in all units at the same site.**	**analysis and plan of implementation of additional measures by 31/12/2014**	**analysis and plan of implementation of additional measures by 31/12/2014**	**analysis and plan of implementation of additional measures by 31/12/2014**

ID	Source	Recommendation	Fulfilment of recommendation	EBO3&4	EMO1&2	MO34
33.	**ENSREG Compilation of recommendations 3.2.16**	**Equipment inspection and training programmes**	**To prepare operating regulations and to implement training programmes for operators of diversity mobile devices.**	**31/12/2015**	**31/12/2015**	**before put of the respective unit into operation**
34.	**ENSREG Compilation of recommendations 3.2.17**	**Further studies to address uncertainties**	**To analyse the SAM project from the viewpoint of severe accident management at multi units(all) at the same site (fuel situated in the reactor core and in the spent fuel pool); to modify the SAM project, if needed, so that sufficient measures can be implemented. To prepare a plan of implementation of additional measures for extension of the SAM project to improve the severe accident manageability at its simultaneous occurrence in all units at the same site.**	**analysis and plan of implementation of additional measures by 31/12/2014**	**analysis and plan of implementation of additional measures by 31/12/2014**	**analysis and plan of implementation of additional measures by 31/12/2014**

ID	Source	Recommendation	Fulfilment of recommendation	EBO3&4	EMO1&2	MO34
35.	**EC Communication Annex**	**The time the operator has at disposal for recovery of safety functions in case of SBO and/or loss of UHS should be longer than an hour.(without human action)**	***Core reactivity control:*** It the unit is not cooled below 238°C during SBO, no fuel damaging occurs due to loss of sub-criticality. **Heat removal from PC** Due to interruption of feedwater supply and failure of RCP after SBO, the residual heat removal from the core in the natural circulation regime is to the detriment of gradual reduction of the secondary circuit coolant. Exploitation of nominal inventory of coolant in SG occurs during 5 hours. **Containment integrity** After two days, 60 ºC is expected in the containment wall centre. The containment integrity isn't endangered at this temperature. **Coolant inventory in PC** Time reserve: PC coolant inventory is sufficient for fuel cooling for 24 hours.	**completed**	**completed**	**part of design**
36.	**EC Communication Annex**	**EOPs should cover all conditions of a power plant (from full power to shut-down reactor)**	**Symptom-oriented regulations for design basis and beyond-design basis emergency conditions were fully implemented in EMO1,2 and EBO3&4 in 1999 (for events initiated during power operation) and in 2006 (for events initiated at shut-down reactor or in SFP).**	**completed**	**completed**	**basic design**

RECOMMENDATIONS OF TOPIC 3 (SEVERE ACCIDENT MANAGEMENT)

ID	Source	Recommendation	Fulfilment of recommendation	EBO3&4	EMO1&2	MO34
37.	**ENSREG Compilation of recommendations 3.3.1**	**Reference WENRA levels**	A. **Incorporation of reference WENRA values related to severe accident management (SAM) to the national legal framework.**	**implemented**	**implemented**	**implemented**
			B. To implement the SAM project.	**31/12/2013**	**31/12/2015**	**included in the basic design**
38.	**ENSREG Compilation of recommendations 3.3.2** **XCNS**	**SAM technical measures**	**To implement the SAM project.**	**31/12/2013**	**31/12/2015**	**included in the design**
39.	**ENSREG Compilation of recommendations 3.3.3**	**Evaluation of SAM measures after severe external events**	**To analyse the SAM project from the viewpoint of severe accident management at multi units(all) at the same site (fuel situated in the reactor core and in the spent fuel pool); to modify the SAM project, if needed, so that sufficient measures can be implemented. To prepare a plan of implementation of additional measures for extension of the SAM project to improve the severe accident manageability at its simultaneous occurrence in all units at the same site.**	**analysis and plan of implementation of additional measures by 31/12/2014**	**analysis and plan of implementation of additional measures by 31/12/2014**	**analysis and plan of implementation of additional measures by 31/12/2014**

ID	Source	Recommendation	Fulfilment of recommendation	EBO3&4	EMO1&2	MO34
40.	**ENSREG Compilation of recommendations 3.3.4**	**Update of severe accident management guidelines (SAMG)**	**To analyse the SAM project with regard to potential damage of infrastructure, including violation of communication at a level of power plant, branch and state, long-term accidents (taking several days) and accidents with an impact on several units and neighbouring industrial facilities.**	**analysis and plan of implementation of additional measures by 31/12/2015**	**analysis and plan of implementation of additional measures by 31/12/2015**	**before put of the respective unit into operation**
41.	**ENSREG Compilation of recommendations 3.3.5**	**SAMG verification**	**To analyse the SAM project from the viewpoint of severe accident management at multi units(all) at the same site (fuel situated in the reactor core and in the spent fuel pool); to modify the SAM project, if needed, so that sufficient measures can be implemented. To prepare a plan of implementation of additional measures for extension of the SAM project to improve the severe accident manageability at its simultaneous occurrence in all units at the same site.**	**analysis and plan of implementation of additional measures by 31/12/2014**	**analysis and plan of implementation of additional measures by 31/12/2014**	**analysis and plan of implementation of additional measures by 31/12/2014**
42.	**ENSREG Compilation of recommendations 3.3.6**	**SAM exercises**	**To prepare conditions for cooperation with selected external organisations at emergency response control during external events and severe accidents.**	**31/12/2014**	**31/12/2014**	**before put of the respective unit into operation, common EMO structures before put of Unit 3 into operation**
			Review of the national emergency arrangements based on the outcomes of the so called HAVRAN exercise.	**31/12/2014**	**31/12/2014**	**31/12/2014**

ID	Source	Recommendation	Fulfilment of recommendation	EBO3&4	EMO1&2	MO34
43.	**ENSREG Compilation of recommendations 3.3.7**	**SAM training**	**Based on the extended SAM to modify the SAM training taking into account the severe accident occurrence at multi (all) units at the same site.**	**analysis and plan of implementation of additional measures by 31/12/2014**	**analysis and plan of implementation of additional measures by 31/12/2014**	**analysis and plan of implementation of additional measures by 31/12/2014**
44.	**ENSREG Compilation of recommendations 3.3.8** **EC Communication Annex**	**Extension of SAMG to all plant states**	**To analyse the SAM project from the viewpoint of severe accident management at multi units(all) at the same site (fuel situated in the reactor core and in the spent fuel pool); to modify the SAM project, if needed, so that sufficient measures can be implemented. To prepare a plan of implementation of additional measures for extension of the SAM project to improve the severe accident manageability at its simultaneous occurrence in all units at the same site.**	**analysis and plan of implementation of additional measures by 31/12/2014**	**analysis and plan of implementation of additional measures by 31/12/2014**	**analysis and plan of implementation of additional measures by 31/12/2014**
45.	**ENSREG Compilation of recommendations 3.3.9**	**Improved communications**	**To consider the SAM project requiring remote control of selected equipment installed within the project in all EMO units in the on-going project of EMO Emergency Centre modification.**	**completed**	**31/12/2015**	**before put of the respective unit into operation**

ID	Source	Recommendation	Fulfilment of recommendation	EBO3&4	EMO1&2	MO34
46.	**ENSREG Compilation of recommendations 3.3.10** **EC Communication Annex**	**Presence of hydrogen in unexpected places**	**To implement the SAM project.**	**31/12/2013**	**31/12/2015**	**included in the design**
			To analyse the SAM project from the viewpoint of potential migration of hydrogen to other places.	**31/12/2015**	**31/12/2015**	**before put of the respective unit into operation**
47.	**ENSREG Compilation of recommendations 3.3.11**	**Large volumes of contaminated water**	**To prepare solutions for treatment of large volumes of contaminated water after an accident at a study level from the conceptual viewpoint.**	**31/12/2015**	**31/12/2015**	**31/12/2015**
48.	**ENSREG Compilation of recommendations 3.3.12**	**Radiation protection**	**To implement the SAM project.**	**31/12/2013**	**31/12/2015**	**included in the basic design**
			To analyse the SAM project from the viewpoint of severe accident management at multi units (all) at the same site (fuel situated in the reactor core and in the spent fuel pool); to modify the SAM project, if needed, so that sufficient measures can be implemented. To prepare a plan of implementation of additional measures for extension of the SAM project to improve the severe accident manageability at its simultaneous occurrence in all units at the same site.	**analysis and plan of implementation of additional measures by 31/12/2014**	**analysis and plan of implementation of additional measures by 31/12/2014**	**analysis and plan of implementation of additional measures by 31/12/2014**
49.	**ENSREG Compilation of recommendations 3.3.13** **EC Communication Annex**	**On site emergency center**	**To consider the SAM project requiring remote control of selected equipment installed within the project in all EMO units in the on-going project of EMO Emergency Centre modification.**	**completed**	**31/12/2015**	**before put of the respective unit into operation**

ID	Source	Recommendation	Fulfilment of recommendation	EBO3&4	EMO1&2	MO34
50.	**ENSREG Compilation of recommendations 3.3.14**	**Support of local operators**	**To prepare conditions for cooperation with selected external organisations at emergency response control during external events and severe accidents.**	**31/12/2014**	**31/12/2014**	**before put of the respective unit into operation, common EMO structures before put of Unit 3 into operation**
51.	**ENSREG Compilation of recommendations 3.3.15**	**Level 2 Probabilistic Safety Assessment**	**The PSA Level 2 was prepared for EBO3&4 in 2001 and it was updated in 2010.** **The PSA studies for EMO1&2 have similar scope even though they were prepared with a certain delay due to later start-up of the power plant.**	**completed**	**completed**	**before put of the respective unit into operation**
52.	**ENSREG Compilation of recommendations 3.3.16**	**Severe accident studies.**	**To analyse the SAM project from the viewpoint of severe accident management at multi units (all) at the same site (fuel situated in the reactor core and in the spent fuel pool); to modify the SAM project, if needed, so that sufficient measures can be implemented. To prepare a plan of implementation of additional measures for extension of the SAM project to improve the severe accident manageability at its simultaneous occurrence in all units at the same site.**	**analysis and plan of implementation of additional measures by 31/12/2014**	**analysis and plan of implementation of additional measures by 31/12/2014**	**analysis and plan of implementation of additional measures by 31/12/2014**

ID	Source	Recommendation	Fulfilment of recommendation	EBO3&4	EMO1&2	MO34
53.	**Peer review country Report of the SR 4.3** **EC Communication– specific to Slovakia 5.11**	**SAM modification implemented according to the proposed schedule**	**The activity is subject to regulatory review and inspection**	**annually**	**annually**	**annually**
54.	**Peer review country Report of the SR 4.3**	**To verify leak-tightness of all penetrations (e.g. RPV cap, SG cap) through the containment under severe accident conditions (in particular leak-tightness of seals).**	**To analyse the SAM project from the viewpoint of resistance of seals and penetrations of the containment under severe accident conditions.**	**analysis and plan of implementation of additional measures by 31/12/2014**	**analysis and plan of implementation of additional measures by 31/12/2014**	**analysis and plan of implementation of additional measures by 31/12/2014**
55.	**Regulatory initiative**	**The concept of large-area fire control – (bigger than considered in the design)**	**To prepare the fire control documentation – operative plan of large-area fire control.**	**31/12/2015**	**31/12/2015**	**31/12/2015**
			To analyse the PFB equipment for control of large-area fire and to propose additional equipping with required technology.	**31/12/2015**	**31/12/2015**	**31/12/2015**
			To include a periodical training in large-area fire control and disposal of its consequences into the plan of educational activities of EBO3&4 and EMO PFB personnel.	**31/12/2015**	**31/12/2015**	**31/12/2015**
			To ensure a periodical drill of EBO3&4 and EMO PFB personnel in a certified training centre aimed at control of large-area fires.	**31/12/2015**	**31/12/2015**	**31/12/2015**

ID	Source	Recommendation	Fulfilment of recommendation	EBO3&4	EMO1&2	MO34
56.	**Regulatory initiative**	**Physical protection**	**To harmonise the implementation of additional SAM measures with potential new increased requirements for physical protection in case of aggravated assaults.**	**31/12/2014**	**31/12/2014**	**31/12/2014**
57.	**Regulatory initiative**	**Emergency arrangements**	**Comprehensive review of the national emergency arrangements based on the outcomes of the so called HAVRAN exercise.**	**31/12/2014**	**31/12/2014**	**31/12/2014**