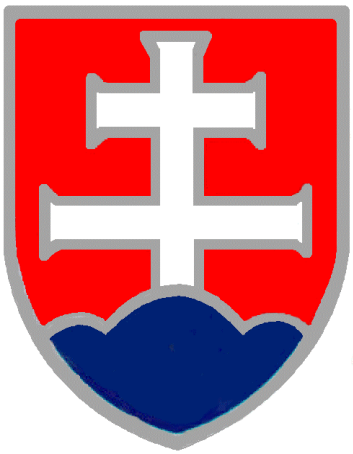
# NATIONAL ACTION PLAN
# of the
# SLOVAK REPUBLIC



**ENSREG**

**Workshop 20 – 24 April 2015**

**Nuclear Regulatory Authority of the Slovak Republic**

**(UJD SR)**

**December 2014**

# Content

# Abbreviations

| | |
|---|---|
| AC | Alternating Current |
| CCS | Central Crisis Staff |
| DG | Diesel Generator |
| EBO | Bohunice Power Plant |
| 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 |
| MDBE | Maximal Designe Basic Earthquake |
| 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. | SlovenskéElektrárne, 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 |

# Preface

The main goal of the 2015 workshop is to use a similar process as in 2013 to peer review the progress with implementation of the National Action Plan (NAcP). Additionally, an exchange of technical information on measures and activities as contained in the NAcP Terms of Reference is expected. This document reports on:

- Progress with implementation of the individual actions within the NAcP;
- Relevant outcomes of studies and analyses identified in the NAcP, and completed since the 2013 workshop;
- Challenges and good practices identified during the implementation of the NAcP.

This report is available on the web page of ENSREG and at UJD SR web page (www.ujd.gov.sk).

# I. Introduction

Following the accident at Fukushima Daiichi in 2011, the European Union countries that operate nuclear power plants each produced a national action plan (NAcP). These plans identified the actions necessary to ensure national improvements in nuclear safety from the lessons learned from a series of reviews at national, European and international level focusing on the NPPs, and within the Terms of Reference of ENSREG.

A NAcP workshop was held in Brussels on 22 – 26 April 2013 to discuss and review the status of implementation of the NAcPs for the EU countries together with Switzerland and Ukraine. A publicly available report of the workshop was issued on the ENSREG website.

The main goal of the 2013 workshop, as expressed in the ENSREG Action Plan, was to present NAcPs and to peer review them via a common discussion.

In relation to Slovakia: the 2013 workshop made the following main findings:

The NAcP follows the Structure proposed in the ENSREG Action Plan. It contains comprehensive information on the actions planned post-Fukushima, as well as on earlier safety improvements and measures.

The actions listed in the Slovak NAcP over the ENSREG recommendations and the Country Peer Review recommendations.

A considerable part of the measures listed is in an advanced stage of implementation or concerns analyses, studies and planning further measures. There is a clear schedule for these measures. Depending on the outcome of analyses to be performed until 2015, the implementation of the technical and administrative findings will take place after 2015.

The correspondence between measures planned pre-Fukushima and post-Fukushima does not become entirely clear from the NAcP; however, this is a complex matter and some explanations have been provided at the Workshop.

It is a complex task to integrate these two categories and to generate a consistent overall schedule. Such a schedule has been developed reflecting both categories of measures. It should also be appreciated that a number of safety improvements was initiated long before the Fukushima accident as a result of the Periodic Safety Review, and the Stress Tests only confirmed that the right decisions had been taken.

Good practices could be identified in the NAcP, in particular in respect to the systematic use of Periodic Safety Reviews to identify improvement measures, the implementation of in vessel retention which is already completed, and the application of a return frequency of $10^{-4}$/year for extreme weather events, as basis for the evaluation of safety important components and systems.

All countries committed to continue implementation of their NAcP until all activities and measures had been finalised. Many countries intended to have a significant proportion completed by end of 2014. Nevertheless, some of the actions in the NAcPs were further studies and the results of these may

require additional measures. The 2013 workshop, therefore, concluded that an additional peer review workshop, to be organised in 2015 and based on WENRA reference levels and safety objectives (to the extent practicable taking into account that WENRA approved the updated reference levels only recently in 2014), would provide added value in terms of understanding of the extent and the nature of measures to be implemented and a valuable opportunity for exchange of information among participants.

The main goal of the 2015 workshop is to use a similar process to peer review progress with implementation of the NAcPs. Additionally, an exchange of technical information on measures and activities as contained in the NAcPs is expected. This document reports on:

- Progress with implementation of the individual actions within the NAcP;
- Relevant outcomes of studies and analyses identified in the NAcPs, and completed since the 2013 workshop;
- Challenges and good practices identified during the implementation of the NAcP.

# General information

**Regulatory Framework**

The state regulatory authority performing the state supervision upon nuclear safety of nuclear installations is the Nuclear Regulatory Authority of the Slovak Republic (UJD SR). The state supervision over nuclear safety is performed in accordance with the Atomic Act (No. 541/2004 Coll.) 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 in 2011 - 2012, in line with the progress in the development of the IAEA Safety Standards and WENRA Reference Levels. Radiation protection is performed by the Public Health Authority (ÚVZ SR) in accordance with the Act No. 355/2007 Coll.

The most significant change in the legal framework is the Act No. 143/2013 Coll. by which the Act No. 541/2004 Coll. (Atomic Act) was amended. The amendment relates to:

- implement Council Directive 2011/70/Euratom establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste,
- increase the amounts of liability in case of a nuclear or radiation accident,
- new provisions to finance nuclear regulatory activities. This amendment entered into force on 1st August 2013 (liability provisions entered into force on 1st January 2014),
- emergency preparedness.

**WENRA Reference Levels**

One of the objectives of WENRA, as stated in its terms of reference, is to develop a harmonized approach to nuclear safety and radiation protection issues and their regulation in Europe. A significant contribution to this objective was the publication, in 2006, of a report on harmonisation of reactor safety in WENRA countries. This report addressed the nuclear power plants in operation and it included “Safety Reference Levels” (SRLs), which reflected expected practices to be implemented in the WENRA countries. The SRLs were updated twice in 2007 and again in 2008.

The SRLs have been established for greater harmonisation within WENRA countries raising the level of nuclear safety in Europe by their implementation in the national regulatory framework and in the nuclear power plants (NPPs). The emphasis of the SRLs has been on nuclear safety, primarily focussing on safety of the reactor core and spent fuel. The SRLs specifically exclude nuclear security and with a few exceptions, radiation safety.

RHWG agreed that the rules for this quantitative reporting would be as follows:

(1) it is limited to the regulatory side,
(2) the status is as of the end of each year,
(3) only reference levels (RLs) transposed into a published national requirement (as defined by WENRA, i. e. national regulation or publicly issued recommendation) are credited as „harmonised“.

Based on this evaluation full harmonisation of safety regulations with WENRA Reference Levels 2008 has been achieved in Slovakia**/1/.**

WENRA members are committed to continuous improvement of nuclear safety in their countries. Within this spirit WENRA emphasizes identifying the insights from the Fukushima Dai-ichi accident in March 2011 and operators improving NPP safety accordingly. For this purpose, WENRA mandated its Reactor Harmonization Working Group (RHWG) to review and revise the SRLs for existing reactors with the aim to integrate the lessons learned from the 2011 Fukushima Dai-ichi accident.

The national regulators make a commitment to improve and harmonize their national regulatory systems, by implementing the new SRLs until 2017 as a target date.

In August 2014 UJD SR Board approved “The principles of new Atomic Act”. The principles represent the basis for the work of a Working Group to prepare a new Atomic Act. A draft of new Atomic Act as a result of the Working Group is expected to be completed by May 2015 and the new Atomic Act will be published by the end of 2015. The new/revised Atomic Act will take into account new EU legal documents e. g. Directive 2014/87/Euratom, Directive 2013/59/Euratom as well as the latest WENRA ReferenceLevels (2014).

**Nuclear Power Plants**

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, updated in2014 |
| Latest update of PSA Level 1/Level 2 | 2010,updated in 2014/2014 | 2010-2011 | 2008, update in progress |
| Last Periodic Safety Review | 2008 | 2009 | - |

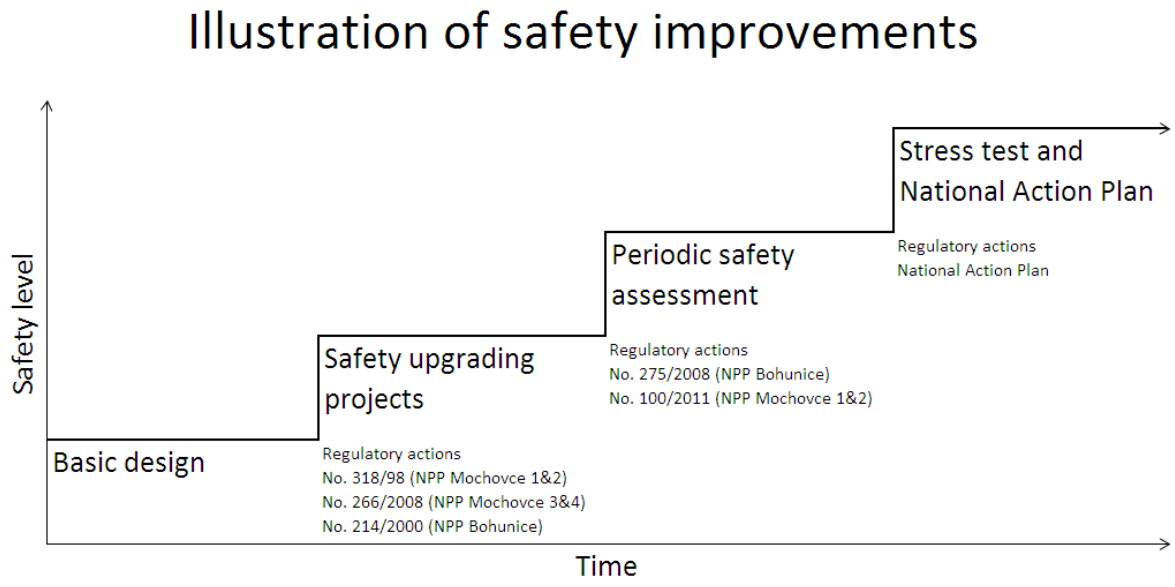
***Upgrading of the plants since the original design***

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 NPPs are subject to Periodic Safety Reviews with 10 years periodicity. The latest periodic review for NPP Bohunice 3&4 was completed in 2008, for EMO1&2 in 2011. Based on the results of the review UJD SR issued operational permit. The permits are associated with approval of safety upgrading programme of the plants.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, feed water 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.



# II. Basic approach and monitoring

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 external 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 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

**Monitoring of the Action Plan implementation**

Majority of tasks resulting from the NAcP are covered by UJD SR decisions issued in the past and in particular after completion of the periodic safety assessment of NPPs in the years 2008 (NPP Bohunice) and 2011 (NPP Mochovce). According to these decisions the operator was obliged to report to UJD SR on the progress and the results achieved annually.

Due to the specific nature of the stress tests and as a provision for accepting the measures proposed by the licensee, UJD SR performed inspections within its annual inspection plan for 2013 and 2014 – inspections the aim of which were to ascertain the factual implementation of measures. 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 UJD SR can impose measures to remove the deficiencies, including binding deadlines for their fulfilment.

The inspection results confirmed the operator´s compliance with the Action plan in terms of substance and deadlines as well. Some measures have been completed before deadline. However in the case of updated severe accident analyses (e.g. accident at multi units), and based on the outcomes of self-assessment /9/ and /10/ UJD SR requested the licensee to expedite the work in preparing a plan of implementation of measures (the evaluation of SAM analyses is still in progress). Details are reported in Chapter III. Inspection activities will continue formonitoring the progress in implementing the Action Plan during the coming years.

# III. Status of implementation

## 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<br><br>Status:<br>According to UJD SR Regulation No. 33/2012 Coll., Section 2 the licensee is obliged to conduct periodic assessment by the date up on which ten years have elapsed since the previous PSR. The objective of PSR (§9) is to assess the extent, up-to date and quality of deterministic safety evaluations, probability-related safety evaluations and analyses of the effect of internal and external hazards in terms of the current condition of the project and operation, structures, systems and components of nuclear equipment, the analytical methods used, calculation instruments and data, as well as in terms of the condition predicted by the date of the next periodic evaluation. | Completed (before 2013) | Completed (before 2013) | Under contruction |
| 2. | ENSREG Compilation of recommendations 2.3<br><br>EC Communication – specific to Slovakia 5.11<br><br>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 |

| ID | Source | Recommendation | Fulfilment of recommendation | EBO3&4 | EMO1&2 | MO34 |
|---|---|---|---|---|---|---|
| | | | **Status:**<br><br>**The project is in the phase of elaboration with the contractor VUJE. The project continues in compliance with the time schedule included in CfW. Finishing of the project expected by the defined deadline.** | | | |
| **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** |
| **4.** | **ENSREG Compilation of recommendations 3.1.1**<br><br>**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.**<br><br>**Status:**<br><br>**New metrological studies for the site were developed for EBO /2/ and for EMO /3/.**<br>**In December 2013 a draft time schedule of implementation of measures for 2014 - 2018 to enhance the resistance of selected EBO and EMO1,2 civil structures was prepared over,** | **To prepare the plan of implementation of additional measures by 31/12/2013**<br><br>**Completed** | **To prepare the plan of implementation of additional measures by 31/12/2013**<br><br>**Completed** | **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 |
|---|---|---|---|---|---|---|
| | | | **and an overall assessment of impacts of extreme meteorological events on safety and reliability of EBO civil structures, including margins to withstand these events was prepared,**<br>**The design documentation for implementation at EBO and EMO is being prepared.**<br>**Measures resulting from assessment of EMO1,2 civil structures are being incorporated into the on-going seismic reinforcement documentation (project IPR 20400).**<br>**The procurement process and the implementation of measures in EBO and EMO will start in 2015.** | | | |
| **5.** | **EC Communication Annex** | **<u>Hazard frequency related to seismicity</u>** | **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.**<br><br>**<u>Status:</u>**<br><br>**Seismic margins of civil structures evaluated /4/.**<br><br>**<u>Additional measures:</u>**<br>**Evaluation of seismic margins (GIP method) for additional seismically qualified equipment performed.** | **31/12/2013**<br><br>**Completed** | **31/12/2013**<br><br>**Completed** | **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 |
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| 6. | EC Communication Annex<br><br>EC Communication– specific to Slovakia 5.11 | <u>Seismicity – minimum peak ground acceleration 0,1 g</u> | 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.<br><br><u>Status:</u><br><br>EMO1,2: According to decision of UJD SR No. 100/2011 the required minimum peak ground acceleration is 0,15 g.<br>Priorities of the tasks defined. Priority 1 (highest) contains buildings where equipment important for long-term residual heat removal after a seismic event are situated: Fire station, access point for external power supply, pipeline of emergency SG feed, emergency response centre, etc.<br>Other SSC will be seismically reinforced up to 2018.<br><br><u>Additional measures:</u><br>EBO: The seismic PSA is being prepared: Finished assessment of the seismic margins for mechanical systems and seismic margins of concrete and steel parts of the main reactor building.<br>EMO1,2: Seismic PSA already completed: /5/. | Completed<br><br>(before 2013) | To make the seismic reinforcement of structures with the set highest priority by 31/12/2015<br><br>In progress | Included in the basic design |

| ID | Source | Recommendation | Fulfilment of recommendation | EBO3&4 | EMO1&2 | MO34 |
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| | | | | | | |
| 7. | ENSREG Compilation of recommendations 3.1.2 | Secondary effects of earthquakes | To prepare a scenario for put of NPP units into safe condition after a seismic event.<br><br>Status:<br><br>Updated scenarios were incorporated into Operating Instructions for Emergency Situations. | Completed<br><br>(before 2013) | Completed<br><br>(before 2013) | Before put of the respective unit into operation, common EMO structures before put of Unit 3 into operation |
| 8. | ENSREG Compilation of recommendations 3.1.3<br><br>Peer review country Report of the SR 4.3<br><br>EC Communication Annex<br><br>EC Communication – specific to Slovakia 5.11 | Protection against penetration of water into buildings.<br>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.<br><br>Status:<br><br>New metrological studies for the site were developed for EBO /2/ and for EMO /3/.<br>In December 2013 a draft time schedule of implementation of measures for 2014 - 2018 to enhance the resistance of selected EBO and EMO1,2 civil structures was prepared over, and an overall assessment of impacts of extreme meteorological events on safety and reliability of EBO civil structures, including margins to withstand these events was | To prepare the plan of implementation of additional measures by 31/12/2013<br><br>Completed | To prepare the plan of implementation of additional measures by 31/12/2013<br><br>Completed | 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 |
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| | | | **prepared.**<br>**The design documentation for implementation at EBO and EMO is being prepared.**<br>**Measures resulting from assessment of EMO1,2 civil structures are being incorporated into the on-going seismic reinforcement documentation (project IPR 20400).**<br>**The procurement process and the implementation of measures in EBO and EMO will start in 2015.** | | | |
| **9.** | **ENSREG Compilation of recommendations 3.1.4** | **<u>Notices on time warning</u>** | **To implement the warning and notification system in case of deteriorating weather and to implement procedures of NPP operating staff response.**<br><br>**<u>Status:</u>**<br><br>**The predictive regulation No. 0-HP/3006 - For measures against extreme climatic conditions was prepared and implemented.**<br><br>**<u>Additional measures:</u>**<br>**Project for independent data flows from the Hydro-meteorological Institution is under preparation: "Warning and Notification of Meteorological Hazard" is in the phase of design preparation (No.: IPR 10178/17).** | **Completed** | **Completed** | **Before put of the respective unit into operation** |
| **10.** | **ENSREG Compilation of recommendations 3.1.5** | **<u>Monitoring of seismicity</u>** | **Arrangement of Bohunice, Mochovce seismic monitoring stations was proposed and built based on detailed seismic and geological survey prepared by the Geophysical Institute** | **Completed**<br><br>**before 2013** | **Completed**<br><br>**before 2013** | **Completed**<br><br>**before 2013** |

| ID | Source | Recommendation | Fulfilment of recommendation | EBO3&4 | EMO1&2 | MO34 |
|---|---|---|---|---|---|---|
| | **EC Communication Annex** | | **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.** | | | |
| **11.** | **ENSREG Compilation of recommendations 3.1.6** | **Qualified walkdowns** | **To prepare regulations for qualified walk downs related to natural risks and to update them after preparation of an international guide.**<br><br>**Status:**<br><br>**Seismic walk downs GIP VVER are performed always after the end of main overhauls or in case of significant changes.**<br>**For other external extreme events (wind, snow, rain) the documentation is being completed.** | **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.**<br><br>**Status:**<br><br>**New metrological studies for the site were developed for EBO /2/ and for EMO /3/.**<br>**In December 2013 a draft time schedule of implementation of measures for 2014 - 2018 to enhance the resistance of selected EBO and EMO1,2 civil structures was prepared over,** | **31/12/2013**<br><br>**Completed** | **31/12/2013**<br><br>**Completed** | **Included in the basic design** |

| ID | Source | Recommendation | Fulfilment of recommendation | EBO3&4 | EMO1&2 | MO34 |
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| | | | **and an overall assessment of impacts of extreme meteorological events on safety and reliability of civil structures, including margins to withstand these events was prepared,**<br><br>**Immediate measures (flood protection bags) were implemented to flood selected rooms in buildings where are located safety systems.**<br><br>**The reports provides and assessment of external flooding at the NPPs Bohunice and Mochovce site due to extreme precipitation.**<br>**Extreme water levels at the locality sites due to direct rainfalls with 10,000 years return period have been calculated with the aid of the software.**<br>**EBO, EMO - The study was prepared "Impact of extreme external temperatures in selected rooms of EBO, EMO NPPs after loss of cooling"**<br><br>**The design documentation for implementation at EBO and EMO is being prepared.**<br>**Measures resulting from assessment of EMO1,2 civil structures are being incorporated into the on-going seismic reinforcement documentation (project IPR 20400).**<br>**The procurement process and the implementation of measures in EBO and EMO will start in 2015.** | | | |

| ID | Source | Recommendation | Fulfilment of recommendation | EBO3&4 | EMO1&2 | MO34 |
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| **13.** | **Peer review country report of the SR 2.3.3** | **<u>Reserves at external risks</u>** | **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.**<br><br>**<u>Status:</u>**<br><br>**New metrological studies for the site were developed for EBO /2/ and for EMO /3/.**<br>**In December 2013 a draft time schedule of implementation of measures for 2014 - 2018 to enhance the resistance of selected EBO and EMO1,2 civil structures was prepared over, and an overall assessment of impacts of extreme meteorological events on safety and reliability of civil structures, including margins to withstand these events was prepared.**<br>**The design documentation for implementation at EBO and EMO is being prepared.**<br>**Measures resulting from assessment of EMO1,2 civil structures are being incorporated into the on-going seismic reinforcement documentation (project IPR 20400).** | **To prepare the plan of implementation of additional measures by 31/12/2013**<br><br>**Completed** | **To prepare the plan of implementation of additional measures by 31/12/2013**<br><br>**Completed** | **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 |
|---|---|---|---|---|---|---|
| | | | **The procurement process and the implementation of measures will start in 2015.**<br>**A study on "Impact of extreme external temperatures in selected rooms of EBO, EMONPPs after loss of cooling" was prepared.** | | | |
| **14.** | **ENSREG Compilation of recommendations 3.1.8** | **<u>Protection against extreme weather conditions</u>** | **To update the meteorological study for Mochovce and Bohunice localities.**<br><br>**<u>Status:</u>**<br><br>**New metrological studies for the site were developed for EBO /2/ and for EMO /3/.**<br>**In December 2013 a draft time schedule of implementation of measures for 2014 - 2018 to enhance the resistance of selected EBO and EMO1,2 civil structures was prepared over, and an overall assessment of impacts of extreme meteorological events on safety and reliability of civil structures, including margins to withstand these events was prepared,**<br>**The design documentation for implementation at EBO and EMO is being prepared.**<br>**Measures resulting from assessment of EMO1,2 civil structures are being incorporated into the on-going seismic reinforcement documentation (project IPR 20400).**<br>**The procurement process and the implementation of measures will start in 2015.** | **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**<br><br>**EC Communication– specific to Slovakia 5.11**<br><br>**XCNS** | **<u>Regulatory monitoring of actions (flooding)</u>** | **The activity is subject to regulatory review and inspection.**<br><br>**<u>Status:</u>**<br><br>**The inspection plan for 2013 /6/and 2014 /7/ contained inspection activities. No deviation from the prepared actions has been identified.** | **Annually**<br><br>**In progress** | **Annually**<br><br>**In progress** | **Annually** |
| **16** | **Peer review country report of the SR 2.3.3**<br><br>**EC Communication– specific to Slovakia 5.11**<br><br>**XCNS** | **<u>Regulatory monitoring of actions (extreme weather conditions)</u>** | **The activity is subject to regulatory review and inspection.**<br><br>**<u>Status:</u>**<br><br>**The inspection plan for 2013 /6/ and 2014 /7/ as well contained inspection activities. No deviation from the prepared actions has been identified.** | **Annually**<br><br>**In progress** | **Annually**<br><br>**In progress** | **Annually** |
| **17** | **Peer review country Report of the SR 2.1.3** | **<u>Regulatory monitoring of actions (seismic upgrade)</u>** | **The activity is subject to regulatory review and inspection.**<br><br>**<u>Status:</u>**<br><br>**The inspection plan for 2013 /6/ and 2014 /7/contained inspection activities. No significant deviation from the proposed actions has been identified.** | **Annually**<br><br>**In progress** | **Annually**<br><br>**In progress** | **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 feed water source to SG by assurance of mobile high-pressure sources.**<br><br>**Status:**<br><br>**Feed water make-up pumps to steam generators for each reactor units were purchased in 2012. The pumps are situated on a fire truck chassis.**<br>**In 2014, flow rate sensors were additionally installed on the mobile feed water source high-pressure pump discharge pipe.**<br>**In 2013 -2014, mobile feed water sources were tested during main overhauls.** | **31/12/2013**<br><br>**Completed** | **31/12/2013**<br><br>**Completed** | **Before put of the respective unit into operation** |

| ID | Source | Recommendation | Fulfilment of recommendation | EBO3&4 | EMO1&2 | MO34 |
|---|---|---|---|---|---|---|
| | | | **To review physical availability of technology needed for gravity filling of SG from feed water tanks in case of SBO.**<br><br>**<u>Status:</u>**<br><br>**Physical access for gravity filling of SG was tested. Because of the necessity of physical manipulation with selected valves it was decided to procure a 3 kW power supply to ensure a remote operation of these valves. This measure is part of EOP.** | **31/12/2013**<br><br>**Completed** | **31/12/2013**<br><br>**Completed** | **Before put of the respective unit into operation** |
| | | | **To finish required modifications of existing equipment for connection of diverse mobile feed water and power sources resistant to external events.**<br><br>**<u>Status:</u>**<br><br>**The project of feed water connection point to SG in EBO and EMO2 completed.**<br><br>**<u>Additional measures:</u>**<br>**Projects for shelters for placing the 0.4 kV mobile DG and cabling between the 0.4 kV mobile DG and selected consumers - procurement in progress.**<br>**"Autonomous cooling for emergency DG" – preparation of design documentation before the project implementation.** | **31/12/2015**<br><br>**Completed** | **31/12/2015**<br><br>**Completed** | **Before put of the respective unit into operation** |

| ID | Source | Recommendation | Fulfilment of recommendation | EBO3&4 | EMO1&2 | MO34 |
|---|---|---|---|---|---|---|
| | | | **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.**<br><br>**<u>Status:</u>**<br><br>**Necessary equipment has been analysed and purchased for example: portable pumps, portable switchboards.**<br>**Training programmes for the diverse mobile devices for cooling water make up from in-site and off-site water sources were prepared implemented and through emergency exercises tested at EBO and EMO.** | **31/12/2013**<br><br>**Completed** | **31/12/2013**<br><br>**Completed** | **Before put of the respective unit into operation** |

| ID | Source | Recommendation | Fulfilment of recommendation | EBO3&4 | EMO1&2 | MO34 |
|---|---|---|---|---|---|---|
| **19.** | **ENSREG Compilation of recommendations 3.2.2** | **<u>AC Power supplies</u>** | **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.**<br><br>**<u>Status:</u>**<br><br>**The project for completion of circuit breakers into the power output diagram and their positioning in the 400 kV substation in the EMO1,2 substation is approved. The procurement process has started.**<br><br>***Clarification: The national action plan required to submit a time schedule for the 400 kV circuit breaker installation. Installation is expected in 2017 – 2018.** | **Completed**<br><br>**(before 2013 as part of the original design)** | **To submit a time schedule of additional installation of a 400 kV circuit breaker by 31/12/2014**<br><br>**Completed *** | **In the basic design** |
| | | | **To update the operating documentation for DG– at DG start and failure of DG connection to the 6 kV section of the emergency power supply of the 2nd category** | **Completed**<br><br>**(before 2013)** | **Completed**<br><br>**(before 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.**<br><br>**<u>Status:</u>**<br><br>**Mobile DG 0.4 kV with connecting cabling were purchased in 2012 for all units. See also ID 18.** | **31/12/2013**<br><br>**Completed** | **31/12/2013**<br><br>**Completed** | **Before put of the respective unit into operation** |
| **20.** | **ENSREG Compilation of recommendations 3.2.3** | **<u>Power supply (DC)</u>** | **To diversify emergency power sources by assurance of mobile DG for charging of accumulator batteries.**<br><br>**<u>Status:</u>**<br><br>**Mobile DG 0.4 kV with connecting cabling were purchased in 2012 for all units.**<br><br>**<u>Additional measures:</u>**<br>**In 2013, mobile rectifiers 240 V, 24 V for each units to charge accumulators from the mobile 0.4 kV DG were supplied.** | **31/12/2013**<br><br>**Completed** | **31/12/2013**<br><br>**Completed** | **Before put of the respective unit into operation** |
| **21.** | **ENSREG Compilation of recommendations 3.2.4** | **<u>Operating and training activities</u>** | **To prepare operating procedures and to implement training programmes for operators of diverse mobile devices.**<br><br>**<u>Status:</u>**<br><br>**New procedures for activities developed and implemented:**<br>**3,4-LPS-001/O60: Activities after Earthquake** | **31/12/2015**<br><br>**Completed** | **31/12/2015**<br><br>**Completed** | **Before put of the respective unit into operation** |

| ID | Source | Recommendation | Fulfilment of recommendation | EBO3&4 | EMO1&2 | MO34 |
|---|---|---|---|---|---|---|
| | | | **3,4-LPS-001/O63: Unit Cool down after MDBE, 3-3,4LPS-001/O64: Activities of OP at Flooding of Structure**<br>**3,4-LPS-001/O65: Strong wind in SE-EBO locality**<br>**3,4-LPS-001/O66: Loss of service water supply in PS Pecenady**<br>**0HP/3001 Loss of external power supply, 0HP/3002 Loss of raw water supply,**<br>**0HP/3003 Back-up water make-up**<br>**0HP/3004 Transport of employees for non-standard and calamity situations,**<br>**0HP/3005 External and internal floods, 1TP/6009 Cool down after seismic event**<br>**0HP3006:Measures against extreme climatic conditions**<br>**The procedures are exercised and operators are trained in compliance with the emergency drill plan (e.g. emergency drill in October 2014 at EBO).**<br>**Training programmes for the diverse mobile devices were prepared implemented and through exercises tested at EBO and EMO.**<br><br>**Operating instructions for mobile DG0, 4kV: 6-TPP-332 and for feedwater pump CAS30/10000-S2 prepared and implemented.**<br><br>**The use of this equipment added to the „EOPs No. ECA0.0 blackout“.** | | | |

| ID | Source | Recommendation | Fulfilment of recommendation | EBO3&4 | EMO1&2 | MO34 |
|---|---|---|---|---|---|---|
| | | | **Use of diverse mobile means is exercised and documented. This item will be subject to a targeted inspection by UJD SR in 2015.** | | | |
| **22.** | **ENSREG Compilation of recommendations 3.2.5** | **<u>Instrumentation and monitoring</u>** | **To specify a list of important parameters needed for monitoring of safety functions.**<br><br>**<u>Status:</u>**<br><br>**EBO3,4, EMO1,2 - A list of important parameters needed for monitoring of safety functions has been defined.** | **Completed**<br><br>**(before 2013)** | **Completed**<br><br>**(before 2013)** | **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.**<br><br>**<u>Status:</u>**<br><br>**The technical specification and procurement of the mobile measuring unit in progress. (e.g. equipment for measuring of temperature and pressure in the primary circuit and water level in the SG).** | **31/12/2015**<br><br>**In progress** | **31./12/2015**<br><br>**In. progress** | **Before put of the respective unit into operation** |

| ID | Source | Recommendation | Fulfilment of recommendation | EBO3&4 | EMO1&2 | MO34 |
|---|---|---|---|---|---|---|
| **23.** | **ENSREG Compilation of recommendations 3.2.6** | **Improvement of shutdown** | **To diversify emergency power sources by assurance of mobile DG.**<br><br>**Status:**<br><br>**See ID 19, 20.** | **31/12/2013**<br><br>**Completed** | **31/12/2013**<br><br>**Completed** | **Before put of the respective unit into operation** |
| | | | **To finish required modifications of existing equipment to enable connection of diverse feed water sources and power sources ensuring physical access and resistance under conditions evoked by an external event.**<br><br>**Status:**<br><br>**See ID 18.** | **31/12/2015**<br><br>**In progress** | **31/12/2015**<br><br>**In progress** | **Before put of the respective unit into operation** |
| **24.** | **ENSREG Compilation of recommendations 3.2.7** | **Seals of reactor coolant pumps (RCP)** | **To check if the existing procedures sufficiently solve the situation after de-sealing of RCP glands.**<br><br>**Status:**<br><br>**The sufficiency of existing procedures at solving of the situation of desealing of RCP glands checked JSC VNIIAS-All Russian Scientific Institute for NPP Operation 109507, Russian Federation, Moscow, May 2013.** | **Completed**<br><br>**Implemented in 2013** | **Completed**<br><br>**Implemented in 2013** | **Before put of the respective unit into operation** |

| ID | Source | Recommendation | Fulfilment of recommendation | EBO3&4 | EMO1&2 | MO34 |
|---|---|---|---|---|---|---|
| | | | **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.**<br><br>**<u>Status:</u>**<br><br>**The analyses made by VNIIAS are available. Resistance of RCP glands GCN-317 for 72 hours confirmed.** | **31/12/2013**<br><br>**Completed** | **31/12/2013**<br><br>**Completed** | **Before put of the respective unit into operation** |

| ID | Source | Recommendation | Fulfilment of recommendation | EBO3&4 | EMO1&2 | MO34 |
|---|---|---|---|---|---|---|
| **25.** | **ENSREG Compilation of recommendations 3.2.8** | **<u>Ventilation</u>** | **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.**<br><br>**<u>Status:</u>**<br><br>**Environment of rooms, where safety systems ensuring fulfilment of key safety function in the main reactor building and safety systems which are in direct contact with the external environment (ESW, AFWS, DGS) were analysed /8/. Impact of extreme external climate conditions in selected rooms (for both NPPs).**<br>**The SAM project includes also the habitability of the main control room and the control of selected equipment from the ERC.**<br><br>**<u>Additional measures</u>**<br>**The plan of implementation of some additional measures resulting from the analyses was elaborated.** | **31/12/2013**<br><br>**Completed** | **31/12/2013**<br><br>**Completed** | **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.**<br><br>**Status:**<br><br>**Mobile DG 0.4 kV with connecting cabling were purchased in 2012 for both EBO and EMO1,2 units. See also ID 18.**<br>**In 2013, mobile rectifiers 240 V, 24 V for each units to charge accumulators from the mobile 0.4 kV DG were supplied.**<br><br>**Additional Measures:**<br>**Mobile rectifiers 24 V, 24 V for each unit to charge accumulators from the mobile 0,4 kV DG were supplied.** | **31/12/2013**<br><br>**Completed** | **31/12/2013**<br><br>**Completed** | **Before put of the respective unit into operation** |

| ID | Source | Recommendation | Fulfilment of recommendation | EBO3&4 | EMO1&2 | MO34 |
|---|---|---|---|---|---|---|
| | | | **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.**<br><br>**<u>Status:</u>**<br><br>**EMO1,2 - The SAM project requiring remote control of selected equipment installed within the project in all EMO units (1,2,3,4) has been considered in the on-going project of EMO Emergency Response Centre modification.**<br>**Preparation of design documentation for performance of the seismic reinforcement with qualification to extreme external conditions is in progress.** | **Completed (before 2013)** | **31/12/2015**<br><br>**In progress** | **Before put of the respective unit into operation** |
| **27.** | **EC Communication Annex** | **<u>External hazard safety</u>** | **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.**<br><br>**<u>Status:</u>**<br><br>**See ID No. 4, 5, 6 and 7.** | **31/12/2013**<br><br>**Completed** | **31/12/2013**<br><br>**Completed** | **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** | **<u>Spent fuel pool</u>** | **To analyse the SAM project from the viewpoint of severe accident management at multi units (all) at the** | **Analysis and plan of implementation** | **Analysis and plan of implementation** | **Analysis and plan of implementation** |

| ID | Source | Recommendation | Fulfilment of recommendation | EBO3&4 | EMO1&2 | MO34 |
|---|---|---|---|---|---|---|
| | | | **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.**<br><br>**<u>Status:</u>**<br><br>**The analysis of severe accident management at all units on the site (including reactors at full power, reactors in shutdown and spent fuel pool) has been prepared (Report No. CVV 12/2014-01 "Management of Severe Accidents on All Units on Site"). The licensee performed a self-assessment on the implementation of severe accident management /9/ and /10/. A plan of implementation of additional measures is under preparation.**<br><br>***Comm.: The analyses has been completed and at present evaluated by the licensee. The plan of implementation of measures is dependent on the evaluation of the analyses results.** | **of additional measures by 31/12/2014**<br><br>***Completed** | **of additional measures by 31/12/2014**<br><br>***Completed** | **of additional measures by 31/12/2014** |

| ID | Source | Recommendation | Fulfilment of recommendation | EBO3&4 | EMO1&2 | MO34 |
|---|---|---|---|---|---|---|
| **28.** | **ENSREG Compilation of recommendations 3.2.11** | **<u>Isolation and independency</u>** | **To diversify the emergency feed water source to SG by assurance of mobile high-pressure sources.**<br><br>**<u>Status:</u>**<br><br>**Feed water make-up pumps to steam generators for each reactor unit were purchased in 2012.The pumps are situated on a fire truck chassis. In 2014, flow rate sensors were additionally installed on the mobile feed water source high-pressure pump discharge pipe.**<br>**In 2014, the mobile feed water sources were tested in the reactor units during EBO and EMO main overhauls.** | **31/12/2013**<br><br>**Completed** | **31/12/2013**<br><br>**Completed** | **Before put of the respective unit into operation** |
| | | | **To diversify emergency power sources by assurance of mobile DG.**<br><br>**<u>Status:</u>**<br><br>**Mobile DG 0.4 kV with connecting cabling were purchased in 2012 for both EBO and EMO1,2 units. See also ID 18.**<br><br>**<u>Additional measures:</u>**<br><br>**In 2013, mobile rectifiers 240 V, 24 V for each unit to charge accumulators from the mobile 0.4 kV DG were supplied and were tested.** | **31/12/2013**<br><br>**Completed** | **31/12/2013**<br><br>**Completed** | **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 feed water sources and power sources ensuring physical access and resistance under conditions evoked by an external event.**<br><br>**<u>Status:</u>**<br><br>**The project of feed water connection point to SG in EBO and EMO2 completed.**<br><br>**<u>Additional measures:</u>**<br>**Projects for shelters for placing the 0.4 kV mobile DG and cabling between the 0.4 kV mobile DG and selected consumers - procurement in progress.**<br>**"Autonomous cooling for emergency DG" – preparation of design documentation before the project implementation.** | **31/12/2015**<br><br>**Completed** | **31/12/2015**<br><br>**Completed** | **Before put of the respective unit into operation** |
| **29.** | **ENSREG Compilation of recommendations 3.2.12** | **<u>Flow path and access availability</u>** | **To prepare operating procedures and to implement training programmes for operators.**<br><br>**<u>Status:</u>**<br><br>**New procedures for activities developed and implemented:**<br>**3,4-LPS-001/O60: Activities after Earthquake**<br>**3,4-LPS-001/O63: Unit Cool down after MDBE, 3-3,4LPS-001/O64: Activities of** | **31/12/2015**<br><br>**Completed** | **31/12/2015**<br><br>**Completed** | **Before put of the respective unit into operation** |

| ID | Source | Recommendation | Fulfilment of recommendation | EBO3&4 | EMO1&2 | MO34 |
|---|---|---|---|---|---|---|
| | | | **OP at Flooding of Structures**<br>**3,4-LPS-001/O65: Strong wind in SE-EBO locality**<br>**3,4-LPS-001/O66: Loss of service water supply in PS Pecenady**<br>**0HP/3001 Loss of external power supply, 0HP/3002 Loss of raw water supply,**<br>**0HP/3003 Back-up water make-up**<br>**0HP/3004 Transport of employees for non-standard and calamity situations,**<br>**0HP/3005 External and internal floods, 1TP/6009 Cool down after seismic event**<br>**0HP3006:Measures against extreme climatic conditions**<br>**The procedures are exercised and operators are trained in compliance with the emergency drill plan (e.g. emergency drill in October 2014 at EBO).**<br>**Training programmes for the diverse mobile devices were prepared implemented and through exercises tested at EBO and EMO.** | | | |

| ID | Source | Recommendation | Fulfilment of recommendation | EBO3&4 | EMO1&2 | MO34 |
|---|---|---|---|---|---|---|
| | | | **To diversify emergency power sources by assurance of mobile DG.**<br><br>**<u>Status:</u>**<br><br>**Mobile DG 0.4 kV with connecting cabling were purchased in 2012 for both EBO and EMO1,2 units.**<br>**In 2013, mobile rectifiers 240 V, 24 V for each unit to charge accumulators from the mobile 0.4 kV DG were supplied.** | **31/12/2013**<br><br>**Completed** | **31/12/2013**<br><br>**Completed** | **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 feed water sources and power sources ensuring physical access and resistance under conditions evoked by an external event.**<br><br>**<u>Status:</u>**<br><br>**The project of feed water connection point to SG in EBO and EMO2 completed.**<br><br>**<u>Additional measures:</u>**<br>**Projects for shelters for placing the 0.4 kV mobile DG and cabling between the 0.4 kV mobile DG and selected consumers - procurement in progress.**<br>**"Autonomous cooling for emergency DG" – preparation of design documentation before the project implementation.** | **31/12/2015**<br><br>**Completed** | **31 12/2015**<br><br>**Completed** | **Before put of the respective unit into operation** |

| ID | Source | Recommendation | Fulfilment of recommendation | EBO3&4 | EMO1&2 | MO34 |
|---|---|---|---|---|---|---|
| | | | **To diversify the emergency feed water source to SG by assurance of mobile high-pressure sources.**<br><br>**<u>Status:</u>**<br><br>**Feed water make-up pumps to steam generators for each reactor unit were purchased in 2012. The pumps are situated on a fire truck chassis. In 2014, flow rate sensors were additionally installed on the mobile feed water source high-pressure pump discharge pipe.**<br>**In 2014, the mobile feed water sources were tested in the reactor units during EBO and EMO main overhauls.** | **31/12/2013**<br><br>**Completed** | **31/12/2013**<br><br>**Completed** | **Before put of the respective unit into operation** |
| **30.** | **ENSREG Compilation of recommendations 3.2.13** | **<u>Mobile devices</u>** | **To diversify the emergency feed water source to SG by assurance of mobile high-pressure sources.**<br><br>**<u>Status:</u>**<br><br>**Feed water make-up pumps to steam generators for each reactor unit were purchased in 2012. The pumps are situated on a fire truck chassis. In 2014, flow rate sensors were additionally installed on the mobile feed water source high-pressure pump discharge pipe.**<br>**In 2014, the mobile feed water sources were tested in the reactor units during EBO and EMO main overhauls.** | **31/12/2013**<br><br>**Completed** | **31/12/2013**<br><br>**Completed** | **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.**<br><br>**<u>Status:</u>**<br><br>**Mobile DG 0.4 kV with connecting cabling were purchased in 2012 for both EBO and EMO1,2 units.**<br>**In 2013, mobile rectifiers 240 V, 24 V for each unit to charge accumulators from the mobile 0.4 kV DG were supplied.** | **31/12/2013**<br><br>**Completed** | **31/12/2013**<br><br>**Completed** | **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 feed water sources and power sources ensuring physical access and resistance under conditions evoked by an external event.**<br><br>**<u>Status:</u>**<br><br>**The project of feed water connection point to SG in EBO and EMO2 completed.**<br><br>**<u>Additional measures:</u>**<br><br>**Projects for shelters for placing the 0.4 kV mobile DG and cabling between the 0.4 kV mobile DG and selected consumers - procurement in progress.**<br>**"Autonomous cooling for emergency DG" – preparation of design documentation before the project implementation.** | **31/12/2015**<br><br>**Completed** | **31/12/2015**<br><br>**Completed** | **Before put of the respective unit into operation** |
| | | | **To prepare operating procedures and to implement training programmes for operators of diverse mobile devices.**<br><br>**<u>Status:</u>**<br><br>**New procedures for activities developed and implemented:**<br>**3,4-LPS-001/O60: Activities after Earthquake**<br>**3,4-LPS-001/O63: Unit Cool down after** | **31/12/2015**<br><br>**Completed** | **31/12/2015**<br><br>**Completed** | **Before put of the respective unit into operation** |

| ID | Source | Recommendation | Fulfilment of recommendation | EBO3&4 | EMO1&2 | MO34 |
|---|---|---|---|---|---|---|
| | | | **MDBE, 3-3,4LPS-001/O64: Activities of OP at Flooding of structures**<br>**3,4-LPS-001/O65: Strong wind in SE-EBO locality**<br>**3,4-LPS-001/O66: Loss of service water supply in PS Pecenady**<br>**0HP/3001 Loss of external power supply, 0HP/3002 Loss of raw water supply,**<br>**0HP/3003 Back-up water make-up**<br>**0HP/3004 Transport of employees for non-standard and calamity situations,**<br>**0HP/3005 External and internal floods, 1TP/6009 Cool down after seismic event**<br>**0HP3006:Measures against extreme climatic conditions**<br>**The procedures are exercised and operators are trained in compliance with the emergency drill plan (e.g. emergency drill in October 2014 at EBO).**<br>**Training programmes for the diverse mobile devices were prepared implemented and through exercises tested at EBO and EMO.** | | | |

| ID | Source | Recommendation | Fulfilment of recommendation | EBO3&4 | EMO1&2 | MO34 |
|---|---|---|---|---|---|---|
| **31.** | **ENSREG Compilation of recommendations 3.2.14** | **Bunkered/Hardened systems** | **To finish required modifications of existing equipment to enable connection of diverse feed water sources and power sources ensuring physical access and resistance under conditions evoked by an external event.**<br><br>**Status:**<br><br>**The project of feed water connection point to SG in EBO and EMO2 completed.**<br><br>**Additional measures:**<br>**Projects for shelters for placing the 0.4 kV mobile DG and cabling between the 0.4 kV mobile DG and selected consumers - procurement in progress.**<br>**"Autonomous cooling for emergency DG" – preparation of design documentation before the project implementation.** | **31/12/2015**<br><br>**Completed** | **31/12/2015**<br><br>**Completed** | **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** | **Analysis and plan of implementation of additional measures by 31/12/2014**<br><br>***Completed** | **Analysis and plan of implementation of additional measures by 31/12/2014**<br><br>***Completed** | **Analysis and plan of implementation of additional measures by 31/12/2014** |

| ID | Source | Recommendation | Fulfilment of recommendation | EBO3&4 | EMO1&2 | MO34 |
|---|---|---|---|---|---|---|
| | | | **occurrence in all units at the same site.**<br><br>**<u>Status:</u>**<br><br>**The analysis of severe accident management at all units on the site (including reactors at full power, reactors in shutdown and spent fuel pool) has been prepared (Report No. CVV 12/2014-01 "Management of Severe Accidents on All Units on Site"). The licensee performed a self-assessment on the implementation of severe accident management /9/ and /10/. A plan of implementation of additional measures is under preparation.**<br><br>***Comm.: The analyses has been completed and at present evaluated by the licensee. The plan of implementation of measures is dependent on the evaluation of the analyses results.** | | | |
| **33.** | **ENSREG Compilation of recommendations 3.2.16** | **<u>Equipment inspection and training programmes</u>** | **To prepare operating regulations and to implement training programmes for operators of diversity mobile devices.**<br><br>**<u>Status:</u>**<br><br>**New procedures for activities developed and implemented:**<br>**3,4-LPS-001/O60: Activities after Earthquake**<br>**3,4-LPS-001/O63: Unit Cool down after** | **31/12/2015**<br><br>**Completed** | **31/12/2015**<br><br>**Completed** | **Before put of the respective unit into operation** |

| ID | Source | Recommendation | Fulfilment of recommendation | EBO3&4 | EMO1&2 | MO34 |
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| | | | **MDBE, 3-3,4LPS-001/O64: Activities of OP at Flooding of structures**<br>**3,4-LPS-001/O65: Strong wind in SE-EBO locality**<br>**3,4-LPS-001/O66: Loss of service water supply in PS Pecenady**<br>**0HP/3001 Loss of external power supply, 0HP/3002 Loss of raw water supply,**<br>**0HP/3003 Back-up water make-up**<br>**0HP/3004 Transport of employees for non-standard and calamity situations,**<br>**0HP/3005 External and internal floods, 1TP/6009 Cool down after seismic event**<br>**0HP3006:Measures against extreme climatic conditions**<br>**The procedures are exercised and operators are trained in compliance with the emergency drill plan (e.g. emergency drill in October 2014 at EBO).**<br>**Training programmes for the diverse mobile devices were prepared implemented and through exercises tested at EBO and EMO.** | | | |
| **34.** | **ENSREG Compilation of recommendations 3.2.17** | **<u>Further studies to address uncertainties</u>** | **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** | **Analysis and plan of implementation of additional measures by 31/12/2014**<br><br>***Com*pleted** | **Analysis and plan of implementation of additional measures by 31/12/2014**<br><br>***Completed** | **Analysis and plan of implementation of additional measures by 31/12/2014** |

| ID | Source | Recommendation | Fulfilment of recommendation | EBO3&4 | EMO1&2 | MO34 |
|---|---|---|---|---|---|---|
| | | | **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.**<br><br>**<u>Status:</u>**<br><br>**The analysis of severe accident management at all units on the site (including reactors at full power, reactors in shutdown and spent fuel pool) has been prepared (Report No. CVV 12/2014-01 "Management of Severe Accidents on All Units on Site"). The licensee performed a self-assessment on the implementation of severe accident management /9/ and /10/. A plan of implementation of additional measures is under preparation.**<br><br>***Comm.: The analyses has been completed and at present evaluated by the licensee. The plan of implementation of measures is dependent on the evaluation of the analyses results.** | | | |

| ID | Source | Recommendation | Fulfilment of recommendation | EBO3&4 | EMO1&2 | MO34 |
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| 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:<br>It the unit is not cooled below 238°C during SBO, no fuel damaging occurs due to loss of sub-criticality.<br>Heat removal from PC:<br>Due to interruption of feed water 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.<br>Containment integrity:<br>After two days, 60 ºC is expected in the containment wall centre. The containment integrity isn't endangered at this temperature.<br>Coolant inventory in PC:<br>Time reserve: PC coolant inventory is sufficient for fuel cooling for 24 hours. | Completed<br>(before 2013) | Completed<br>(before 2013) | 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<br>(before 2013) | Completed<br>(before 2013) | Basic design |

## RECOMMENDATIONS OF TOPIC 3 (SEVERE ACCIDENT MANAGEMENT)

| ID | Source | Recommendation | Fulfilment of recommendation | EBO3&4 | EMO1&2 | MO34 |
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| **37.** | **ENSREG Compilation of recommendations 3.3.1** | **Reference WENRA levels** | **A. In corporation of reference WENRA values related to severe accident management (SAM) to the national legal framework.**<br><br>**B. To implement the SAM project.**<br><br>**Status:**<br><br>**Based on this evaluation full harmonisation of safety regulations with WENRA Reference Levels (2008) has been achieved in Slovakia.**<br><br>**Additional measures:**<br>**On 21. 08. 2014 UJD SR Board meeting approved "The principles of new Atomic Act". The principles represent the basis for the work of a Working Group to prepare the new Atomic Act. A draft of new Atomic Act as a result of the Working Group is expected to be completed by May 2015 and the new Atomic Act be published by the end of 2016. The new/revised Atomic Act will take into account new EU legal documents:**<br>**e.g. Directive 2014/87/Euratom, Directive 2013/59/Euratom as well as the latest WENRA Reference levels (2014).** | **Implemented** | **Implemented** | **Implemented** |

| ID | Source | Recommendation | Fulfilment of recommendation | EBO3&4 | EMO1&2 | MO34 |
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| **38.** | **ENSREG Compilation of recommendations 3.3.2**<br><br>**XCNS** | **<u>SAM technical measures</u>** | **To implement the SAM project.**<br><br>**<u>Status:</u>**<br><br>**SAM project implemented and completed at EBO, implementation at EMO in progress according to schedule. The licensee performed a self-assessment on the implementation of severe accident management /9/ and /10/. A plan of implementation of additional measures is under preparation.** | **31/12/2013**<br><br>**Completed** | **31/12/2015**<br><br>**In progress** | **Included in the design** |
| **39.** | **ENSREG Compilation of recommendations 3.3.3** | **<u>Evaluation of SAM measures after severe external events</u>** | **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.**<br><br>**<u>Status:</u>**<br><br>**The analysis of severe accident management at all units on the site (including reactors in shutdown and spent fuel pool) has been prepared (Report No. CVV 12/2014-01 "Management of Severe Accidents on** | **Analysis and plan of implementation of additional measures by 31/12/2014**<br><br>***Completed** | **Analysis and plan of implementation of additional measures by 31/12/2014**<br><br>***Completed** | **Analysis and plan of implementation of additional measures by 31/12/2014** |

| ID | Source | Recommendation | Fulfilment of recommendation | EBO3&4 | EMO1&2 | MO34 |
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| | | | **All Units on Site").**<br>**The licensee performed a self-assessment on the implementation of severe accident management /9/ and /10/. A plan of implementation of additional measures is under preparation.**<br><br>***Comm.: The analyses has been completed and at present evaluated by the licensee. The plan of implementation of measures is dependent on the evaluation of the analyses results.** | | | |
| **40.** | **ENSREG Compilation of recommendations 3.3.4** | **<u>Update of severe accident management guidelines (SAMG)</u>** | **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.**<br><br>**<u>Status:</u>**<br><br>**Summarisation of outputs of deterministic analyses of extreme external events which will provide inputs for the analysis is in progress. Based on outputs of the analyses, possible additional measures with time schedule of their implementation will be prepared. Finishing of the project expected by the defined deadline.** | **Analysis and plan of implementation of additional measures by 31/12/2015**<br><br>**In progress** | **Analysis and plan of implementation of additional measures by 31/12/2015**<br><br>**In progress** | **Before put of the respective unit into operation** |

| ID | Source | Recommendation | Fulfilment of recommendation | EBO3&4 | EMO1&2 | MO34 |
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| **41.** | **ENSREG Compilation of recommendations 3.3.5** | **<u>SAMG verification</u>** | **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.**<br><br>**<u>Status:</u>**<br><br>**The analysis of severe accident management at all units on the site (including reactors at full power, reactors in shutdown and spent fuel pool) has been prepared (Report No. CVV 12/2014-01 "Management of Severe Accidents on All Units on Site"). The licensee performed a self-assessment on the implementation of severe accident management /9/ and /10/ as well and the plan of implementation of additional measures is an integral part of respective documents.**<br><br>***Comm.: The analyses has been completed and at present evaluated by the licensee. The plan of implementation of measures is** | **Analysis and plan of implementation of additional measures by 31/12/2014**<br><br>***Completed** | **Analysis and plan of implementation of additional measures by 31/12/2014**<br><br>***Completed** | **Analysis and plan of implementation of additional measures by 31/12/2014** |

| ID | Source | Recommendation | Fulfilment of recommendation | EBO3&4 | EMO1&2 | MO34 |
|---|---|---|---|---|---|---|
| | | | **dependent on the evaluation of the analyses results.** | | | |
| **42.** | **ENSREG Compilation of recommendations 3.3.6** | **<u>SAM exercises</u>** | **To prepare conditions for cooperation with selected external organisations at emergency response control during external events and severe accidents.**<br><br>**<u>Status:</u>**<br><br>**Agreement with the Ministry of Defence on mutual assistance and cooperation and its provision at occurrence of an extraordinary event in nuclear installation (No. SE/2012/22100-01).**<br>**The cooperation tested during the all-plant emergency exercise ŽERIAV 2014 in EBO.** | **31/12/2014**<br><br>**Completed** | **31/12/2014**<br><br>**Completed** | **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.**<br><br>**<u>Status</u>**<br><br>**See ID 57.** | **31/12/2014**<br><br>**Completed** | **31/12/2014**<br><br>**Completed** | **31/12/2014**<br><br>**Completed** |
| **43.** | **ENSREG Compilation of recommendations 3.3.7** | **<u>SAM training</u>** | **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.**<br><br>**<u>Status:</u>**<br><br>**The analysis of severe accident management at all units on the site** | **Analysis and plan of implementation of additional measures by 31/12/2014**<br><br>***Completed** | **Analysis and plan of implementation of additional measures by 31/12/2014**<br><br>***Completed** | **Analysis and plan of implementation of additional measures by 31/12/2014** |

| ID | Source | Recommendation | Fulfilment of recommendation | EBO3&4 | EMO1&2 | MO34 |
|---|---|---|---|---|---|---|
| | | | **(including reactors at full power, reactors in shutdown and spent fuel pool) has been prepared (Report No. CVV 12/2014-01 "Management of Severe Accidents on All Units on Site"). The licensee performed a self-assessment on the implementation of severe accident management /9/ and /10/. A plan of implementation of additional measures is under preparation.**<br><br>***Comm.: The analyses has been completed and at present evaluated by the licensee. The plan of implementation of measures is dependent on the evaluation of the analyses results.** | | | |
| **44.** | **ENSREG Compilation of recommendations 3.3.8**<br><br>**EC Communication Annex** | **<u>Extension of SAMG to all plant states</u>** | **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.**<br><br>**<u>Status:</u>** | **Analysis and plan of implementation of additional measures by 31/12/2014**<br><br>***Completed** | **Analysis and plan of implementation of additional measures by 31/12/2014**<br><br>***Completed** | **Analysis and plan of implementation of additional measures by 31/12/2014** |

| ID | Source | Recommendation | Fulfilment of recommendation | EBO3&4 | EMO1&2 | MO34 |
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| | | | **The analysis of severe accident management at all units on the site (including reactors at full power, reactors in shutdown and spent fuel pool) has been prepared (Report No. CVV 12/2014-01 "Management of Severe Accidents on All Units on Site"). The licensee performed a self-assessment on the implementation of severe accident management /9/ and /10/. A plan of implementation of additional measures is under preparation.**<br><br>***Comm.: The analyses has been completed and at present evaluated by the licensee. The plan of implementation of measures is dependent on the evaluation of the analyses results.** | | | |
| **45.** | **ENSREG Compilation of recommendations 3.3.9** | **<u>Improved communications</u>** | **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.**<br><br>**<u>Status:</u>**<br><br>**EMO1,2 - The SAM project requiring remote control of selected equipment installed within the project in all EMO units (1,2,3,4) has been considered in the on-going project of EMO ERC modification.**<br>**Preparation of design documentation** | **Completed**<br><br>**(before 2013)** | **31/12/2015**<br><br>**In progress** | **Before put of the respective unit into operation** |

| ID | Source | Recommendation | Fulfilment of recommendation | EBO3&4 | EMO1&2 | MO34 |
|---|---|---|---|---|---|---|
| | | | **for performance of the seismic reinforcement with qualification to extreme external conditions is in progress.** | | | |
| **46.** | **ENSREG Compilation of recommendations 3.3.10**<br><br>**EC Communication Annex** | **<u>Presence of hydrogen in unexpected places</u>** | **To implement the SAM project.**<br>**To analyse the SAM project from the viewpoint of potential migration of hydrogen to other places.**<br><br>**<u>Status:</u>**<br><br>**The project is in the phase of elaboration with the contractor UJV Rez. Preparation of the initial study which will be followed by other works in progress. Partial project outputs can be expected at the beginning of 2015.** | **31/12/2015**<br><br>**In progress** | **31/12/2015**<br><br>**In progress** | **Before put of the respective unit into operation** |
| **47.** | **ENSREG Compilation of recommendations 3.3.11** | **<u>Large volumes of contaminated water</u>** | **To prepare solutions for treatment of large volumes of contaminated water after an accident at a study level from the conceptual viewpoint.**<br><br>**<u>Status:</u>**<br><br>**The project is in the phase of elaboration with the contractor UJV Rez. Preparation of the initial study which will be followed by necessary action if any is in progress. Partial project outputs can be expected at the beginning of 2015.** | **31/12/2015**<br><br>**In progress** | **31/12/2015**<br><br>**In progress** | **31/12/2015** |

| ID | Source | Recommendation | Fulfilment of recommendation | EBO3&4 | EMO1&2 | MO34 |
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| **48.** | **ENSREG Compilation of recommendations 3.3.12** | **<u>Radiation protection</u>** | **To implement the SAM project. 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.**<br><br>**<u>Status:</u>**<br><br>**The analysis of severe accident management at all units on the site (including reactors at full power, reactors in shutdown and spent fuel pool) has been prepared (Report No. CVV 12/2014-01 "Management of Severe Accidents on All Units on Site") The SAM project includes also the habitability of the main control room and the control of selected equipment from the ERC. The licensee performed a self-assessment on the implementation of severe accident management /9/ and /10/ as well and the plan of implementation of additional measures is an integral part of respective documents. This self-assessment contained a chapter dealing with local** | **Analysis and plan of implementation of additional measures by 31/12/2014**<br><br>***Completed** | **Analysis and plan of implementation of additional measures by 31/12/2014**<br><br>***Completed** | **Analysis and plan of implementation of additional measures by 31/12/2014** |

| ID | Source | Recommendation | Fulfilment of recommendation | EBO3&4 | EMO1&2 | MO34 |
|---|---|---|---|---|---|---|
| | | | **radiation conditions in those technological premises to which access is necessary for long term control of SAM.**<br><br>***Comm.: The analyses has been completed and at present evaluated by the licensee. The plan of implementation of measures is dependent on the evaluation of the analyses results.** | | | |
| **49.** | **ENSREG Compilation of recommendations 3.3.13**<br><br>**EC Communication Annex** | **<u>On site emergency center</u>** | **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.**<br><br>**<u>Status:</u>**<br><br>**Remote control of selected equipment for all EMO units (1,2,3,4) has been considered in the on-going project of Emergency Response Centre upgrade. Preparation of design documentation for seismic reinforcement with qualification to extreme external conditions is in progress.** | **Completed**<br><br>**(before 2013)** | **31/12/2015**<br><br>**In progress** | **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.**<br><br>**Status:**<br><br>**Agreement with the Ministry of Defence on mutual assistance and cooperation and its provision at occurrence of an extraordinary event in nuclear installation (No. SE/2012/22100-01).**<br>**The cooperation tested during the all-plant emergency exercise ŽERIAV 2014 in EBO.** | **31/12/2014**<br><br>**Completed** | **31/12/2014**<br><br>**Completed** | **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 and for EMO1,2 and are continuously updated.** | **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**<br><br>***Completed** | **Analysis and plan of implementation of additional measures by 31/12/2014**<br><br>***Completed** | **Analysis and plan of implementation of additional measures by 31/12/2014** |

| ID | Source | Recommendation | Fulfilment of recommendation | EBO3&4 | EMO1&2 | MO34 |
|---|---|---|---|---|---|---|
| | | | **Status:**<br><br>**The analysis of severe accident management at all units on the site (including reactors at full power, reactors in shutdown and spent fuel pool) has been prepared (Report No. CVV 12/2014-01 "Management of Severe Accidents on All Units on Site"). The licensee performed a self-assessment on the implementation of severe accident management /9/ and /10/. A plan of implementation of additional measures is under preparation.**<br><br>***Comm.: The analyses has been completed and at present evaluated by the licensee. The plan of implementation of measures is dependent on the evaluation of the analyses results.** | | | |
| **53.** | **Peer review country Report of the SR 4.3**<br><br>**EC Communication– specific to Slovakia 5.11** | **SAM modification implemented according to the proposed schedule** | **The activity is subject to regulatory review and inspection /6/, /7/** | **Annually**<br><br>**In progress** | **Annually**<br><br>**In progress** | **Annually** |

| ID | Source | Recommendation | Fulfilment of recommendation | EBO3&4 | EMO1&2 | MO34 |
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| **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.**<br><br>**Status:**<br><br>**A study (including experimental verification) was prepared by UJV Řež to test the sealing under SA conditions. This study was prepared within the implementation of SAM project.**<br><br>**Additional measures:**<br>**Replacement of seals at the reactor pressure vessel cavity lids and doors in progress.** | **Analysis and plan of implementation of additional measures by 31/12/2014**<br><br>**Completed** | **Analysis and plan of implementation of additional measures by 31/12/2014**<br><br>**Completed** | **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.**<br><br>**Status:**<br><br>**A report on: "Analyses of fire distribution after the impact of a cargo Air plane" was prepared by the Technical University in Ostrava.**<br><br>**Based on the analysis, the fire brigade on the site prepared an operative fire control plan. Plan of procurement of technology, training of the personnel in cooperation with external organisations in progress.** | **31/12/2015**<br><br>**In progress** | **31/12/2015**<br><br>**In progress** | **31/12/2015**<br><br>**NPP under construction** |

| ID | Source | Recommendation | Fulfilment of recommendation | EBO3&4 | EMO1&2 | MO34 |
|---|---|---|---|---|---|---|
| **56.** | **Regulatory initiative** | **<u>Physical protection</u>** | **To harmonise the implementation of additional SAM measures with potential new increased requirements for physical protection in case of aggravated assaults.**<br>**All equipment which are part of SAM measures are located within the physical protection barriers of the NPPs (e.g. fire brigade, mobile equipment )** | **31/12/2014**<br><br>**Completed** | **31/12/2014**<br><br>**Completed** | **31/12/2014**<br><br>**NPP under conctruction** |
| **57.** | **Regulatory initiative** | **<u>Emergency arrangements</u>** | **Comprehensive review of the national emergency arrangements based on the outcomes of the so called HAVRAN exercise.**<br><br>**<u>Status:</u>**<br><br>**Government Resolution No. 28/2013 requested the Minister of Interior to submit to the Government a report on the progress in implementing the measures resulting from the HAVRAN 2012 exercise. The report was submitted to the government in January 2014 and took note of the progress achieved.**<br><br>**<u>Additional measures:</u>**<br>**A comprehensive review of the civil protection and emergency management has been initiated. The Ministry of Interior proposes that an amendment to Law No. 42/1994 Coll.** | **31/12/2014**<br><br>**Completed** | **31/12/2014**<br><br>**Completed** | **31/12/2014**<br><br>**NPP under conctruction** |

| ID | Source | Recommendation | Fulfilment of recommendation | EBO3&4 | EMO1&2 | MO34 |
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| | | | **on Civil Protection of Citizens to be prepared. This amendment is also necessary to implement the Directive 2012/18/EU on the control of major-accident hazards involving dangerous substances.**<br>**The amendment to Law No. 42/1994 Coll. would provide the Ministry of Interior with an obligation to prepare a "Plan of Protection of Citizens" on national level - part of which would be devoted to radiation protection. Estimated entry into force of the Amendment is 2015.** | | | |

**REFERENCES**

**/1/ WENRA: Qualitative Reporting on Status of Harmonisation of Safety of Existing Reactors**

**/2/ Súhrnná správa SHMÚ pre lokalitu Jaslovské Bohunice, Bratislava, Január 2012**

**/3/ Súhrnná správa SHMÚ pre lokalitu Mochovce, Bratislava, Marec 2011**

**/4/ Report on estimation of limit seismic margin of civil structures for EBO, EMO12)**

**/5/ Seismic PSA for seismic re-evaluation of the 1st and 2nd NPP EMO-Final Report,**

**/6/ UJD SR Inspection Plan 2013**

**/7/ UJD SR Inspection Plan 2014**

**/8/ Impact of extreme external climate conditions in selected rooms (for both NPPs) STMSE000015,**

**/9/ Report on targeted self-assessment in the area of civil accidents according to WANO methodology (POC 2013 – 1) at EMO**

**/10/ Report on targeted self-assessment in the area of civil accidents according to WANO methodology (POC 2013 – 1) at EBO**