UJD SR

Nuclear Regulatory Authority of the Slovak Republic

# International cooperation of UJD SR in the area of new NPPs

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NRC 23rd Annual Regulatory Information Conference

March 8-10, 2011

Bethesda. Maryland, USA

## Content

- New NPP project in Slovakia
- International cooperation
- Update of national legislation



## 1. NEW NPP PROJECT IN SLOVAKIA

## Facts about the new-built project

- New joint stock company JESS was established in December 2009.
- JESS owned by the Slovak JAVYS (51%) and Czech ČEZ companies (49%).
- Their intention to build a new NPP at the Bohunice site was clearly stated.
- There was the first official introductory meeting between the JESS and UJD in 2010.
- A rough schedule for building the new unit was presented (2011 – feasibility study, 2015 – construction permit, 2020 – opeartional licence).
- No official proceeding/licencing proces started so far.



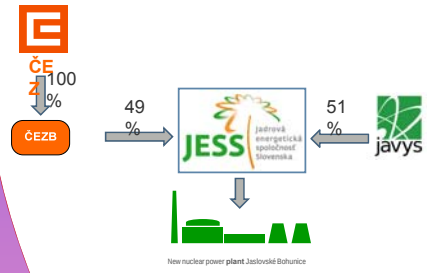
## JESS company background

- In May 2009, Slovakian company Jadrová a vyraďovacia spoločnosť, a.s. (JAVYS) and Czech power company ČEZ, a. s. signed the shareholder agreement enabling establishing a joint venture (JV) company for building of a new nuclear power plant at Bohunice site, Slovakia.
- JV company – Jadrová energetická spoločnosť Slovenska, a.s. (JESS) company was officially registered in December 2009.



## Shareholder structure

- JAVYS keeps 51% of the shares while ČEZ Bohunice, a.s. owns 49% of the shares in the joint venture.



## Company Vision

Construction of the modern nuclear power plant with aim to produce the electricity safely and effectively in the shortest possible time.

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## New nuclear power plant requirements

- Selected area: Bohunice site.
- Selected technology: Pressurized Water Reactor
  - Lifetime min. 60 years
  - One unit
  - Electrical output between 1000 – 1700 MW
  - Design must fulfill the highest international standards
- Nuclear fuel will be delivered together with nuclear island.
- Not to build the prototype, the technology must already exist at least at the construction stage.

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## Bohunice Site

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## Bohunice site




## Bohunice site



## Key project issues

- **Government Project support**
  - **Government is major Shareholder through JAVYS company**
  - **Support in licensing process**
- **Legislation and licensing process**
  - **National experience from ongoing construction of NPP in Slovakia (NPP Mochovce)**
- **Schedule – experience from other projects**
  - **Preparatory stage – approximately 60 months**
  - **Construction stage – approximately 60 months**
  - **Comprehensive schedule will be elaborated in the Feasibility study**

## Current and next steps activities

- Exchange of Information with potential Vendors
- Elaboration of input studies for the Feasibility study
  - Grid connection study
  - Heavy Components Transport study
  - Geology and Seismology study
  - Water Supply study
- Feasibility study elaboration
- Zone planning activities
- Preparation work for an EIA documentation

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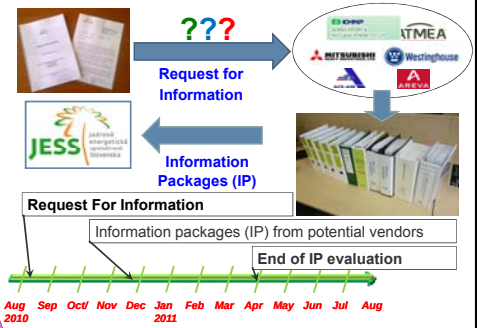
## Exchange of information

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## Exchange of information

| Project | Vendor | Evaluated |
|---|---|---|
| AP 1000 | Westinghouse | 16.12.2010 |
| Atmea 1100 | ATMEA | 17.1.2011 |
| APWR 1700 | Mitsubishi | 26.1.2011 |
| MIR 1200 | Atomstrojexport | 18.2.2011 |
| APR 1400 | KHNP/ KEPCO | 4.3.2011 |
| EPR 1600 | AREVA | 18.3.2011 |

**End of IP evaluation – 1. April 2011**

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## Input studies for Feasibility study
## Grid connection study

- December 2010 - Preliminary analysis:
  - Possibility to use the existing grid corridors of decommissioned NPP V1 through newly built 400 kV switchyard
  - It is necessary to strengthen some of domestic and cross border 400 kV grids and to built regulatory and backup power sources
- Comprehensive assessment of new NPP connection will result from the Grid Connection Study



## Input studies for Feasibility study
## Heavy components transport study

- Heavy Components Transport to the relevant site represents significant logistical chalenge which will be minutely evaluated in Feasibility Study.
- Optimal solution of heavy components transportation is combination of water and road shipment.

- There are transportation companies with experience of heavy and bulky components handling in Slovakia.



## Input studies for Feasibility study
## Heavy components transport study

| Vendor & component | Reactor pressure vessel | | | Steam generator | | | |
|---|---|---|---|---|---|---|---|
| Length /m/ | 12,70 | 13,50 | 11,20 | 22,00 | 24,50 | 26,50 | 23,10 |
| Width /m/ | 7,12 | 8,20 | 5,50 | 5,10 | 6,10 | 7,00 | 6,19 |
| Height /m/ | 6,74 | 8,40 | 5,50 | 5,10 | 6,10 | 6,00 | 6,19 |
| Weight /t/ | 408 | 530 | 330 | 465 | 665 | 560 | 782 |

## Input studies for Feasibility study Geology and seismology study

- The preliminary characteristics of Free Field Response Spectra are as follows:
  - Peak Ground Acceleration horizontal 0.34 g
  - Peak Ground Acceleration vertical 0.214 g
  - Surface Wave Magnitude (Ms) 5.86
  - Distance of earthquake (r) 12,2 km
- This values was created by de-aggregation of the probabilistic seismic hazard computation for the logic tree
- Reassessment of these characteristics is actually in process.
- *) RLE: Review Level Earthquake



## Input studies for Feasibility study Water supply study

- The Váh river forms the central axis of the Slovak river system.
- The Sľňava reservoir was build on the Váh river for Bohunice NPP.
- Possible flow capacityof the water supply for new NPP is 5 m3/s and this is sufficient value.
- Specific conditions for raw water supply will be elaborated in the Feasbility study



## Feasibility study

- Objectives
  Evaluation and analysis of the design alternatives, suitability of the site, project organization and commercial conditions, financial and economic analysis before preparation stage.
- Feasibility Study structure
  1. Technical part
  2. Site information
  3. Contract approaches
  4. Project management
  5. Project schedule
  6. Project financing
  7. Project economy analysis
- Assumption of the Feasibility Study final version 12 month after signature of a contract with a Feasibility Study supplier

# 2. INTERNATIONAL COOPERATION



## WENRA

- WENRA = Western European Nuclear Regulators Association
- Network of Chief Regulators of EU countries established in 1999
- Main objectives:
  - to develop a common approach to nuclear safety,
  - to provide an independent capability to examine nuclear safety in applicant countries
  - to be a network exchanging experience and discussing significant safety issues.
- The first decade of its existence was dedicated mainly to existing reactors (harmonization).



## WENRA

- In 2008 the WENRA board decided to define and express a common view on the safety of new reactors, so that:
  - the public can have confidence that new reactors to be licensed across Europe in the next years will offer improved levels of protection compared to existing ones;
  - regulators press for safety improvements in the same direction and ensure that these new reactors will have high and comparable levels of safety;
  - applicants take into account this common view when formulating their regulatory submissions.
- In 2009 WENRA STATEMENT ON SAFETY OBJECTIVES FOR NEW NUCLEAR POWER PLANTS was published.
- In 2010 a new working group on Inspection practices related to the inspections during construction of new NPPs was established.
- Our expectations from being a WENRA member: harmonization with European regulators.

## OECD NEA

- NEA established a new Working Group on Regulation of New Reactors (WGRNR) in 2008
- Main objective is to deal with regulatory activities in the primary program areas of siting, licensing and oversight for new commercial nuclear power reactors (Generation III+ and Generation IV reactors).
- The group is struggling with finding activities that would not overlay with other existing groups.
- Database of inspection findings during construction was created.
- Survey report on national practices regarding siting of new NPPs was published.
- Our expectations: to be informed about licensing practices in all OECD countries.

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## Multilateral agreements

- Annual meetings with regulatory bodies of Slovak Republic, Czech Republic, Hungary and Slovenia are organized.
- In 2009 a new activity was agreed among these countries – to cooperate and exchange information on regulation of new reactors.
- Poland was invited to participate as well in 2010.
- So far only formal initial steps were done without real outputs.
- Expectations:
  - exchange of information about new legislation in the area of new NPPs,
  - Share information and results of review and assessment of particular applications.

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## 3. UPDATE OF DOMESTIC LEGISLATION

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## Update of the legislation

- Based on the presented intent UJD commenced an activity in order to prepare national legislation for licencing a new NPP.
- First step udertaken in 2009:
  - comparison of requirements from a pre-defined list of documents with Slovak nuclear regulations
  - done upon a contract by a TSO
  - the aim was to identify and remove deltas compared to current standards



## Reference documents

- Report on the Survey on Regulation of Site Selection and Preparation, WGRNR OECD NEA
- Database of OECD NEA - 5.1 Criteria for structures (buildings) ConEx Database
- Site Evaluation for Nuclear Installations. IAEA Safety Standard Series No. NS-R-1-draft 2009
- The Management System for Nuclear Installations. IAEA Safety Standards Series No. GS-G-3.5
- Nuclear Safety Infrastructure for a National Nuclear Power Programme Supported by The IAEA Fundamental Safety Principles. IAEA INSAG-22
- Managing the First Nuclear Power Plant Project. IAEA-TECDOC-1555
- Construction and commissioning experience of evolutionary water cooled nuclear power plants. IAEA TECDOC-1390
- Nuclear Power Project Management. IAEA Technical report Series No.279
- The Management System for Facilities and Activities. IAEA Safety Standards Series No. GS-R-3
- Czech Regulation on nuclear and radiation safety 195/1999 Sb., draft 2009
- Safety Criteria for NPPs. Revision D, Bundesministerium fur Umwelt, Naturschutz und Reaktorsicherheit
- Technical Guidelines for the Design and Construction of the Next Generation of NPPs with PWR. GPR/German experts plenary meetigns. 2000



## Results

- There were 22 requirements selected for the Slovak regulation on nuclear safety
- Examples:
  - External events for siting
  - Containment tightness during severe accidents
  - Fire safety analysis
  - Qualification of safety related equipment with respect to external events
  - Computer-based safety systems
  - Safety culture
- Separate topic: seismicity
  - A complete set of requirements was formulated that will be included in the siting criteria.
  - A Slovak safety guide based on the NS-G-3.3 DS422 was created.

## Thank you for your attention