



Licencing of Dukovany NPP Long Term Operation

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Outline

- NPP Dukovany LTO background
- LTO Legislative framework
- Licencing process
- Issues of LTO process
- Operating licence and licence conditions



NPP Dukovany LTO background

- Originally expected lifetime of Dukovany NPP was 30 years (Unit 1 in operation since 1985, Unit 2...1986, Unit 3,4...1987)
- Current SÚJB's Decisions on operating permit („operating licence“) valid till:
 1. unit **new operating licence issued on 30. 3. 2016 (valid from 1.4. 2016** for an indefinite time period, with almost 100 operating licence conditions)
 2. unit 31.12. 2016
 3. unit 31.12. 2017
 4. unit 31.12. 2017





Legislative framework

- **Act No. 18/1997 Coll.** on Peaceful Utilisation of Nuclear Energy and Ionising Radiation (**Atomic Act**)
- **Decree No. 106/1998 Coll.** on Nuclear Safety and Radiation Protection Assurance during Commissioning and Operation of Nuclear Installations,
- **Decree No. 195/1998 Coll.** On Design Requirements for Nuclear Installations,
- **Decree No. 132/2008 Coll.** on Quality Assurance System ...,
- **Decree No. 309/2005 Coll.** on provision of technical safety for classified equipment



Legislative framework (cont.)

Relevant national regulatory safety guides:

- SÚJB, BN-JB-2.1 - **Ageing Management for Nuclear Power Plants** (esp. Annex 2), 2015
- SÚJB, BN-JB-1.9 - **Maintenance, In-service Inspections and Functional Testing**, 2010
- SÚJB, BN-JB-1.2 - **Periodic Safety Review**, 2012
- SÚJB, BN-JB-1.12 – **Content of Safety Analysis Report**

Relevant international safety requirements and guides:

- **EU directive on nuclear safety 2014/87/Euratom**, 2014
- **WENRA Safety reference levels**, 2014
- NS-G-2.12 - **Ageing Management for NPP's**, 2009
- NS-G-2.6 - **Maintenance, Surveillance and ISI in NPP's**, 2002
- SRS No. 57 - **Safe long term operation of NPP's**, 2008



Legislative framework (cont.)

Czech approach for license renewal:

- a) formal legal framework based on Atomic Act requirements for operational license and on conditions defined by previously issued licences;
- b) assessment and safety demonstration for License „renewal“ for operation beyond originally designed/expected lifetime based primarily on three elements: reassessment and update of FSAR, Periodic Safety Review and comprehensive Ageing management programme.



NPP Dukovany LTO related conditions defined by previously issued licences

- Operating licence conditions related to LTO (issued in 2005 – 2007)
 - To submit amendments of Pre-operational Safety Analysis Report (Final SAR) annually (chapter on residual lifetime of safety significant systems/components)
 - To perform and complete a PSR by 30. 6. 2015
 - To submit the Strategy for long term operation (approach to operation beyond originally designed life-time) on the basis of IAEA requirements and international best practice by 31.12. 2007
 - To submit the Programme for Dukovany NPP LTO by 31.12.2008 (on the basis of Technical and Economic Feasibility Study results)
 - To update the Programme for Dukovany NPP LTO annually (with respect to changes in relevant programmes, new requirements on safety, issues related to aging of equipment and personnel)



Licencing process – SÚJB and ČEZ interactions

- Formal SÚJB-Licensee consultations started before 2005
- Operating licence conditions related to LTO of Dukovany Units 1 – 4 (2005 – 2007)
- Intensive communication started on January 2014: 3 levels of „LTO“ meetings:
 - Top management meetings – 1 x 6 weeks
 - Consulting days between SÚJB and Dukovany LTO Project managers – monthly
 - Work level meetings – as needed

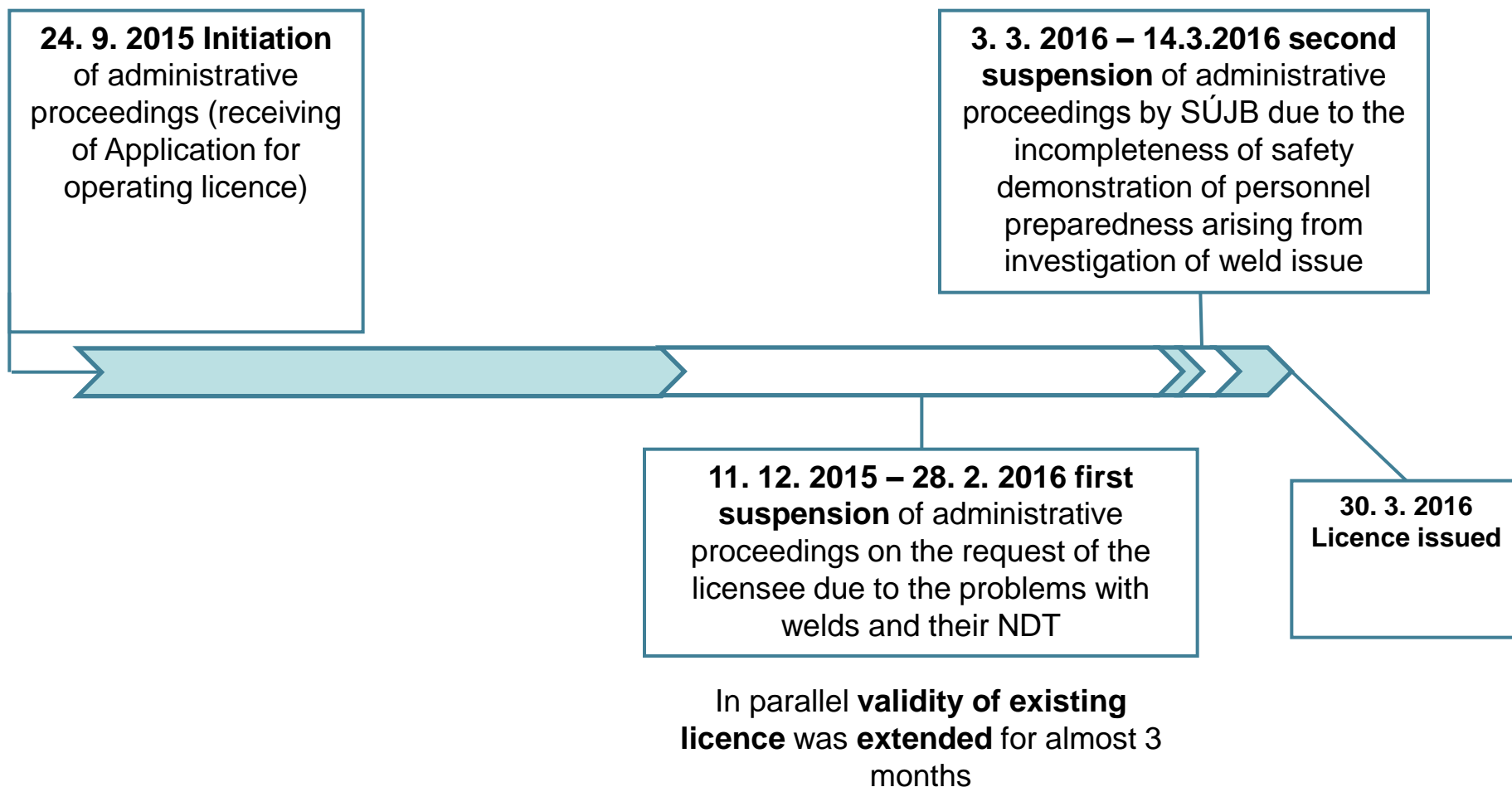


Licensing process - Administrative proceedings

- Time limit for taking a decision after initiation of administrative proceeding given by Atomic Act - 90 days
- Admin Code includes provisions for suspension of the process if needed
- The precondition for obtaining the licence for further operation is to meet all conditions from previous operating licence (to resolve the issues raised from PSR 20 and other SÚJB requirements...) and provide sufficient evidence that SSCs are able to operate safely in the future
- Operating licence for Unit 1 was valid till 31.12.2015
- Application needed to be submitted by 30. 9. 2015



Licencing process - Administrative proceedings





Licencing process - Documentation

Application of regulatory approach for operating licence – documentation required for the nuclear installation operating licence according to the Atomic Act

- Pre-operational Safety Analysis Report (FSAR) amendments and amendments of other documentation required for obtaining a licence for the first nuclear fuel loading into the reactor (ISI programme, List of selected components etc.) related to changes carried out after the first nuclear fuel loading;
- Evidence of previous SÚJB's decisions and conditions implementation
- **Safety demonstration that the installation and personnel are prepared for further operation;**
- Operation schedule;
- Updated limits and conditions for safe operation



Licencing process - Documentation

Safety demonstration that the installation is prepared for next operation includes:

- **Description of licensee organizational** structure related to AM and LTO assessment
 - **Data** collection and record keeping system
 - Description of **Scoping/screening** process
 - **Scoping database**
 - **Review of aging management process** for all systems with impact on safety (**AMR final reports**)
 - **Assessment of analysis with time assumptions (revalidation of TLAA on the basis of expert analysis and opinion)**
 - The **Effective Maintenance Strategy Project** (categorization of components based on critical functions and its results - **maintenance templates**)
 - Assessment of actual status of SSC's (results given in **Health reports**)
- Descriptive part
- Evaluation part



Licencing process - SCOPE

- **Scoping -->> more than 200 000 items included into the assessment frame**
- **Detailed assessment of SCs covered 33.624 SCs (revalidation of TLAA and AMR)**
- **Licensee created in total 459 reports (about 11800 pages A4 + 2500 excel spreadsheets)**



Licencing process – SCOPE (cont.)

459 reports:

- **AMR Reports for long life SCs with passive function:** 77 reports
 - for each individual technological system in mechanical area
 - for buildings in civil structures area
- **Specific Summary Reports:**
 - Summary Reports for Electrical area - 1 report
 - Summary Reports for I&C area - 1 report
 - Summary Report for Cables - 1 report
 - Summary Report for Valves with Drives - 1 report
- **Final reports from Effective Maintenance Strategy (SRS) mainly for SCs with active function** - 141 reports
- **Results of TLAA revalidation and TLAA Summary Report** -119 reports + 1 report
- **System Health reports (SRS)** – 117 reports



Licencing process - Regulatory review

- In relation to licensee application for LTO beyond 30 years of operation **three SÚJB review teams** were defined and their responsibilities set up by SÚJB Chairperson Directives and Section Director Instructions (internal documents defining review objectives, review team members, responsibilities, schedule and methodologies); they were focussed on:
 - review of **Safety demonstration** that the installation and personnel are prepared for further operation
 - review of **Pre-operational Safety Analysis Report**
 - review and inspection of **PSR** results
- Output: Evaluation reports containing suggestions of licence conditions
- Internal workshops/coordination meetings to communicate necessary information and agreed procedures



Licencing process - Regulatory review

Procedure:

- 1) Is **scoping** for „LTO“ appropriate? – criteria given in BN-JB-2.1 on Aging management
- 2) Are **screening results** correct?
- 3) Is safety **documentation sufficient** enough and **technically correct**?
- 4) For passive/long lived components following items were subject of SÚJB's assessment:
 - Evaluation of real **physical condition of SCs**
 - Identification of **degradation mechanisms** and **aging effects** (Using the degradation mechanisms catalogue and the public information from project IGALL)
 - **Evaluation and Review** of current state of **ageing management** (Existence of necessary AMPs for managing all identified degradation mechanisms/ageing effects), correctness of AMPs (9 attributes)
 - Identification of existing **TLAAs** and **PTD_{TLL}** and their revalidation for next operational period



Licencing process - Regulatory review (cont.)

- **Are remedial suggestions from licensee assessment** implemented? (If proposed corrective measure were somehow considered - e.g. suggestions on creating of new AMPs or improvement of the existing ones, new inspection places, new methods for inspection... (→ some proposed action have been implemented before licence issuing, some are subject of „The LTO EDU 1 action plan“ to resolve the findings and recommendations and will be followed by regular progress reports and will be monitored and inspected by SÚJB)

5) for components not included in AMR (replaceable or regularly changed components because of their qualified life), the following elements were evaluated by SÚJB:

- usefulness of maintenance
- maintenance programmes applied to all components within the scope of LTO
- appropriateness of acceptance criteria
- the adequacy and accuracy of all evidences
- quality assurance (also the compliance with licensee internal procedure)

Some areas have been subject to an **independent assessment** by our **TSO's**



Issues related to preparatory and licencing phase of „LTO“

- Excessive time demand (on both sides) – Licensee started to evaluate safety demonstration data and processes relevant to LTO in 2009 (in 2013 a new methodology for evaluation of the SCs was created in ČEZ) -->> there was still not enough time
- Not all activities were fully completed by the time the licence was issued → licence conditions and „Action plan“
- Unexpected events: Essential service water rupture (November 2014 – concealed piping); quality of NDTs of welds
- Periodical integral leaktightness test – redetermination of test pressure



Issues related to preparatory and licencing phase of „LTO“ – (cont.)

- Not complete AMP for civil structures
- Fire protection water
- Very limited independent verification of LTO analysis by licensee TSO (other than was the author of evaluation reports)
- The final scope of the AM was fixed recently (even it was PSR issue after 20 years of operation) – for some of AMPs not enough data for monitoring the efficiency of the programme



Licence and licence conditions

New operating licence for Unit 1 issued on 30. 3. 2016 (valid from 1. 4. 2016) with almost 100 time limited conditions which if not fulfilled could be the reason for withdrawal of the licence:

Licence conditions:

- A) General conditions on Pre-operational Safety Analysis Report (to add some missing information – design bases, missing analysis, list of normative documentation, detailed specifications in some areas, analysis complement the WENRA reference levels etc.)
- B) Conditions related to the assessment and documentation of site characteristics EDU (additional surveys of geological features, to update information about evaluation of groundwater etc...)
- C) Conditions related to the requirements for evaluation SSC's and measures to ensure the safety functions (to establish a methodology for evaluation of civil structures, to implement some measures for increasing the reliability of spent fuel storage pool, evaluation of safety relevant cables in non-harsh environment, to increase the activities concerning the monitoring of essential service water piping, to perform detailed analysis of the list of classified components and in-service inspection program etc.)



STÁTNÍ ÚŘAD PRO JADERNOU BEZPEČNOST

V Praze dne 30. 3. 2016
 Č. j.: SÚJB-OUJB-4932/2016
 Zn. sp.: SÚJB-POD-19657/2015/1
 Vyřizuje úřvar: Odbor hodnocení jaderné bezpečnosti
 Oprávněná úřední osoba: Ing. Jiří Štuller

ROZHODNUTÍ

Státní úřad pro jadernou bezpečnost (dále jen „SÚJB“) jako správní úřad příslušný podle § 3 odst. 3 písm. c) a e) zákona č. 181/1997 Sb., o mírovém využívání jaderné energie a souvzrušného záření a o změně a doplnění některých zákonů, ve znění pozdějších předpisů (dále jen „atomový zákon“), ve správním řízení zahájeném podle § 44 odst. 1 zákona č. 500/2004 Sb., správní řád (dále jen „spr. ř.“), dne 24. 9. 2015, na základě žádosti zadávatele podle § 27 odst. 1 písm. a) spr. ř. - ČEZ, a. s., se sídlem Dubová 2/1444, 140 53 Praha 4, identifikační číslo 45274649, evidenční číslo 108618 (dále jen „žadatel“), ze dne 24. 9. 2015, č. j.: B-EDU/23869/2015, o povolení provozu 1. bloku Jaderné elektrárny Dukovany, rozhodl takto:

I.

SÚJB podle § 67 odst. 1 spr. ř. a podle § 9 odst. 1 písm. d) atomového zákona

povoluje

žadateli provoz jaderného zařízení – 1. bloku Jaderné elektrárny Dukovany.

II.

SÚJB podle § 67 odst. 1 spr. ř. a § 17 odst. 2 písm. a) a části D písm. a) bodu 6 přílohy atomového zákona souhlasně žádání

schvaluje

aktualizované Limity a podmínky bezpečného provozu, archivní číslo A004a-245-11, které byly zadávatelem zaslány SÚJB ke schválení dopisem č. j. B-EDU/9872/2015 dne 13. 4. 2015.

Strana 1 (celkem 45)



Licence and licence conditions

- D) Conditions for nuclear fuel and reactor core
- E) Conditions for future evaluation of safe operation (to submit information about implementation of new legislation, to perform PSR after 40 years of operation, PSA level 1 and 2 updates, update of safety analysis on the basis of current state-of-the-art, regular updates of AMR, HR, TLAAs, maintenance templates, progress report of LTO action plan etc....)
- F) Conditions related to ensuring physical protection (residual lifetime analysis of physical protection system technical parts)
- G) Conditions covering adequate human and financial resources assuring and appropriate safety organization and management (connected again with „Welds affair“, e.g. to submit planned changes in ČEZ organizational structure, to perform complex root cause analysis of long-term undetected bad quality of RT inspections, safety culture etc....)



Positive aspects

- On ČEZ side:
 - International verification of preparatory phase by successful full-scope SALTO mission (and Follow-up mission)
 - Active licensee reaction on SÚJB recommendations
 - Licensee openness to SÚJB
- On SÚJB side:
 - priority given to LTO review process
 - no significant financial restrictions for independent assessment by SÚJB TSOs
 - SÚJB management support when needed
- **Licence for Unit 1 was issued and licencing process for unit 1 will serve as the basis for Units 2-4**

SÚJB

Státní úřad pro jadernou bezpečnost

