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Licensing Documentation and Licensing Process for Dismantling and Decontamination projects in Lithuania*

**The successful preparation of the licensing documentation for the D&D projects at INPP was grant funded by the EBRD-managed Ignalina International Decommissioning Support Fund (IIDSF)*

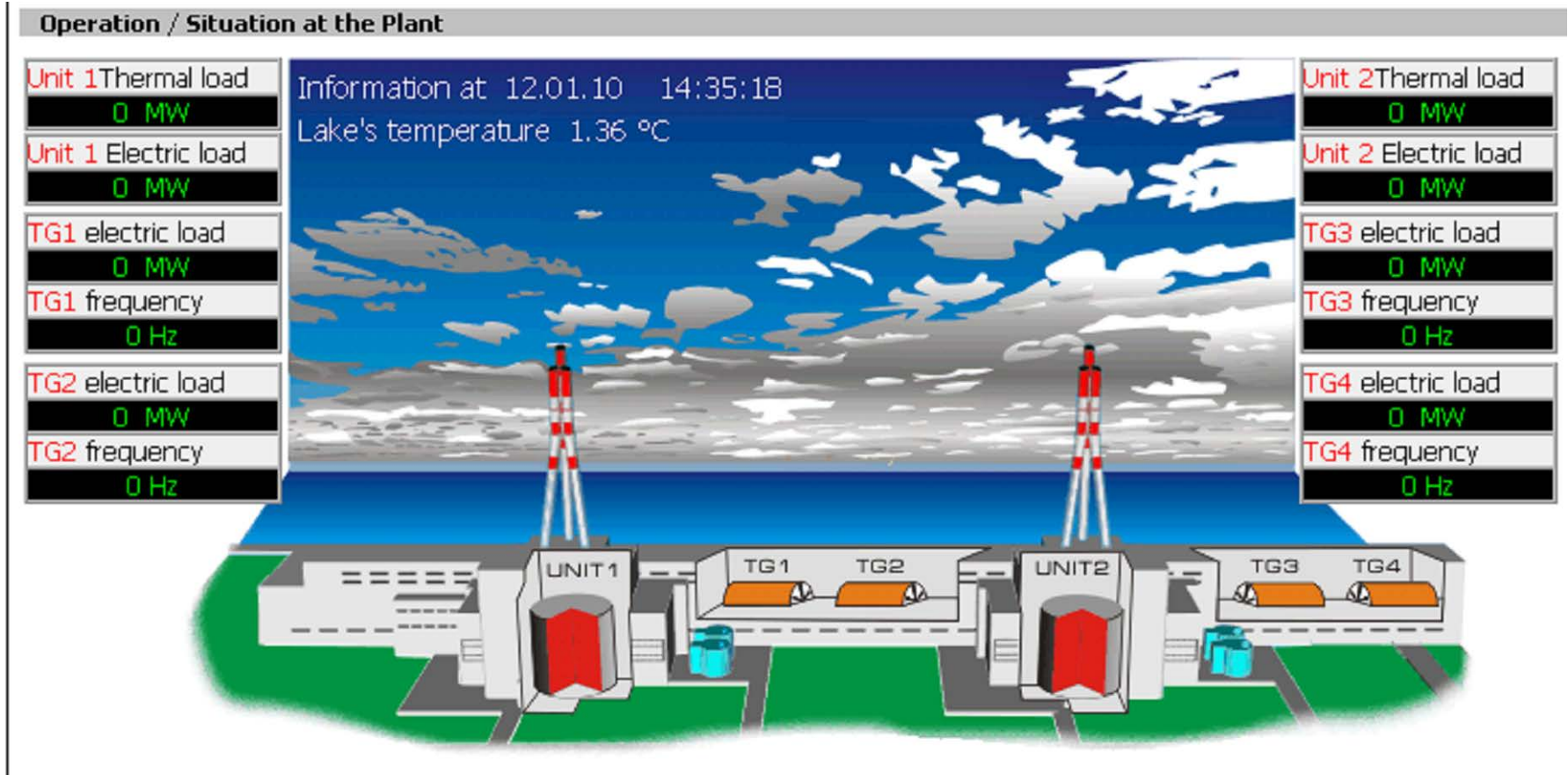
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Introduction

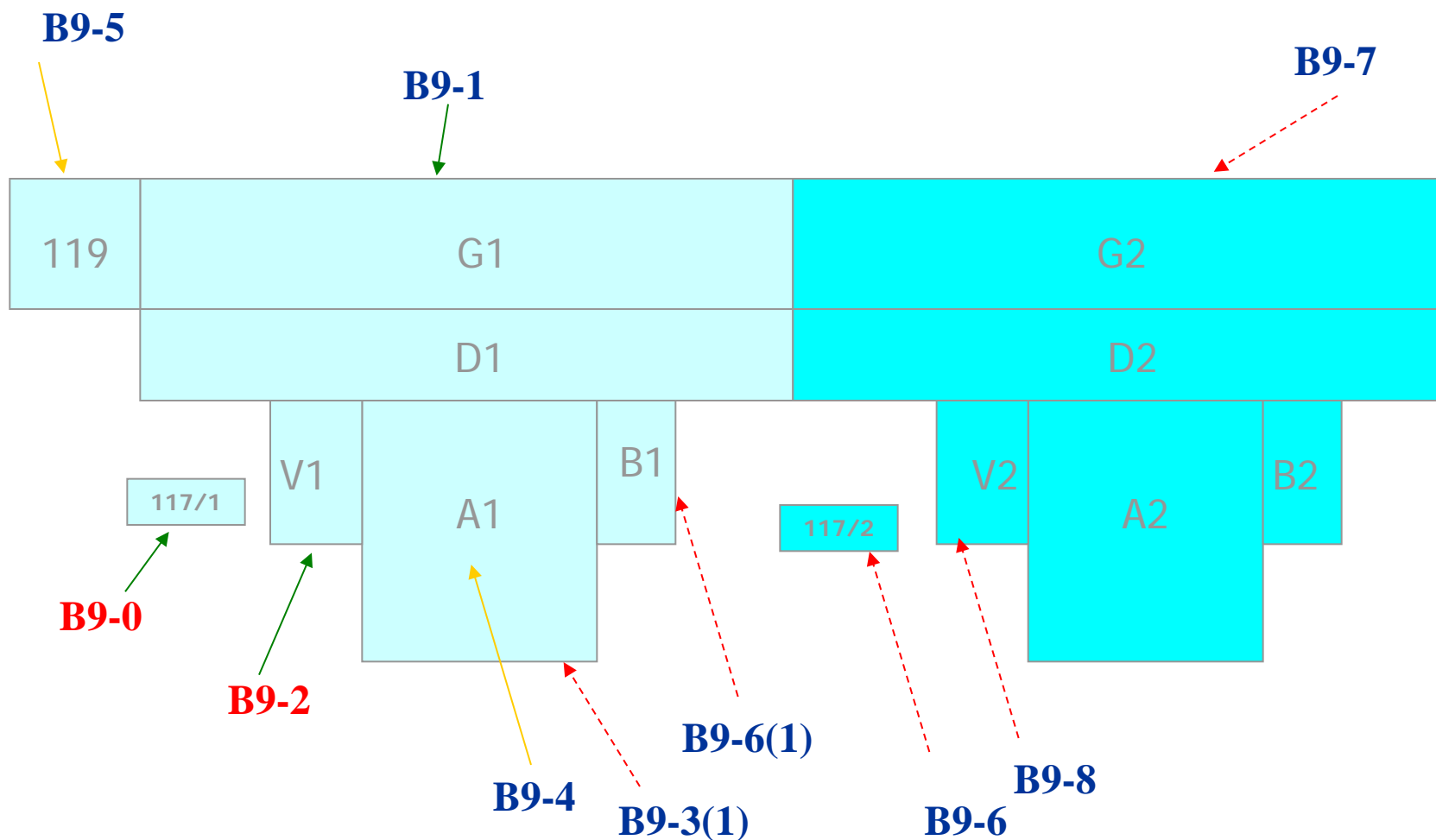
- Presentation will show main steps of **licensing process** applied to authorized activities under separate **dismantling and decontamination (D&D) projects** at Ignalina NPP.
- The **licensing process**:
 - **starts** when NPP submits the first licensing document(s) to the Authorities,
 - it is **completed** when all the licensing documents are approved by the Authorities and authorization to start D&D works is received by NPP.
- LEI took participation in two Ignalina NPP D&D projects:
 - **B9-0**,
 - **B9-2**.

Introduction – Ignalina NPP



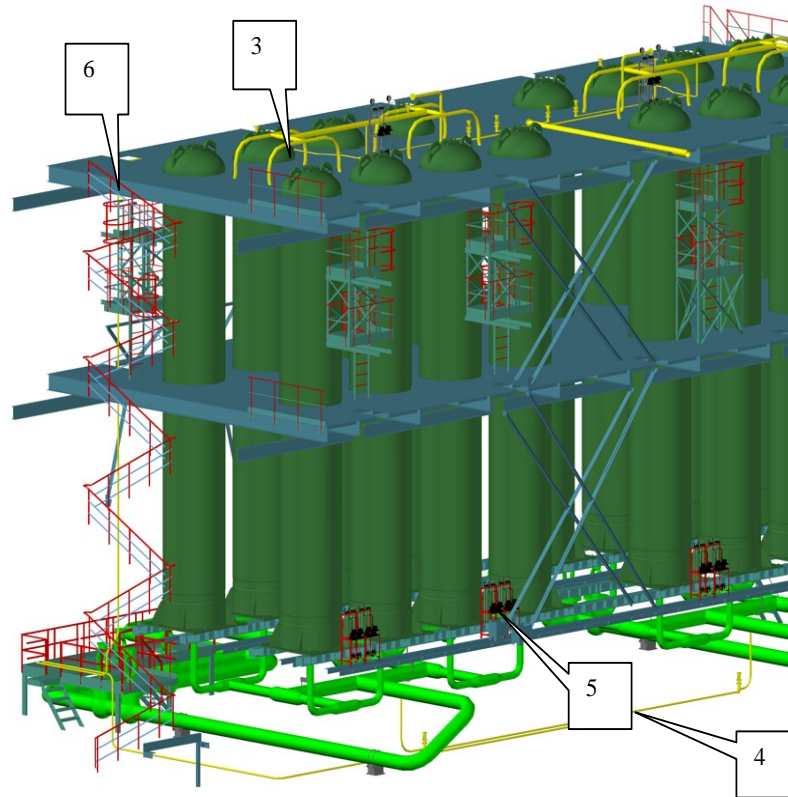
- Ignalina NPP – two units of RBMK-1500, commissioned in 1983 and 1987
- Both units are shutdown for decommissioning, at the end of 2004 and 2009

Introduction - Ignalina NPP D&D Engineering Projects



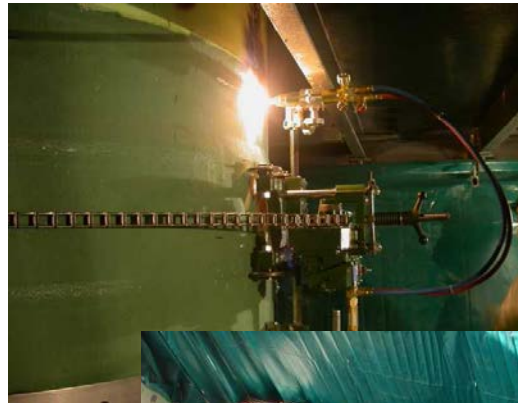
Introduction – B9-0

- The main systems in building 117/1 (Project B9-0):
 - The Emergency Core Cooling System (ECCS) components (e.g. sixteen ECCS Pressure vessels, 14 m height and 47650 kg mass each),
 - Helium Facility (part of Reactor Gas Circuit)



Introduction – B9-0

- After Project B9-0 completion about 1000 tons of equipment were decontaminated and dismantled in INPP Building 117/1, the main part of it are Emergency Core Cooling System pressurized tanks and pipelines.



Introduction – B9-2

- The main systems in building V1 (Project B9-2):
 - reactor gas circuit,
 - exhaust gas cleaning system,
 - system of maintenance cooling tanks (part of Main Circulation Circuit),
 - different components of ventilation systems,
 - part of emergency core cooling system.

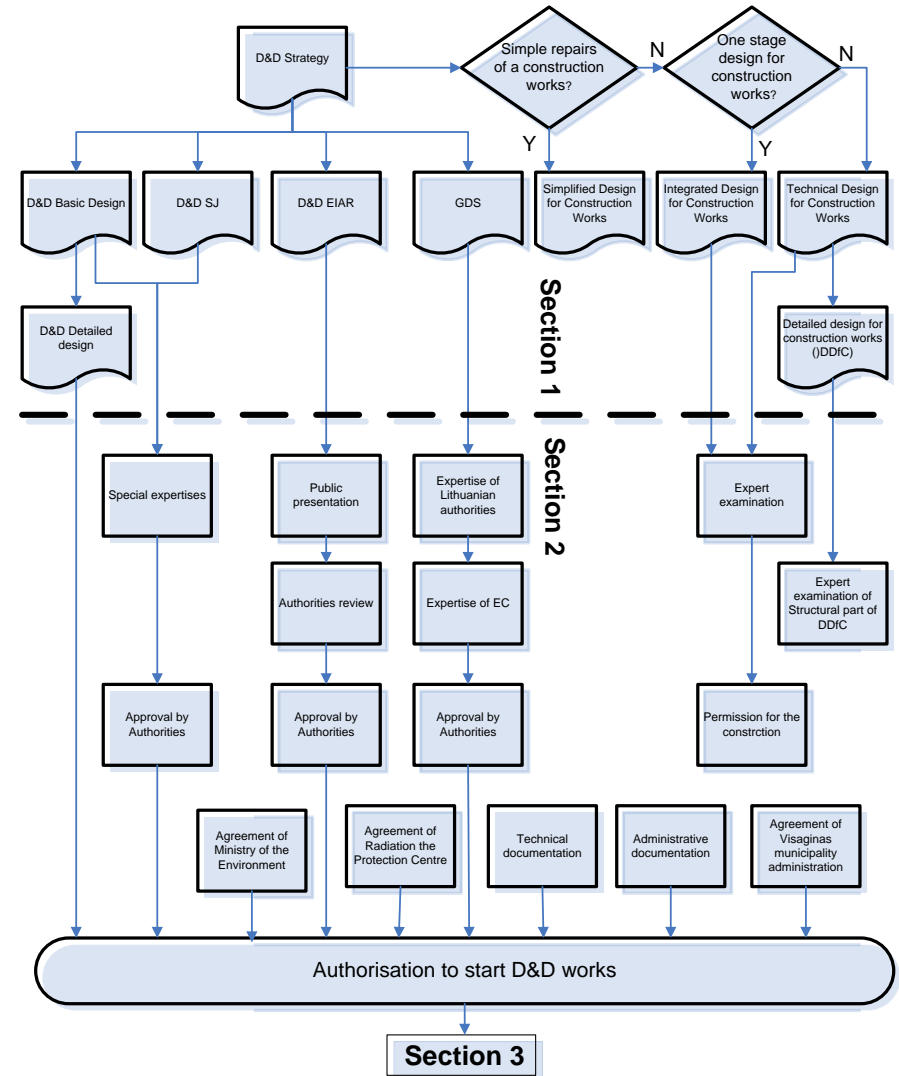


Overview of activities related with licensing process of D&D projects at Ignalina NPP

- The licensing process used in Lithuania covers approval by the Authorities of the following documents:
 - D&D Basic Design,
 - D&D Safety Justification Report,
 - D&D Environmental Impact Assessment Report,
 - General Data Set on radioactive waste disposal plan
 - Design for Construction Works.
- The D&D documents such as Strategy, Detail Design including D&D working procedures, Operational and Maintenance Manual and Training programs may be inspected by the Authorities but not require approval from them.

Overview of activities related with licensing process of D&D projects at Ignalina NPP

- Section 1 – documents development phase
- Section 2 – licensing phase
- Section 3 – work implementation



Overview of activities related with licensing process of D&D projects at Ignalina NPP

- Licensing actions and involved Authority

| ID | Licensing action | Involved authority |
|----|---|--|
| 1 | EIA process | Ministry of Environment, General public, VATESI, Ministry of Health, Fire and rescue department, Utena region environmental protection department, Cultural Heritage department, Utena region administration, Visaginas municipal administration |
| 2 | Expertise of the D&D Basic Design and D&D SJ | VATESI, Ministry of Environment, Ministry of Health (RPC), Visaginas municipal administration. |
| 3 | Expertise of the Design for construction works, when needed | Ministry of Environment, Certified expertise company |
| 4 | Permission for construction (civil works), when needed | Government or an institution authorized by it |
| 5 | General data set on Radioactive waste disposal (Article 37 of Euratom Treaty) | VATESI, Ministry of Environment, Radiation Protection Centre, Fire and Rescue Department of Ministry of the Interior, European Commission |
| 6 | Authorization to start D&D works | VATESI, Ministry of the Environment or an institution authorized by it, Radiation Protection Centre, Visaginas municipality |

Licensing process of Environmental Impact Assessment report

- The licensing process of the Environmental Impact Assessment Report is regulated in Lithuania by the Lithuanian Law on the EIA and Regulation. In the Law the following participants of the EIA process are defined:
 - Responsible institution:
 - Ministry of Environment or other authorized by government institution;
 - Subjects of environmental impact assessment of proposed economic activity:
 - State institutions responsible for public health, fire safety, protection of cultural heritage, institutions of district and municipality;
 - Undertaker (client) of proposed economic activities;
 - Developer of documentation on environmental impact assessment;
 - Public.

Licensing process of Environmental Impact Assessment report

- EIAR licensing process consists of the several steps:
 - Public presentation:
 - **within 10 working days** prior to the public presentation of EIA report all information is provided in the national and local press, on the Ignalina NPP and EBRD web-sites, as well on billboards in the Visaginas municipality.
 - Experts review include state institutions (EIA subjects) responsible for:
 - public health;
 - fire safety;
 - protection of cultural heritage;
 - institutions of district and municipality;
 - all institution have **20 working days** to provide the reasoned conclusions concerning the EIA report.

Licensing process of Environmental Impact Assessment report

- Decision of the Responsible Institution:
 - When the conclusions from the EIA subjects are received EIA documentation is submitted to responsible institution (**the Ministry of Environment**).
 - The responsible institution, after receipt of the EIA report immediately organizes an **announcement on the web page** of the Ministry of Environment concerning the proposed activity.
 - The responsible institution **within 25 working days** upon receiving the report perform following actions:
 - submits reasoned requirements to correct or supplement the report,
 - or accepts the report.

Licensing process of Environmental Impact Assessment report

- Public Information about Decision:
 - The responsible institution within **10 working days** from the acceptance of decision about the acceptability of the report, announces that information on the web page of the Ministry of Environment.
 - Ignalina NPP after receipt of the decision from the responsible institution, within 10 working days provides information to the public through the national and local press, as well as on billboards in the municipality.
 - At that point the complex review process of EIA report is finished.

Expertise of the D&D Basic Design and D&D Safety Justification

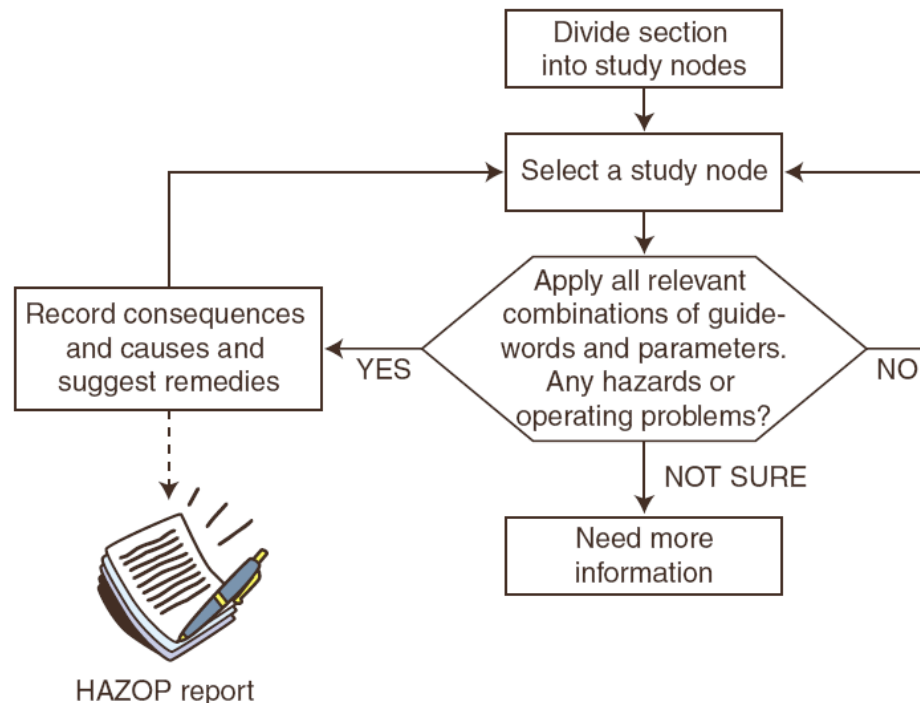
- The **D&D Basic Design** (or D&D Technological project) and **D&D Safety Justification** are main documents in the application for the implementation of D&D works.
- Licenses for the implementation of D&D works shall be issued by **VATESI** after **co-ordination** with **the Ministry of the Environment** (or an institution authorized by it), the **Radiation Protection Centre** and the director of **administration of the municipality**.

Expertise of the D&D Basic Design and D&D Safety Justification

- For the licensing the D&D Basic Design and D&D Safety Justification documents are issued together as documents which support each other. Usually Basic Design document present technology proposed for the indicated D&D activities and Safety Justification report justify that proposed technologies can be applied in safe way.
- One of main part for the review is **fault schedule** and **accident analysis** sections of **Safety Justification** report.
- All **initiating events** possible during implementation of proposed D&D technology **shall be identified** and their **consequences shall be analyzed**.

Expertise of the D&D Basic Design and D&D Safety Justification

- The Hazards and Operability Assessment (HAZOP) procedure was applied in the Ignalina NPP D&D projects for identification and preliminary analysis of the possible hazards, raised by the proposed D&D technology.



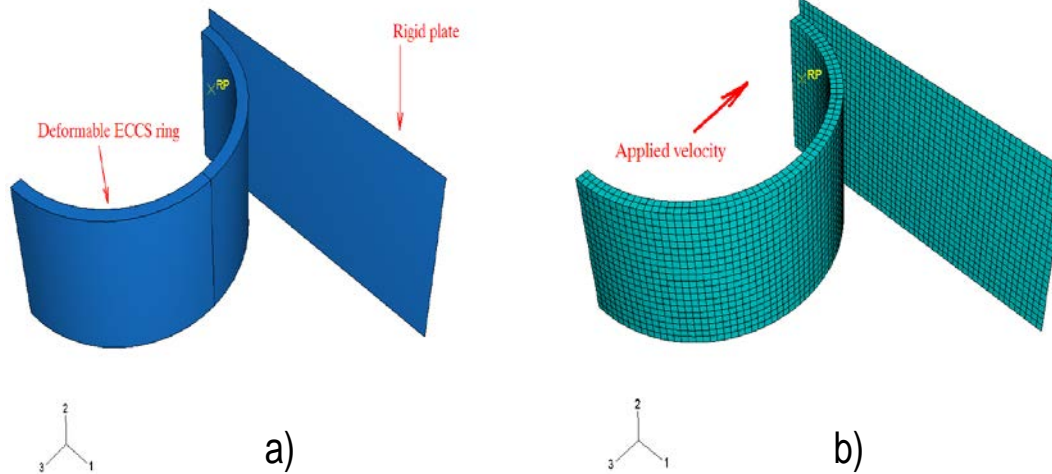
Expertise of the D&D Basic Design and D&D Safety Justification

- It is well known that **D&D works**, especially with the clean or very low contaminated equipment, **mostly generate industrial hazards** such as **heavy load drops or workers injuries**.
- Any dismantling activity covers a lot of different operations related to cutting and lifting of different pieces of equipment. Dismantled equipment parts are lifted by a crane to transfer to storage or decontamination area.
- The consequences of an unlikely drop event shall be evaluated in the D&D safety justification report.



Expertise of the D&D Basic Design and D&D Safety Justification

- In the case of Ignalina NPP B9-0 project, as an bounding heavy load drop event, the drop of one-piece ring of ECCS vessel (3200 kg) from height 14 m was investigated in details.

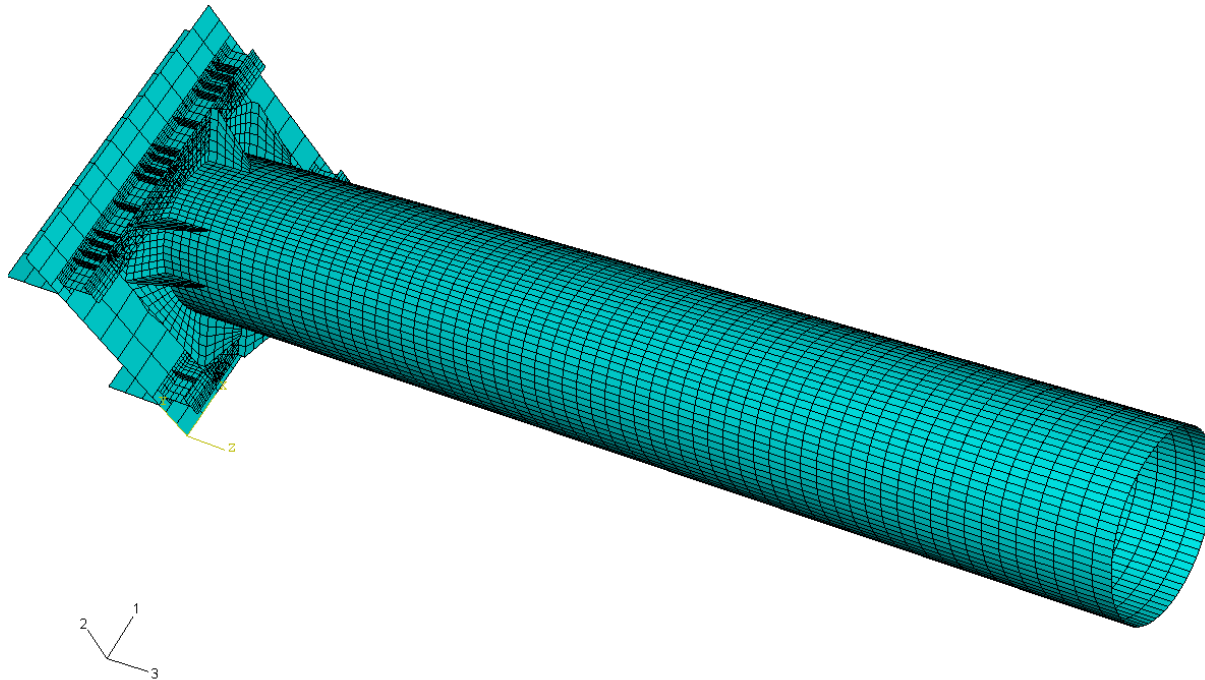


Expertise of the D&D Basic Design and D&D Safety Justification

- The maximum stresses in I-beam are located near impacted area with maximum value of **85 MPa**. The received stresses are below that yield stresses of I-beam steel which is **353 MPa**.
- Besides structural integrity assessment, the radiological consequences of the drop of one-piece ring of ECCS vessel were evaluated.
- The results of demonstrated that radiological doses are well below allowed limits in the case of this event.

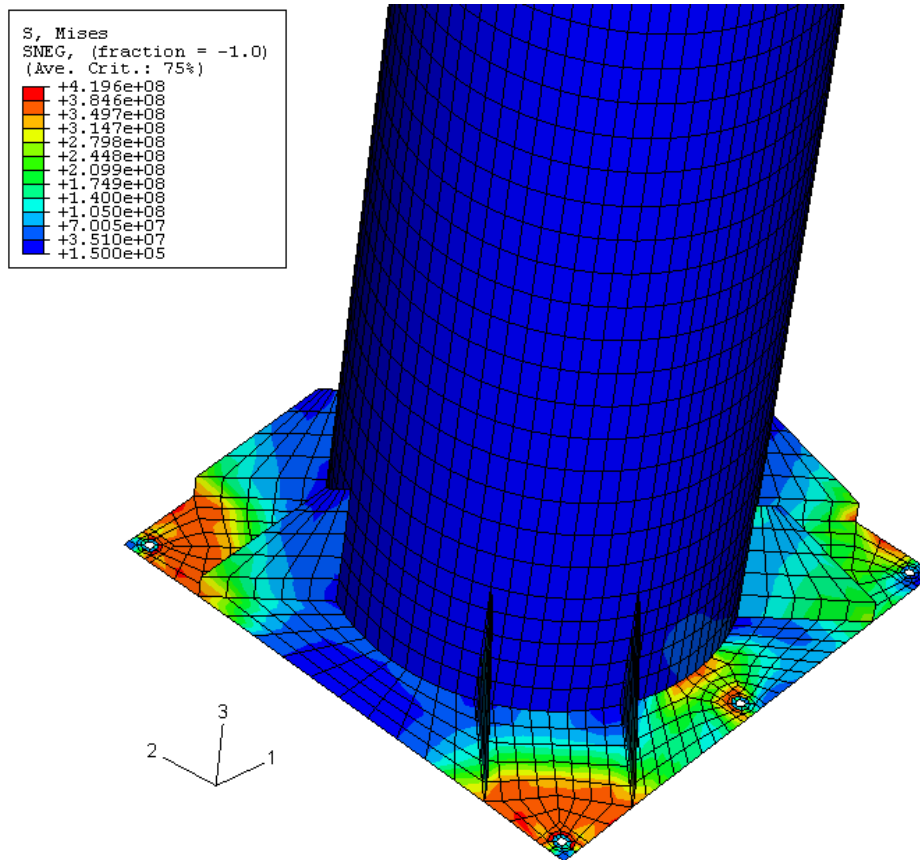
Expertise of the D&D Basic Design and D&D Safety Justification

- Another example is investigation of the mishandling with loads during transportation of one-piece ring of ECCS vessel. The consequences of mishandling of 3.2 t load, velocity 0.4m/s in directions X and Y were evaluated.



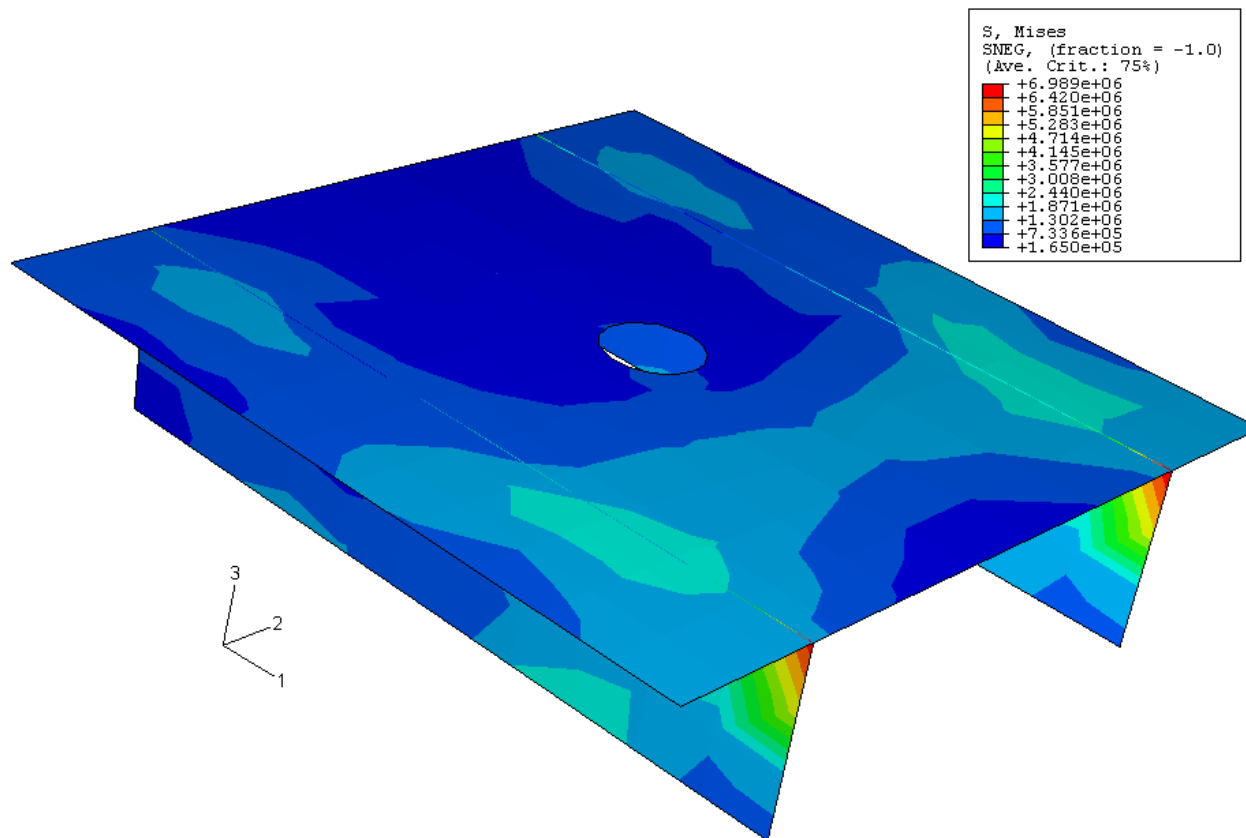
Expertise of the D&D Basic Design and D&D Safety Justification

- The von Mises stress (Pa) distribution in the model



Expertise of the D&D Basic Design and D&D Safety Justification

- The von Mises stress (Pa) distribution in the slab at bottom level of ECCS building



Expertise of the D&D Basic Design and D&D Safety Justification

- The results of the above presented analysis show that maximum stresses reach a maximum value of **7 MPa** (during mishandling of load in direction X) or **7,9 MPa** (during mishandling of load in direction Y). The static compressive strength limit for concrete is **17 MPa** and for tension is **1.5 MPa**.
- The compressive strength limit of concrete wasn't reached in girder and slab.
- The impacted reinforced concrete girder at bottom level of ECCS building experiences cracking of concrete in tension layers, but the structural integrity of these slab and girder will be maintained during mishandling of load in both directions - X and Y.

Expertise of the D&D Basic Design and D&D Safety Justification

- Together with the industrial hazards all radiation protection issues raised during D&D work implementation were analyzed in the Safety Justification Report.
- The performed analysis demonstrated that all individual and collective doses are below established radiation safety limit for individual dose – **16 mSv** per year and **20 mSv** per year (taking into account that effective dose limit for workers is **100 mSv** in a consecutive 5 year period).

Expertise of Design for Construction works

- In accordance with the Law on **Construction Expert examination** of design documentation of a construction works of exceptional significance (nuclear facilities belong to this category) **are mandatory**.
- However, same Law clarifies that **Expert examination** of design documentation of the construction works shall be carried out **in the cases of construction of new construction works, reconstruction of construction works and major repairs**.
- Therefore in the case of **simple repairs** of a construction works, **Expert examination** of design documentation of the construction works **is not required**.
- **Simple repairs** in Law on Construction are defined as repairs of a construction works **without changing and reinforcing of load-bearing structures** of the construction.

Expertise of Design for Construction works

- After the D&D Strategy development, when the scope and implications of the design for construction works are defined, the decision should be taken on the following:
 - the composition of Design for Construction (Basic and Detail Designs, or the Integrated Design, or the Simplified Design for Construction (Civil) Works);
 - the necessity of Permission for the construction;
 - the necessity of Expert examination.
- In order to reduce the overall duration of project implementation and to optimize the documentation development and licensing process, the **simplified design** can be used in the case of simple construction works and/or simple repairs.

Expertise of Design for Construction works

- The Law on Nuclear Energy specifies that Designs for the construction or reconstruction, upgrading, expansion, dismantling and decommissioning of nuclear facilities is subject to a comprehensive **state expert evaluation**.
- The comprehensive state expert evaluation of nuclear energy objects includes the specialized and general expert evaluations.
- In all cases when specialized expert evaluation of designs is carried out, it is performed before the general expert evaluation and its conclusions presented to the Ignalina NPP together with the design documentation.
- The results of design expert evaluation are introduced in the act of expert evaluation.

General data set on radioactive waste disposal

- Article 37 of the Euratom Treaty requires that each Member State is to provide the Commission with the General data set relating to any plan for the disposal of radioactive waste.
- The Commission is to deliver its opinion within **six months**, after consulting the group of experts.
- In Lithuania the General data set on radioactive waste disposal shall be agreed with:
 - Ministry of the Environment,
 - Fire and Rescue Department under the Ministry of the Interior of the Republic of Lithuania,
 - Radiation Protection Centre and
 - State Nuclear Power Safety Inspectorate.
- These institutions (Authorities) within **25 working** days should analyze the information according their competence to coordinate and present their remarks.

General data set on radioactive waste disposal

- After receiving comments from the Authorities, the NPP within 25 working days (if State Nuclear Power Safety Inspectorate does not define any other term) consider all comments and present the updated General data set to the Authorities for reassessment.
- Upon receiving the approved General data set and approval letters from the Authorities, the NPP submit this information to the State Nuclear Power Safety Inspectorate.
- The State Nuclear Power Safety Inspectorate submits the approved General data set to the European Commission. This shall be presented to the Commission within 6 months prior to the issue of license for performance of activity.

Authorisation to start D&D works

- In accordance with the Final Decommissioning Plan, D&D activities start under the license for Unit 1 extended operation. The authorization for D&D activities will be issued by VATESI after coordination with the Ministry of the Environment or an institution authorized by it, the Radiation Protection Centre and the director of Visaginas municipality administration licensing regulations.
- The application for the authorization to start D&D works will be provided to VATESI when all D&D documentation is ready and approved by the authorities. The documentation provided along with application for the authorization will be agreed with VATESI.

Conclusions

- Analysis of decommissioning projects licensing shows that this is complex process which requires participation of many different authorities and experts. Due to that, to avoid influence of the licensing process to the overall project schedule, the detail planning of overall licensing process in the beginning of any project is necessary.
- Lithuanian experience shows that early involvement of the authorities and review experts in the document development process, using Knowledge transfer sessions and different formal and informal discussion, allow speeding up further review process and leads to low amount of possible comments or suggestions on authorized documentation.
- The key document considered in the licensing process is the D&D Safety Justification Report. It is extremely important to apply a systematic approach in the safety analysis – starting from hazards identification in the early phase of project up to detailed consequences analysis of all bounding initiating events, including heavy load drop events, operator errors, equipment failures, etc. For some of initiating events (heavy load drop) both – structural integrity and radiological consequences analysis is required in order to demonstrate the compliance with acceptance criteria.

Acknowledgement

- In the presentation referred Dismantling and Decontamination projects B9-0 and B9-2 at the Ignalina NPP was grant funded by the EBRD-managed Ignalina International Decommissioning Support Fund (IIDSF)

Thank You for your Attention