

Experience in Safety and Environmental impact assessment to support irradiated graphite decommissioning

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LITHUANIAN ENERGY INSTITUTE (LEI)

State Research Institution

- ✓ 250 employees
- ✓ 140 researchers
- ✓ 30 PhD students
- ✓ 11 scientific divisions



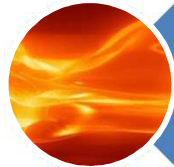


LITHUANIAN ENERGY INSTITUTE (LEI)

R&D competences



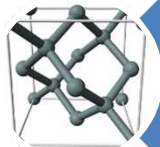
✓ Research on energy technologies



✓ Thermal engineering & metrology



✓ Environmental engineering



✓ Materials science



✓ Energy systems & economy



LITHUANIAN ENERGY INSTITUTE (LEI)

There are two „NUCLEAR“ laboratories at LEI:

**Nuclear
Engineering
Laboratory
(NEL, 14 Lab.)**

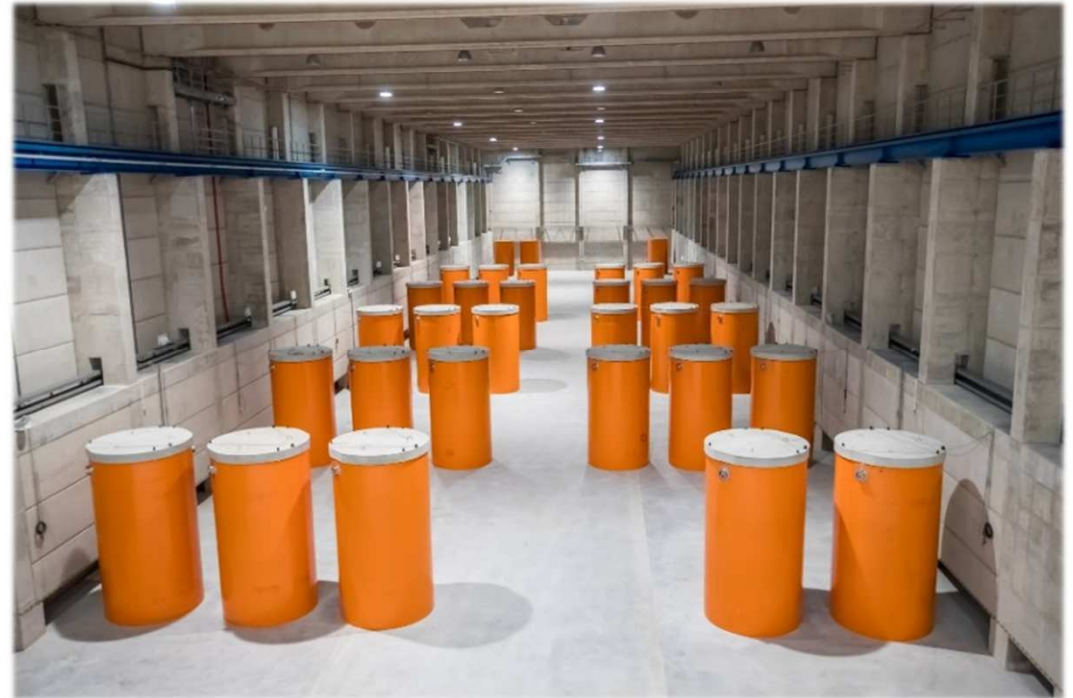
**Laboratory of
Nuclear
Installations
Safety
(LNIS, 17 Lab.)**



LITHUANIAN ENERGY INSTITUTE (LEI)

Main research areas of NEL (14 Lab.)

- ✓ Safety of spent nuclear fuel (SNF) management;
- ✓ Safety of radioactive waste management;
- ✓ Evaluation of different factors related to decommissioning of nuclear power plants;





LITHUANIAN ENERGY INSTITUTE (LEI)

Main research areas of LNIS (17 Lab.)

- ✓ Nuclear Reactors Safety;
- ✓ Thermonuclear Installations Safety;
- ✓ Decommissioning of Nuclear Installations;





LITHUANIAN ENERGY INSTITUTE (LEI) Experience

PERFORMED PROJECTS
and
GAINED EXPERIENCE



Project B9-0. INPP Building 117/1 Equipment Decontamination and Dismantling Project Development (Emergency core cooling system)

- ✓ LEI was a partner in a Consortium led by Bobcock Nuclear Limited (formerly known as VT Nuclear Services (UK)).
- ✓ Client: Ignalina NPP (Lithuania),
- ✓ LEI (NEL and LNIS) participated in following activities:
 - ✓ Support in preparation of the D&D Strategy and Basic Design;
 - ✓ Preparation of the **Safety Justification Report** and support to the Client in licensing;
 - ✓ Preparation of the **Environmental Impact Assessment Report** and coordination with the Public, Relevant Parties and Competent Authority;
 - ✓ Preparation of the **General Data Set**;
 - ✓ Support in preparation of the D&D Detailed Design;
 - ✓ Participation in development of training modules, knowledge transfer and presentations.





Project B9-2. INPP Building V1 Equipment Decontamination and Dismantling Project Development

(Reactor make-up systems: reactor gas circuit, ect.)

- ✓ LEI was a partner in a Consortium led by Bobcock Nuclear Limited (formerly known as VT Nuclear Services (UK)).
- ✓ Client: Ignalina NPP (Lithuania)
- ✓ Project duration: 2009 - 2012
- ✓ LEI (NNL and LNIS) participated in following activities:
 - ✓ Support in preparation of the D&D Strategy and Basic Design;
 - ✓ Preparation of the **Safety Justification Report** and support to the Client in licensing;
 - ✓ Preparation of the **Environmental Impact Assessment Report** and coordination with the Public, Relevant Parties and Competent Authority;
 - ✓ Preparation of the **General Data Set**;
 - ✓ Support in preparation of the D&D Detailed Design;
 - ✓ Participation in development of training modules, knowledge transfer and presentations.





Feasibility Study for the Management of V1 NPP Primary Circuit Components (D7.1) in Slovakia

- ✓ LEI was a partner in a Consortium led by Specialus montažas – NTP
- ✓ Client: JAVYS (Jadrova Vyradovacia Spolocnost, a.s.) - Slovakia
- ✓ Project duration: 2012 - 2013
- ✓ LEI (LNIS) participated in following activities:
 - ✓ Pre-operational **Safety Analysis report**
 - ✓ Identification of Client's objectives in Decommissioning and Waste Management;
 - ✓ Identification of Applicable and Relevant Requirements (ARRs) including WAC;
 - ✓ Performance of Baseline Risk Assessment (BRA);
 - ✓ Detailed analysis of Alternatives for management of Large Components of Primary Circuits.





Preparation of the SAR and EIA documents for Unit 2 decommissioning (for Ignalina NPP)

- ✓ LEI was a Contractor (Consortium leader)
- ✓ Client: Ignalina NPP (Lithuania)
- ✓ The aim of the Project was preparation of the **Safety Assessment Report** and the **Environmental Impact Assessment Report** necessary for the future works on INPP Unit 2 systems and equipment dismantling and decontamination.
- ✓ Project duration: 2008 - 2009
- ✓ LEI (NER and LNIS) participated in following activities:
 - ✓ Preparation of the **Environmental Impact Assessment Report** and coordination with the Public, Relevant Parties and Competent Authority;
 - ✓ Preparation of the decommissioning **SAR** and support to the Client in licensing.





Visaginas Nuclear Power Plant in Lithuania

- ✓ LEI was a partner in a Consortium led by Pöyry Energy Oy (Finland)
- ✓ Client: Visaginas NPP (Lithuania)
- ✓ The aim of the Project was preparation of the **Environmental Impact Assessment Report** necessary for the future works on construction and operation of the new NPP in Lithuania (Visaginas NPP).
- ✓ Project duration: 2008 - 2010
- ✓ LEI (NEL) participated in following activities:
 - ✓ Preparation of the **Environmental Impact Assessment Report**;
 - ✓ Coordination of the EIAR with Lithuanian Public, Relevant Parties and Competent Authorities;
 - ✓ Support to Ministry of Environment in coordination of EIAR with foreign countries on transboundary impact assessment.





Preliminary studies for the decommissioning of the reactor compartments of the former Paldiski military nuclear site and for the establishment of a radioactive waste repository

- ✓ LEI was a Subcontractor to UAB Eksortus
- ✓ Client: AS A.L.A.R.A. (Estonian radwaste management agency).
- ✓ Project duration: 2014 - 2015
- ✓ LEI (LNIS) participated in following activities:
 - ✓ Organizational project activities;
 - ✓ Collection of data and overview of national and international requirements;
 - ✓ Determining the possibilities of decommissioning the reactor compartments and analysis of different options for the disposal of radioactive waste in Estonia;
 - ✓ **Decommissioning safety assessment**, taking into account the waste quantities to be generated.





Solid Waste Management and Storage Facility (SWMSF) Project B2/3/4

- ✓ LEI was a sub-contractor to NUKEM Technologies GmbH
- ✓ Client: Ignalina NPP (Lithuania)
- ✓ Project duration: 2006 - 2017
- ✓ LEI (NEL) participated in following activities:
 - ✓ Preparation of the **SAR (preliminary, updated and final)** and support to the Client in licensing;
 - ✓ Preparation of the **Environmental Impact Assessment Report**;
 - ✓ Coordination of the EIAR with Lithuanian Public, Relevant Parties and Competent Authority;
 - ✓ Support to Ministry of Environment in coordination of EIAR with foreign countries on transboundary impact assessment.





Preparation of safety analysis for the 158/2 Storage Facility for interim storage of graphite waste

- ✓ LEI was a Contractor
- ✓ Client: Ignalina NPP (Lithuania)
- ✓ The aim of the Project was to justify the safety of the Ignalina NPP 158/2 Storage Facility so it could store the graphite waste that will be generated during the dismantling of the reactor channels. Currently the Storage Facility is only used for storage of cemented solid waste.
- ✓ Project duration: 2017 - 2018
- ✓ LEI (NEL) performed following tasks:
 - ✓ Preparation of the **SAR** and support to the Client in licensing;
 - ✓ Preparation of the **Waste package description** of long-lived low and intermediate level graphite radioactive waste.





Preparation of the Final decommissioning plan and of the EIA for the Project “Decommissioning of Maišiagala Radioactive Waste Storage Facility”

- ✓ LEI was a Contractor (Consortium leader)
- ✓ Client: Radioactive Waste Management Agency (Lithuania)
- ✓ The aim of this procurement was to prepare Final decommissioning plan and Environmental impact assessment for decommissioning of Maišiagala institutional radwaste storage facility.
- ✓ Project duration: 2016 - 2018
- ✓ LEI (NEL and LNIS) performed following activities:
 - ✓ Decommissioning strategy selection based on MCDA analysis;
 - ✓ Preparation of the **Environmental Impact Assessment Report** and coordination with the Public Relevant Parties and Competent Authority;
 - ✓ Preparation of the **Final Decommission Plan** and support to RATA in approval by the Authorities.





Assistance to INPP by Technical Support Organisations in the Field of Radiological Characterisation for Block A1 (Reactor and auxiliary systems)

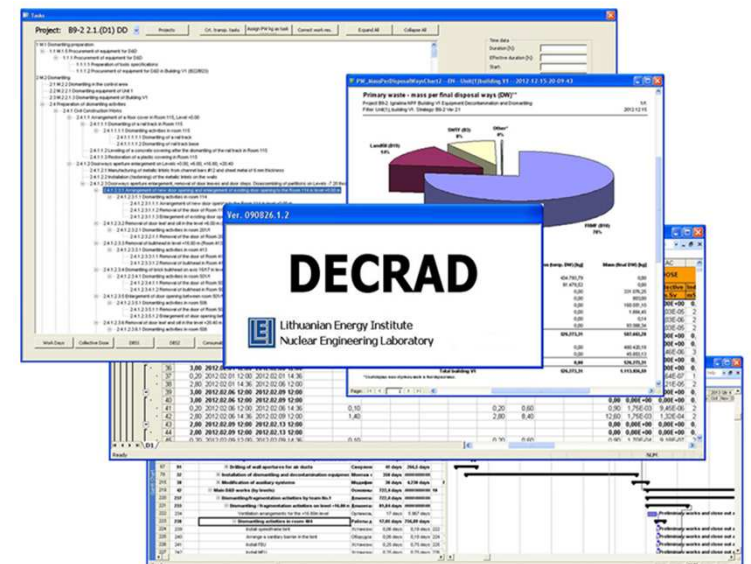
- ✓ LEI is a partner in a Consortium led by FMTC
- ✓ Client: Ignalina NPP (Lithuania)
- ✓ The aim of the Project is to **determine the scaling factors for INPP Block A1** (including the reactor of Unit 1 and its service equipment) and corresponding nuclide vector which is the set of the scaling factors.
- ✓ Project duration: 2016 - ongoing
- ✓ LEI (NEL) participated in following activities:
 - ✓ **Analysis of nuclide list and justification** (including theoretical modelling of nuclide generation);
 - ✓ **Analysis of A1 systems;**
 - ✓ **Analysis of the radioactive waste streams;**
 - ✓ Preparation of the report and support to the Client in VATESI approval.





EXPERIENCE-Conclusions

- ✓ Experience in preparation of SAR's for many projects and support to the Clients in licensing;
- ✓ Preparation of SAR for management of the **irradiated graphite** and support to the Client in licensing;
- ✓ Experience in preparation of EIAR's for many projects and coordination with Lithuanian Public, Relevant Parties and Competent Authority;
- ✓ Support to Ministry of Environment in coordination of EIAR with foreign countries on transboundary impact assessment;
- ✓ Selection of strategies/alternatives (based on MCDA analysis);
- ✓ DECRAD code developed by LEI (NEL) for analysis of different decommissioning/dismantling factors (planning, costs, doses, schedules, waste streams etc.);
- ✓ Knowledge of the systems, components and radiological characteristics of RBNK-1500 reactor.



Thank you

<http://www.lei.lt/main.php?m=565&k=9>

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