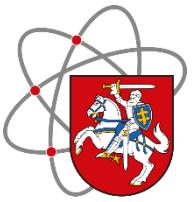


Lithuania's Experience with Evaluation of the Physical Security Effectiveness

Renaldas Sabas

Head of Nuclear Material Control and Physical Security Division
State Nuclear Power Safety Inspectorate (VATESI), Lithuania

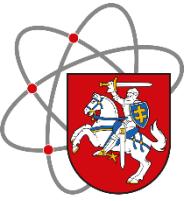
Third International Regulator's Conference on Nuclear Security
Marrakech, Morocco
October 1-4, 2019



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Topics

- Important dates and figures
- Nuclear security infrastructure
- Nuclear power program
- Legal basis for evaluation of the effectiveness
- Evaluation of the physical security effectiveness at nuclear facility
 - Construction, commissioning, operation and decommissioning phases
 - The methodology and the process
 - The outcome

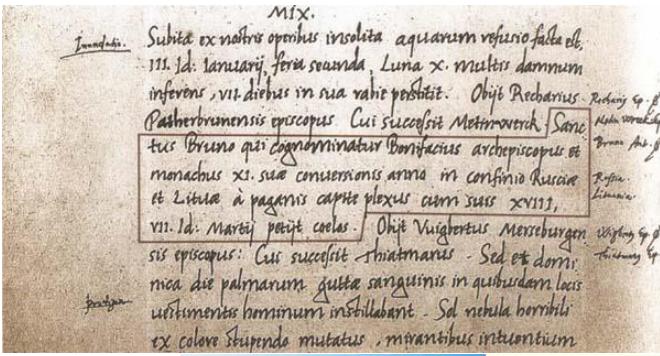


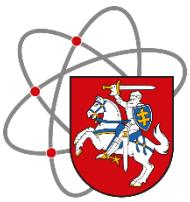
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The Republic of Lithuania

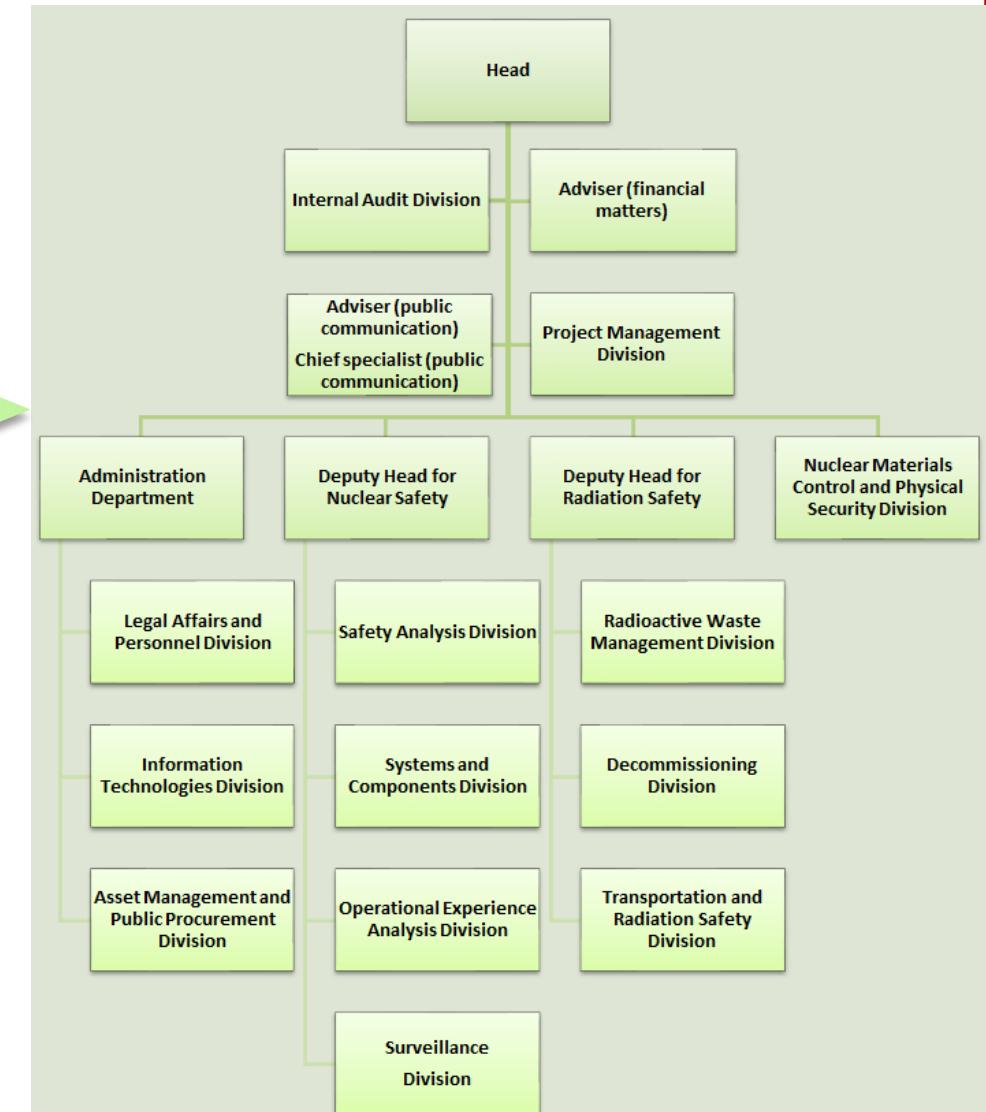
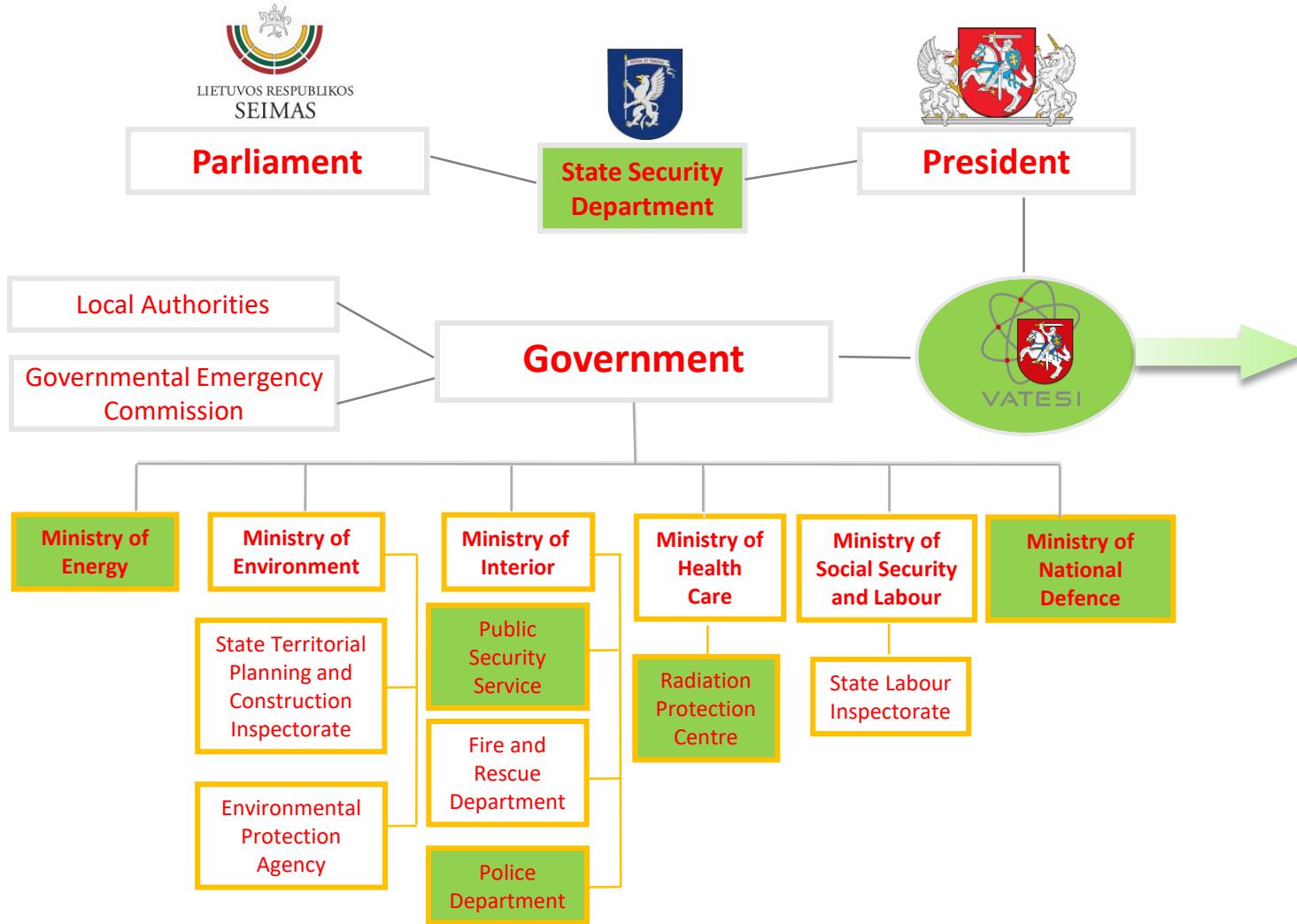
- Important dates and facts:

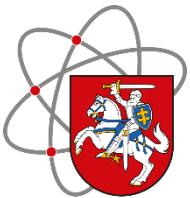
- After a re-estimation of the boundaries of the continent of Europe in 1989, a scientist at the French National Geographic Institute determined that the geographic centre of Europe is located at 54°54'N 25°19'E (in Lithuania)
- The first known record of the name of Lithuania – 9 March 1009
- Lithuanian language is believed to be the linguistically most conservative living Indo-European tongue, retaining many features of Proto Indo-European
- Grand Duchy of Lithuania at its greatest extent, in the 15th century, was the largest state in Europe
- Independence declared – 16 February 1918
- Independence restored – 11 March 1990
- NATO joined – 29 March 2004
- European Union joined – 1 May 2004
- Area – 65 300 km² and population – 2,859,709





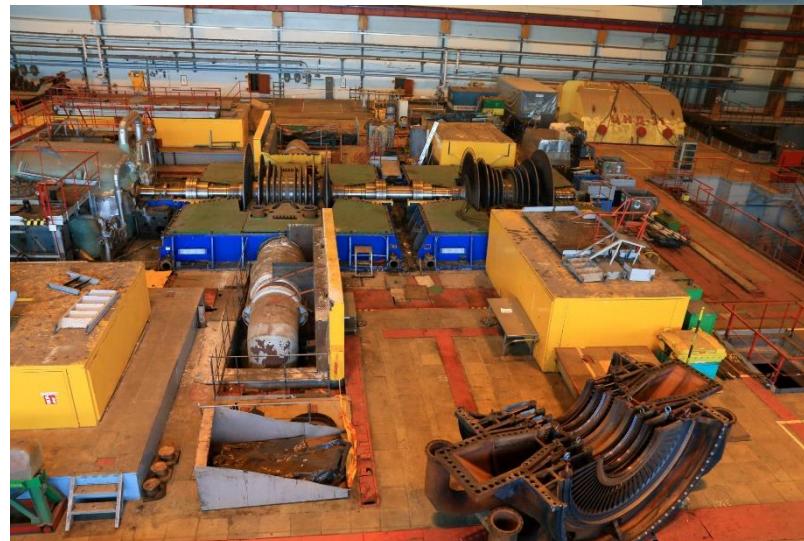
Nuclear Security Infrastructure

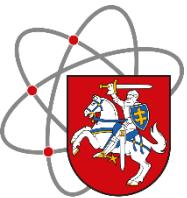




Nuclear Power Program in Lithuania

- Ignalina Nuclear Power Plant
 - Type: Two RBMK-1500 water-cooled, graphite-moderated, channel-type power reactors
 - Years in service:
 - Unit 1: Dec 1983 to Dec 2004
 - Unit 2: Aug 1987 to Dec 2009
 - Final shutdown in compliance with the protocol of Lithuania's accession to the EU

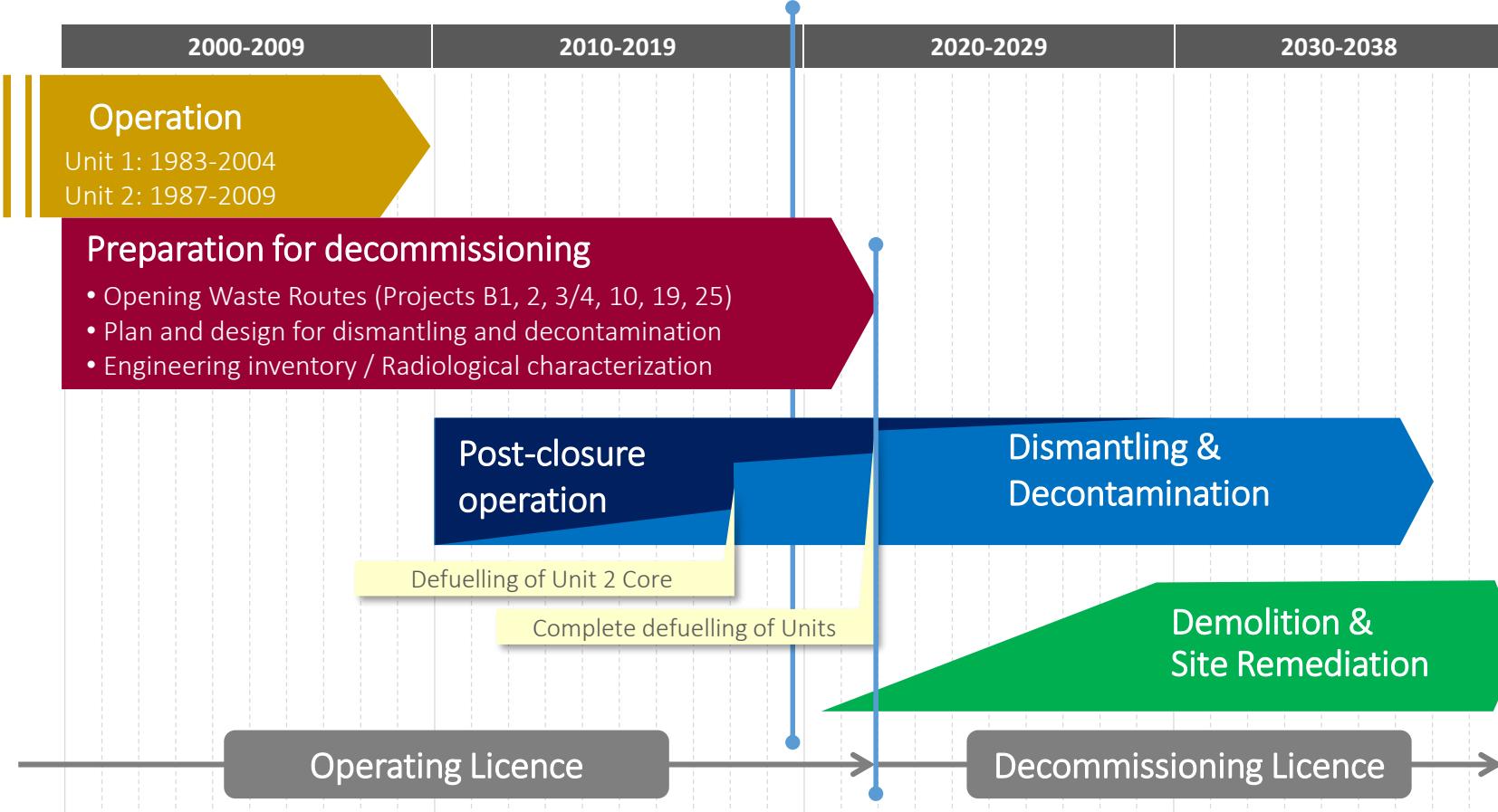


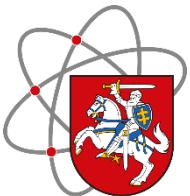


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Nuclear Power Program in Lithuania

- In September 2018, VATESI received the application from SE Ignalina NPP to issue a license for decommissioning of both NPP units and related facilities (currently operated under separate licenses)

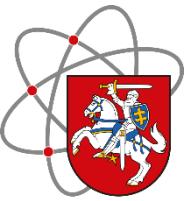




Nuclear Power Program in Lithuania

- Spent Nuclear Fuel Management
 - There are currently about 22,000 fuel assemblies at NPP
 - Two dry type storage facilities for SNF
 - “Old” Spent Fuel Storage Facility stores up to 120 casks
 - “New” Interim Spent Fuel Storage Facility up to 202 casks
 - The operation of storage facilities will continue for 50 years
- Radioactive Waste Management
 - Solid Waste Management & Storage Facility (project B2/3/4)
 - Landfill Facility for Short-lived Very Low Level Waste (project B19)
 - Near Surface Repository (project B25)
 - under construction





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Other Nuclear Facilities and Related Activities

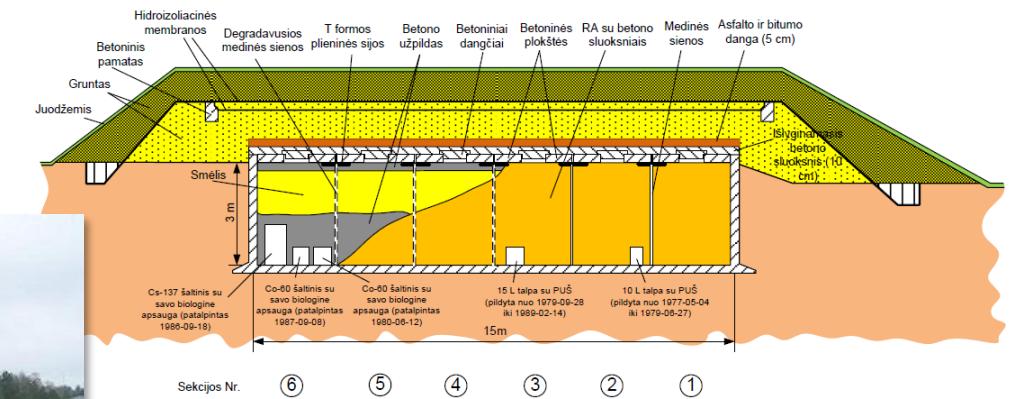
- Maišiagala Radioactive Waste Storage Facility

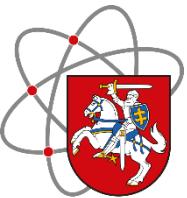
- A vault of 200 m³ capacity constructed at a depth of 3 m in the forest (20 km from Vilnius). Radioactive wastes were accumulated at the Maišiagala Storage Facility until 1989 (approximately 120 m³). The radioactive wastes stored here are of different types: short-lived very-low level, short-lived low- and intermediate-level, long-lived and very-high-level
- In the middle of 2018, VATESI received an application to issue a license for decommissioning of Maišiagala Radioactive Waste Storage Facility

2002



2018





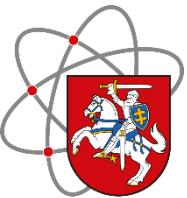
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Governance of Nuclear Facilities in Lithuania

- All nuclear facilities and related activities are operated by SE Ignalina NPP
 - Units 1 and 2, waste management facilities, spent nuclear fuel storage facilities, waste storage facilities)



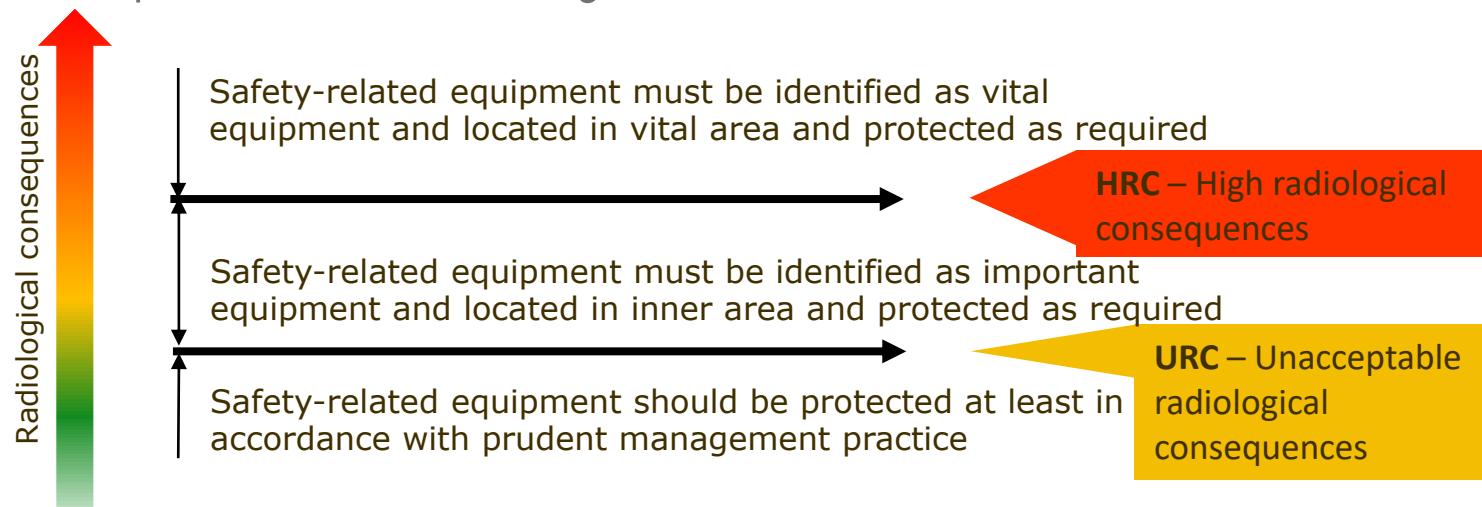
- Maišiagala Radioactive Waste Storage Facility (20 km from the capital Vilnius).
- Collection and disposal of orphan sources in Lithuania

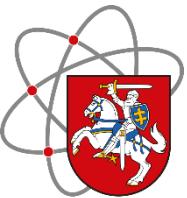


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Key Points of Physical Security of Nuclear Materials and Nuclear Facilities

- Threat Assessment and Design Basis Threat (DBT) as a basis for the PPS design and evaluation
 - All nuclear facilities (nuclear power plant, nuclear fuel storage facility, waste storage facility and etc.)
 - All nuclear materials in use, storage and transport if it is more than 5 g
 - All ionized sources (excl. DBT)
- Graded approach
 - Categorization of Nuclear Materials (INFCIRC 225/Rev5)
 - Identification of important and vital equipment at Nuclear Facility
- Design and implementation of the Physical Security System
 - Defence-in-depth (combination of multiple layers of systems and measures)
 - Main functions of the Physical Protection Measures – Detection, Delay, Response
- Evaluation of the effectiveness of the Physical Security System

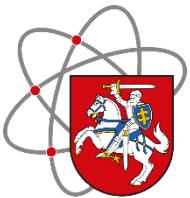




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Legal Basis for Evaluation of the Effectiveness

- National Laws
 - Law on Nuclear Safety sets the responsibility to the licensee to organise the physical security of nuclear material and nuclear facility
 - Law on Nuclear Energy sets the responsibility to the Ministry of Interior to protect nuclear material and nuclear facilities (guarding and on-site/off-site response)
- VATESI security requirements
 - Nuclear Safety Requirements BSR-1.6.1-2012 “Physical security of Nuclear Facilities, Nuclear Material and Nuclear Fuel Cycle Material” sets main principles on the evaluation of effectiveness of the physical security system
- Resolution of the Government of the Republic of Lithuania
 - Regulations on the Issue of Licenses and Permits Necessary to Engage in Nuclear Energy Activities (Resolution No. 722, June 20th, 2012) indicates which documents has to be provided to get the licence, including:
 - The facility's security plan
 - The programme for effectiveness evaluation
 - The report of effectiveness evaluation

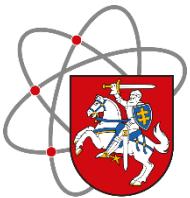


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Evaluation of the Physical Security Effectiveness at Nuclear Facility: Construction phase

- An applicant who wants to get a construction license has to provide to the regulatory body:
 - Construction site security plan
 - Preliminary facility's security plan
 - Analysis for the facility division into protection zones (i.e. vital area identification)
 - The design of physical protection system
- All documents are reviewed and approved by the regulatory authority (VATESI)
- No effectiveness evaluation is performed

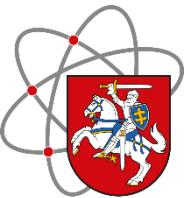




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Evaluation of the Physical Security Effectiveness at Nuclear Facility: Commissioning, Operation and Decommissioning phases

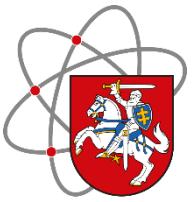
- The applicant who wants to **commission** a nuclear facility must provide an updated security plan and perform an evaluation of effectiveness of the entire physical security system
- The licensee who has an **operation** license has to review and update security plan periodically and to perform a periodic evaluation of the effectiveness of the entire physical security system
 - At least once in three years
 - After the design basis threat changes
- The applicant who wants to get a **decommissioning** licence has to provide security plan and to perform an evaluation of effectiveness of the entire physical security system taking into account the situation after the decommissioning (e.g. no fuel, less vital equipment, decommissioning activities, more personnel and etc.). During the whole decommissioning process, a periodic review of the security plan and periodic evaluation of the effectiveness has to be performed
 - At least once in three years
 - After the design basis threat changes



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Evaluation of the Physical Security Effectiveness at Nuclear Facility: The Methodology and the Process

- An applicant or licensee selects the method of evaluation
 - The method of evaluation of the physical security system should allow evaluating how the physical security system (technical and organizational measures, including actions of response forces) is able to meet physical security objectives – protect nuclear facility and nuclear material from illegal possession and other activities which could lead to unacceptable radiological consequences
 - For nuclear power plant it is required to use tactical exercises (FoF)
 - For other nuclear facilities licensee is free to chose. Currently it is agreed to use table-top exercises
- An applicant or licensee provides to the regulatory body
 - The programme for effectiveness evaluation (could be a single document for all facilities and updated if necessary)
 - The description of the selected evaluation method
 - The description of responsibilities and functions of all persons participating in the evaluation process
 - Criteria for the successful effectiveness evaluation
 - Adversary scenarios (shortly before the evaluation)
 - Adversary scenarios must be selected considering the design basis threat
 - It is agreed to play three scenarios during the evaluation



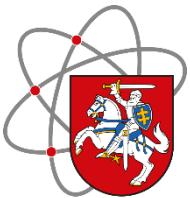
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Evaluation of the Physical Security Effectiveness at Nuclear Facility: The Methodology and the Process

- Performance of the evaluation

- Walkdown of the facility before the exercise to check the operability of all physical security system elements
- Safety and security briefing for all participants
- Exercises – table-top or tactical
- VATESI participates as observers (it is not an inspection)

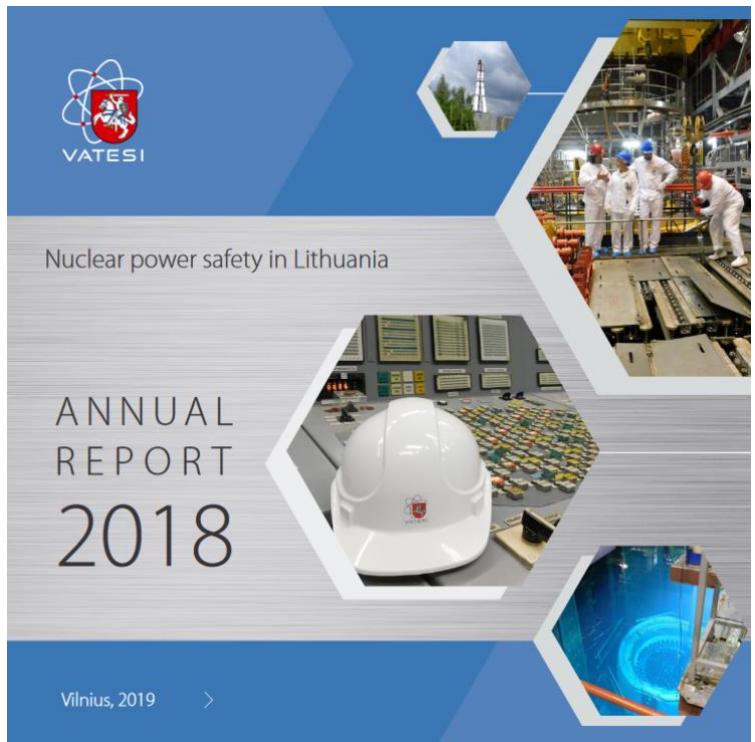




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Evaluation of the Physical Security Effectiveness at Nuclear Facility: The Outcome

- After the evaluation the licensee shall
 - Prepare the effectiveness evaluation report with final conclusion
 - Prepare the plan for elimination of the assessed vulnerabilities and discrepancies, if any are identified
- The effectiveness evaluation report is provided to VATESI for information (approval is not needed)
- The Head of VATESI takes a decision on the approval of the plan for elimination of the assessed vulnerabilities and discrepancies
 - VATESI Nuclear Material Control and Physical Security Division is responsible for supervision of the plan implementation
 - No sanctions for the licensee are applied if identified vulnerabilities and discrepancies are not related to security requirements violations
 - If identified vulnerabilities and discrepancies indicates any possible violation of the security requirements – the formal inspection process is initiated and sanctions may be applied
 - A binding instruction with fixed deadline to eliminate the violation
 - A fine (personal or for the company)
 - Suspension or withdrawal of the license



Thank you