

# Maintaining Effective Security During the Decommissioning of Nuclear Facilities

Eugenijus Šepetys  
Head of the Physical Security Service



Decommissioning of Ignalina NPP is co-financed  
by the European Union

11 November, 2019



# General Information

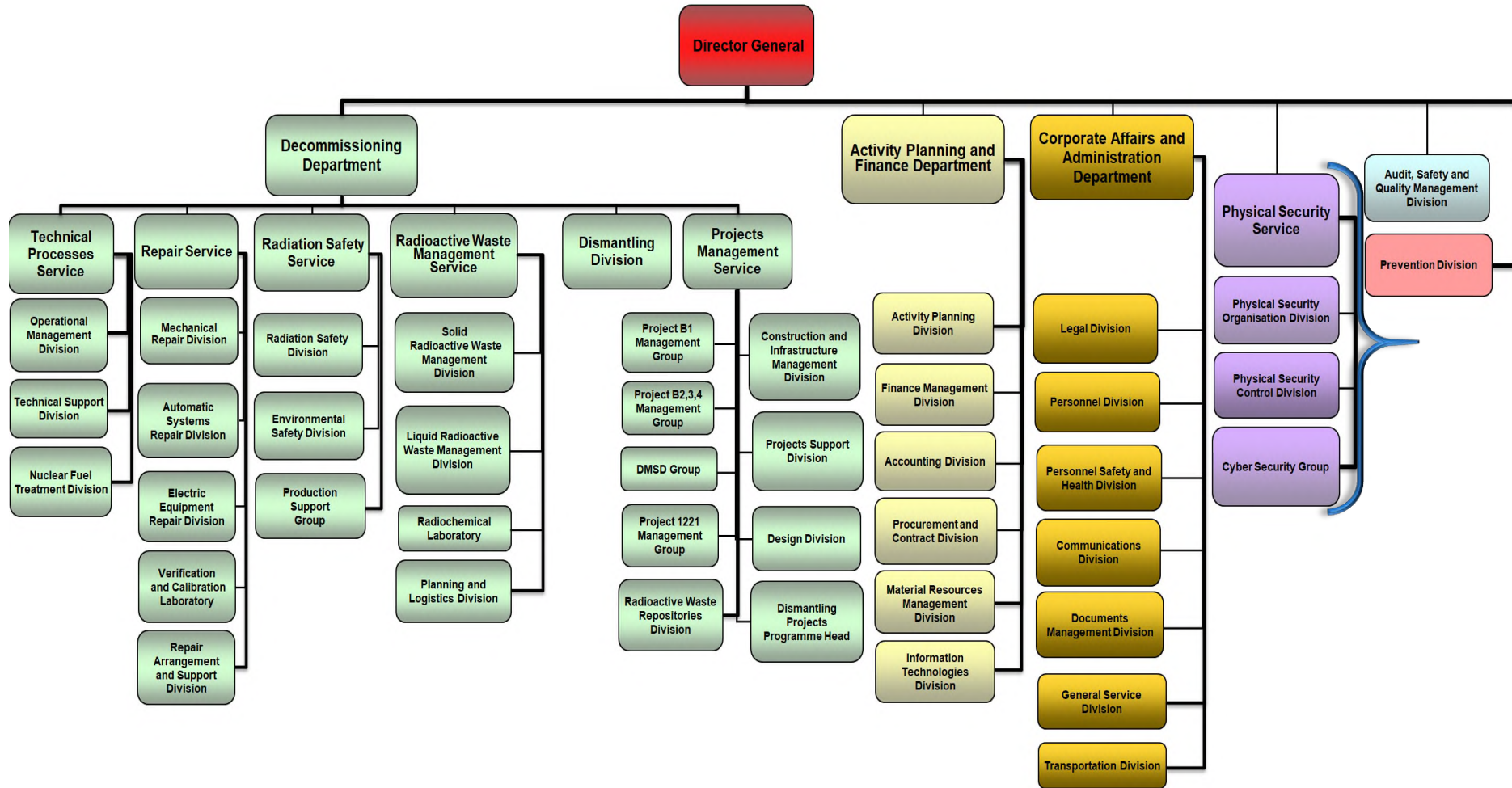


# About Ignalina Nuclear Power Plant

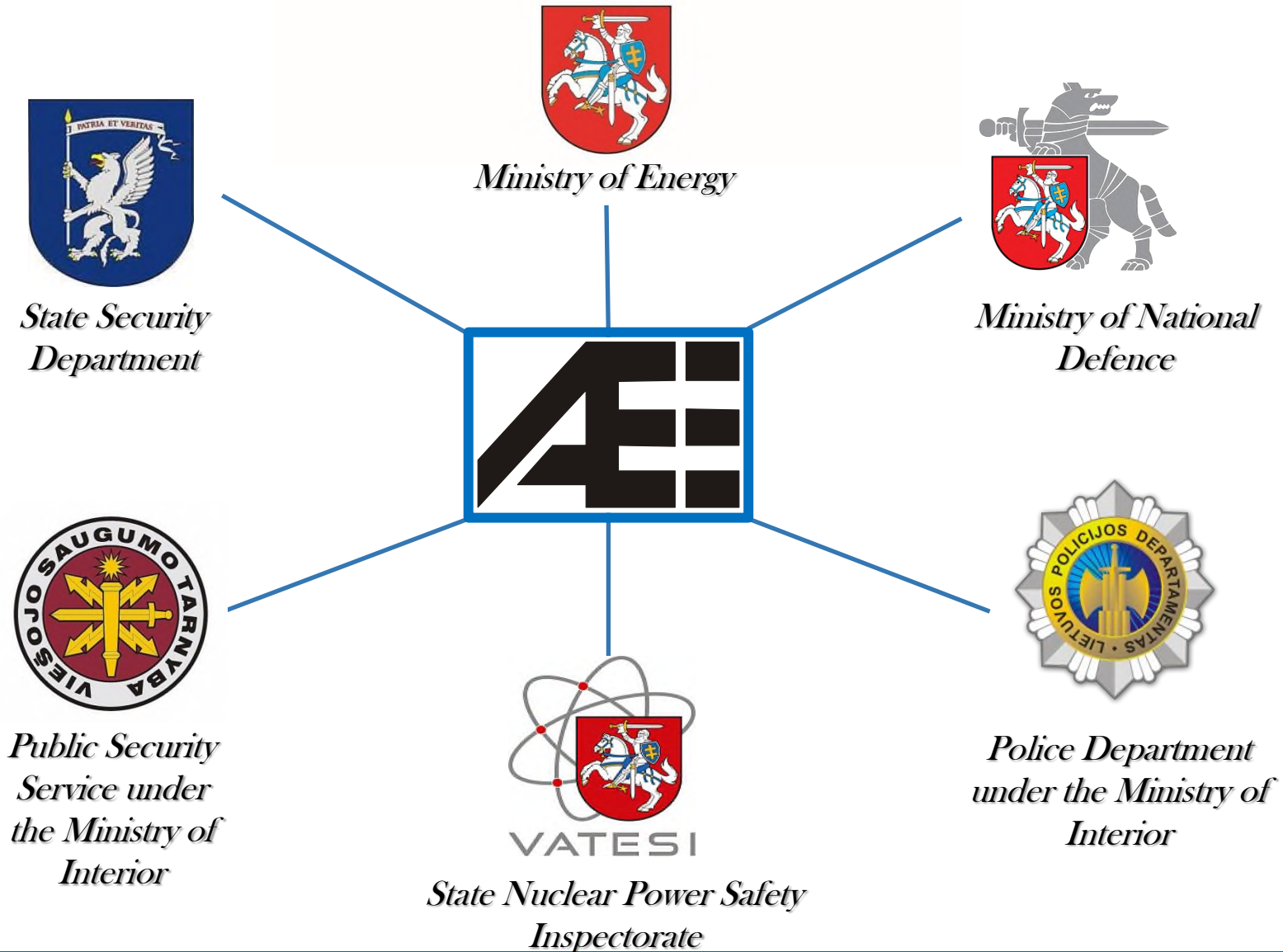


- ❖ **Location:** Far north-east corner of Lithuania. Immediately bordering Latvia and Belarus. Approx. 2½ hours drive from Vilnius.
- ❖ **Type:** Unique, twin RBMK-1500 water-cooled, graphite-moderated, channel-type power reactors. The largest and the most advanced RBMK reactor ever built.
- ❖ **Construction and capacity:** Construction began in 1974 and was finished in 1987. It was planned to construct 4 units (only 2 were constructed). INPP supplied 70-80% of Lithuania's national electricity demand.
- ❖ **Operation:** Operation of Unit 1 began in December 1983, Unit 2 – August 1987. INPP had ≈ 5600 employees during operation.
- ❖ **Closure:** Ignalina NPP was closed at around its mid-life. Final closure of Unit 1 was in December 2004, Unit 2 – December 2009. 1950 employees currently work at INPP.

# Organizational Chart of Ignalina NPP 2019



# Subjects of Physical Security



# International Cooperation

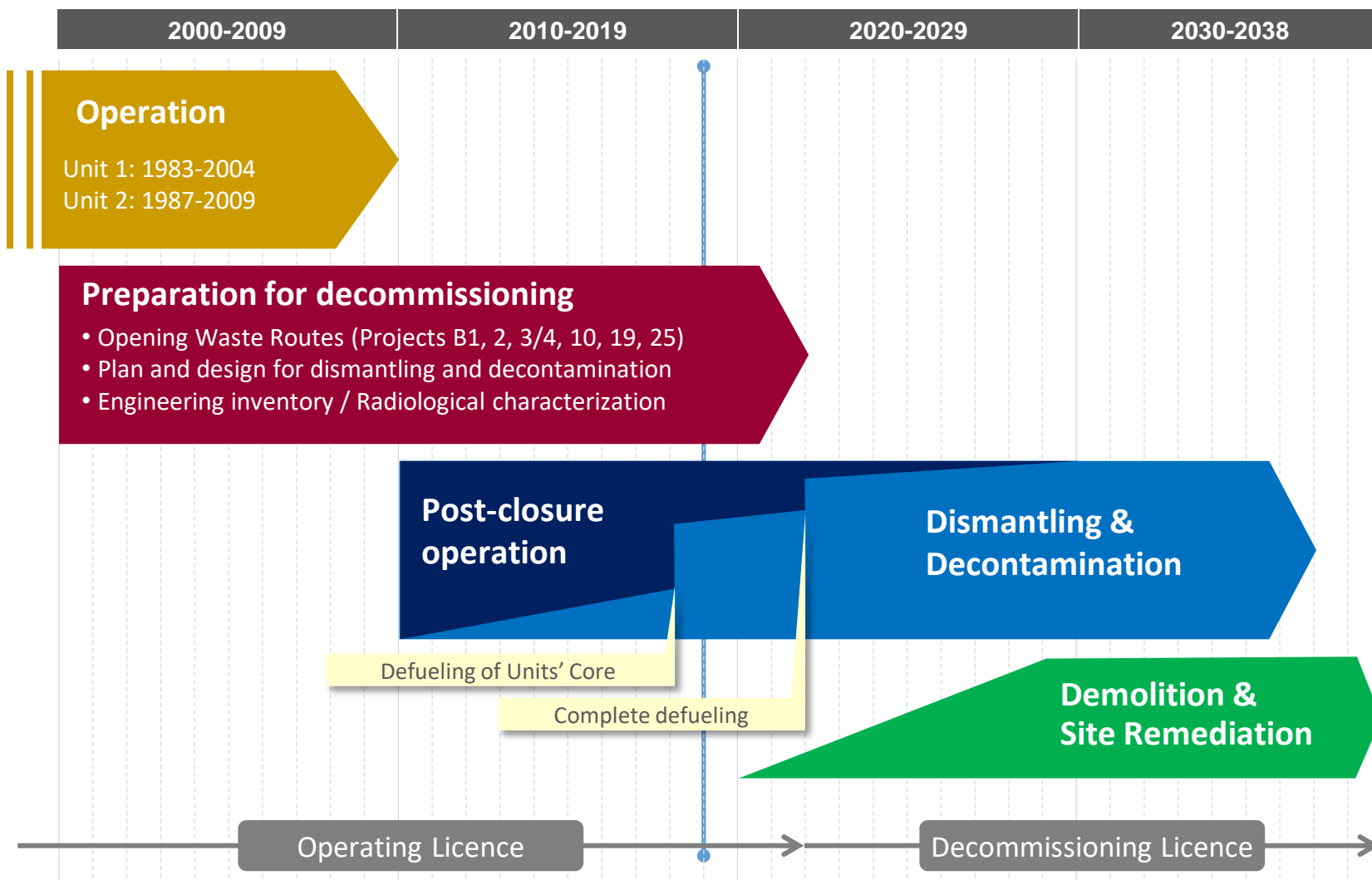


- ❖ **International cooperation:**
- ❖ **Sandia National Laboratories**
- ❖ **International Atomic Energy Agency (IAEA)**  
**International Physical Protection Advisory Service (IPPAS) missions:**
- ❖ 1<sup>st</sup> IPPAS mission in 1999
  - 23 recommendations
  - 5 suggestions
  - 8 good practices
- ❖ IPPAS follow-up mission in 2002
  - 7 recommendations
  - 10 suggestions
  - 1 good practice
- ❖ 2<sup>nd</sup> IPPAS mission in 2017
  - 4 recommendations
  - 14 suggestions
  - 6 good practices

# Decommissioning

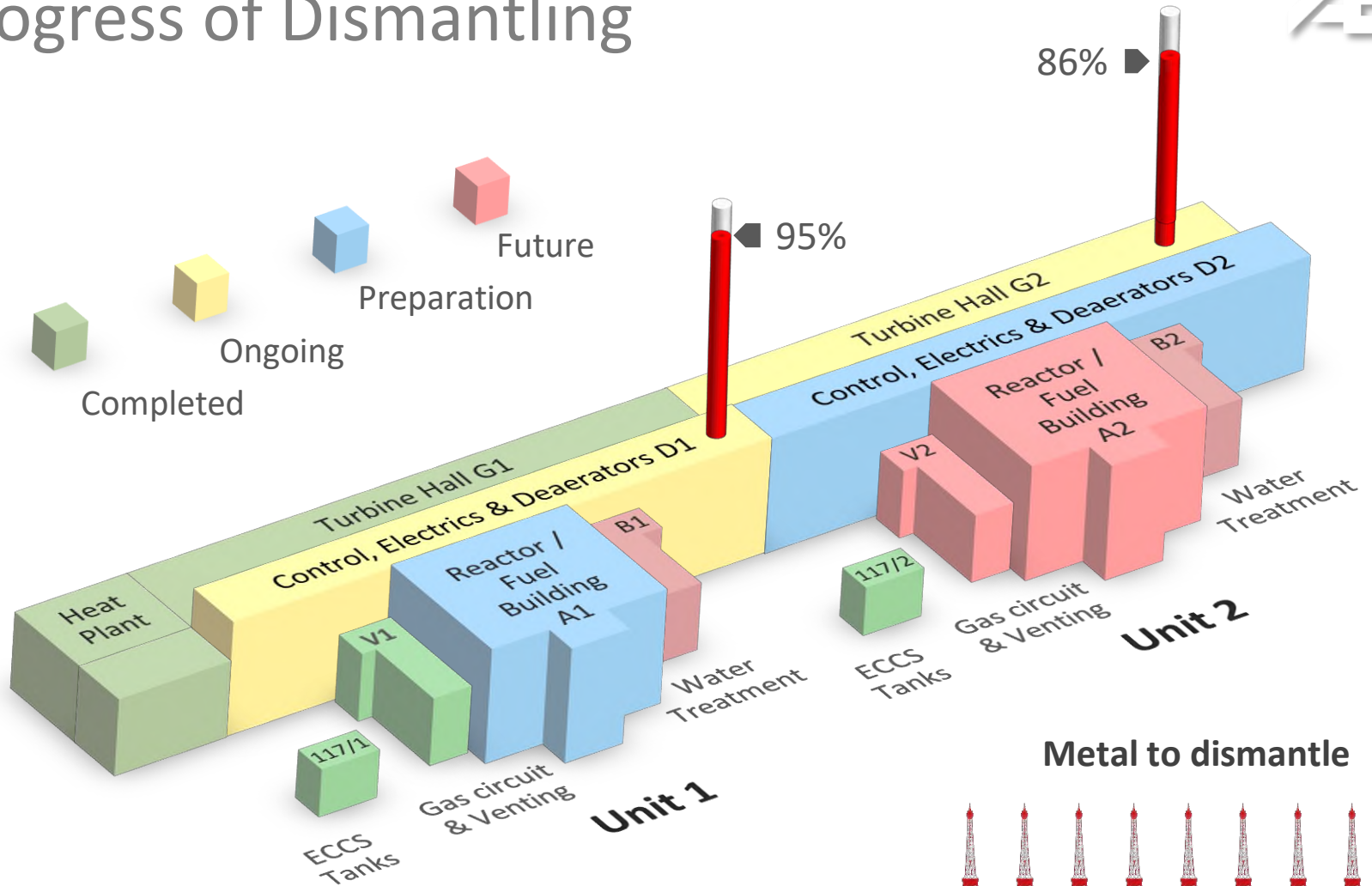


# Decommissioning Plan

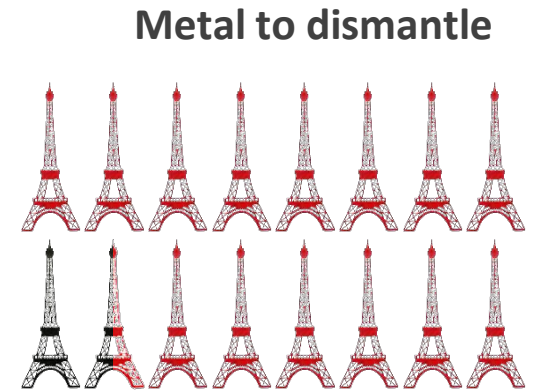




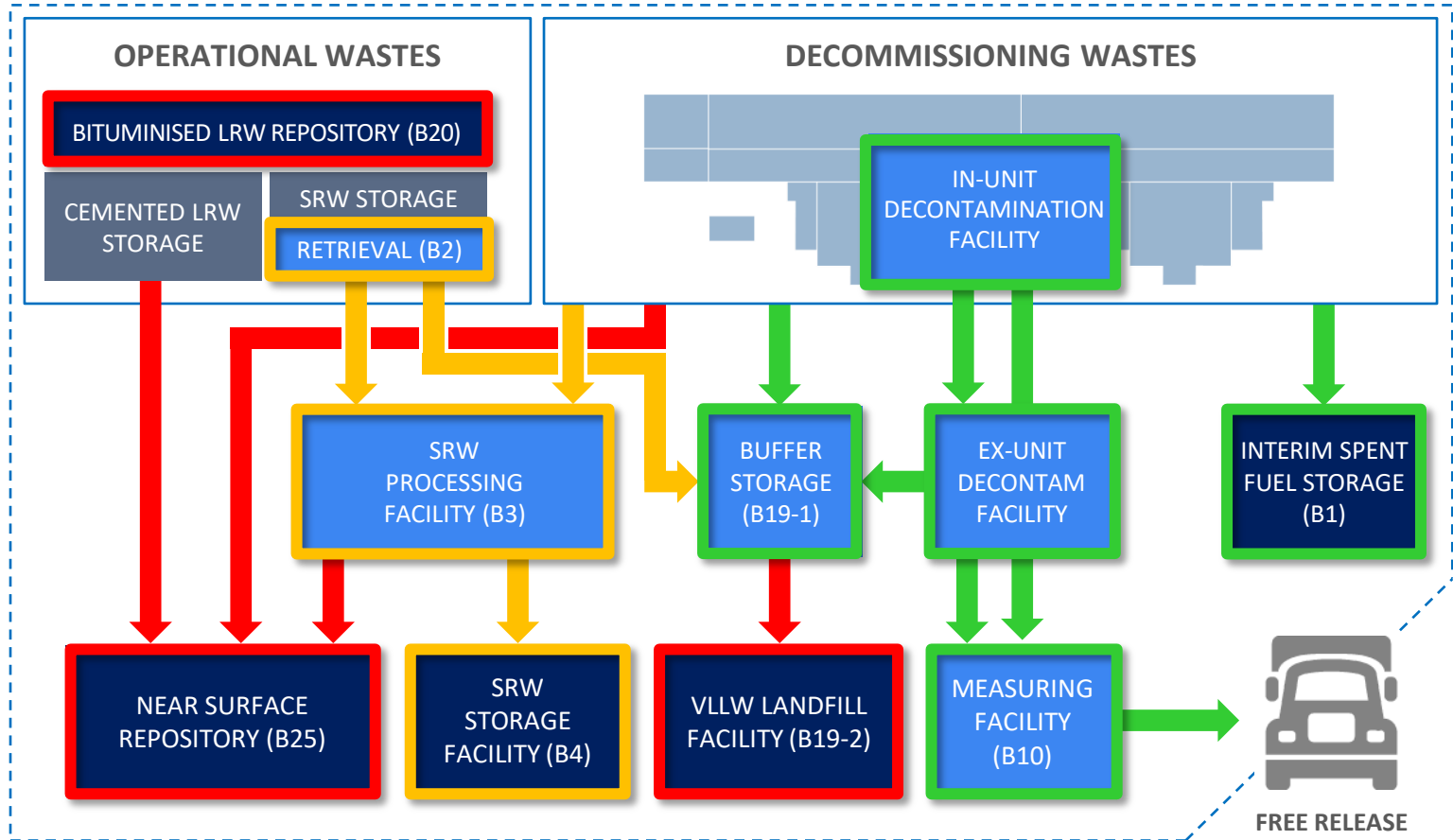
# Progress of Dismantling



16x more than Eiffel Tower  
(of which 14½ contaminated)



# Waste Routes Overview



**New facilities**

Remaining after decommissioning  
 For purposes of decommissioning

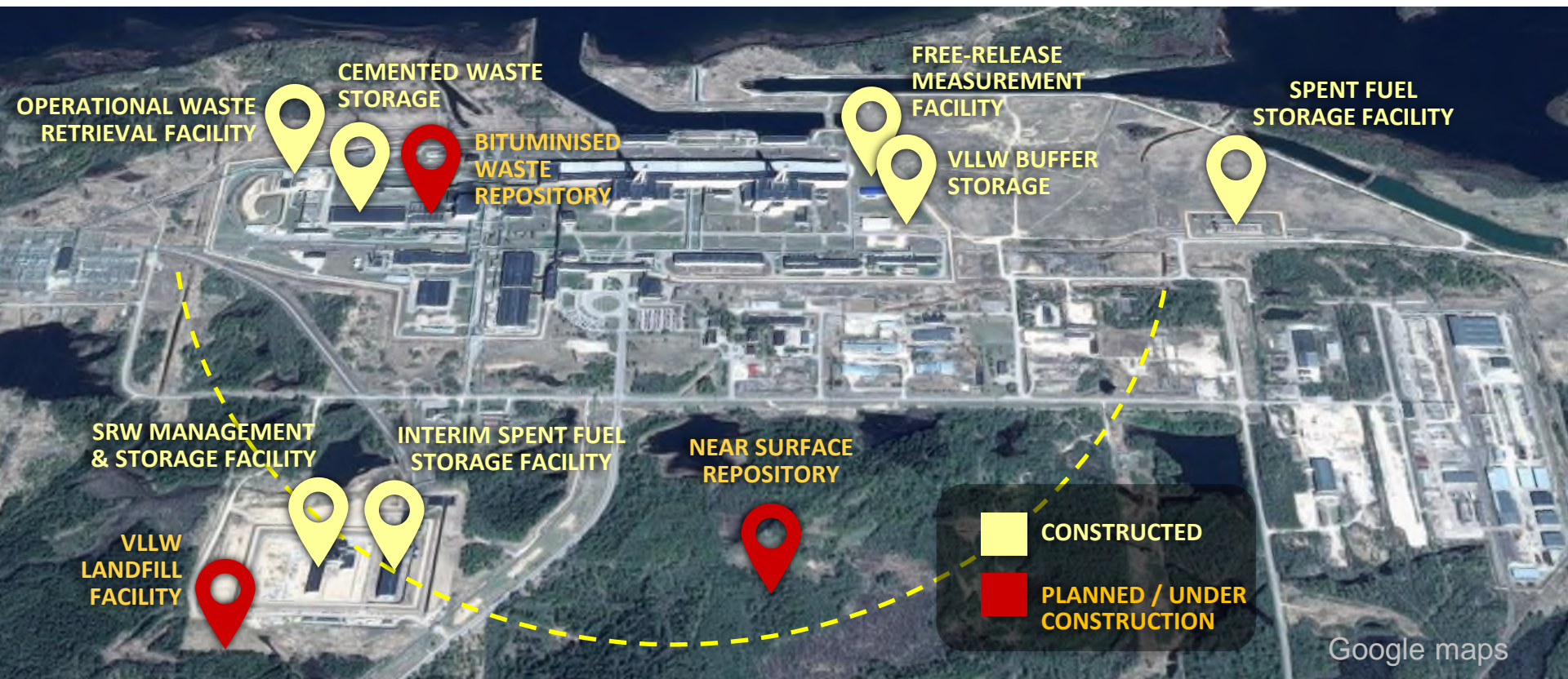
Under construction  
 Under commissioning  
 In operation

SRW = Solid Radioactive Waste  
 LRW = Liquid Radioactive Waste  
 VLLW = Very Low Level Waste

# New Waste Facilities



All new waste interim-storage or disposal Facilities to be created on, adjacent to, Ignalina NPP site (radius  $\approx 1.5$  km)





**Main  
Challenges of  
PSS**

# Main Challenges of Physical Security Service



- ❖ **Nuclear and nuclear fuel cycle material**
- ❖ **Construction of new and decommissioning of old Facilities**
- ❖ **Transport of nuclear and nuclear fuel cycle material**
- ❖ **Cybersecurity**

# Nuclear and Nuclear Fuel Cycle Material



- ❖ **Before the Decommissioning:**
- ❖ **Constant storage location:** Nuclear fuel was stored in the same location, volumes were constant and easier to manage.
- ❖ **Decommissioning:**
- ❖ Drastic increase of volumes
- ❖ Multiple storage locations
- ❖ Exposure
- ❖ Accessibility
- ❖ Variety of material

# Construction of New and Decommissioning of Old Facilities



- ❖ **Before the Decommissioning:**
- ❖ **Single Facility:** Physical Security Service had to maintain security of the Main Site.
- ❖ **Decommissioning:**
- ❖ Security of multiple Facilities
- ❖ Design and construction of new security means
- ❖ Need of personnel to maintain high level of security
- ❖ Ensure security during:
  - design period;
  - construction;
  - operation of a Facility



# Transport of Waste

- ❖ **Before the Decommissioning:**
- ❖ **Inner:** Transport of fresh fuel to Ignalina NPP, transport of spent fuel to the on-site storage facility
- ❖ **Decommissioning:**
- ❖ Increase of transport rates
- ❖ Transport of waste outside INPP Main Site to the storage Facilities
- ❖ Control of transport
- ❖ Control of fuel loading
- ❖ Escort
- ❖ Waste Transport Route



# Cybersecurity



- ❖ **Before the Decommissioning:**
- ❖ **Cybersecurity:**
- ❖ Unique software which was easy to maintain and control
- ❖ Cyber threats were practically non-existent
- ❖ **Decommissioning:**
- ❖ Design flaws during the design process (software update, access, copyright issues)
- ❖ Control of constantly increasing number of user and systems
- ❖ Control of the significantly expanded network (new facilities, communications)
- ❖ Easy access to the Internet



# Other issues

## ❖ **Funding:**

- ❖ No funds were accumulated for decommissioning due to early closure of the plant
- ❖ Lithuania is committed to maintaining a co-financing rate of at least 14% of direct Ignalina NPP decommissioning cost, which includes majority of security expenses

## ❖ **Employees:**

- ❖ Age of the Ignalina Nuclear Power Plant and Public Security Service personnel
- ❖ Difficult to find new/young employees

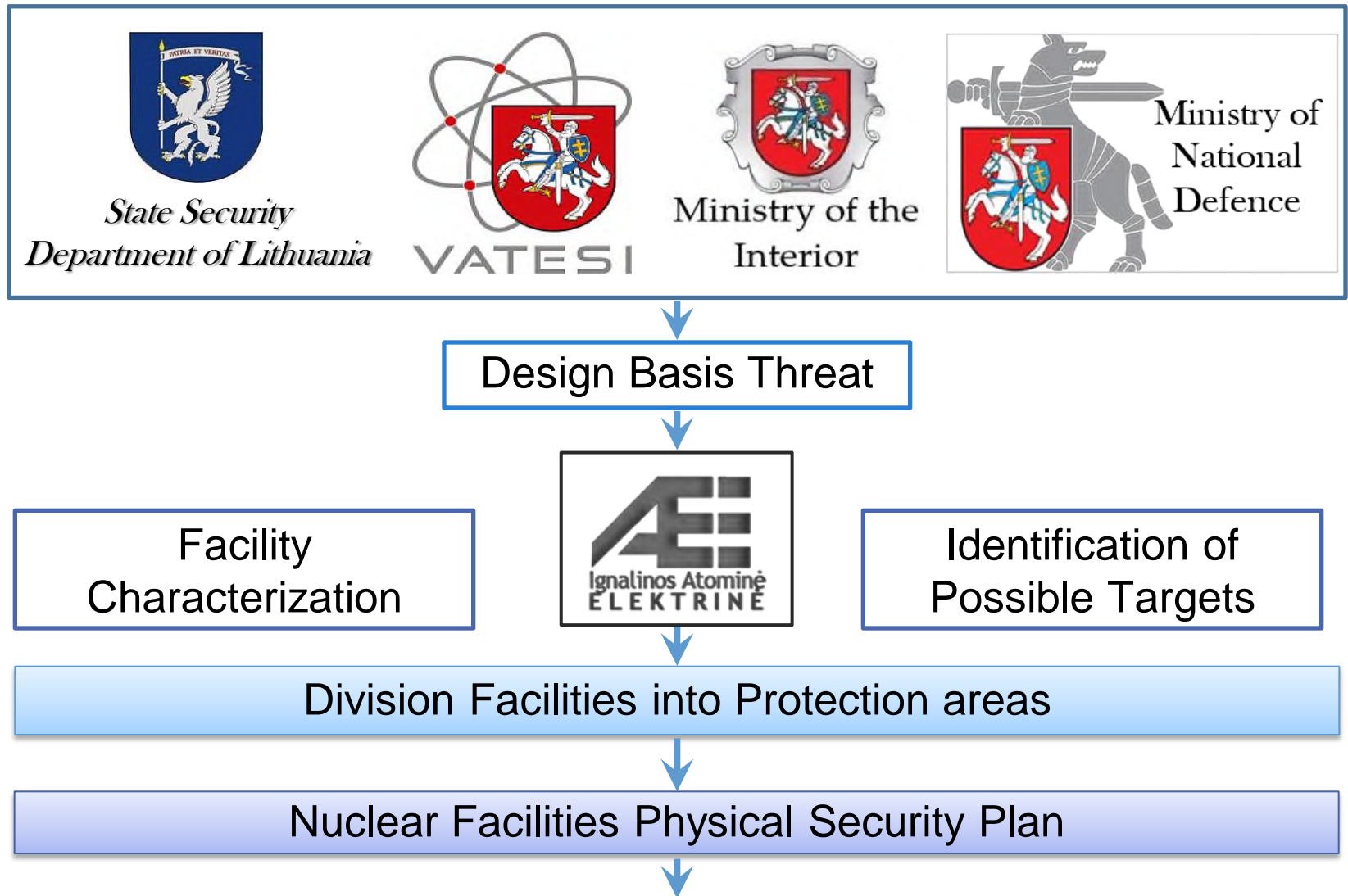
## ❖ **Drones:**

- ❖ Few drones were seized this year after they breached the air space of INPP

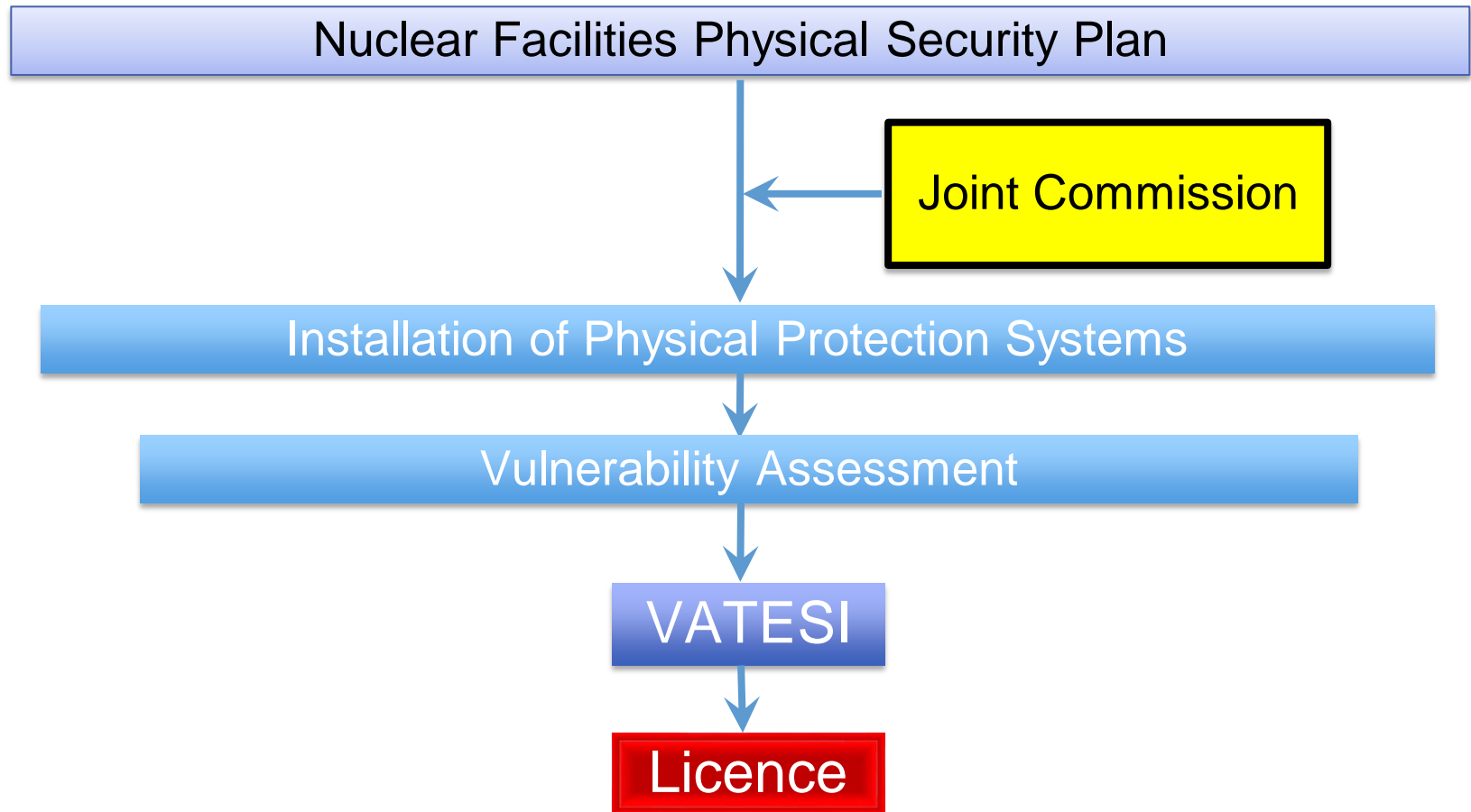
## ❖ **Attention:**

- ❖ HBO's "Chernobyl" miniseries brought a lot of attention to Ignalina NPP, flocks of tourists are coming to see Ignalina NPP

# Creation of PSS of a Nuclear Facility



# Creation of PSS of a Nuclear Facility





# Security

## PSS



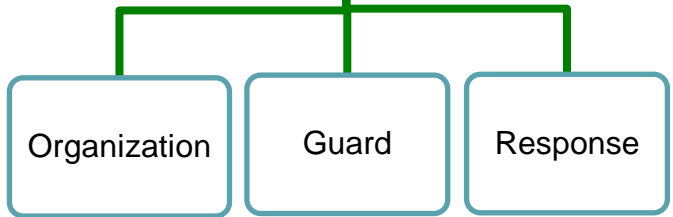
1. Control of access to protected and inner areas
2. Guard of protected and inner areas
3. Response
4. Participation during the vulnerability assessment of PS systems
5. Control of limited access area
6. Control of PS requirements
7. Protection of nuclear material during transport



1. Identification of Protection Areas
2. Preparation of Physical Security Plan
3. Design, installation, maintenance and modernization of PS systems
4. Vulnerability Assessment of PS systems
5. Trustworthiness checks of INPP and contractor employees
6. Administration of permit system
7. Control of PS requirements
8. Ensure of preventive measures
9. Administration and protection of classified information
10. Supervision of the most vulnerable places of INPP 24/7
11. Administration of cybersecurity of IT infrastructure

# Protection

## PSS





**Eugenijus Šepetys**  
**Head of the Physical Security Service**

State Enterprise Ignalina Nuclear Power Plant

Drūkšinių km, Visagino sav  
LT-31500, Lithuania

**Phone** +370 386 28340

**Fax** +370 386 28999

**E-mail** [sepetys@iae.lt](mailto:sepetys@iae.lt)

**Website:** [www.iae.lt](http://www.iae.lt)



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