


Ignalina Nuclear Power Plant

Sergej Martynov
Project manager
03.09.2015



**INPP BUILDING V1 EQUIPMENT
DISMANTLING & DECONTAMINATION
(D&D)**



 Ignalina NPP decommissioning activities are co-financed by European Union

2



Building V1 equipment D&D project (B9-2).

General view.

Contractual activities, planning, development of Design documentation, licensing in scope of the Project B9-2 were performed similarly to Project B9-0.

Project B9-2 features:

1. Equipment D&D in Unit V1 is performed in 2 phases:
 - Phase D1 – equipment D&D, which is no longer necessary after defueling completion from the reactor of Unit №1
 - Phase D2 - D&D of the rest contaminated equipment at the preparation for building demolition.
2. In works on D&D on Unit V1 the equipment and instruments were used, procured for Projects B9-0 and B9-1. The decontamination of dismantling waste was performed on the units in building 117/1.



Ignalina NPP decommissioning activities are co-financed by European Union

3



Building V1 equipment D&D project.

Preparation Phase.

The B9-2 prehistory:

PIS – Project Identification Sheet	2007-2008 y.
PDS – Project Delivery Strategy	2007-2008 y.
TS – Technical Specification Development	2007-2008 y.
EoI – Invitation for Expression of Interest	November 2007
RfP – Request for Proposal	May 2008
Evaluation of technical and financial proposals	October 2008
Contract assigned	January 2009



Ignalina NPP decommissioning activities are co-financed by European Union

4



**Building V1 equipment D&D project. Engineering.
Equipment to be dismantled (examples).**



Gas cleaning system
compressor

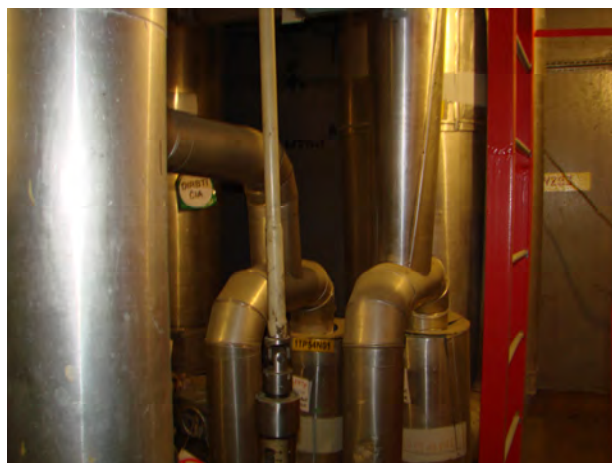


Ignalina NPP decommissioning activities are co-financed by European Union

5



**Building V1 equipment D&D project. Engineering.
Equipment to be dismantled (examples).**



Gaseous circuit
adsorber



Ignalina NPP decommissioning activities are co-financed by European Union

6



**Building V1 equipment D&D project. Engineering.
Equipment to be dismantled (examples).**



Gaseous circuit.
Heater.



Ignalina NPP decommissioning activities are co-financed by European Union

7



**Building V1 equipment D&D project. Engineering.
Equipment to be dismantled (examples).**



Gaseous circuit.
Helium
compressor.



Ignalina NPP decommissioning activities are co-financed by European Union

8



Building V1 equipment D&D project. Engineering. Equipment to be dismantled (examples).



Gaseous circuit.
Pipelines.



Ignalina NPP decommissioning activities are co-financed by European Union

9



Building V1 equipment D&D project. Engineering. Project development by Contractor.

Contractor – Consortium Firm:

- BABCOCK
- NUKEM
- LEI
- ANSALDO

The scope of works of the Contractor included :

1. D&D strategy development – choosing the best option from all currently used methods and instruments for D&D.
2. Development of licensing documents:
 - Basic Design (BD)
 - Safety Justification Report (SJR)
 - Environmental Impact Assessment Report (EIAR)



Ignalina NPP decommissioning activities are co-financed by European Union

10



Building V1 equipment D&D project. Engineering. Project development by Contractor.

3. Other project documentation development:

- D&D Tools Technical Specifications (TS)
- Design for Construction Works (DfC)
- Detail Design

4. Licensing support.

5. Knowledge transfer.

6. Implementation support (if necessary).

B9-2 Contract Price:

Section 1 (Design)	€ 1 783 753.00 + £ 918 472.00
Section 2 (Licensing)	€ 233 021.00 + £107 109.00
Section 3 (Implementation)	€ 79 641.00 + £ 146 993.00
Total	€ 2 096 425.00 + £ 1 172 574.00



Ignalina NPP decommissioning activities are co-financed by European Union

11



Building V1 equipment D&D project. Engineering. Project development by Contractor.

Following the contractual obligations, the Contractor defined the best D&D option, by analyzing with the MADA method the possible methods and equipment for dismantling, decontamination, waste management, radiological measurements on the qualitative and quantitative levels. In September, 2009 Contractor submitted D&D Strategy Report.

On the basis of the chosen strategy the Contractor has developed documents of Project BD, SJR, EIAR, DfC, which in October, 2010 were provided to the Regulator (Section 1 completion).

After reviewing the VATESI documents with the involvement of independent TSO experts and with the Contractor's support in July, 2012 the INPP license was added and permission for dismantling has been received (Section 2 completion).



Ignalina NPP decommissioning activities are co-financed by European Union

12



**Building V1 equipment D&D project. Engineering.
Project development by Contractor.**



Site visit with
contractor



Ignalina NPP decommissioning activities are co-financed by European Union

13



**Building V1 equipment D&D project. Engineering.
Project development by Contractor.**



Site visit with
contractor



Ignalina NPP decommissioning activities are co-financed by European Union

14



Building V1 equipment D&D project. Implementation. Preparatory works.

Knowledge transfer.

1. Before the start of works on D&D by the Contractor (BABCOCK and LEI) the training has been organized and INPP personnel attestation has been conducted (with the certificates issue) on the topics :

- Decommissioning program
- Radiation protection program
- Dismantling of tanks
- Pipe cutting
- Wastes monitoring/packing
- Handling and transportation
- Wastes size reduction and decontamination
- Ventilation



Ignalina NPP decommissioning activities are co-financed by European Union

15



Building V1 equipment D&D project. Implementation. Preparatory works.

Preparatory works

In the course of works on preparation for dismantling the following has been performed :

- Partial dismantling with the aim of the area clearance for equipment D&D installation
- Organizing the interim dismantling waste storage facility before their treatment and transportation
- Construction works (transportation routes laying, cranes and ventilation installation)
- Development of the additional Design documentation by the INPP personnel (if necessary)



Ignalina NPP decommissioning activities are co-financed by European Union

16



Building V1 equipment D&D project. Implementation. Preparatory works.



Installation of the transportation aperture



Ignalina NPP decommissioning activities are co-financed by European Union

17



Building V1 equipment D&D project. Implementation. Preparatory works.



Transportation door



Ignalina NPP decommissioning activities are co-financed by European Union

18



Building V1 equipment D&D project. Implementation. Preparatory works.



Ventilation penetrations



Ignalina NPP decommissioning activities are co-financed by European Union

19



Building V1 equipment D&D project. Implementation. Preparatory works.



Buffer storage



Ignalina NPP decommissioning activities are co-financed by European Union

20



Building V1 equipment D&D project. Implementation. Preparatory works.



Buffer storage



Ignalina NPP decommissioning activities are co-financed by European Union

21



Building V1 equipment D&D project. Implementation. D&D.

In the scope of Phase D1 596 t is dismantled.

From them:

- 0 class waste (including and after decontamination) – 482.5 t
- A class waste – 113.2 t
- Secondary waste – 2.5 t

The dismantling is carried out with the application of the disassembly, mechanical, plasma and flame cutting. Decontamination was performed in building 117/1 on the equipment, earlier applied in the Project B9-0. Formation of the waste packages for transportation to the buffer storage Landfill was performed in building 130/2.



Ignalina NPP decommissioning activities are co-financed by European Union

22



Building V1 equipment D&D project. Implementation. D&D.



Packing



Ignalina NPP decommissioning activities are co-financed by European Union

23



Building V1 equipment D&D project. Implementation. D&D.



After
dismantling



Ignalina NPP decommissioning activities are co-financed by European Union

24



Building V1 equipment D&D project. Implementation. D&D.



Dismantling



Ignalina NPP decommissioning activities are co-financed by European Union

25



Building V1 equipment D&D project. Implementation. D&D.



Dismantling



Ignalina NPP decommissioning activities are co-financed by European Union

26



Building V1 equipment D&D project. Implementation. D&D.



Helium compressors room after dismantling



Ignalina NPP decommissioning activities are co-financed by European Union

27



Building V1 equipment D&D project. Implementation. D&D.



After dismantling



Ignalina NPP decommissioning activities are co-financed by European Union

28



Building V1 equipment D&D project. Implementation. D&D.



After dismantling



Ignalina NPP decommissioning activities are co-financed by European Union

29



Building V1 equipment D&D Project. Implementation. Impact on the Environment and radiation protection.

Radiation doses to the personnel amounted to:

- Collective exposure dose – 1.65 man/mSv
- max Individual Exposure dose – 0,39 mSv

Which is well below the design-basis (250 and 18.6 correspondingly).

The hazardous emissions are regulated by the requirements of Permissions for integrated warning and control (TIPKL TV(2)-3), which was issued by the Department of Environmental Protection of Utena region. According to the EIAR estimation, the emissions amounted to 0.012 t CO and 0.057 t NO_x.

The activity of the radioactive discharges in course of the activity is far less, than is permitted IAEA plan of releases.



Ignalina NPP decommissioning activities are co-financed by European Union

30



Building V1 equipment D&D Project. Implementation. Impact on the Environment and radiation protection.

Radioactive releases

Nuclide	Estimated activity, Bk	Measured releases activity through the ventilation duct, Bk	Max authorized activity of rad. discharges, Bk/y
C-14	1.32E+08	-	4.55E+13
Mn-54	4.11+05	-	9.47E+11
Co-60	5.87E06	2.85E+07	9.47E+11
Zn-65	9.39E+02	-	9.47E+11
Sr-90	1.12E+06	3.57E+06	9.47E+11
Cs-134	3.04E+05	-	9.47E+11
Cs-137	1.01E+07	8.51E+06	9.47E+11



Ignalina NPP decommissioning activities are co-financed by European Union

31



Building V1 equipment D&D Project. Implementation. Actual Project value.

At the moment of works completion on designing, licensing and D&D in the scope of Phase D1 the total expenditures equaled to € 3 514 030.

Total sum of expenditures for the Project will be estimated after the Phase D2 completion.



Ignalina NPP decommissioning activities are co-financed by European Union

32



Building V1 equipment D&D project.

THANK YOU FOR YOUR ATTENTION.



Ignalina NPP decommissioning activities are co-financed by European Union

33



Игналинская АЭС Снятие с эксплуатации

INPP Boiler House Equipment Dismantling Project B9-5

Prepared by Nikolaj Barinov

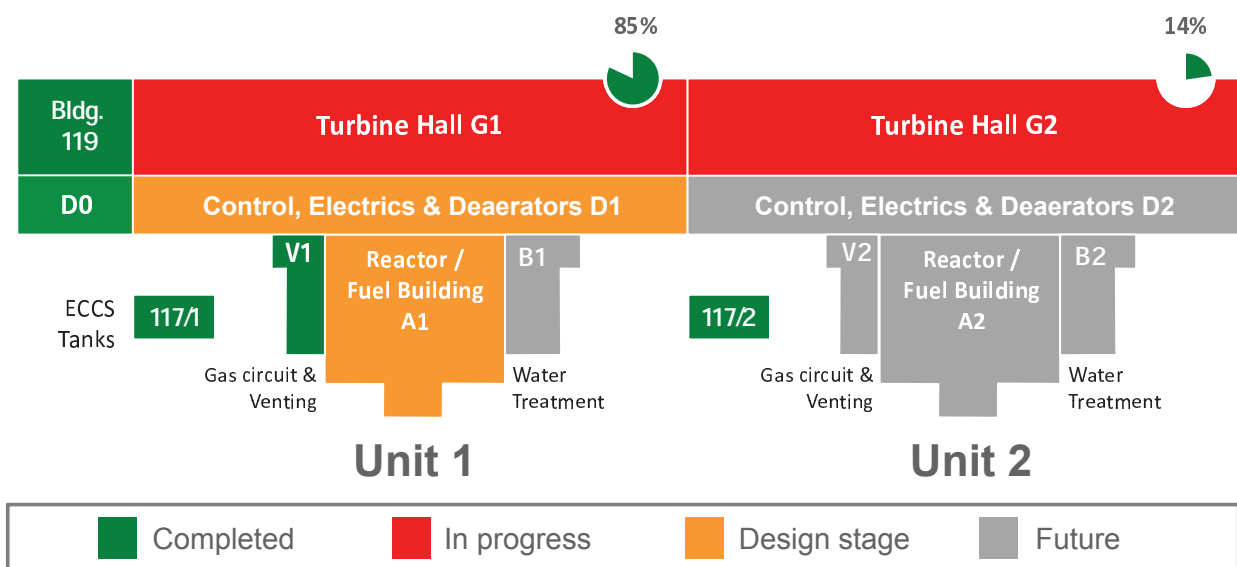
Ignalinos Atominė Elektrinė

 Ignalina NPP decommissioning activities are co-financed by European Union

1

Progress of Dismantling

Ignalina NPP 



 Ignalina NPP decommissioning activities are co-financed by European Union

2

1. Work out the technical documentation package that enables the dismantling and decontamination of the INPP Boiler House Facility redundant equipment and to manage waste arising by the most effective and safe manner
2. Obtain permission from the Lithuanian regulatory authorities for implementation of the planned activities
3. Ensure consultative maintenance during equipment D&D works.

The contract to develop the project was made 2009-05-05 by international tender.

Project managers from the INPP - DS workers
(currently DD group)

The contractor - consortium consisting of:

1. UKAEA Ltd (United Kingdom Atomic Energy Authority)
– the consortium leader (United Kingdom)
2. Grontmij Ltd (United Kingdom)
3. Ernst & Young Baltic UAB (Lithuania)
4. SWECO BKG LSPI UAB (Sweden, Lithuania)

The volume of project documentation

1. Environmental impact assessment report
2. D&D Basic Design
3. Safety justification report
4. Simplified design (preparatory works)
5. D&D detailed design (Проекты производства работ)
6. Technical specifications for Procurement of tools

The project implementation

1. Environmental impact assessment report has been prepared 2010-04-02
2. The solution of Agency of Protection of Environment of the Lithuanian Republic received 2011-08-22
3. Documents to amendment the license to perform D&D activities (Basic Design, Safety justification report) were prepared 2010-04-02

The project implementation

4. Amendment VATESI licenses for dismantling work received 2011-10-19
5. 2012-09-17 completed the development of all project documentation provided by the contract (the warranty period including)

Preparatory works include:

1. Equipment dismantling at level. -2,40 bld. 119
2. Zones of primary waste treatment preparation :
 - waste size reduction area
 - waste radiation measurement area
 - waste packing area





Before



After

Main equipment of bldg. 119

1. Network water heaters - 24 pcs.
2. Steam generators - 2 pcs.
3. Volume compensators - 4 pcs.
4. Deaerator - 1 pcs.
5. Pumps - 15 pcs. (Preparatory works)
6. Heaters - 8 pcs.



INPP Boiler House equipment D&D works were commenced 2010-07-01

Equipment dismantling was carried out 2013-02-14

All dismantling waste were removed from the building 2013-07-10

The waste volume produced in the process of equipment dismantling was 1544 tons



After equipment dismantling and waste removal (according to the projects B9-1 and B9-1 (2)), the building 119 is used for grinding, radiological measurements and packing of conditionally non-radioactive waste (waste of class 0), generated in the process of Unit 1 and Unit 2 turbine halls" equipment dismantling works.





Before



During assembly

Equipment dismantling



Before



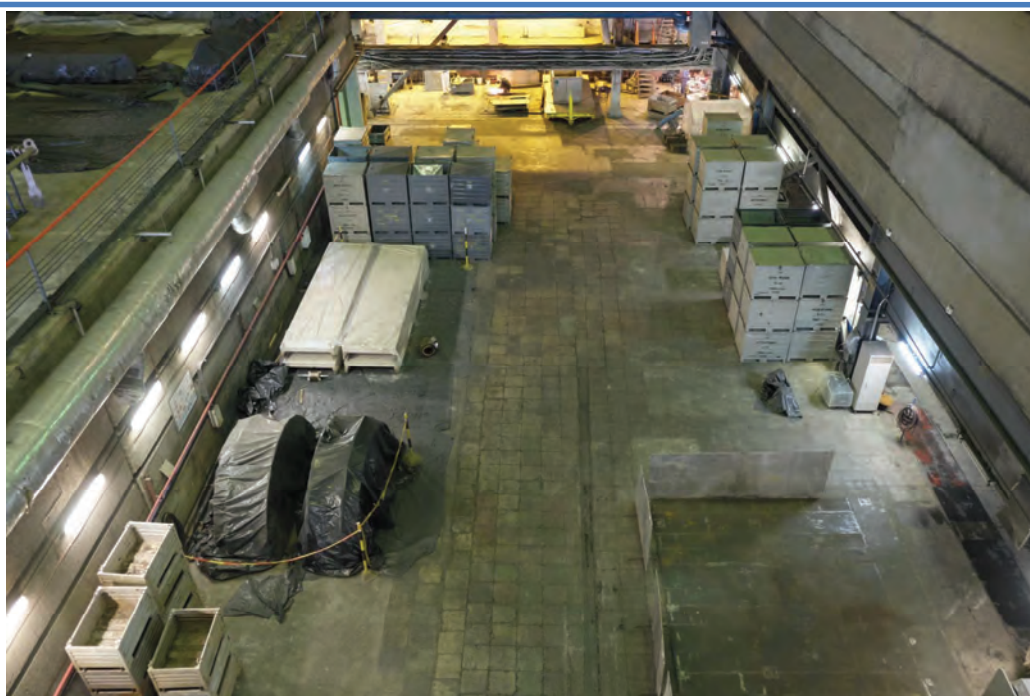
After



Before



After



The building 119 is now

