AP0

CHALLENGES TODAY.
RESPONSIBILITY FOR AGES

IGNALINA
NUCLEAR
POWER PLANT

WORKSHOP
Lessons Learned at INPP in the Project "Installation of Radioactive Metal Waste Treatment Facility"

20 October 2022

ACCREDITED
MSCB-113

ISO 9001:2015
GKLT-0199-QC

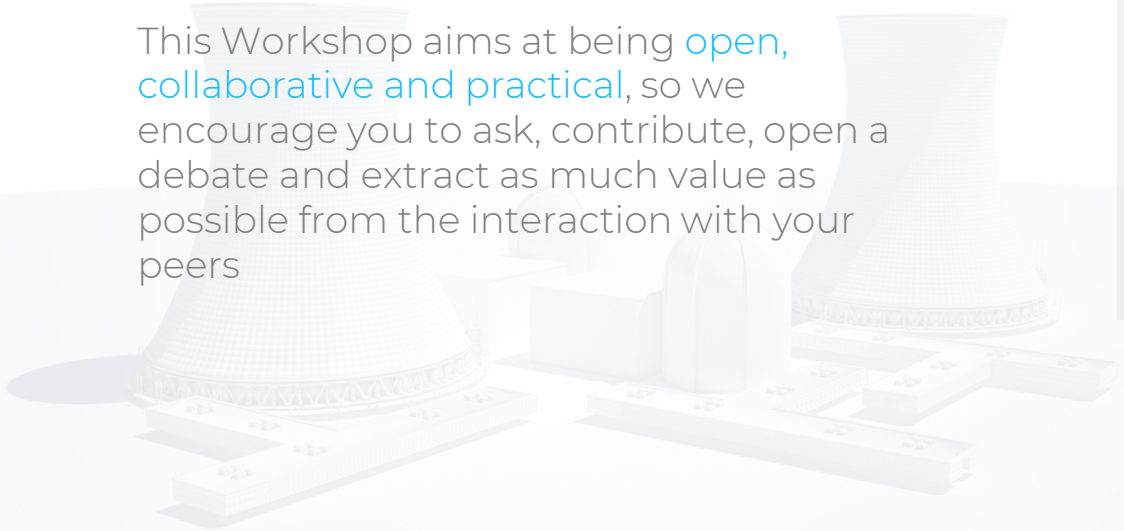
Ignalina NPP decommisioning activities are co-financed by the European Union

Welcome!

We would like to thank you for your participation today

We are very excited to have you here with us today

This Workshop aims at being open, collaborative and practical, so we encourage you to ask, contribute, open a debate and extract as much value as possible from the interaction with your peers



50
Attendees

8
Organizations

7
Products

5
KPI

What is your current position?

1. I work in a Project and my job is mostly related to technical and project management issues
2. I work in the Finance/ Economic Division
3. I work in the Safety Division or my job is mainly related to safety and risk management (including Health and Safety)
4. I work in the HR/ Training Unit or I have a managerial position with responsibility over people and processes
5. I work for an institution, authority, regulator or other stakeholder that is not a decommissioning operator

What is this slide?

We propose to develop a quick survey to get to know better the audience

IT is quick and works pretty well to break the ice and understand the profile of the attendees

It is automatic and can be quickly and easily responded on the phone, showing results on time

Why this Workshop

This Workshop is part of an effort to spread the knowledge gained over the course of decommissioning and radioactive waste management activities across all EU Member States

The JRC is leading an initiative to collect and make available knowledge gained by EU operators in the form of “knowledge products” that can be used and deliver value to potential users in the Union

INPP has collected relevant experience and lessons learned from the creation and upgrade of the Facility for radioactive metal waste processing in this “knowledge product” that will be presented today

Knowledge Product
Code: KI-S-04
Type: Workshop
Produced by: INPP

What is the goal?

This Workshop aims at promoting a dialogue between the participants to share the experience of INPP in the Installation of a Radioactive Metal Waste Treatment Facility

Who may benefit?

Decommissioning operators and other stakeholders in the EU that need to design, build, operate or upgrade similar facilities

What will you learn?

Attendees will have the opportunity to learn from the experience of INPP regarding the Installation of a Radioactive Metal Waste Treatment Facility. You will become familiar with the selection process, initial investment, tools used by INPP and will learn from their experience in the field

FORMAT

- Face to face + Video conference
- 10-30 min presentations
- 15 min breaks every hour
- INPP ppt + Attendee ppt + discussion

COMMUNICATION

- Presentations. Please leave your questions in the chat. We will address them at the end of the presentation.
- Discussions. Ask, comment, anytime. These sessions are collaborative. Please participate!
- Moving forward. Contact us for anything you may need.
- Pavel Aksionov Aksionov@iae.lt
- Michail Orlov Orlovm@iae.lt
- Dmitrij Ekaterinichev Ekaterinichev@iae.lt

Opening Session				
15 min	**Welcome. Workshop Goal and Overview**			
	Goal Present the workshop. Goal and overview Explain the workshop specific objectives and the agenda		Format • Presentation • Roundtable? • Live Poll (IDOM helps design poll)	JRC
10 min	**Background. Context**			
	Goal • Provide background relative to the Knowledge Product production/JRC Knowledge sharing effort	Contents Slide of background. Motivation. Importance in the decommissioning field.	Format • PPT presentation	JRC-ENER-IDOM?
10 min	**About this Worskshop**			
	Goal • Remark the Relevance of metal waste treatment in Europe • Explain what will be learned, who are the end users	Contents State of the art, overview of activities in EU Specific takeaways from the INPP product	Format PPT presentation	JRC-ENER-IDOM?
25 min	**Project Overview**			
	Goal • Provide General information about the project and main data. • Introduce how was the project divided.	Contents • General description • Main tasks performed. Description of the 2 stages and the purpose of both (S1 -> new build; S2 -> Extension) • Duration of each and cost • Costs	Format • PPT presentation	INPP
15 min	**Break**			

JJO0

Session 1				
10 min	**Metal waste treatment facilities in Europe. Needs and experience**			
	Goal • Get feedback from attendees regarding their needs / experience in their countries • Use this feedback to promote exchange of insights and discussions. Also, to tailor the messages from the posterior presentations	Contents • Similar projects / experiences • Specific needs, regulatory situation, country status, expectations	Format • Presentation	Participants / IDOM Need to contact EU organizations to attend the WS
20 min	**Project Stage 1: Lessons Learned from Construction /New Build**			
	Goal • Give an overview of the activities involved in the building of a facility like this from the technical and managerial point of view. • Share generic and specific lessons learned and best practices applicable to organizations that may tackle similar projects • Provide concrete insights on cost, decision making tips, things that worked well, things to avoid, etc.	Contents • Technical side: enumeration of main activities and explanation. Duration. Cost. Issues. What you learned and may be applicable to others • Managerial side: enumeration of main activities and explanation. Issues. What you learned and may be applicable to others • Safety considerations	Format • Presentation	INPP
10 min	**Extension upgrades of existing facilities in Europe. Needs and experience**			
	Goal • Get feedback from attendees regarding their needs / experience in their countries Use this feedback to promote exchange of insights and discussions. Also, to tailor the messages from the posterior presentations	Contents • Similar projects / experiences Specific needs, regulatory situation, country status, expectations	Format Presentation	Participants / IDOM Need to contact EU organizations to attend the WS
20 min	**Project Stage 2: Lessons Learned from Extension**			
	Goal • Give an overview of the main activities performed, which were mainly the procurement of equipment.	Contents • Technical side: enumeration of the equipment and explanation of the use and why was needed. Cost. Issues Managerial side: enumeration of main activities and explanation. Issues.	Format Presentation	INPP
20 min	**Discussion / Roundtable**			
15 min	**Break**			

Session 2				
10 min	**Cost, Schedule, and Risk Management insights**			
	Goal • Provide a complete view of the impact of each activity in the project cost and duration.	Contents Planning and a plot cake with cost distribution	Formats 1 Slide (planning) + 1 Slide (plot cake)	INPP
10 min	**Project Stage 3: Moving Forward**			
	Goal Provide a complete view of the impact of each activity in the project cost and duration.	Contents Planning and a plot cake with cost distribution	Formats 1 Slide (planning) + 1 Slide (plot cake)	INPP
20 min	**Discussion / Roundtable**			
	Open sessions, challenges, risks, opportunities, moving forward			All
5 min	**Survey & Closure**			JRC

CHALLENGES TODAY.
RESPONSIBILITY FOR AGES

IGNALINA
NUCLEAR
POWER PLANT

WORKSHOP
Lessons Learned at INPP in the Project "Installation of Radioactive Metal Waste Treatment Facility"

INPP general information

ACCREDITED
MSCB-113

ISO 9001:2015
GKLT-0199-QC

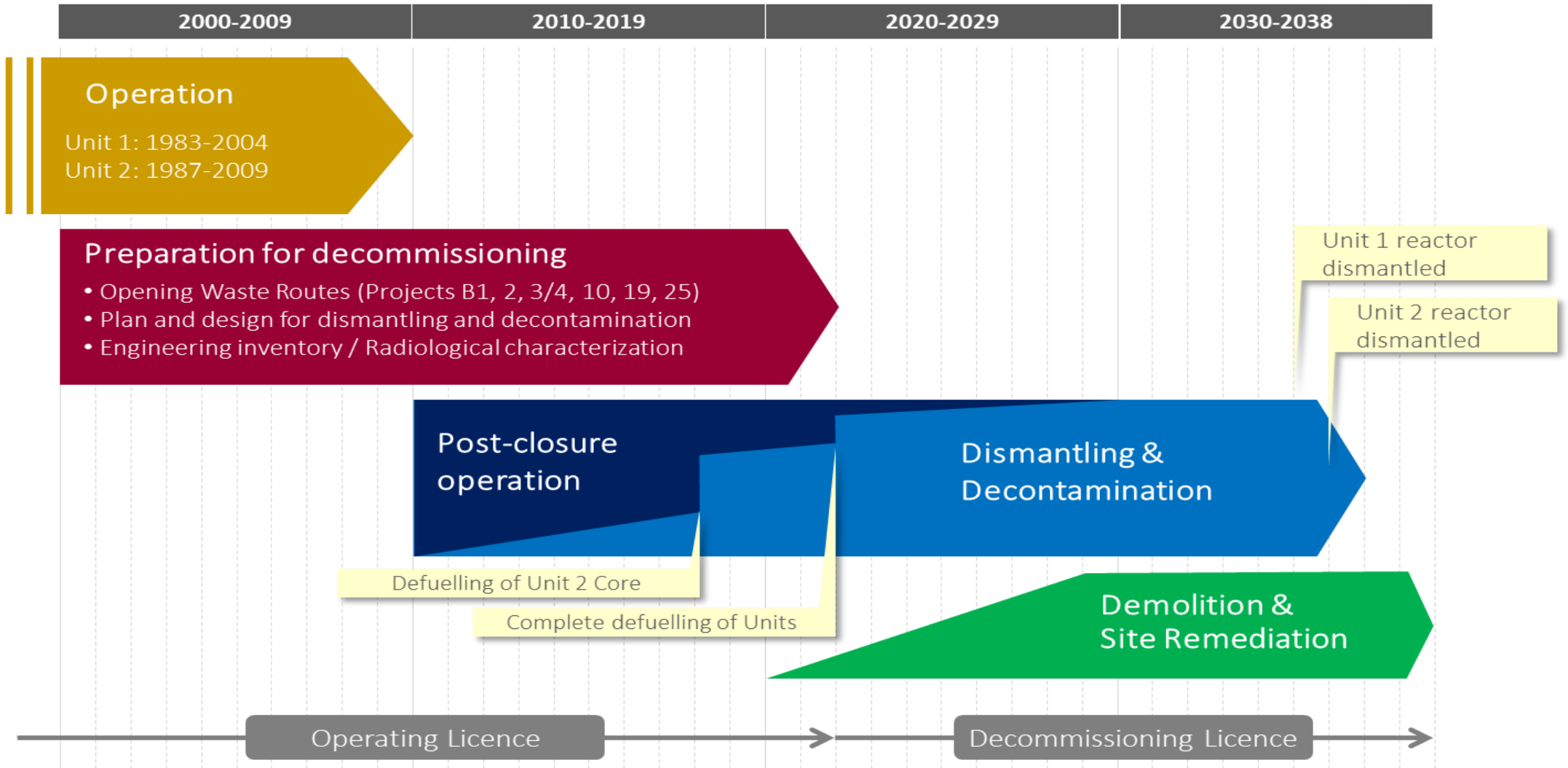
Ignalina NPP decommisioning activities are co-financed by the European Union

Location: Far north-east corner of Lithuania. Immediately bordering Latvia and Belarus

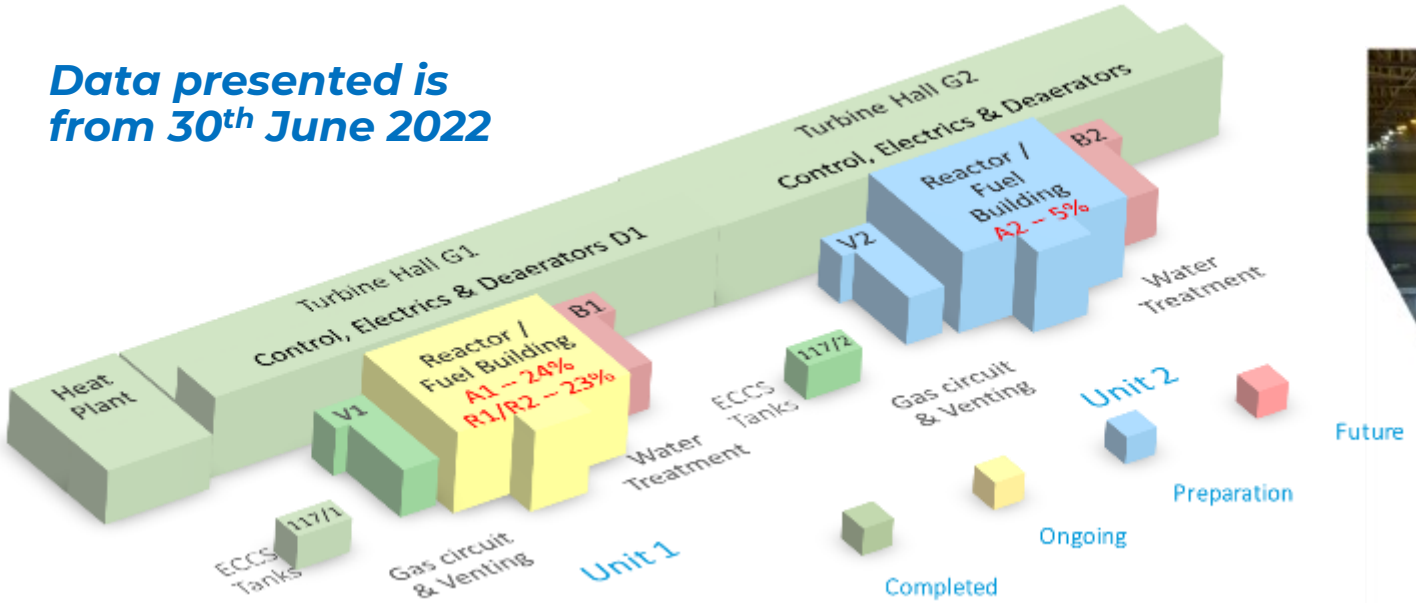
Design: 2 × RBMK-1500 water-cooled, graphite-moderated channel-type power reactors

Capacity: Intended to supply NW region of the former USSR (not Lithuania). After independence, one unit could produce 80% of Lithuanian electricity demand

Operation:
Unit 1 commissioned Dec 1983 / closed Dec 2004
Unit 2 commissioned Aug 1987 / closed Dec 2009


2000-2009
2010-2019
2020-2029
2030-2038
Operation
Unit 1: 1983-2004
Unit 2: 1987-2009
Preparation for decommissioning
• Opening Waste Routes (Projects B1, 2, 3/4, 10, 19, 25)
• Plan and design for dismantling and decontamination
• Engineering inventory / Radiological characterization
Unit 1 reactor dismantled
Unit 2 reactor dismantled
Post-closure operation
Dismantling & Decontamination
Defuelling of Unit 2 Core
Complete defuelling of Units
Demolition & Site Remediation
Operating Licence
Decommissioning Licence

Data presented is from 30th June 2022

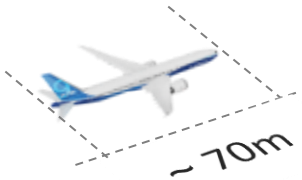


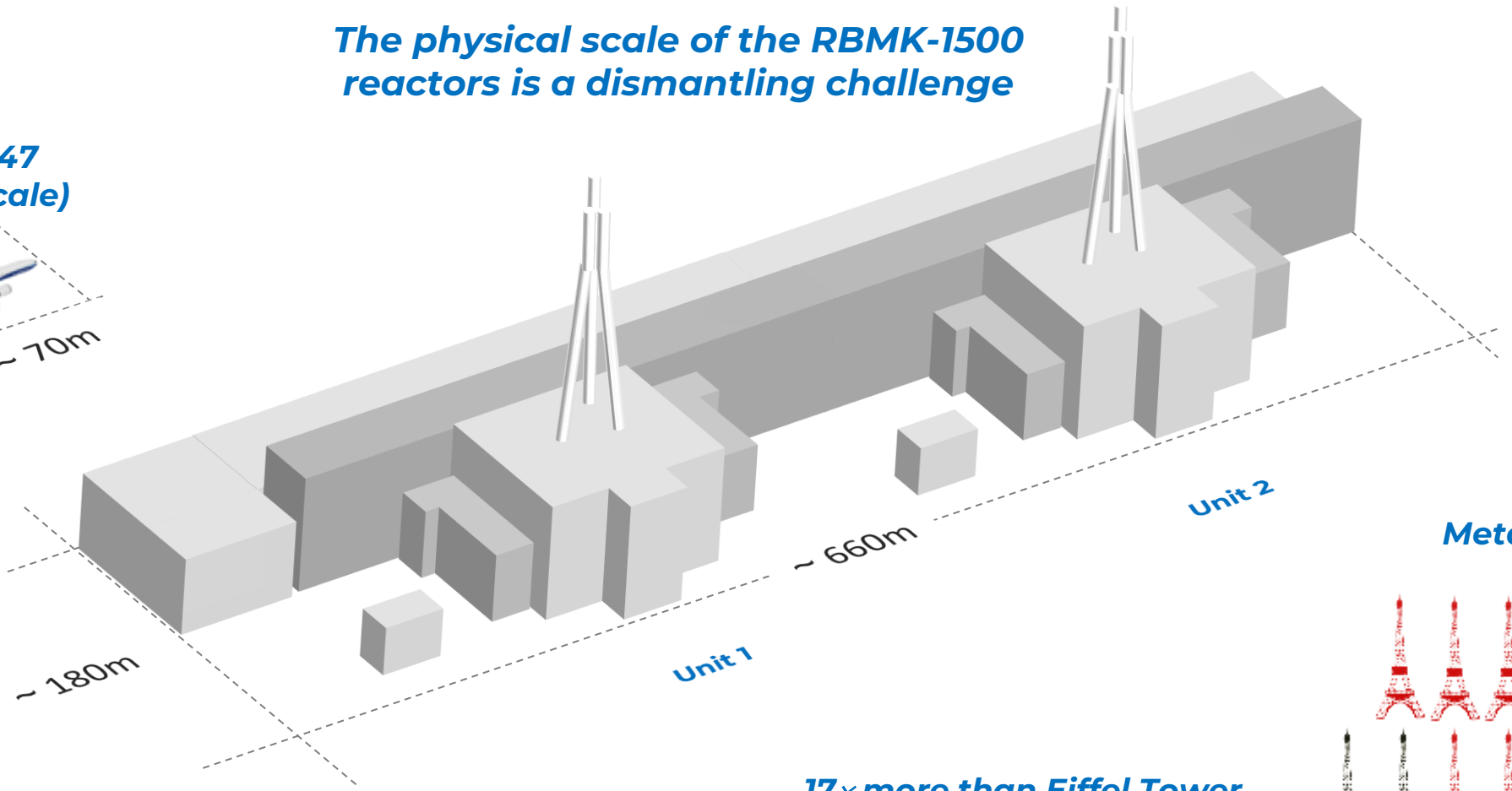
	x 1000 tons	2010-2021	2010-2038
		(in all)	(in all)
Dismantled:	Equipment	62,4	180
	Concrete	9,2	1 920
Waste free-released:	Equipment	50,6	125
	Concrete	8,3	1 755

As the result of INPP technological equipment dismantling, around 180 thousand tons of waste are generated.

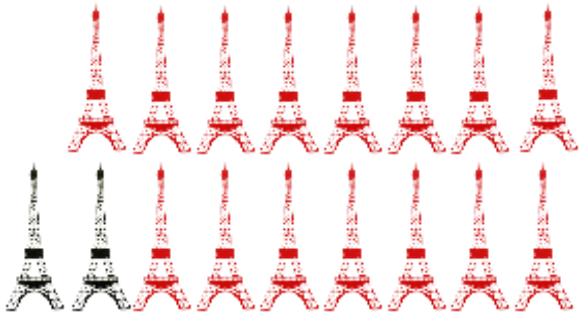
The physical scale of the RBMK-1500 reactors is a dismantling challenge

Boeing 747 (to same scale)

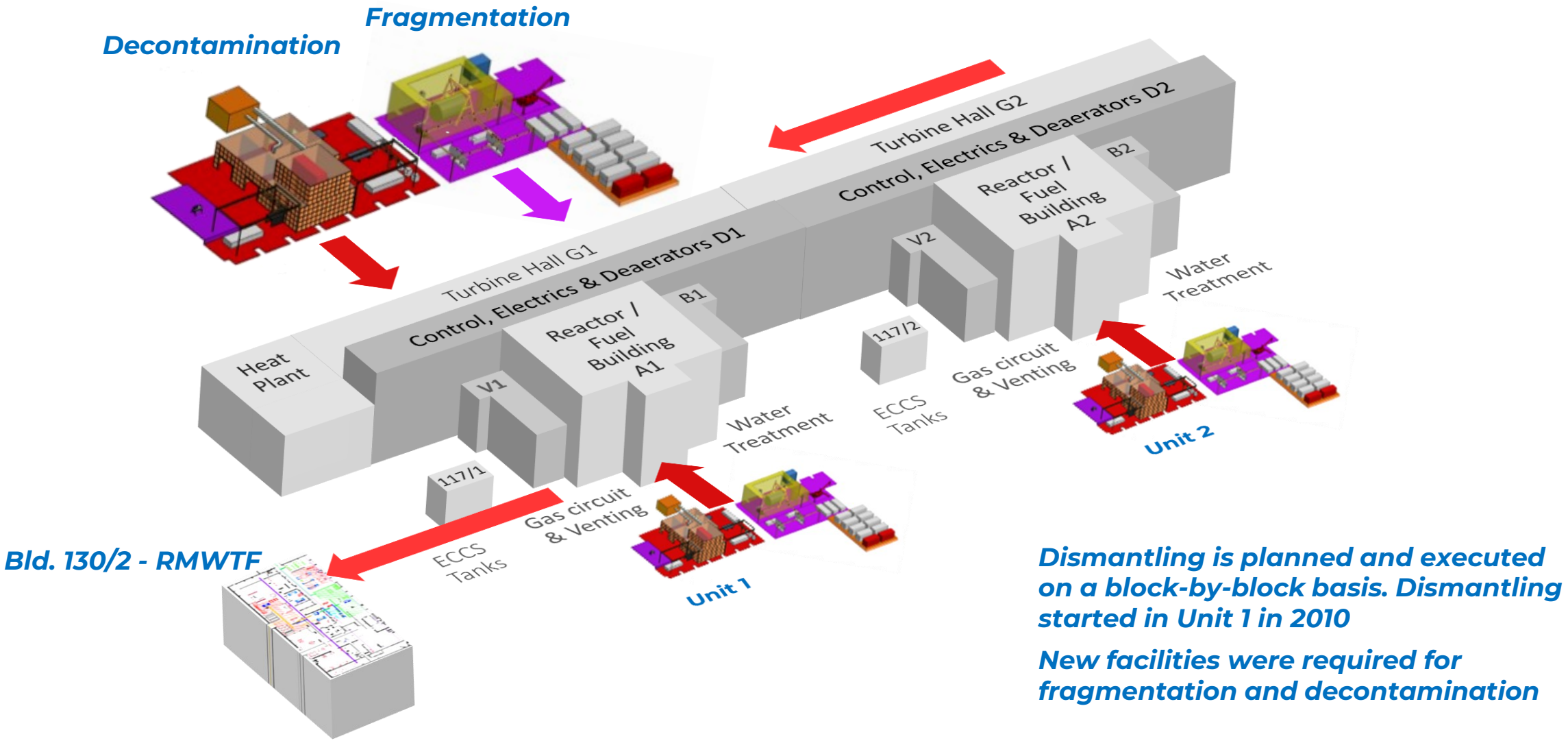




Metal to dismantle

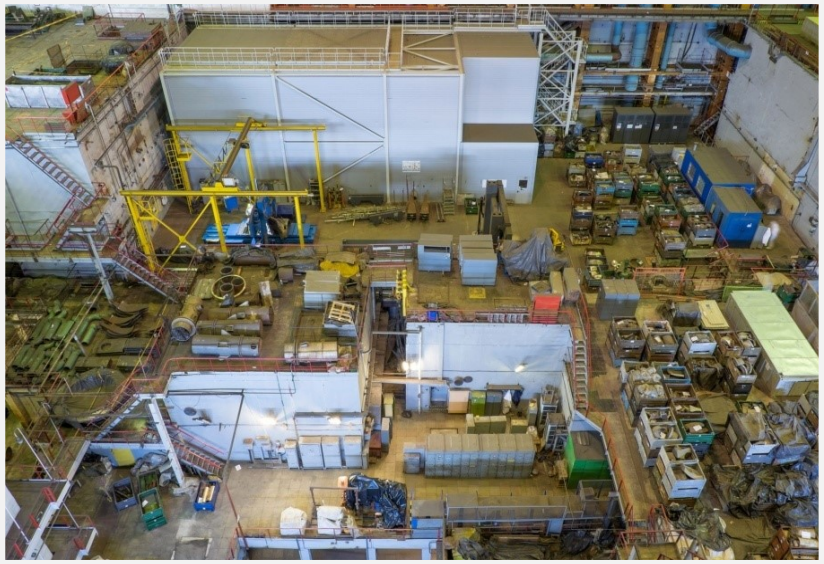


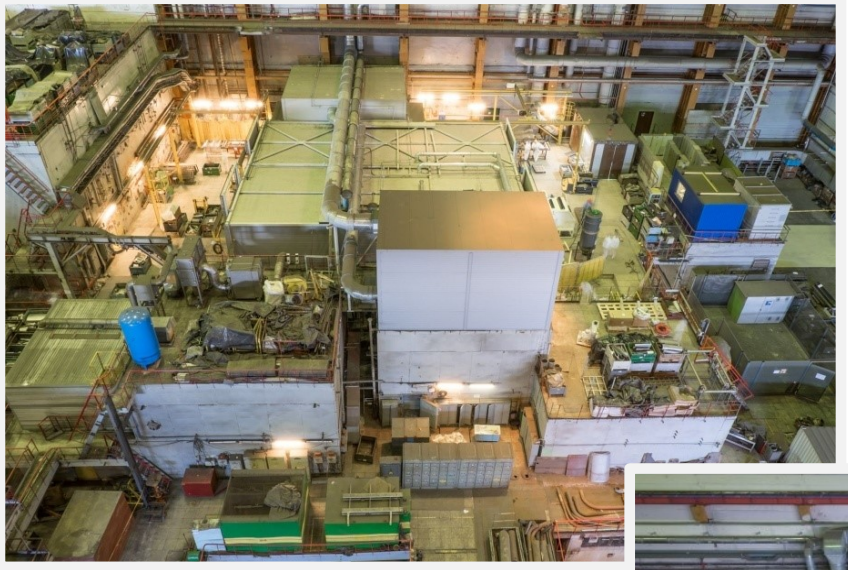
17× more than Eiffel Tower (of which 15 are contaminated)



Dismantling is planned and executed on a block-by-block basis. Dismantling started in Unit 1 in 2010

New facilities were required for fragmentation and decontamination





The areas for G1 Turbine Hall waste treatment were organized in bl. G1 in 2013.

After starting the equipment dismantling of Units G2 and D1 in 2015, the following risks appeared:

- The pace of dismantling will outstrip the pace of decontamination.
- Loading of decontamination areas in bl. G1 will exceed the throughput of these areas (bottleneck effect).
- Temporary waste storage areas in bl. G1 will overflow.
- Failure of decontamination equipment will stop the process for the duration of unscheduled repairs.

Data accumulated from INPP equipment engineering inventory and radiological characterization made it is possible to both estimate the amounts and qualities of waste types generated as a result of INPP decommissioning:

Unprocessed Waste (Tons)	Distribution (Tons)	Waste Class	Buildings
≈*100,000	≈70,000	A	Bldg. 117/1,2, Bldg. 119, Bldg. 101/1,2
	≈30,000	Other	
*Not including non-ferrous metals			
Throughput of G1: 5 Tons / shift			

In principle, the Block G1 infrastructure was sufficient for processing of all metallic wastes generated by dismantling of Block G1/Block G2 equipment. Yet, experience suggested that a waste bottleneck existed in the pre-decontamination phase due to:

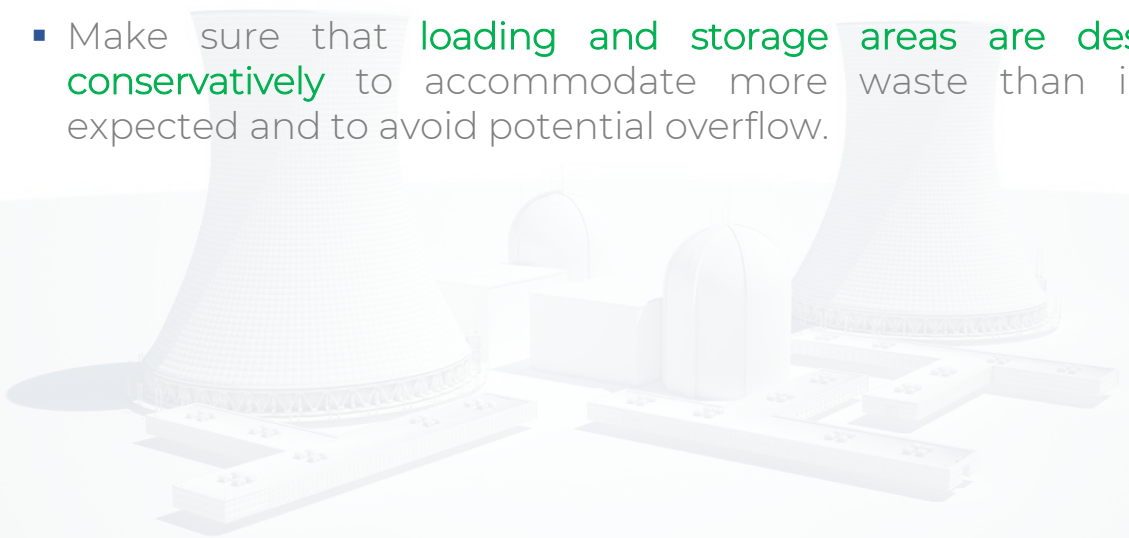
- Complex geometry fragments to be processed
- Presence of difficult-to-remove contamination hot spots (requiring multiple shot blasting machine runs),
- Lack of backup equipment for decontamination in case of failure and maintenance.
- Escalating dismantling rates in other blocks (Block D1, D2, A1, A2, etc.),

LESSON LEARNED No. 1

- Dismantling and decontamination work can be carried out at different speeds. The INPP experience shows that dismantling activities can outstrip the pace of decontamination, for example, with increased decontamination volumes, or due to failure equipment. In this case, the loading of the decontamination zone may exceed the capacity of these zones (bottleneck effect).

GOOD PRACTICE No. 1

- Make sure that loading and storage areas are designed conservatively to accommodate more waste than initially expected and to avoid potential overflow.



Waste Storage Areas
Waste Treatment and Processing
Site Selection for Decontamination
Planning and research
Cost reduction
Terms extension

LESSON LEARNED No. 2

- Difficulties may arise with waste handling and decontamination due to underestimation of the amount of radioactive waste.

GOOD PRACTICE No. 2

- In order to avoid stopping the decontamination process in the future and thus slowing down the pace of the decommissioning project, it is necessary to estimate the radioactive waste streams in advance through engineering inventory and radiological characterization.

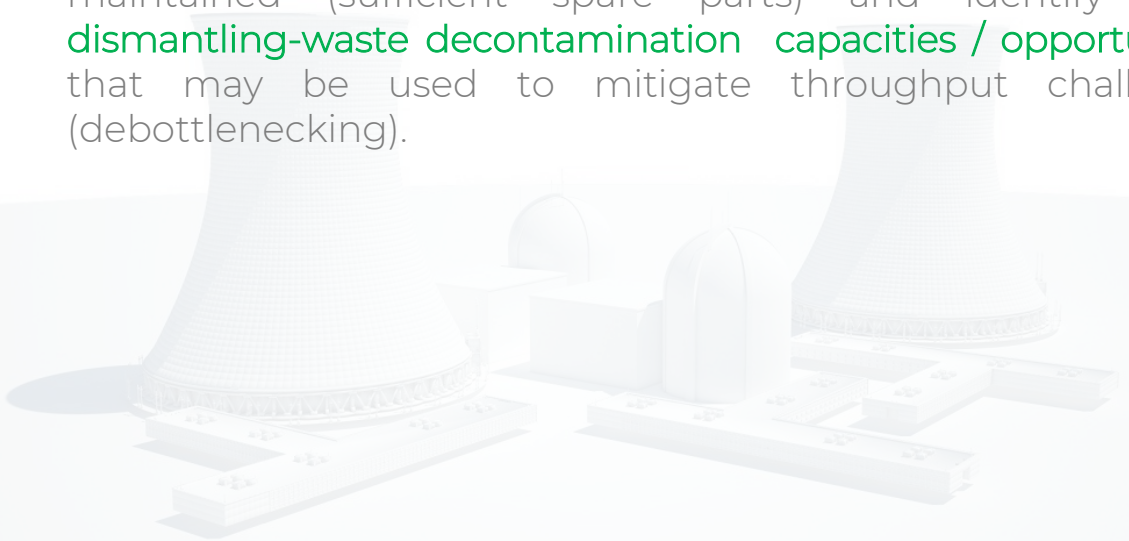
Waste Storage Areas
Waste Treatment and Processing
Site Selection for Decontamination
Planning and research
Cost reduction
Terms extension

LESSON LEARNED No. 3

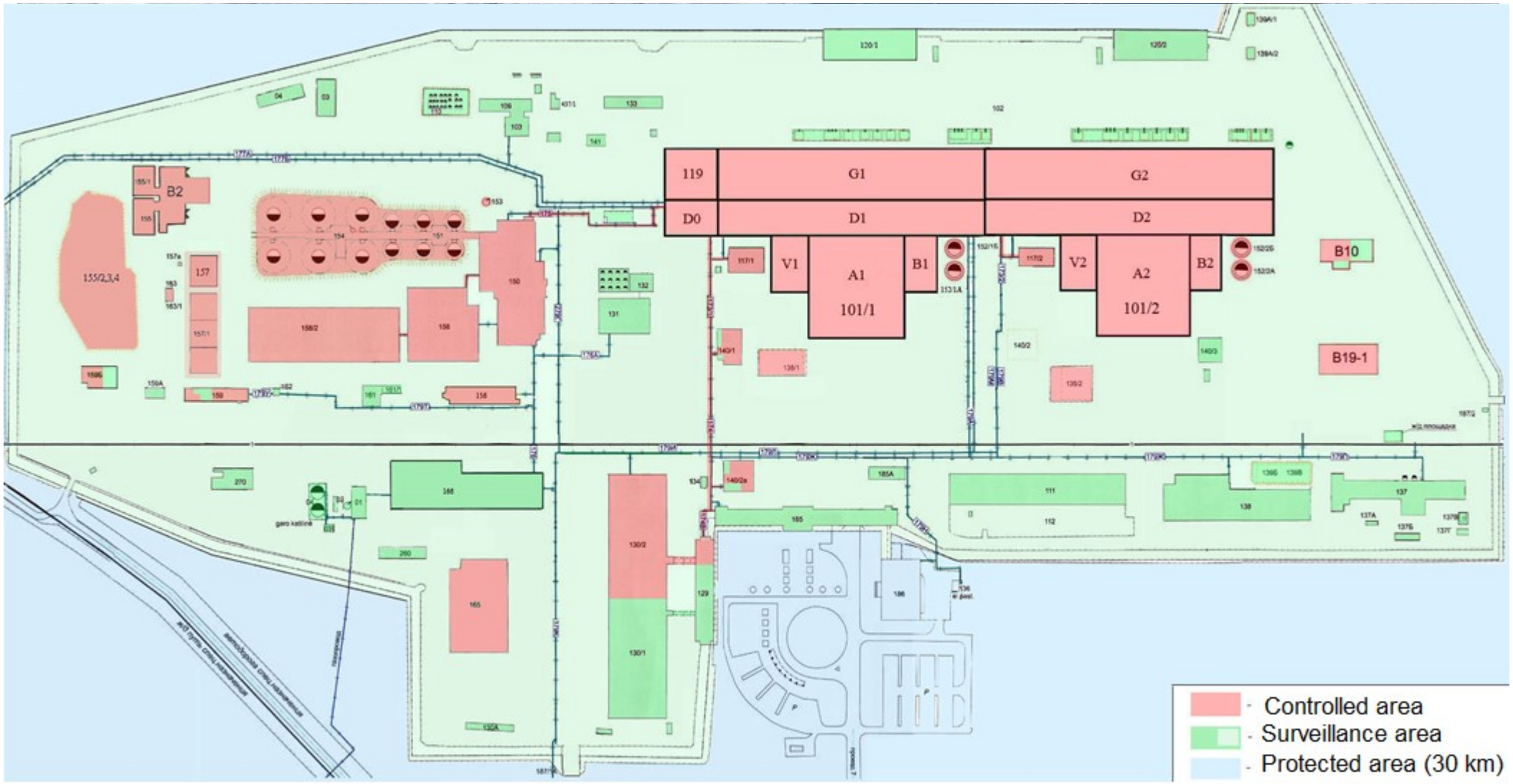
- Difficulties may arise in waste treatment and processing due to the homogeneity amongst metallic waste geometry and material, lack of backup equipment for decontamination, and the presence of difficult-to-remove contamination hot spots in existing materials.

GOOD PRACTICE No. 3

- Ensure that back up equipment are regularly serviced and maintained (sufficient spare parts) and identify other dismantling-waste decontamination capacities / opportunities that may be used to mitigate throughput challenges (debottlenecking).



Waste Storage Areas
Waste Treatment and Processing
Site Selection for Decontamination
Planning and research
Cost reduction
Terms extension


119
G1
G2
D0
D1
D2
V1
A1
101/1
B1
V2
A2
101/2
B2
B10
B19-1
155/2,3,4
Controlled area
Surveillance area
Protected area (30 km)

Consideration of options:

- Main buildings 101/1,2, buildings G1, G2, D1, D2, A1, etc.
- Building 130/2, in the former main workshop.

Buildings 101/1,2

Advantages:

- Organization of decontamination processes near the dismantling areas.
- Minimization of waste movement/transportation outside the main buildings 101/1,2.

Disadvantages:

- High buildings maintenance costs (including heating), high heat losses due to the low energy efficiency of buildings.
- Limited lifetime of buildings (before demolition projects start).
- Space limitation and complexity of organizing transportation routes between sections inside buildings.

Building 130/2

Advantages:

- Relatively low building maintenance costs (including heating).
- Sufficiency of space and good infrastructure adapted for decontamination.
- Centralization of waste management processes.
- Long service life of the building.

Disadvantages:

- Additional operations: packaging and transportation of waste to building 130/2.

It was decided to organize activities for the initial processing/treatment of metal waste in the premises of building 130/2. For that purpose, the equipment and tools for cutting, decontamination, packaging and radiation monitoring were procured by INPP. These equipment and tools are combined into the Complex for Initial Treatment – “Radioactive Metal Waste Treatment Facility” – RMTF.

The advantages of the building 130/2 infrastructure are:

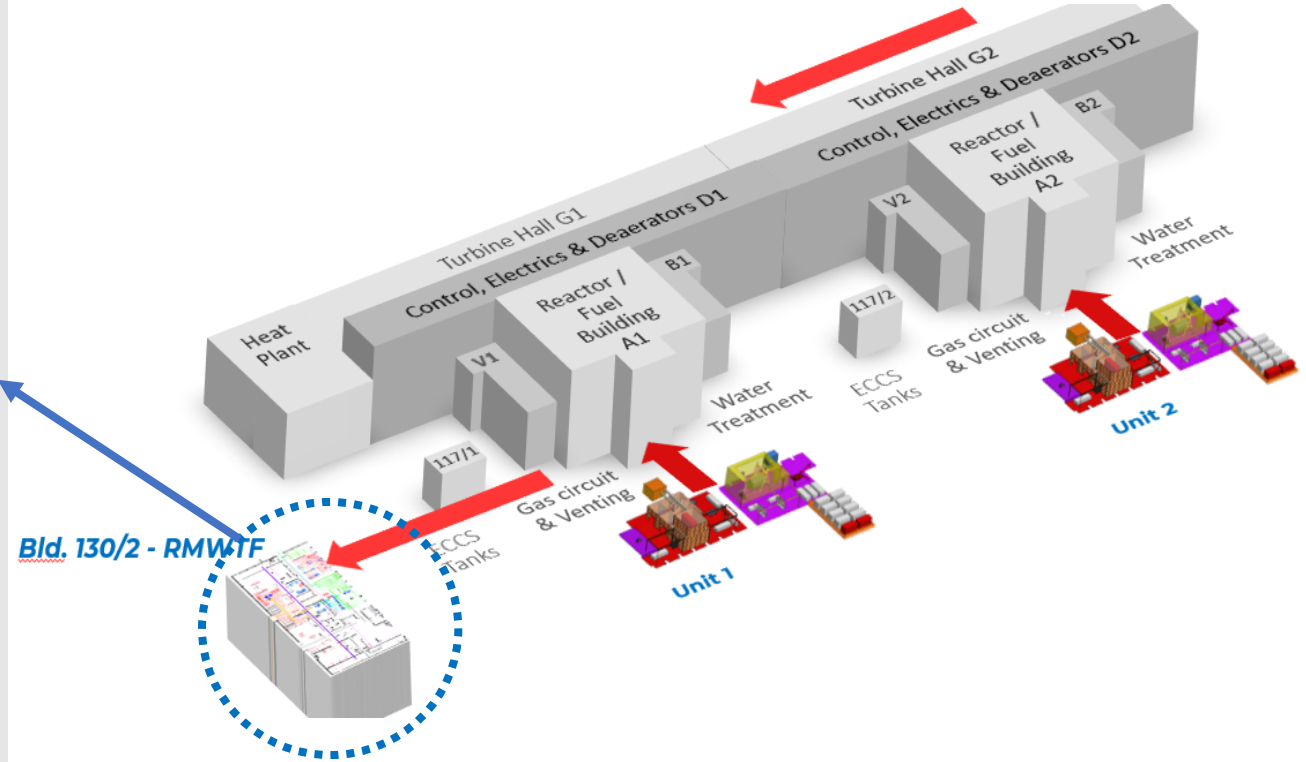
- Zoning: division of premises into different categories based on radiation classification.

- Transport routes to the building and inside the building: level 0.00, presence of gates along the perimeter of the building, high allowable floor load, the presence of rail tracks, bridge cranes of 10 and 57 tons covering the entire area of the building, etc.

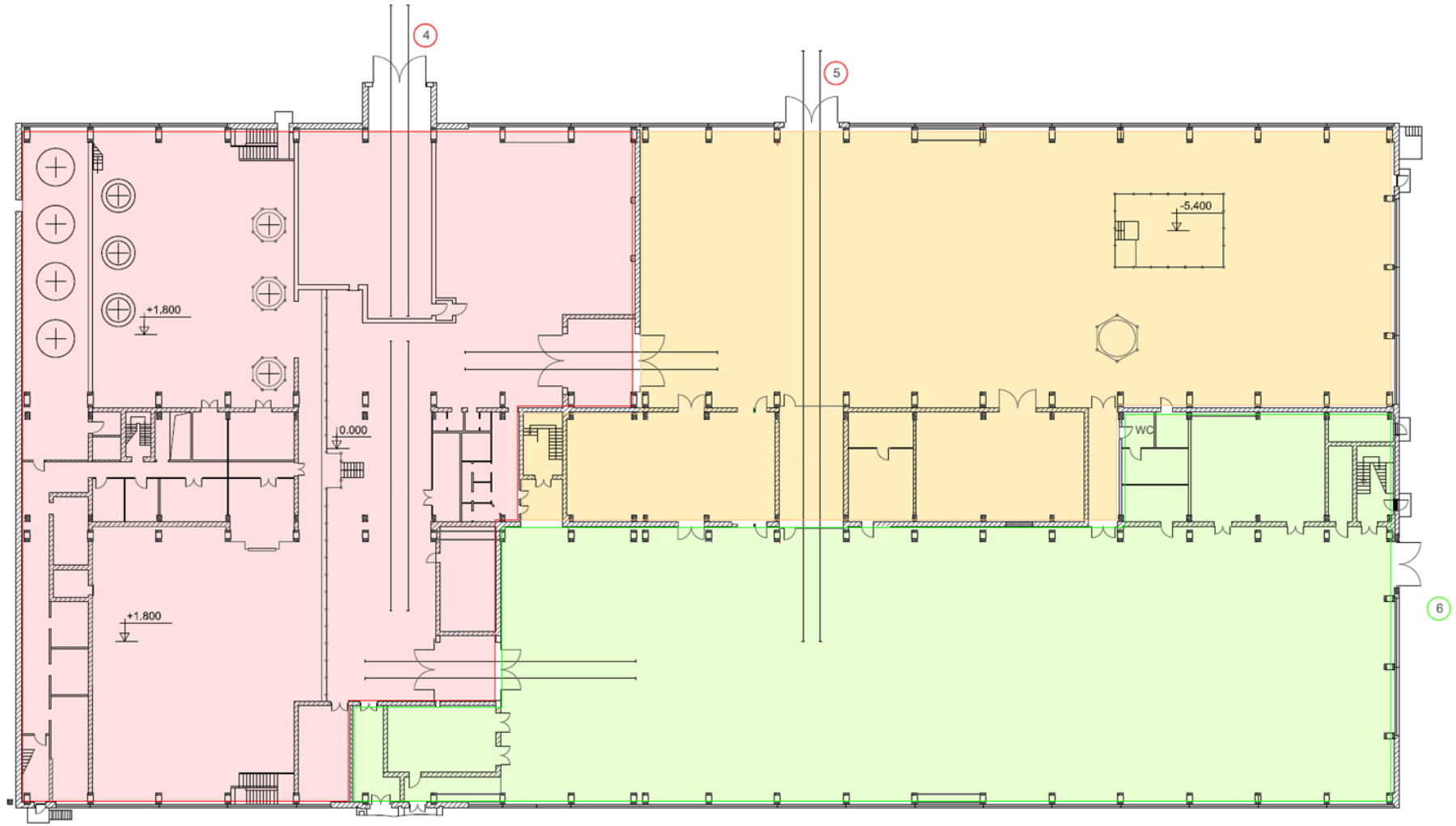
- Engineering systems: power supply, lighting, water supply, heating, special ventilation, communications and fire alarm, sewage, compressed air, etc.

- Staff accommodations, storage rooms, etc;

- Machine tools, hoisting equipment (Q=5.0t, Q=10t, Q=57.0t - 2 cranes), furnaces for thermal treatment of components.



Building 130/2 - Radioactive Metal Waste Treatment Facility.



Layout/space distribution.

Fragmentation/cutting

Decontamination

Packing

Cutting methods:

- hot cutting – plasma cutting, acetylene oxygen cutting.
- cold cutting – band saws, electric hand saws, electric and hydraulic shears, etc.

Decontamination methods:

- physical (mechanical) techniques such as blasting, jetting, wiping, brushing, etc
- ultrasonic techniques
- chemical techniques (CORD concept)

Dismantling waste:

- Material class: carbon steel, stainless steel, non-ferrous metals.
- Level of radioactive contamination: VLLW, LLW, ILW.
- Place of waste generation: block, technological system.
- Contamination nature: weakly fixed/strongly fixed.
- Surface nature: smooth, rough, porous, etc.
- Component type: complex/simple geometric shapes.

The choice of methods and equipment is carried out taking into account:

- International experience: recommendations of foreign consultants, cooperation with colleagues from other countries.
- INPP experience: waste decontamination under dismantling projects, trial decontamination.
- Engineering analysis: feasibility assessment, comparison of the cost of different methods of decontamination with the cost of disposal.
- Opportunities of the existing infrastructure and geography of buildings.

The new line of waste processing arranged in Bldg. 130/2 will provide parallel decontamination of metallic wastes of dismantling from Blocks G2, D1, D2, A1, A2, etc., that will enable INPP:

- to carry out decontamination of metallic wastes of dismantling in due time, including the peaks of their generation (in parallel work of both lines);
- to maintain redundancy of decontamination lines, specifically uninterrupted decontamination process in case of the main equipment failure in one line;
- to unload buffer sites (areas of dismantling wastes temporary storage) in Blocks G1 and G2;
- to clear Block G1 and G2 areas for separate buffer areas for wastes of different classes, from different dismantling facilities, with different nuclide vectors, etc.;
- to have a positive impact on the decontamination works performance schedule and, accordingly, on the whole INPP decommissioning schedule.

In the longer term (outside the scope of this project), it was considered advantageous to plan the transfer of all metallic waste decontamination from Block G1 to Bldg. 130/2 due to the sub-optimal working conditions in Block G1 and the cost of its maintenance and heating. The establishment of a separate radioactive waste processing facility was also supported by international experience and consistent with CPMA’s recommendations on improvement of decontamination processes at INPP.

LESSON LEARNED No. 4

- Before planning a new Project, it is necessary to carry out research and receive recommendations made within the framework of consultations.

GOOD PRACTICE No. 4

- At the stage of implementation of the new radioactive waste processing line, international consultations were held with companies with similar experience. For example, Ignalina NPP has considered the experience of the Greifswald NPP and others before procurement of the necessary equipment for waste treatment.

Waste Storage Areas
Feasibility of the new line
Waste Treatment and Processing
Planning and research
Cost reduction
Terms extension

Benefits of creating a new complex for waste decontamination:

- Promotes more waste for free release;
- Reduces waste disposal cost (Landfill Facility);
- Generating additional revenue;
- Improved fragmentation and decontamination throughput;
- Helps to avoid accumulation of waste in buffer storages;
- Accelerates the completion of the decommissioning process.

CHALLENGES TODAY.
RESPONSIBILITY FOR AGES

IGNALINA
NUCLEAR
POWER PLANT

WORKSHOP
Lessons Learned at INPP in the Project "Installation of Radioactive Metal Waste Treatment Facility"

Project Stage 1: Lessons Learned from Construction

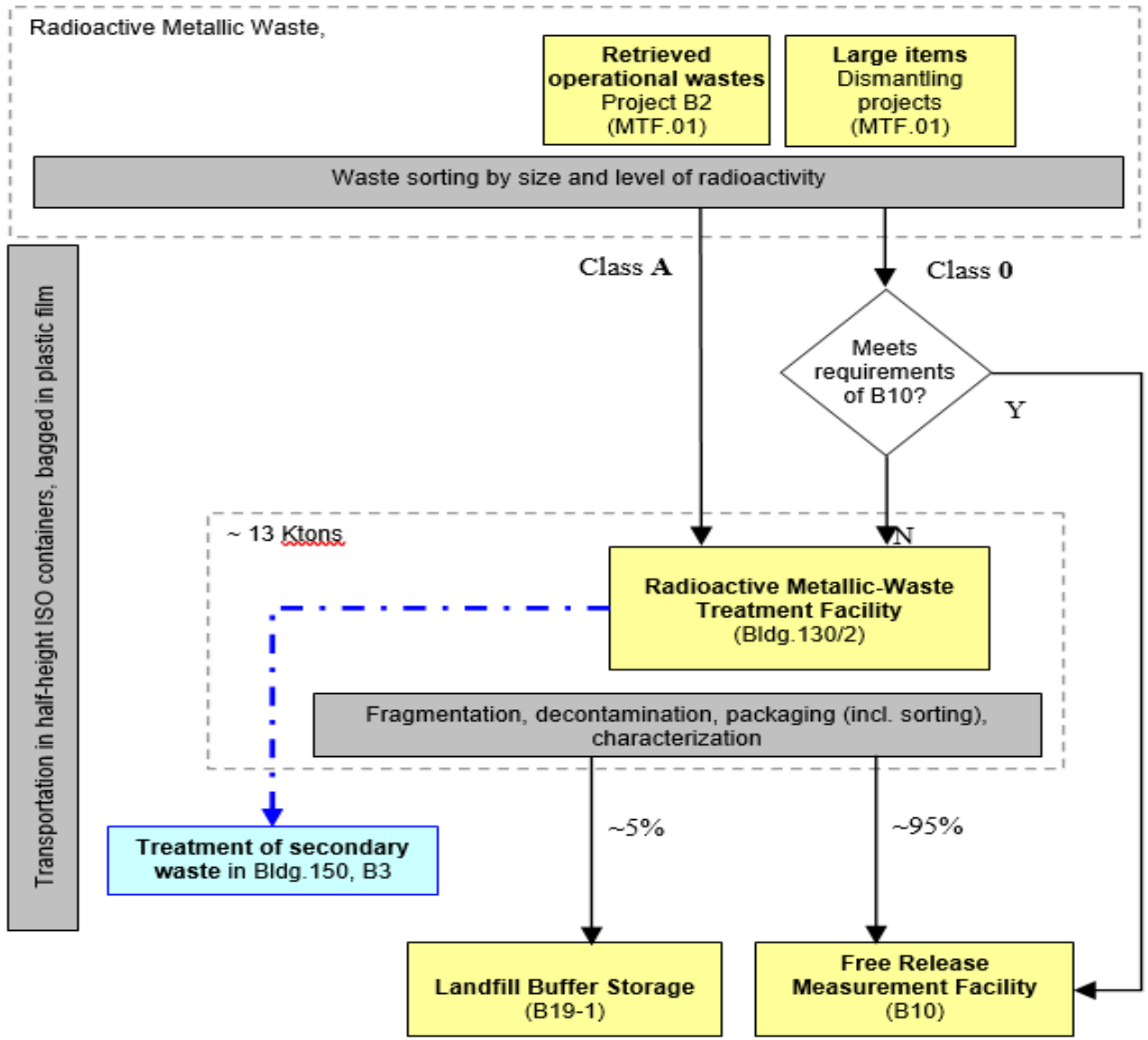
ACCREDITED
MSCB-113

G-CERTi SYSTEM SERVICE
ISO 9001:2015
GKLT-0199-QC

Ignalina NPP decommisioning activities are co-financed by the European Union

Purpose: Establishment of a Radioactive Metal Waste Treatment Facility in the former main workshop (Building 130/2) making use of available equipment and support systems, as well as installation of additional new equipment

Focus: Reconstruction of the building and equipping of RMTF for processing of metal waste extracted from temporary storage facilities under the INPP B2 project and large metal components

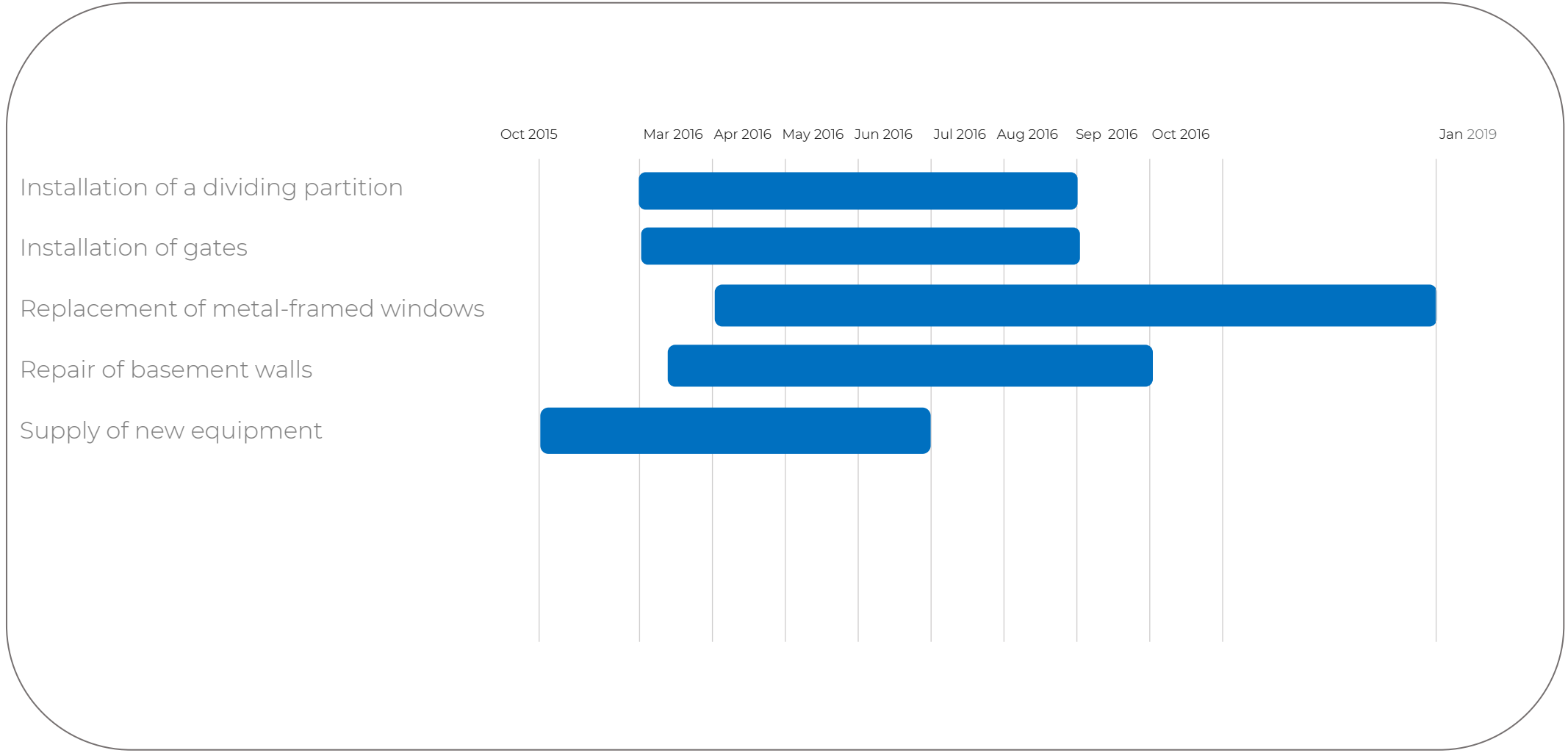


The following tasks were planned under Stage-1, MTF.01:

- Installation of a dividing partition with doors between Rooms 160 and 198 (40 m^2) - 2 pieces;
- Installation of gates between Rooms 160 and 198 - 2 pieces;
- Replacement of metal-framed windows by plastic windows ~2560 m^2;
- Repair of basement walls;
- Supply of new equipment required for the RMTF and training of personnel to work with the mentioned equipment:
    - Arc plasma cutting device -1 piece;
    - Dry shot-blasting machine with vacuum removal and filtration equipment - 2 pieces;
    - Wet decontamination high-head plant (pressure up to 1000 bar) -1 piece;
    - Transfer mechanisms (electric loader) - 2 pieces;
    - Compressor with receiver - 2 pieces;
    - Local filtering installation - 2 pieces;
    - Prefabricated portable tents from fireproof material for use during waste treatment -3 pieces;
    - Mobile device for aerosols measurement - 4 pieces;
    - Hands and feet contamination measurement device - 2 pieces;
    - Surface contamination measurement radiometer - 2 pieces;
    - Dosimeter - 2 pieces.

The activities that were carried out by INPP within the frame of Stage-1, MTF.01:

- Development of the design and engineering documentation for preparatory and auxiliary works;
- Disassembly of existing partitions (160/1, 160/2, 160/4, 160/5) in Bldg. 130/2;
- Re-commissioning of existing equipment required for the RMTF and dismantling of equipment not suitable for re-use;
- Progressive restoration of Building 130/2 systems;
- Commissioning of new equipment for fragmentation, decontamination and radiological measurement following procurement;
- Agreement of documents on modifications.


Oct 2015
Mar 2016
Apr 2016
May 2016
Jun 2016
Jul 2016
Aug 2016
Sep 2016
Oct 2016
Jan 2019
Installation of a dividing partition
Installation of gates
Replacement of metal-framed windows
Repair of basement walls
Supply of new equipment

Zone division #1

Zone division #2

Windows replacement

Walls repair

Supply of new equipment

Description

Installation of a dividing partition with doors between Rooms 160 and 198 (40 m^2) - 2 pieces.

Key decisions

The overall area of Bldg.130/2 is subdivided into two principal rooms: Rooms 160 and 198. It was proposed that the RMTF be divided into clean and contaminated areas for the creation of radiation monitoring zones. To achieve this, two partitions with doors, as well as two gates between Rooms 160 and 198 were installed

Zone division #1

Zone division #2

Windows replacement

Walls repair

Supply of new equipment

Description

Installation of gates between Rooms 160 and 198 - 2 pieces.

Key decisions

The overall area of Bldg.130/2 is subdivided into two principal rooms: Rooms 160 and 198. It was proposed that the RMTF be divided into cleanse and contaminated areas for the creation of radiation monitoring zones. To achieve this, two partitions with doors, as well as two gates between Rooms 160 and 198 were installed

Cost for dividing partition with doors and gates € 14376 (without VAT)

Zone division #1

Zone division #2

Windows replacement

Description

Replacement of metal-framed windows by plastic windows ~2560 m^2.

Key decisions

The replacement of metal-framed windows by double-glazed plastic units is economically justified on the basis of thermal losses. Before the works are undertaken, a justified investment project and technical design was prepared. Since the building is expected to operate until 2031, it is advisable to carry out work to reduce energy consumption. The economic effect of energy saving is 277.888 MW / year, which, considering the current energy prices, is a good saving.

Cost € 221 656 (without VAT)

LESSON LEARNED No. 5

- When analyzing the heat loss of the building, it was found that a large amount of heat escapes through the old windows, which significantly increases the maintenance of the building.

GOOD PRACTICE No. 5

- In buildings that will be used for a long time, it is advisable to carry out measures to improve energy efficiency. This will reduce financial costs when performing work.

Waste Storage Areas
Feasibility of the new line
Waste Treatment and Processing
Planning and research
Cost reduction
Terms extension

Zone division #1

Zone division #2

Windows replacement

Walls repair

Supply of new equipment

Description

Repair of basement walls.

Key decisions

There is a partial basement in the building 130/2 containing technological equipment and supply lines. The surface finish of the basement walls has deteriorated and requires repair to prevent distribution of contamination, including radioactive and chemical in cases of pipe leakage .

Cost € 14424 (without VAT)

Zone division #1

Zone division #2

Windows replacement

Walls repair

Supply of new equipment

Description

Supply and installation of new equipment required for the RMTF and training of personnel to work with the mentioned equipment.

Key decisions

- Arc plasma cutting device - 1 piece;
- Dry shot-blasting machine with vacuum removal and filtration equipment - 2 pieces;
- Wet decontamination high-head plant (pressure up to 1000 bar) - 1 piece
- Transfer mechanisms (electric loader) - 2 pieces;
- Compressor with receiver - 2 pieces;
- Local filtering installation - 2 pieces;
- Prefabricated portable tents from fireproof material for use during waste treatment - 3 pieces.
- Mobile device for aerosols measurement - 4 pieces;
- Hands and feet contamination measurement device - 2 pieces;
- Surface contamination measurement radiometer - 2 pieces;
- Dosimeter - 2 pieces.

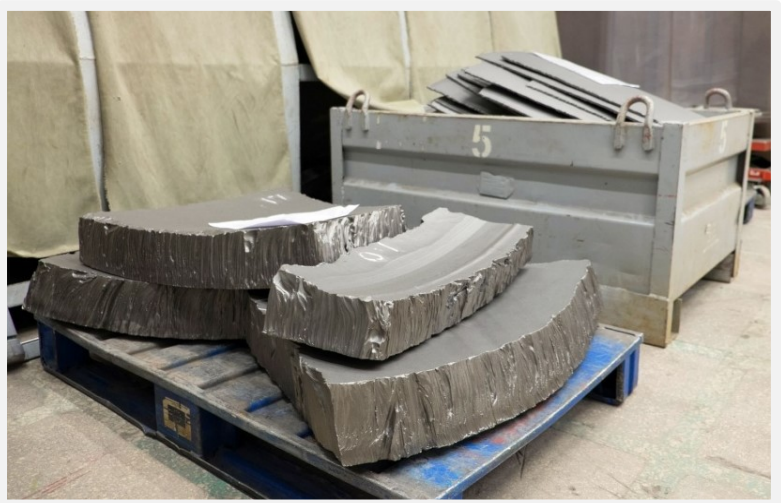
Arc plasma cutting device Cutmaster 40SL 100 - 1 piece

- El. power – 23,6 kW
- Pressure – 4,1÷6,5 bar
- Air consumption – 0,212 m^3/min

Key decision

The plasma cutting has certain advantages, including faster cutting times and lower initial investment and operational costs. Typical materials cut with a plasma torch include steel, stainless steel, aluminum, brass and copper, although other conductive metals may be cut as well. Plasma cutting is an effective way of cutting thin and thick materials alike, up to 200 mm thick.

Cost 6360€ (without VAT and installation cost)



Dry shot-blasting machine with vacuum removal and filtration equipment - 2 pieces:

Dry shot-blasting machine with vacuum removal and filtration equipment DINO JUNIOR II

- El. Power – 5,5 kW
- Pressure – 7 bar
- Air consumption – >2 m^3/min
- Filter efficiency - 99.9%

Key decision

It is a compact and mobile vacuum blasting machine. The machine provides a clean working environment, low shot usage (due to the recycling unit) and low waste disposal costs.

It is used to clean small contaminated areas, remove hot spots and treat blind spots where a roller conveyor shot blasting machine is not effective.

Cost 28665€ (without VAT and installation cost)

Dry shot-blasting machine with vacuum removal and filtration equipment - 2 pieces:

Dry shot-blasting machines with filtration equipment CABILUX PC-CL 433

- El. Power – 18 kW
- Pressure – 7 bar
- Air consumption – 6,2 m^3/min
- Filter efficiency - 99.9%

Key decision

Medium-size blastroom dedicated to surface cleaning of workpieces from a few centimeters to several meters in length.

Highly effective blasting machine used to clean the contaminated areas, remove hot spots and treat blind spots where a roller conveyor shot blasting machine is not effective.

Cost 68000€ (without VAT and installation cost)

Wet decontamination high-head plant (pressure up to 1000 bar) DYNAJET - 1 piece

- Pressure – 1000 bar
- El. power – 30 kW
- Water consumption – 17 l/min

Key decision

This is small, simple to operate, easy to transport and flexible for wet decontamination. It is used to remove poorly fixed contamination from the surface.

Cost 31775€ (without VAT and installation cost)

Transfer mechanisms (electric loader) VENI KM.AC 1200/2.0 - 2 pieces

- Load capacity - 1200 kg
- Lifting height - 1910 mm
- Battery - 300 Ah

Key decision

Transfer mechanisms are highly maneuverable and easy to control – ideal for containers and metal fragments handling.

Cost 13782€ (without VAT and installation cost)

Compressor with receiver OSC60 OZEN - 2 pieces

- Power - 45 kW
- Max. pressure - 15 bar
- Capacity - 6.7 m^3/min

Key decision

Initially, the compressors were used to support the shot blasting machines, but during Stage-2, an additional compressor was purchased and two of the three were used in the modification of the compressed air system of building 130/2. Today, the building has a redundant compressed air system.

Cost 21154€ (without VAT and installation cost)

Local filtering installation AirBravo DK223 - 2 pieces

- Power - 4.1 kW
- Working pressure - 5÷7 bar
- Capacity - 2200 m³/hour
- Degree of purification - HEPA H13, filter efficiency - 99.95%

Key decision

Filtering installation for the local exhaust ventilation and filtration of dust and smoke generated from processing of waste. The device is mobile, it can be used anywhere in the building 130/2, depending on the need. According to the requirements, the release of purified air is into the central ventilation system.

Cost 22330€ (without VAT and installation cost)

Prefabricated portable tents from fireproof material for use during waste treatment - 3 pieces

Electric and pneumatic grinders – 4 pieces.

Key decision

Indoors, in separate tents, mechanical decontamination points are organized using angle grinders and a dry shot-blasting machine DINO JUNIOR II.

The KEMPER filtering unit provides both local air extraction directly from the tents, and air extraction from the general volume of the room.

Cost 7500€ (without VAT and installation cost)

Radiation monitoring equipment:

- Mobile device for aerosols measurement - 4 pieces
- Hands and feet contamination measurement device - 2 pieces
- Surface contamination measurement radiometer - 2 pieces
- Dosimeter - 2 pieces

Key decision

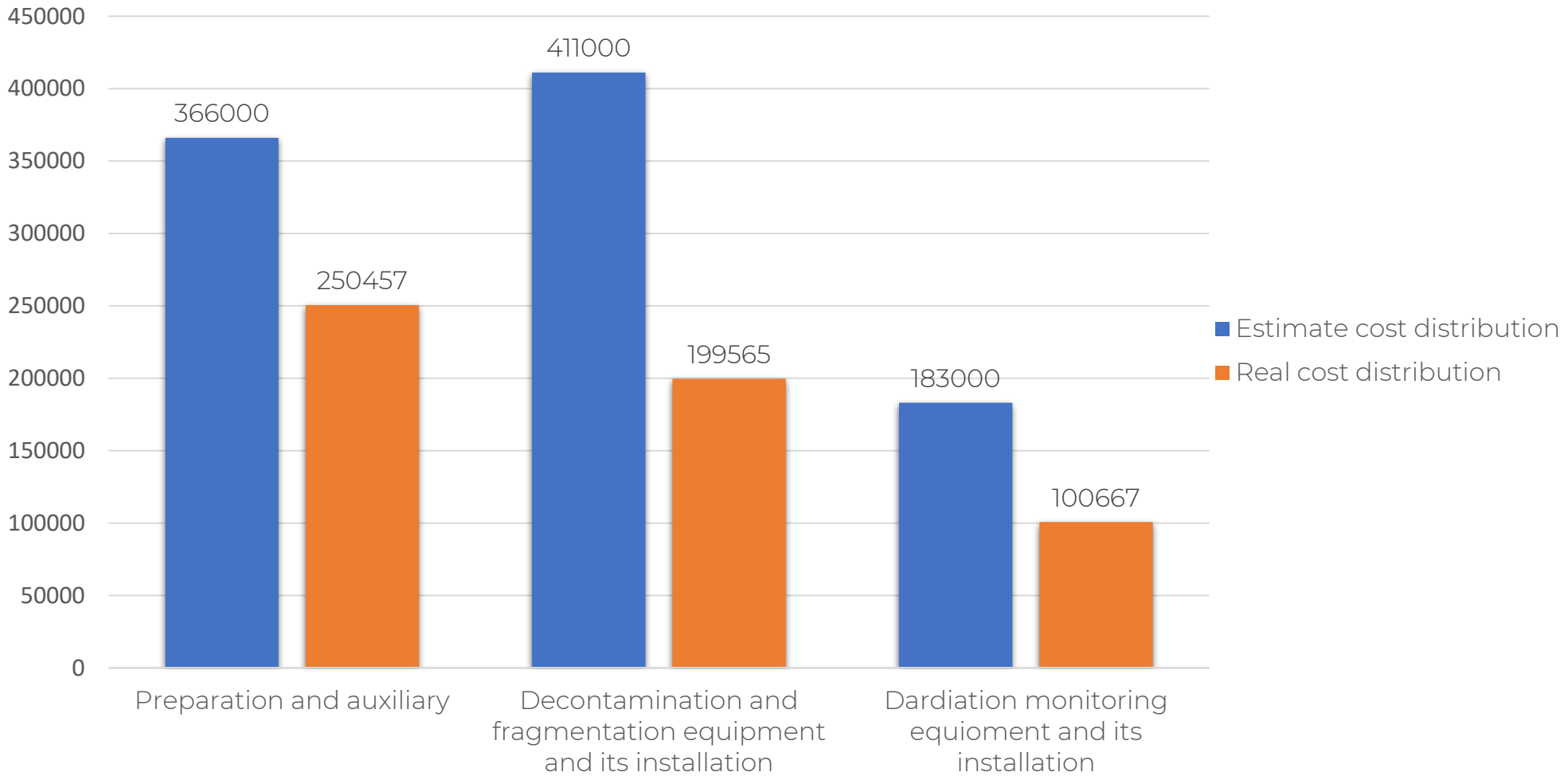
To monitor the contamination of the surface of the skin and clothing of workers, there are “Hands and Feet” monitoring devices in building 130/2. The control of radioactive aerosols in the workplace is carried out using portable devices and mobile measuring installations.

Cost 100667€ (without VAT and installation cost)

The indicative costs as per MTF.01 and the actual costs at projects completion are presented in the table below:

Cost Item	Estimated cost, EUR	Actual cost, EUR
1. Preparatory and auxiliary works in Bldg.130/2	366000,00	250457,61
- Renovation of walls in basement of Bldg. 130/2 - Installation of gates between Rooms 160 and 198 (2 pieces) - Installation of partition with doors (2 pieces) between Rooms 160 and 198 (40 m2) - Replacement of metal-framed windows by plastic-framed windows (2560 m2) (subject to justification and technical design)		
2. Decontamination and fragmentation equipment and its installation	411000,00	199565,53
- Arc plasma cutting device -1 piece; - Dry shot-blasting machine with vacuum removal and filtration equipment - 2 pieces; - Wet decontamination high-head plant (pressure up to 1000 bar) -1 piece - Transfer mechanisms (electric loader) - 2 pieces; - Compressor - 2 pieces; - Local filtering installations - 2 pieces; - Prefabricated portable tents from fireproof material for use during waste treatment -3 pieces.		
3. Radiation monitoring equipment and its installation	183000,00	100666,76
- Mobile device for aerosols measurement - 4 pieces; - Hands and feet contamination measurement device - 2 pieces; - Surface contamination measurement radiometer - 2 pieces; - Dosimeter - 2 pieces.		
TOTAL	**960000,00**	**550689,90**

CHART SHOWING ESTIMATED COST DISTRIBUTION WITHIN ACTIVITIES VS REAL COST DISTRIBUTION FOR STAGE 1, EURO



LESSON LEARNED No. 6

- Procurement of equipment, works and services takes a significant amount of time during project implementation. If, within tender evaluation process, **the planned budget turns out to be less than the budgets of submitted proposals, this entails an increase in the project implementation** time due to the need to organize re-tender.

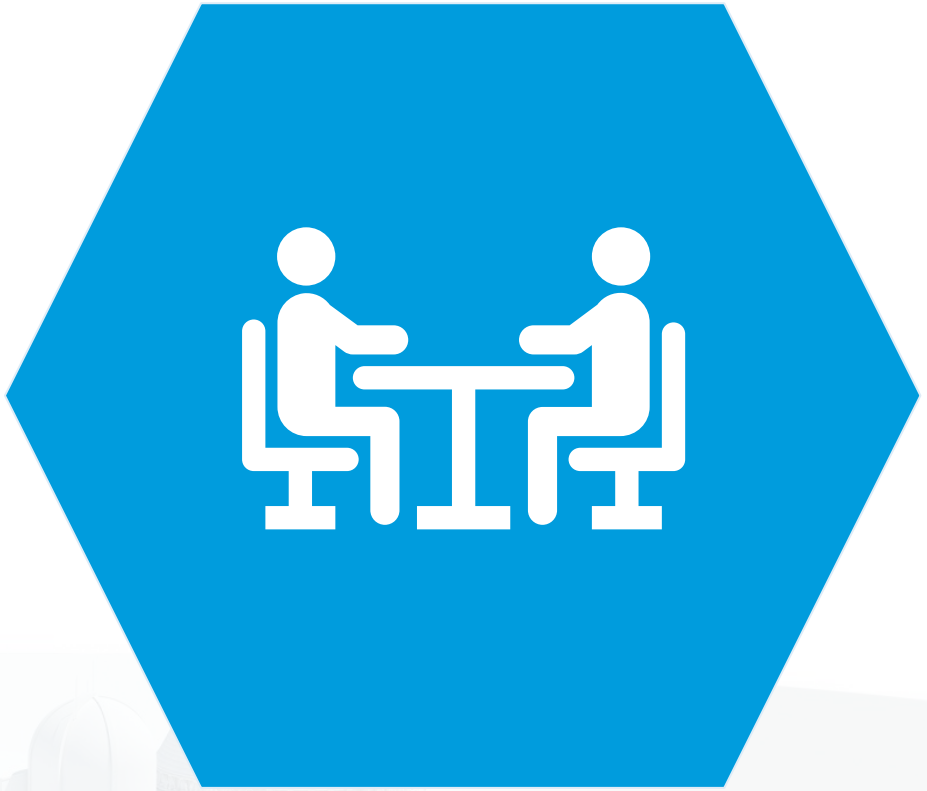
GOOD PRACTICE No. 6

- When planning the budget for the procurement of equipment, works or services, at the stage of market research and requesting prices from potential suppliers, it is necessary to plan **additional funds (15% -20%) in the final estimate**. This will reduce the risks of repeating the procurement procedure with an insufficient budget.

Waste Storage Areas
Feasibility of the new line
Waste Treatment and Processing
Planning and research
Cost reduction
Terms extension

- **Problem 1:** According to the contract, the contractor had to complete all the work by the end of August 2018, but in fact, the window replacement work was delayed until November, and further work on the exterior finish was suspended until the beginning of April 2019 to avoid technology violations due to the winter period. The work was completed in May 2019.
- **Causes:** The reason for the late completion of the work was: insufficient number of qualified contractor personnel, insufficient number of required equipment and poor organizational and administrative management.
- **Solution:** During the entire period of the contract, control over the implementation of the work schedule and control over the compliance of the work with the requirements of the construction project was tightened, daily meetings were held with the contractor at the construction site. In order to accelerate the pace of work, the INPP ordered the contractor to provide the construction site with additional human resources and equipment.
- **Lesson Learned 1:** When planning work, it is necessary to take into account the seasonality of work, and in case of a delay in the deadline, their implementation may be delayed which will negatively affect the duration of the project.
- **Lesson Learned 2:** If there are prerequisites for the fact that the execution of work may delay, it is necessary to strengthen control over the work.

- **Problem 2.** According to the contract, the contractor was to supply equipment and additional spare parts. After installation and commissioning of equipment, it turned out that additional spare parts were not delivered in full. The repeated order from the manufacturer of the missing parts and spare parts did not allow the contractor to fulfill its obligations under the contract in time.
- **Solution**: The delay of spare parts was not a significant problem, as the contractor completed the installation and assaying of the equipment in a timely manner.
- **Lesson learned**: When planning project risks, consider that spare parts and materials may not be delivered in full.



Q&A / DISCUSSION / ROUNDTABLE

CHALLENGES TODAY.
RESPONSIBILITY FOR AGES

IGNALINA
NUCLEAR
POWER PLANT

WORKSHOP
Lessons Learned at INPP in the Project "Installation of Radioactive Metal Waste Treatment Facility"

Project Stage 2: Extension and Upgrades

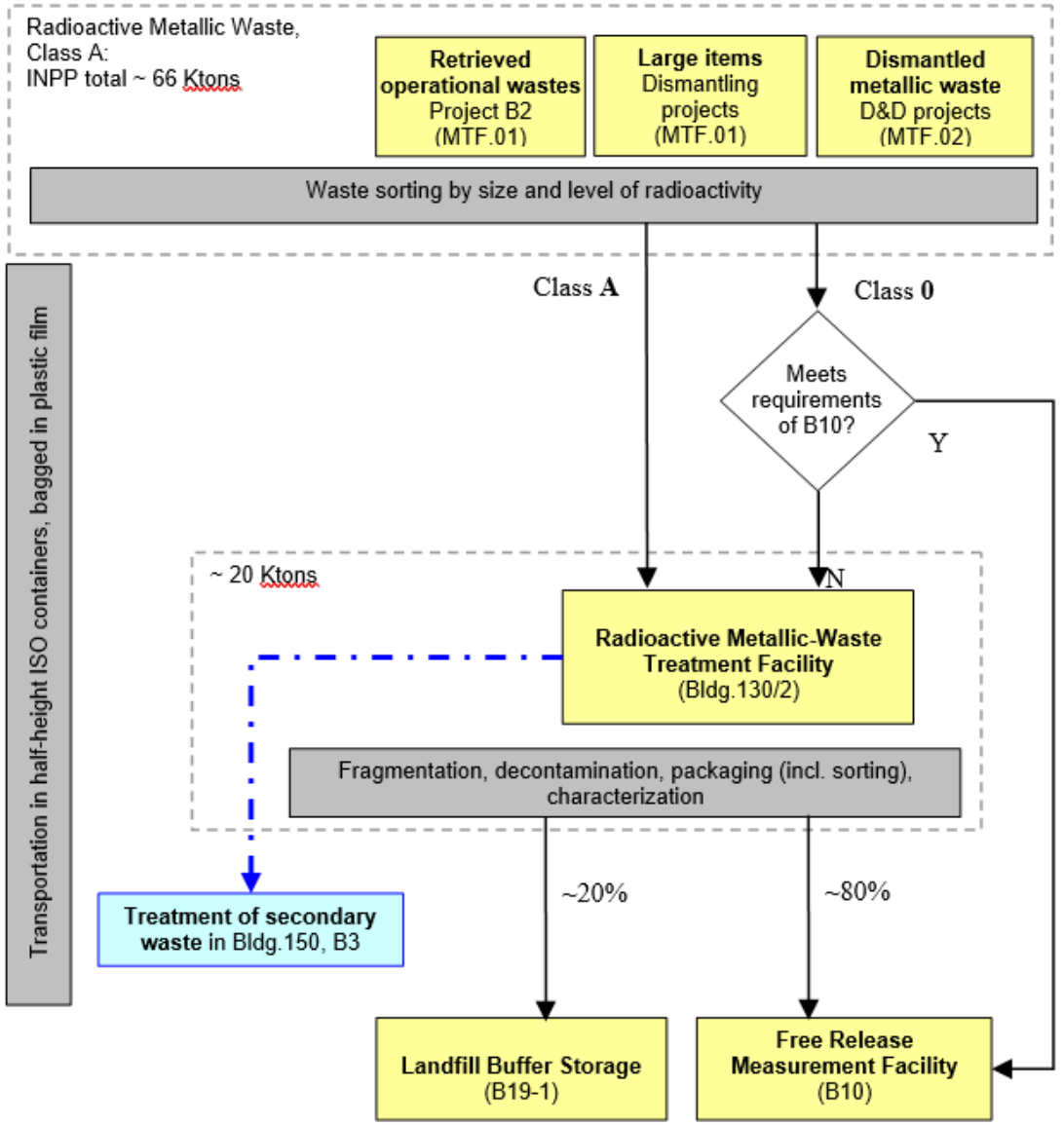
ACCREDITED
MSCB-113

G-CERTi SYSTEM SERVICE
ISO 9001:2015
GKLT-0199-QC

Ignalina NPP decommisioning activities are co-financed by the European Union

Purpose: Create additional capacities in the RMTF in order to increase decontamination throughput and ensure timely treatment of metallic waste coming from other Buildings.

Focus: Procured tools and equipment will increase the RMTF throughput from 5 t up to 6 tons per shift. At the RMTF, the received wastes will be further sorted according to required treatment method, fragmented, decontaminated and their residual activity measured. It is intended that approximately 80% of radioactive wastes passing through the RMTF will be suitable for free release.



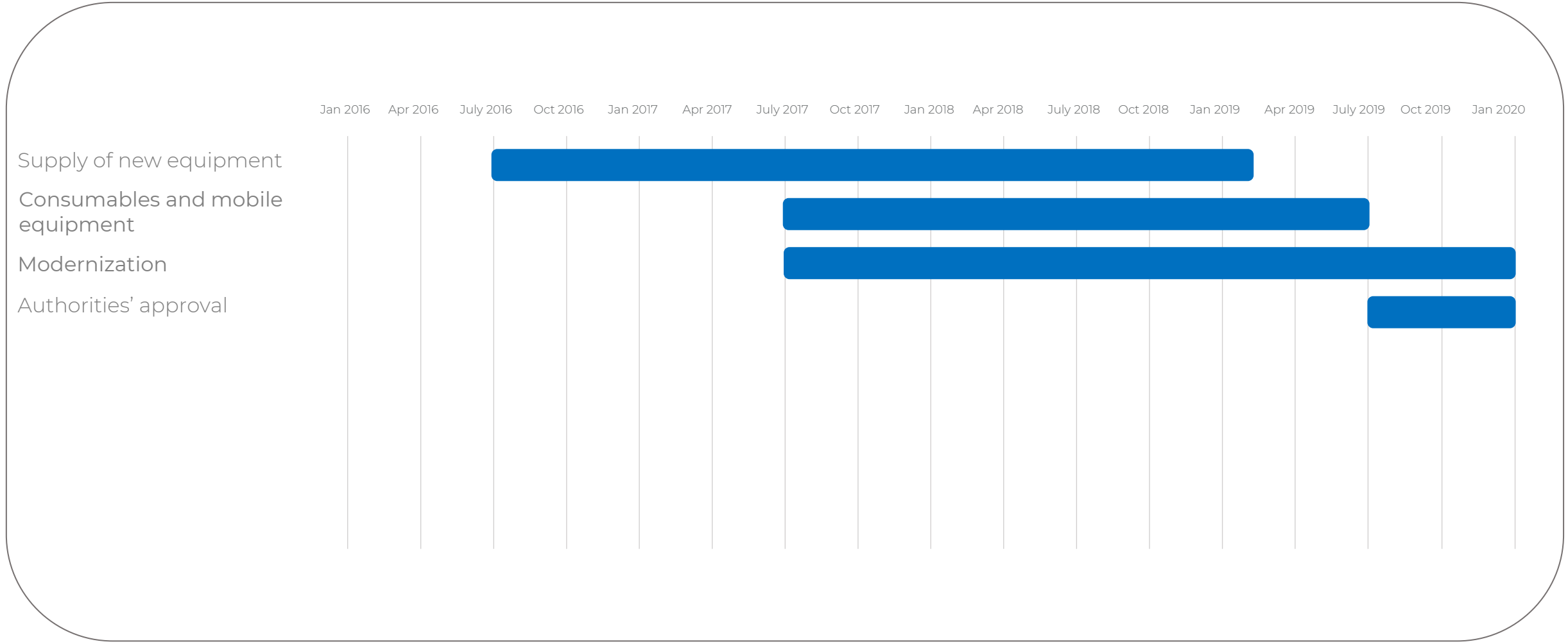
The following tasks were planned under Stage-2, MTF.02:

- Supply of new equipment required for the RMTF and training of personnel to work with the mentioned equipment:
  - Through-type shot blasting facility with roller conveyer having the capability of processing the waste 1000÷1200 mm in width and 400÷600 mm in height - 1 piece;
  - An air compressor with a receiver to support the shot blasting facility and other tools - 1 piece;
  - Cranes/hosting devices with carrying capacity 0.5÷1 t - 2 pieces;
  - Hook-conveyor shot-blasting machine with T-track, Y-track, or O-track rail - 1 piece;
  - High-pressure water-jet facility (2500÷3000 bar) - 1 piece;
  - Band saw with cutting capability of up to 1.2 m - 2 pieces;
  - Forklift loader (electric truck) with carrying capacity 1.6 t - 2 pieces.

The following tasks were planned under Stage-2, MTF.02:

- Supply of new equipment required for the RMTF (consumables and mobile equipment) that are not funded under MTF.02 but required in the frame of Stage-2:
  - Radiological monitoring equipment for: dose rate measurement (3 off), surface contamination measurement (3 off), and hand/foot contamination monitoring (3 off);
  - Overalls for safe water-jet facility operation: boots, trousers, jacket, protective helmet with forced air supply for work at facility 2500÷3000 bar, apron, foot protection, hand protection, half masks with filtering devices (8 sets);
  - Shot for shot-blasting.
- Activities/procurements which are not funded under MTF.02 but required in the frame of Stage-2:
  - Preparation to tender (investigation of market, analysis of suppliers, development of technical specification, etc.);
  - Commissioning of new equipment for fragmentation, decontamination and radiological measurement following procurement;
  - Development of supporting documentation required to confirm that the upgraded facility meets all regulatory requirements.

Construction > Stage-2 Main activities (under construction)



Supply of new equipment

Consumables and mobile equipment

Modernization

Authorities’ approval

Description

Supply of new equipment required for the RMTF and training of personnel to work with the mentioned equipment.

Key decisions

- Through-type shot blasting facility with roller conveyer having the capability of processing the waste 1000÷1200 mm in width and 400÷600 mm in height - 1 piece;
- An air compressor with a receiver to support the shot blasting facility and other tools - 1 piece;
- Cranes/hosting devices with carrying capacity 0.5÷1 t - 2 pieces;
- Hook-conveyor shot-blasting machine with T-track, Y-track, or O-track rail - 1 piece;
- High-pressure water-jet facility (2500÷3000 bar) - 1 piece;
- Band saw with cutting capability of up to 1.2 m - 2 pieces;
- Forklift loader (electric truck) with carrying capacity 1.6 t - 2 pieces.

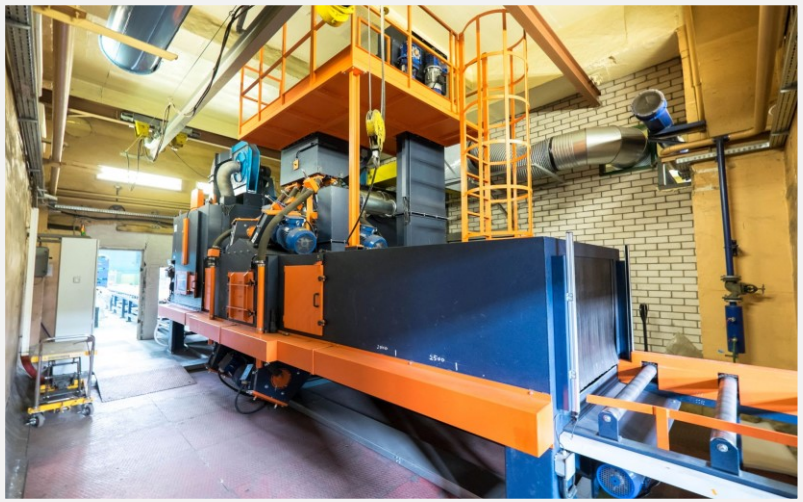
Through-type shot blasting facility with roller conveyer BV S.R.L. DR 10x7-8TR - 1 piece

- Capacity – > 4 m^2/min
- Turbines quantity – 8 pieces
- El. power – 112 kW
- Compressed air consumption - 10 ÷ 24 m^3 / hour
- Fan capacity – 13000 m^3/h, degree of purification - HEPA H13, efficiency - more than 99.95%

Key decision

According to operation experience at Block G-1, the shot blasting facility is the most effective tool for metallic waste decontamination. This is due to the high efficiency (4-5 t per shift) of the facility and comparatively low cost of decontamination (the procurement included 10 tons of shot for commissioning purposes)

Cost 287626€ (without VAT and installation cost)



Air compressor with two receivers Vortex ERS45DD - 1 piece

- Power - 45 kW
- Max. pressure - 10 bar
- Capacity - 6.8 m^3/min

Key decision

An air compressor with a receiver to support the shot blasting facility and other tools.

Cost 14244€ (without VAT and installation cost)

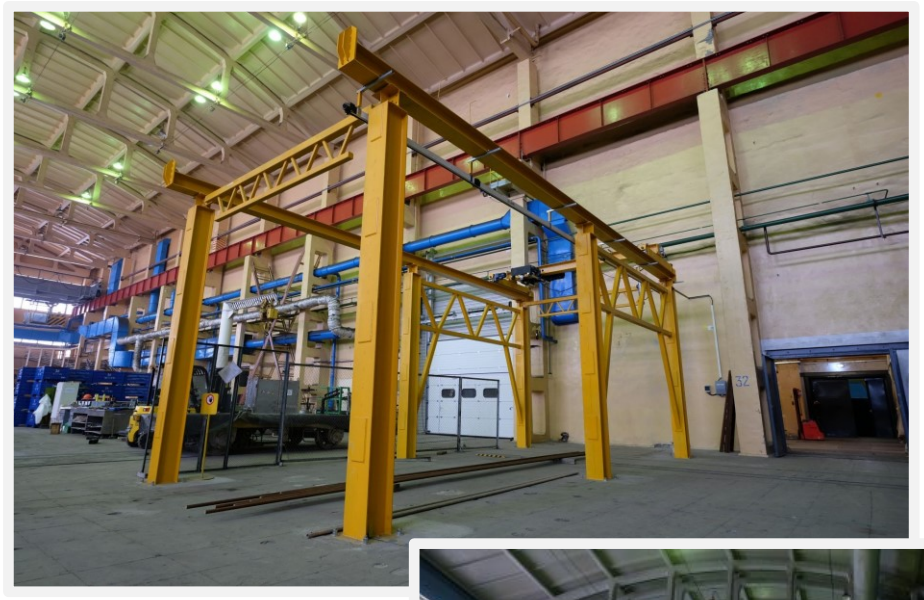
Cranes/hosting devices TAV1250/4/5 and TAV1250/8/5 - 2 pieces

- Load capacity – 1,25 tons
- Lifting height – 4,2 m
- TAV1250/4/5 Length – 10 m, Width – 4 m
- TAV1250/8/5 Length – 10 m, Width – 8 m

Key decision

Cranes/hosting devices are required for delivery of the wastes being decontaminated on the conveyer at the entrance to the shot blasting cell and their withdrawal from the conveyer at the exit from the shot blasting cell.

Cost 35380€ (without VAT and installation cost)



Hook-conveyor shot-blasting machine with Y-track BV S.R.L. H-11x17 2TR - 1 piece

- Capacity – > 10 m^2/h
- Turbines quantity – 2 pieces
- El. power – 45 kW
- Compressed air consumption - 5 ÷ 8 m^3/h
- Fan capacity – 8000 m^3/h, degree of purification - HEPA H13, efficiency - more than 99.95%

Key decision

In the machine, the metallic elements to be shot-blasted are hung on a rotary hook. During the shot-blasting operation, the hook is turning and moving while the abrasive is blasted sideways at different angles. The hook-conveyor machine will be used for treatment of waste with complex shapes that are not suitable for a shot blasting facility with the roller-conveyer machine.

Cost 145945€ (without VAT and installation cost)

High-pressure water-jet facility Hamelmann HDP 124 – 1 piece

- Pressure – 2800 bar
- El. power – 75 kW
- Water consumption – 12 l/min

Key decision

According to operational experience at Block G1, a high-pressure water-jet facility is an effective tool for dust-free decontamination of metallic waste with poorly fixed (easily removed) radioactive contamination. The water-jet facility is also applied in a combination of decontamination methods, for example, during preparation of waste for the further decontamination in the shot blasting facility enabling most effective initial processing and reduction of secondary waste amount.

Cost 81435€ (without VAT and installation cost)

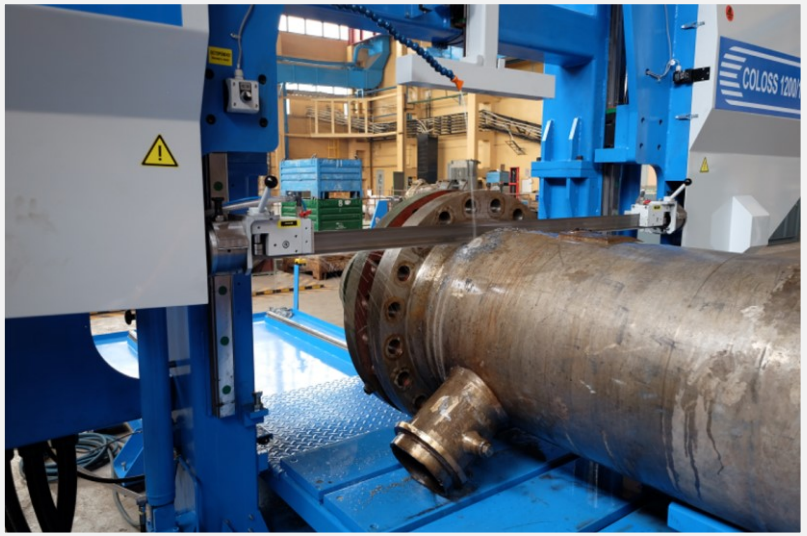
Band saw Siloma Coloss 1200/1200 HP – 2 pieces

- El. power– 11 kW.
- Cutting capability – Ø200мм÷1200мм.
- Work piece length – <3000 m

Key decision

Band saws are an effective tool for cold, dust-free cutting of metal. It is supposed that two facilities will be sufficient for all metal waste from building 101/1,2.

Cost 275170€ (without VAT and installation cost)



Forklift loader (electric truck) EV 698.30.242 S – 2 pieces

- Load capacity - 1600 kg
- Lifting height - 3000 mm
- Battery - 600 Ah

Key decision

Forklift loaders (electric trucks) will enable effective waste transfer along the new transportation routes generated in Bldg.130/2. Since the radioactive waste stream and already decontaminated waste stream are separated (in different rooms), it is assumed that two forklifts will be enough to cover both transportation routes.

Cost 29978€ (without VAT)

Supply of new equipment

Consumables and mobile equipment

Modernization

Authorities’ approval

Description

Procurement of consumables and mobile equipment (radiological monitoring equipment, overalls for safe water-jet facility operation, shot for shot-blasting, containers, extraction systems, platform scales, vacuum cleaners, lead mats, etc.) that may be used elsewhere in INPP decommissioning were conducted out MTF.02.

Containers - 200 pieces

- External length – 1200 mm ±2 mm
- External height – 620 mm ±2 mm
- External width – 830 mm ±2 mm
- Carrying capacity - >1000 kg

Key decision

Containers have been purchased to ensure transportation processes inside building 130/2.

The dimensions and load capacity of the containers are selected considering the existing INPP experience in order to carry out the efficient transportation of metal waste segments.

To avoid mixing of waste, the containers are labeled depending on the class of transported waste.

Cost 39600€ (without VAT)

Welding smoke extraction system KEMPER 811000100 and 811300120 – 2 pieces

KEMPER 811000100

- Power - 7.5 kW
- Working pressure - 2500 Pa
- Capacity - 10000 m^3/hour
- Filter efficiency - >99.99%

KEMPER 811300120

- Power - 11 kW
- Working pressure - 2500 Pa
- Capacity - 13000 m^3/hour
- Filter efficiency - >99.99%

Key decision

The welding smoke/fume extraction system are equipped with filter cartridges and are suitable for setting up central extraction systems. System is ideally suited for factory buildings and welding shops with high levels of smoke and dust, for example, for welding shops, grinding shops, training facilities, robot lines, etc. These systems provide air filtration in the RMTF VLLW mechanical decontamination area and VLLW thermal cutting area.

Cost Out of project budget, since the equipment was transferred from another project after being used. The installation cost is not considered.

Platform scales – 1 piece

- Weight limit – 3000kg
- Dimensions of the platform: length – 1500mm, width – 1500mm

Key decision

In order to ensure the packaging process with an effective measuring tool for weighing containers with waste or separate elements, as well as in order to reduce electricity consumption associated with weighing using a crane, it was decided to purchase and install in the room. 198 building 130/2 platform scales with a loading capacity of 3 t.

Cost 1700 Euro (without VAT and installation cost)

Screw-cutting machine 1H65 – 2 pieces

- El. power– 23 kW.
- Cutting capability – 2 m² per shift
- Maximum length of a pipeline fragment – 0,6m

Key decision

The use of turning machine is reasonable in cases of contamination of surfaces with a deep level of penetration, for example, into cracks, pores, etc. To decontaminate fragments of pipelines of the live steam system, a mechanical decontamination area (with a screw-turning machine) was organized.

Cost Not applicable, since the area was fully covered by INPP existing tools. The installation cost is not considered.

Supply of new equipment

Consumables and mobile equipment

Modernization

Authorities’ approval

Description

The modernization of engineering networks and building structures was also carried out the modernization of lighting, the modernization of the compressed air system, the modernization of the electrical network, the modernization of ventilation systems, modification of lifting mechanisms, update of emergency exits, etc.

The implementation of modernizations, modifications, updates was carried out during the entire lifetime of Stage-2 until the end of 2019.

Compressor with receiver OSC60 OZEN - 2 pieces

- Power - 45 kW
- Max. pressure - 15 bar
- Capacity - 6.7 m^3/min

Key decision

Initially, the compressors were used to support the shot blasting machines, but during the second stage, an additional compressor was purchased and two of the three were used in the modification of the compressed air system of building 130/2. Today, the building has a redundant compressed air system.

Cost 21154€ (without VAT and installation cost)

JJO0

Key decision

A replacement of the main lighting lamps (400W and 700W) with new economical ones (LED lamps 150W) was carried out. Replacement of lamps in certain areas of rooms 160 and 198 of building 130/2 (totaling 160 pieces) with LED lamps of lower power, but with similar parameters, ensured compliance with design requirements and safety standards for illumination at workplaces. Replacement of lamps was carried out with saving the existing design scheme, incl. cable lines and mounting points (lamp holders).

Main lighting ROOMLUX B60750-150W – 160 lamps

- Power – 150W
- Rated luminous efficacy – 18000lm

Cost 23760 Euro (without VAT and installation cost)

JJO0

LESSON LEARNED No. 7

- Reducing energy consumption plays an important role in the financial stability of the enterprise. When implementing the project, it is necessary to evaluate all available opportunities to reduce electricity consumption. Since 400-700 watt lamps were used for the main lighting of bld. 130/2, it was observed that it would be possible to reduce electricity consumption between two to three times using modern LED technologies.

GOOD PRACTICE No. 7

JJO1

- In order to reduce the cost of energy consumption and maintenance of lighting, as well as to improve the reliability of lighting, all ceiling lamps were replaced with modern 150 watt LED lamps. According to the calculations performed during the operation of the complex, this will save approximately 3,800 megawatts.

Waste Storage Areas
Feasibility of the new line
Waste Treatment and Processing
Planning and research
Cost reduction
Terms extension

Air filter cassette – 100 pieces

- Cleaning class according to EN779 – F5(M5)
- Rated airflow – 1440$m^3/h/m^2$
- Dust capacity - >300g/m^2

Key decision

To increase the service life of the existing fine filters of the central ventilation system ВЦ-1, a preliminary coarse air filter (first stage) was installed in the inlet collector of filtering station.

Cost 2180 Euro (without VAT and installation cost)

LESSON LEARNED No. 8

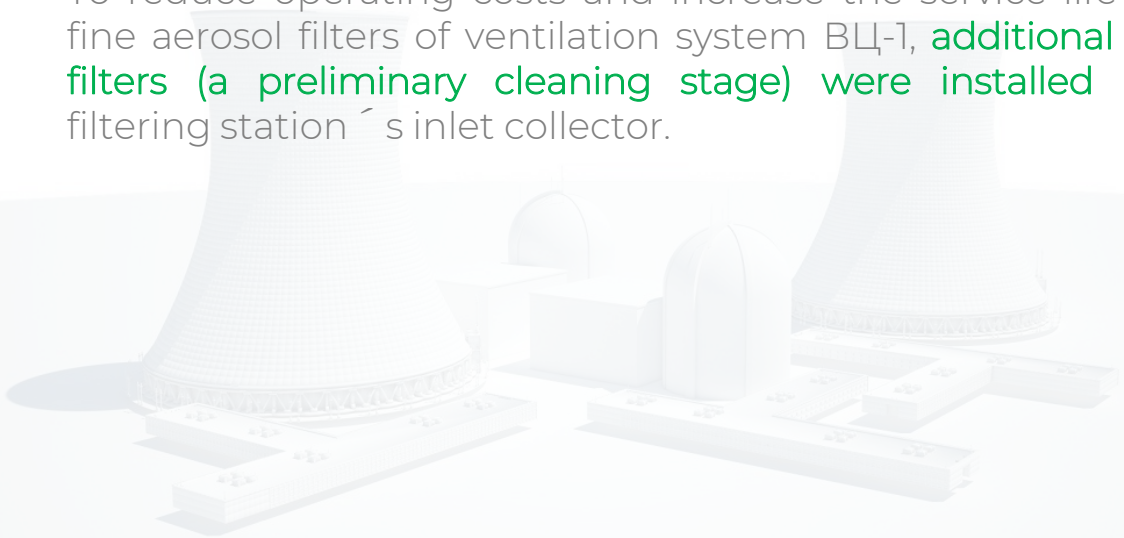
JJO1

- Intensive work, associated with a large release of gases, soot, dust, etc. was carried out in building 130/2. However, the building´s central special filtering station ВЦ-1 (with filters Д-23) is designed for fine and ultra-fine cleaning, with an efficiency of up to 99.9%. Therefore, the concern was raised that the filter elements could fail under the stress of larger particles.

JJO0

GOOD PRACTICE No. 8

- To reduce operating costs and increase the service life of the fine aerosol filters of ventilation system ВЦ-1, additional coarse filters (a preliminary cleaning stage) were installed in the filtering station´s inlet collector.



Waste Storage Areas

Feasibility of the new line

Waste Treatment and Processing

Planning and research

Cost reduction

Terms extension

Emergency exits doors – 7 pieces

Key decision

Emergency exits are organized in the outer walls of the building 130/2 - 7 doors. In order to ensure fire safety requirements, the wooden doors of emergency exits were replaced with metal ones.

Doors replacing also had a positive effect on heat savings

Cost 1692 € (without VAT and installation cost)

Supply of new equipment

Consumables and mobile equipment

Modernization

Authorities’ approval

Description

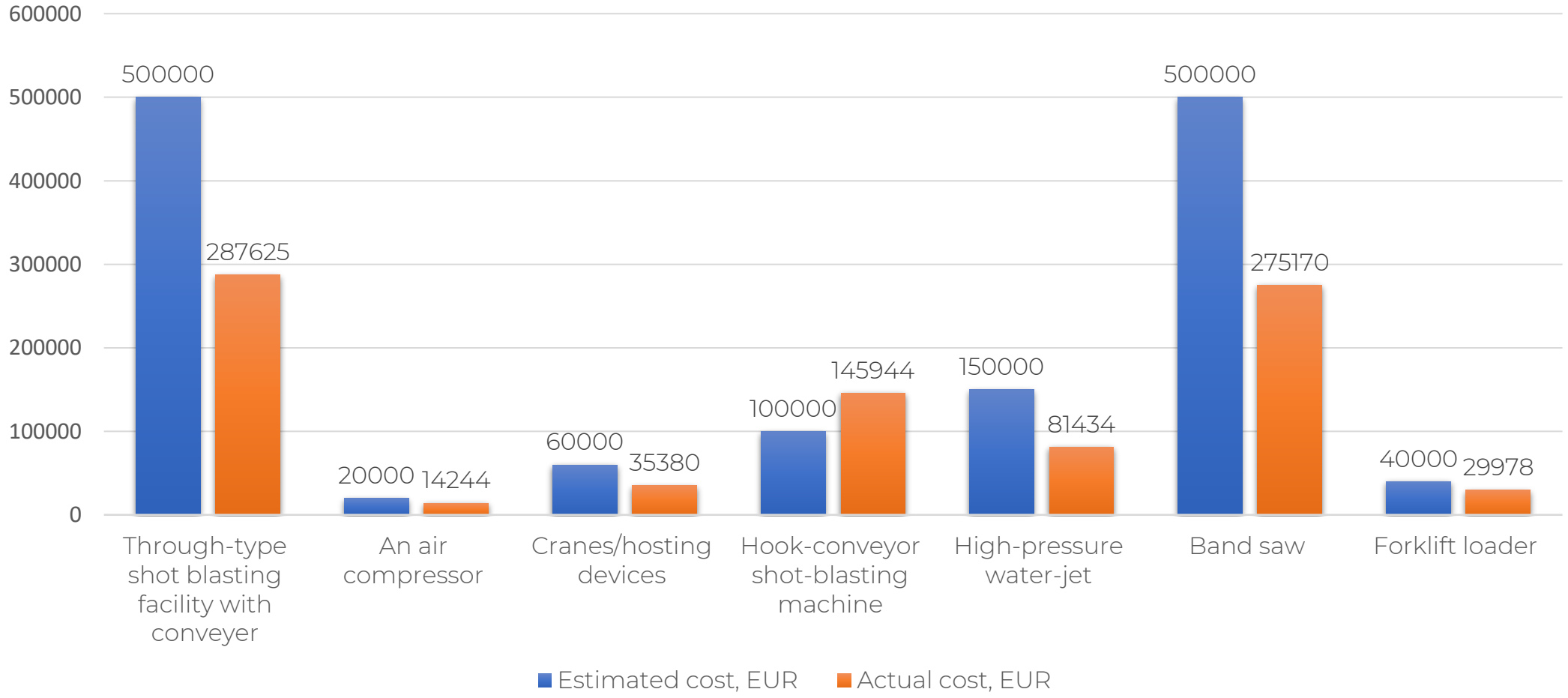
Before starting the operation of the equipment, Ignalina NPP developed and approved: the necessary design documentation, instructions for the operation of the equipment and internal procedures for working at the initial processing areas, etc.

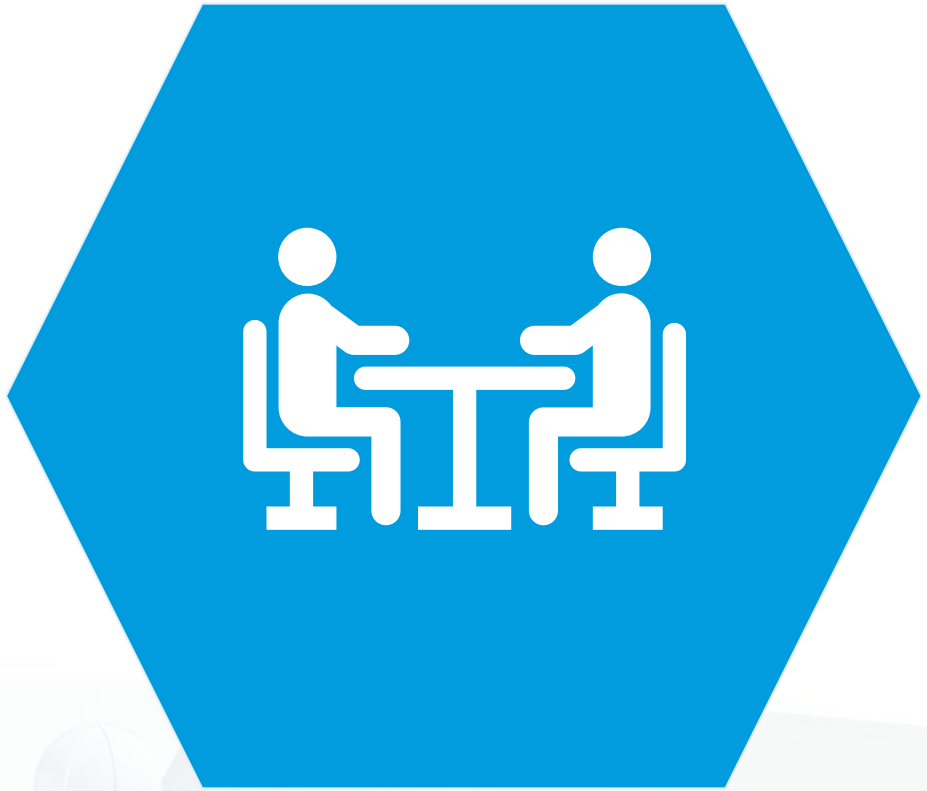
Safety justification and environmental impact analysis were developed and agreed with VATESI (State Nuclear Power Safety Inspectorate).

The indicative costs as per MTF.02 and the actual costs at projects completion are presented in the table below:

Cost Item	Estimated cost, EUR	Actual cost, EUR
- Through-type shot-blasting facility with roller conveyer having the capability of processing the waste 1000÷1200 mm in width and 400÷600 mm in height - 1 piece	500000,00	287625,72 (incl. shot)
- Shot for commissioning shot blasting facility – up to 10 tons	10000,00	-
- An air compressor with a receiver for shot blasting facility - 1 piece (totally);	20000,00	14244,00
- Cranes/hosting devices with carrying capacity 0.5÷1 t for delivery of the wastes on the conveyer and their withdrawal from the conveyer of the shot blasting facility - 2 pieces.	60000,00	35380,00
- Hook-conveyer shot-blasting machine with T-track, Y-track or O-track rail – 1 piece	100000,00	145944,60
- High-pressure water-jet facility (2500÷3000 bar) - 1 piece	150000,00	81434,48
- Band saw with cutting capability of up to 1.2 m - 2 pieces	500000,00	275170,00
- Forklift loader (electric truck) with carrying capacity 1.6 t - 2 pieces	40000,00	29978,00
TOTAL	**1380000,00**	**869776,80**

CHART SHOWING ESTIMATED COST DISTRIBUTION WITHIN ACTIVITIES VS REAL COST DISTRIBUTION FOR STAGE 2, EUR





Q&A / DISCUSSION / ROUNDTABLE

CHALLENGES TODAY.
RESPONSIBILITY FOR AGES

IGNALINA
NUCLEAR
POWER PLANT

WORKSHOP
Lessons Learned at INPP in the Project "Installation of Radioactive Metal Waste Treatment Facility"

Project Stage 3 Update of the ventilation system

ACCREDITED
MSCB-113

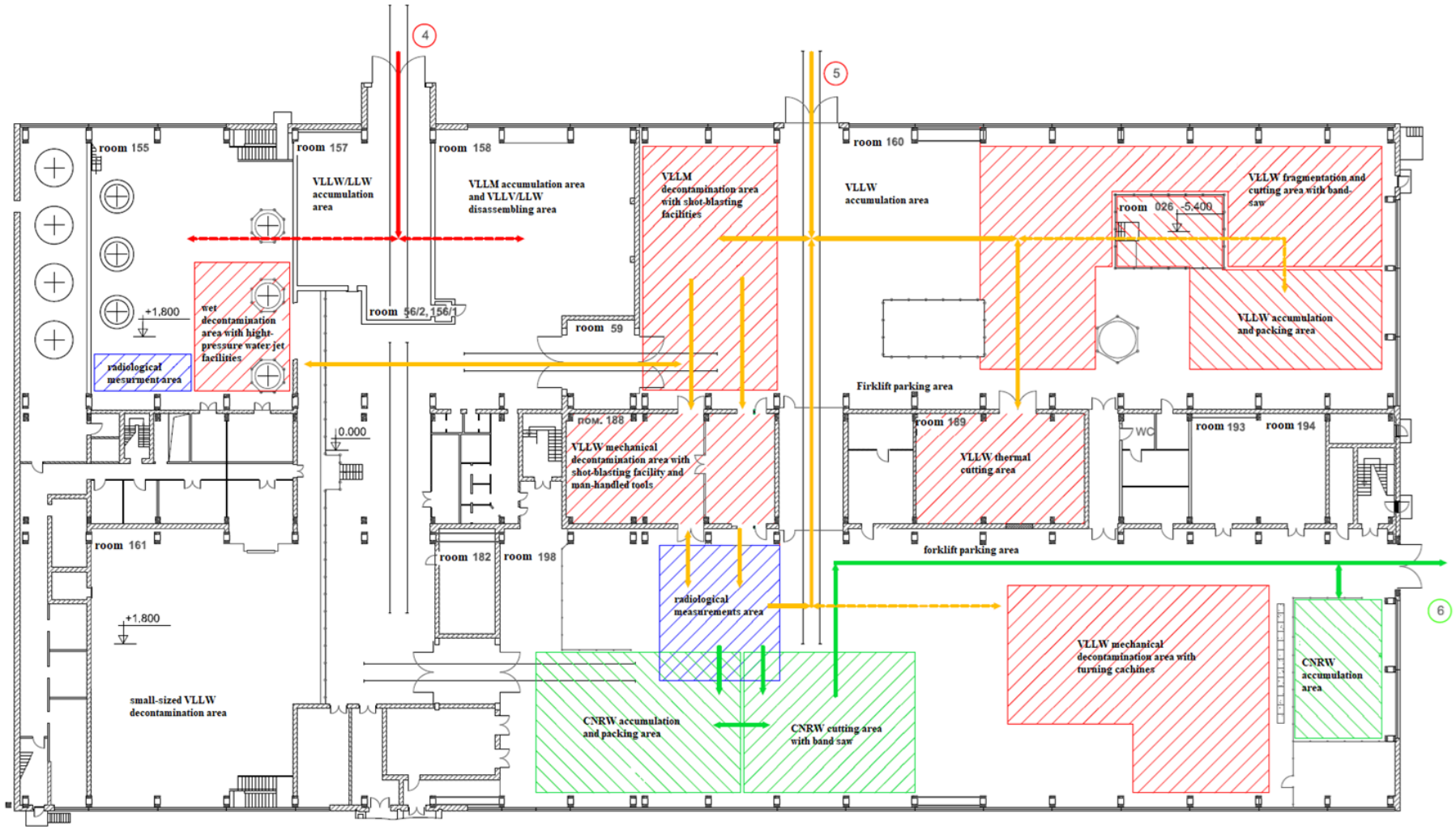
G-CERTi SYSTEM SERVICE
ISO 9001:2015
GKLT-0199-QC

Ignalina NPP decommisioning activities are co-financed by the European Union

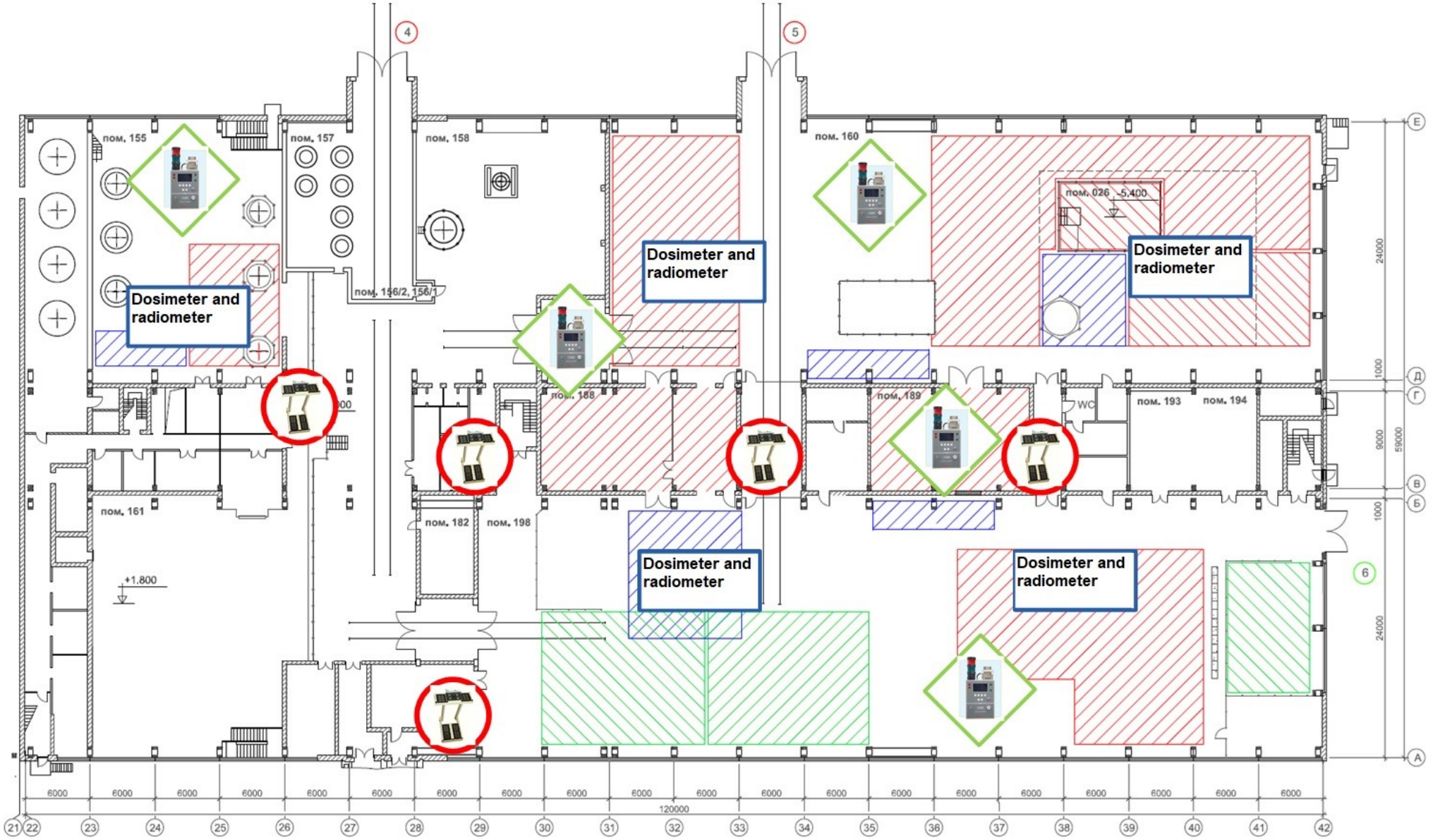
The following list of activities has been carried out by INPP personnel to support both projects MTF.01 and MTF.02:

- Preparation to tender and tender arranging (investigation of market, analysis of suppliers, development of technical specification, evaluation of proposals, etc.).
- Development of the designs and engineering documentation for preparatory and auxiliary works;
- Disassembly of existing partitions (160/1, 160/2, 160/4, 160/5) in Bldg. 130/2;
- Re-commissioning of existing equipment required for the RMTF and dismantling of equipment not suitable for re-use;
- Progressive restoration of Building 130/2 systems (light, electricity, water, ventilation, heating, fire protection, radiological control, etc.);
- Commissioning of new equipment for fragmentation, decontamination and radiological measurement following procurement;
- Development of supporting documentation required to confirm that the upgraded facility meets all regulatory requirements, including performing of safety assessment of works with the use of new equipment in bld. 130/2.

In order to ensure proper logistics in the building 130/2 during the treatment of radioactive waste, separate zones and areas for packing, cutting and decontamination were organized. The areas for treatment of conditionally non-radioactive waste, very low level waste, low level waste have been separated as well.


4
5
6
room 155
room 157
room 158
room 160
VLLW/LLW accumulation area
VLLM accumulation area and VLLV/LLW disassembling area
VLLM decontamination area with shot-blasting facilities
VLLW accumulation area
VLLW fragmentation and cutting area with band saw
room 026
-5.400
+1.800
wet decontamination area with hight-pressure water jet facilities
radiological mesurment area
room 56/2, 156/1
room 59
VLLW accumulation and packing area
Firklift parking area
0.000
room 188
VLLW mechanical decontamination area with shot-blasting facility and man-handled tools
room 189
VLLW thermal cutting area
WC
room 193
room 194
room 161
room 182
room 198
forklift parking area
radiological measurements area
+1.800
small-sized VLLW decontamination area
CNRW accumulation and packing area
CNRW cutting area with band saw
VLLW mechanical decontamination area with turning cachines
CNRW accumulation area

JJO0



Installation of radiometric control of contamination of hands / feet

Monitor for measurement of aerosols in the air

Dosimeter and radiometer

Dosimetr and radiometr

The purpose of the Stage-3 is the modification of ventilation systems in building 130/2.

JJO0

INPP has carried out a considerable amount of work to adapt the ventilation systems in bldg. 130/2 to ensure proper operation of the Radioactive Metal Waste Treatment Facility (RMTF). The existing ventilation systems (Spec ventilation system ВЦ-1, Input ventilation systems П 1÷П-5, Exhaust ventilation systems В-1÷В-12) should completely cover all RMTF needs.

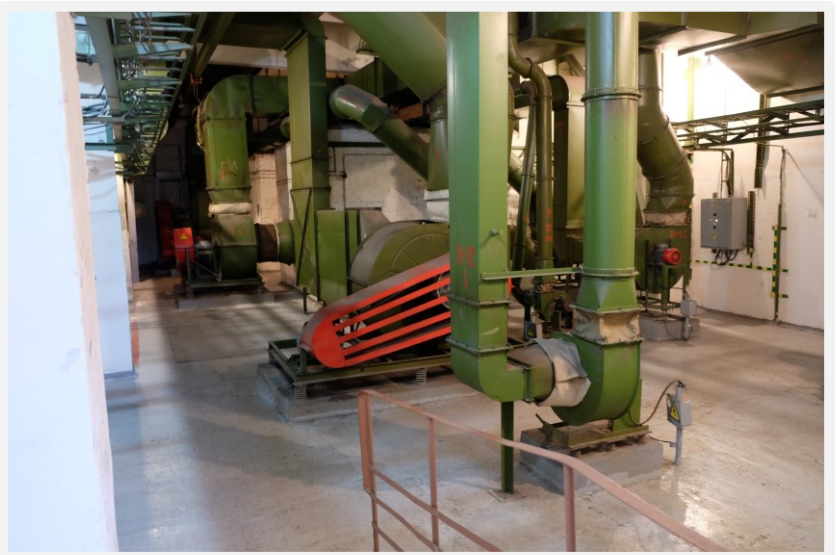
Implementing the “global” modification of 130/2 ventilation systems would be interesting for the following reasons: increasing the system efficiency and reducing the power consumptions.

The indicative cost of Stage-2, MTF.02 was 1 380 000,00 Euro and the actual cost of MTF.02 is 869 776,80 Euro. Savings under PIF MTF.02 is 510 223,20 Euro and that is assumed to cover Stage-3 - modification/modernization of building 130/2 ventilation systems.

The purpose of the Stage-3 is the modification of ventilation systems in building 130/2.

Efficiency: Installation of electric valves on ventilation lines (bldg. 130/2 has 11 lines for main ventilation and 17 lines for supporting ventilation), as well as installation of automatic control system will allow to selectively control the ventilation without operator’s constant involvement; more effectively distribute the airflow between the zones and areas; remove the contaminated air directly from the rooms their work is carried out, but not from the entire volume of bldg.130/2; etc.

Power consumptions: There are 22 big and small old-type ventilation units in the bldg. 130/2. The total electric power of the motors is around 525 kW. The use of modern ventilation units (electro motor+frequency regulator) can reduce the electricity consumption by 30-50%.



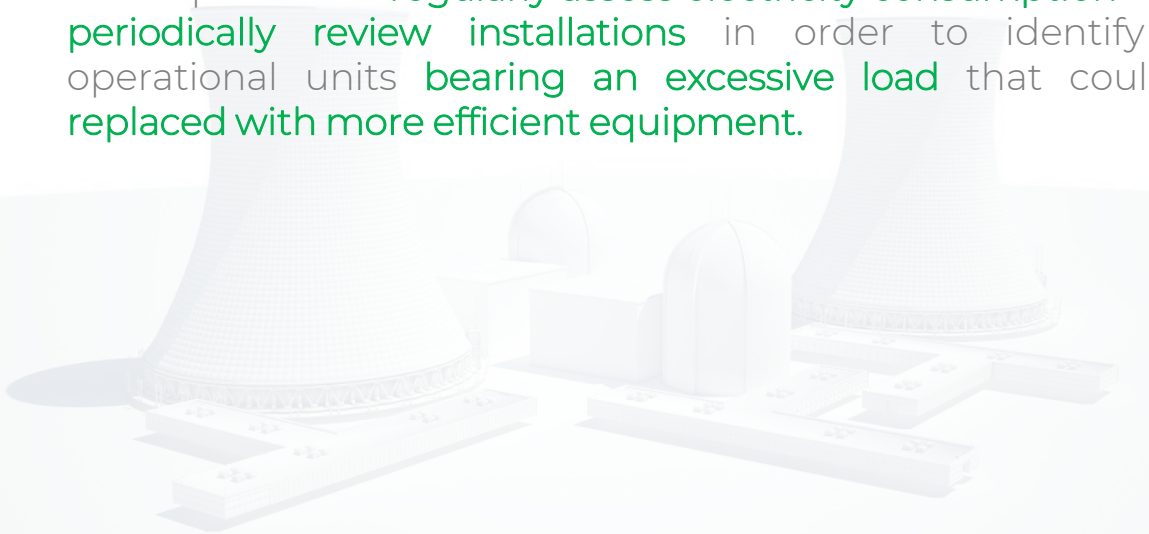
JJO0

LESSON LEARNED No. 9

- Electricity consumption was analyzed, after which it was observed that old energy-intensive fans were in-use. To reduce energy consumption, it was decided to replace the old fans with new ones possessing a frequency regulator and control system. The commissioning/installation of the new updated ventilation system is expected in 2023.

GOOD PRACTICE No. 9

- It is important to regularly assess electricity consumption and to periodically review installations in order to identify any operational units bearing an excessive load that could be replaced with more efficient equipment.



Waste Storage Areas

Feasibility of the new line

Waste Treatment and Processing

Planning and research

Cost reduction

Terms extension

The following tasks are planned under Stage-3, MTF.02:

- Upgraded Ventilation System. Owing to increases in capacity and usage, improved ventilation is required in particular for the filtration of dust arising from dry decontamination activities. The improvements will include:
  - Installation of an automatic control system to effectively distribute the airflows between the areas in building 130/2;
  - Upgrade of ventilation equipment in building 130/2 to reduce the heat and electricity consumption.

To achieve these goals the following minimum is required:

- Replacement of ventilation units;
- Installation of frequency regulators;
- Installation of electric valves, check valves, fire dampers, etc.;
- Installation of equipment for automatic temperature control of the heat transfer agent in the heaters;
- Integration of automatic control system;
- Design development;
- Implementation of installation works.

CHALLENGES TODAY.
RESPONSIBILITY FOR AGES

IGNALINA
NUCLEAR
POWER PLANT

WORKSHOP
Lessons Learned at INPP in the Project "Installation of Radioactive Metal Waste Treatment Facility"

Labor resources

ACCREDITED
MSCB-113

ISO 9001:2015
GKLT-0199-QC

Ignalina NPP decommisioning activities are co-financed by the European Union

Labor resources for fragmentation in building 130/2

JJO0

To perform fragmentation and cutting of the dismantled equipment in building 130/2 during one work-shift, the following labor resources are required:

- Disassembly of dismantled equipment – 2 people;
- Cutting using a band saw (2pcs. COLOSS 1200) – 2 people;
- Fragmentation using an Arc plasma cutting device – 2 people;
- Fragmentation using an Arc acetylene-oxygen cutting device – 2 people;
- Foreman – 1 person.

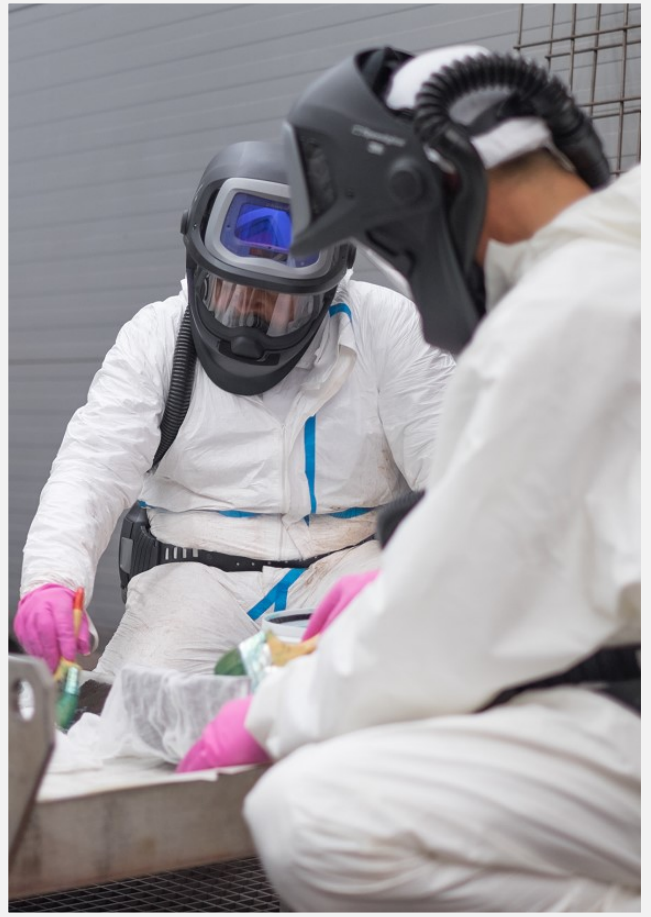
To perform the fragmentation work in building 130/2 as described, 9 people are supposed for one work-shift.

Labor resources for decontamination in building 130/2

JJO0

To perform the decontamination of the dismantled equipment and waste in building 130/2 during one work-shift, the following labor resources are required:

- Through-type shot-blasting facility with roller conveyer – 5 people;
- Hook-conveyer shot-blasting machine – 1 person;
- Shot blasting machine with direct action (Cabilux PC-CL 433) – 1 person;
- Dust-free shot blasting machine (DINO JUNIOR II) – 1 person;
- Screw-cutting machine – 1 person;
- Wet decontamination high-head plant (DYNAJET 1000me, Hamelmann HDP) – 3 people;
- Post-treatment of waste with grinding machines (mechanical decontamination points) – 3 people;
- Foreman – 1 person.



To perform the decontamination work in building 130/2 as described, 16 people are supposed for one work-shift.

Labor resources for packing and transportation in building 130/2

To perform packing of dismantled equipment and waste in building 130/2 during one work-shift, the following labor resources are required:

- Class «0» waste packaging – 10 people;
- Class «A» waste packaging – 3 people;
- Foreman – 2 people.

Labor resources for waste transportation and moving in building 130/2

To carry out transport work relating to the movement of waste in building 130/2, an overhead crane operator is also required – 1 person.

To perform the packing and transportation work in building 130/2 as described, 16 people are supposed for one work-shift.

JJO0

In total, to cover all waste treatment processes (fragmentation, decontamination and packing) in building 130/2, 41 people are required for one work-shift.

This is the maximum number of workers that ensures the full load of the equipment in the current project is dealt with. The envisaged number of workers in practice is less, since the loading of the Radioactive Metal Waste Treatment Facility depends on the waste flows from the dismantling areas and the necessary options for processing this waste (how it will be fragmented and cut, how it will be decontaminated, how and where it will be packed...).

Remarks:

- This calculation shows the required labor resources of the INPP Dismantling Division. The number of dosimetrists is not considered within the calculation. Dosimetrists are supporting any waste treatment processes by default, and they are assigned by the INPP Radiation Safety Division. Generally, there is at least one dosimetrist at each working area.
- This calculation was made for one work-shift. INPP can have from 1 to 3 working shifts of 7.2 hours each per day. The number of shifts is determined by the need, depending on the generation of dismantling waste and the loading of G1 facilities. A “1 - 3 work-shifts” approach allows for flexible management of waste flows and finding a balance between available labor resources and the need to perform waste processing.

VIDEO

IGNALINOS ATOMINĖ ELEKTRINĖ

Elektrinės g. 12/1
Drūkšinių k. 31152
Visagino sav. Lietuva

Valstybės įmonė
Ignalinos atominė elektrinė
www.iae.lt

Telefonas +370 386 28985
Faksas +370 386 24396
El. paštas iae@iae.lt

ACCREDITED MSCB-113

G-CERTi SYSTEM SERVICE
ISO 9001:2015
GKLT-0199-QC

Ignalinos AE eksploatacijos nutraukimo veikla yra bendrai finansuojama Europos Sąjungos