

Experience from Decommissioning of Obsolete Nuclear Facilities in the ÚJV Řež, a. s.



Introduction



- ÚJV Řež, a. s. is a company operating in the area of development, services, production and research on the top national and global level more than 60 years.
- More than 1,000 persons employed by the ÚJV Group represent the potential from scientific capacities through technology specialists, designers to experienced production workers.



Introduction

- Radioactive Waste Management Department
 - Manage most of institutional RAW (waste from research, medicine, industry, education) produced in the Czech Republic (aprox. 90%)
 - Is one of the biggest producer of RAW (aprox. 60%)
- RAW management facility
 - Necessity for own reserch and business
 - Equipped with various technologies centralize in on building (Building No.241)
(RAW stores, evaporator, segmentation and decontamination equipment, low pressure compactor, cemnetation unit) and auxilialy equipment (ventilation system, special sewage system, maintence and mechanical workshops, sanitary loops, etc.)
 - Operated since in 1963 and was reconstructed few 3y ago
- Building description
 - 4 above-ground floors and 3 underground floors
 - Technological and office section
 - Total area: 4500 m²



Decommissioning process

- The Decommissioning activities started in 1990's as part of Project called „Decommissioning of Old Nuclear Facilities at the Nuclear Research Institute Řež“ – as a government sponsored project
- The project was divided into 2 phases (based on potential risks and the budget)
 - Some facilities or technologies has potential risk for the environment or the staff
- This project is the only ongoing decommissioning project in the Czech Republic



Decommissioning process

PREPARATION FOR DECOMMISSIONING

- 1) Collection of design and operational documentation records, procedures, equipment and RAW inventories (Started in 1996)
- 2) Studying the collected data and information
- 3) Characterization of ionizing radiation sources and radioactive contamination
- 4) Safety analysis Report
characterization and description of potential sources of risks, exposure pathways, potential chemical compounds, radionuclides and media of concern (Approved in 2000)
- 5) Determination priorities of Decommissioning based on Safety analysis Report



Decommissioning process

- The Decommissioning project started in 2003 and will be finished in 2018

Item	Realization	Status
Special Sewage System	2004 - 2005	Decommissioned
Liquid RAW storage tanks (Building 241)	2004 - 2013	Reused
Technology for RAW treatment (Building 241)	2003 - 20011	Decommissioned
Contaminated equipment (Building 250)	2003 - 2014	Decommissioned
System of storage of sealed sources (Building 261)	2003 - 2005	Decommissioned
Decay tanks (Building 211/5)	2003 - 2014	Decommissioned
Old bitumenation unit	2004 - 2008	Decommissioned
Reloading site for RAW storage	2003 - 2018	In process
RAW storage site	2009 - 2014	Decommissioned

Decommissioning

- Old evaporator
 - For treating the liquid waste
 - Consists of evaporator, 3 drops separators, condenser and tanks for collecting the clean condensate and concentrate
 - Dismantling started with removing the thermal isolation
 - The big metal parts were segmented by oxyacetylene cutting and removed from positions per parts or by nibbler to minimize the air-contamination and the tubes were cutten by hydraulic shears
 - The heater was removed in one piece (see on pic.)



Fig.: Heater and Olde evaporator before dismantling

Decommissioning

- Liquid RAW storage tanks
 - Two sedimentation tanks with volume of 25 m³
 - Decontaminated by high pressure water jetting
 - Dismantled partially by nibbler and oxyacetylene cutting or by plasma arc cutting
 - Made from structural steel or from structural steel with an internal layer of stainless steel



Fig.: The storage tanks before fragmentation and removal the bottom of tank

Decommissioning

- Solid RAW compactor
 - Were used for more than 40 years and had complicated construction
 - Were constructed for compacting waste with higher activities
 - Very heavy contamination and was decommissioned
- Cementation unit
 - Was designed in 1970´s for conditioning the RAW produced at NPPs and wasn´t suitable for limited amount of RAW
 - The technology was dismantled and completely decommissioned



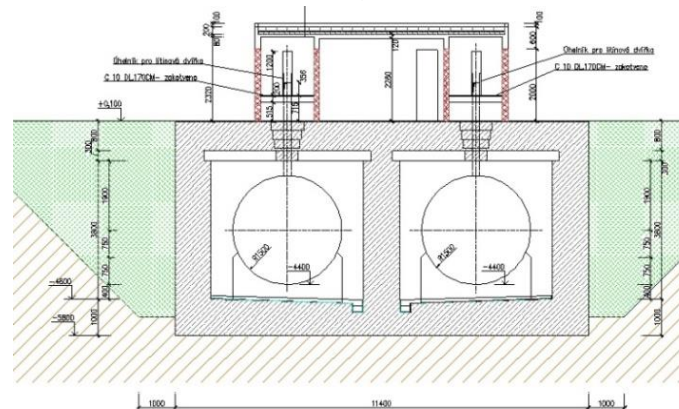
Decommissioning

- Contaminated equipment (Building 250)
 - Two laboratories were in the past used for research in fuel reprocessing
 - Labs are equiped with Alfa contaminated glove boxes and eight sets of wall boxes
 - Volume of contaminated material is aprox. 80 m³
- Storage tanks
 - For liquid RAW collection
 - Made from structural steel with an internal layer of stainless steel
 - Tanks were segmented and processed as RAW



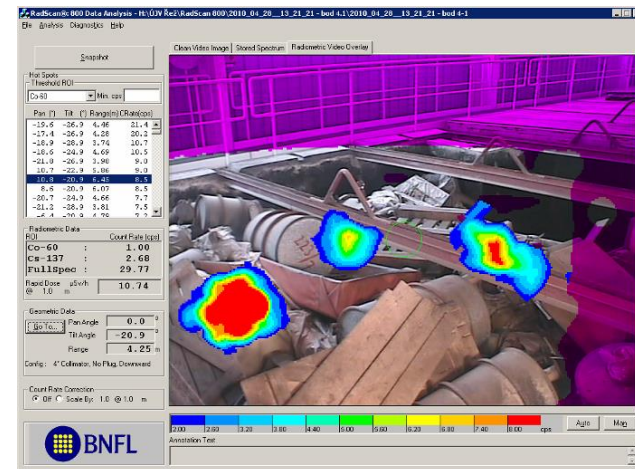
Decommissioning

- Decay tanks (REUSE of Tanks)
 - Were in use since 1961, two tanks of capacity 63 m³ each
 - Designed for storing and decay of concentrated short-lived RAW used for more than 40 years and
 - Unfortunately were identified also the long-lived radionuclides
 - Made from structural steel and are placed into a concrete bunkers
 - Before starting any decom. Activity the bunkers were overroofed.



Decommissioning

- Reloading site
 - Constructed as a temporary storage for conditioned waste and also waste of various level of treatment
 - 8 concrete boxes covered with the new hall
 - The total volume of RAW is aprox. 600 m³
 - Preliminary chracterization were made by Gama Camera and from the records of inventory



Decommissioning

- Reactor vessel cutting
 - Stored for aprox. 30 years
 - Alluminium alloy
 - Necessity of in-situ cutting



Decommissioning

- Contaminated technology removal and processing
 - Stored 5 boxes in Storage facility
 - Unknown radionuclides and level of contamination
 - Various origin of RAW



Material free release

- Measurements for free release material into the environment
 - The way of reducing RAW is decontamination until reaching the Releasing limits (releasing into the environment)
 - Necessity of low background measurements – developed together with company Envinet a.s. the special device MUM



Conclusion

- The ÚJV Řež, a. s. obtain wide experience during the obsolete facilities decommissioning for the future activities in decommissioning area
- Optimizing the volume of resulted RAW by the decontamination or processing (volume reduction) and free release the capacity of repositories is significantly save, same as the costs savings (not always 😊)
- Reusing is option how reduce RAW and save costs
- Decommissioning project must be done under carefull radiological characterization
- Investments into the new equipment is beneficial in financial and environmental point



The End



Thank you.