MOBILITY MISSION REPORT

This work has been partially supported by the EURAD project that has received funding from H2020-EURATOM 1.2 under grant agreement ID 847593.

The information included in this mission report consists of personal data of applicants, and in the frame of GDPR we ask you place emphasis on its integrity: the personal data in this mission report cannot be used for purposes other than the evaluation and the management of EURAD Mobility Programme. For the avoidance of doubt, this information – out of its nature – is confidential information as mentioned in Article 10.1 of the EURAD Consortium Agreement Version [17/09/2019] with effective date of 1 June 2019 (although it might not be explicitly marked as such).

MISSION TITLE

EURAD-PREDIS Summer School on Waste Acceptance Criteria

DESCRIPTION

Concerned organisations

Research entities: Lithuanian Energy Institute (LEI), Research Centre Husinec-Řež (CVŘ)

Concerned infrastructures or facilities

Research centre (CVŘ)

Waste package control facilities (UJV-Řež)

Waste disposal site – Richards repository

Concerned phases

Phase 0: Policy, framework and programme establishment

Phase 1: Site evaluation and site selection

Phase 4: Facility operation and closure

Phase 5: Post-closure

Themes and topics

- Theme 1: Managing implementation and oversight of a radioactive waste management programme
  - Programme planning
  - Organisation
  - Resources
- Theme 2: Radioactive waste characterisation, processing and storage (Pre-disposal activities), and source term understanding for disposal
  - Waste handling, characterisation, treatment and packaging
  - Interim storage
  - Transportation between facilities
  - Radionuclide inventory and source term
  - Waste acceptance criteria
- Theme 5: Geological disposal facility design and the practicalities of construction, operations and closure
  - Facility and disposal system design
  - Constructability, demonstration and verification testing
  - Health and safety during transport, construction, operations and closure
  - Monitoring and retrievability
- Theme 6: Siting and Licensing
  - Site selection process
  - Detailed site investigation
  - Licensing

Keywords

Waste acceptance criteria; radioactive waste disposal; radioactive waste management; waste package specification; safety case.

EXECUTIVE SUMMARY

As in other nuclear countries, the operation of the Ignalina nuclear power plant (INPP) in Lithuania has led to the accumulation of a large amount of various radioactive waste, that is currently held in interim storage. A country's responsibility for the safe management of its SNF is acknowledged worldwide. Within the European Union (EU), directive 2011/70/EURATOM contains the provision for every member state (country) to be responsible for the implementation of the safe and sustainable solution for SNF and radioactive waste management and disposal.
Researchers of Nuclear Engineering Laboratory have been actively involved in the analysis of problems related to the management of radioactive waste from INPP since 1994. For this purpose, the Laboratory performs assessments of the release of radionuclides from waste repositories, safety assessments of waste treatment technological equipment, storage and disposal facilities, environmental impact studies, contributes to the development of waste acceptance criteria, etc.
The EURAD-PREDIS Summer School on Waste Acceptance Criteria offers a great opportunity to increase my competence in this field of radioactive waste management. It

will also expand the LEI researchers' competence as knowledge sharing between researchers is a promoted work practice at LEI. This would help LEI researchers to contribute more in current and future national and EURAD work projects.

1. MISSION BACKGROUND

Klikněte nebo klepněte sem a zadejte text.

1.1. R&D background

Proposed mobility action is the participation of PhD student Povilas Balčius at a joint EURAD-PREDIS Summer School on Waste Acceptance Criteria (WAC) for radioactive waste. During this Summer School, participants learn about the basics of (WAC), it's development and application. Examples of WAC in national programs are showcased. The theoretical lectures are complemented with exercises and two technical visits. This Summer School is targeted at PhD students from EURAD and PREDIS projects and professionals working on WAC. This Training course was foreseen to take place on September 4th to September 8th.

1.2. Mission objectives

During the training course the participants were learning to:

- Describe the waste management life cycle
- Describe and explain waste acceptance systems and waste acceptance criteria elements
- Discuss the WAC development process
- Provide examples of types of WAC
- Design WAC for a program without a disposal facility
- Describe WAC for legacy, non-standard, and problematic radioactive waste
- Discuss the treatment of non-conformances and departures from established WAC
- List examples of WAC in existing national programs

1.3. Mission request

To cover the cost of Povilas Balčius training course at CVR (Rez Research Centre) September 4th – Septemeber 8th, total 1521,02 Eur, which include travelling to and from CVR (travel on September 3rd, daily commute to CVR from Prague and return home on September 9th), accommodation and daily expenses (for a period from September 3rd to September 9th).

1.4. Mission composition

Host organisation

Husinec-Řež Research Centre (Czech Republic)

Host facility

Husinec-Řež Rezearch Centre

Mission dates

2023 September 3rd – September 9th.

2. MAJOR PRACTICES, TECHNIQUES, METHODS, TOOLS OR SYSTEMS OPERATED OR STUDIED

Klikněte nebo klepněte sem a zadejte text.

2.1. Practice, technique, method, tool or system operated or studied during the mission

Waste Acceptance Criteria. Radioactive waste disposal, waste package designs, storage concepts and handling safety.

Description

Lectures on waste acceptance criteria, specification of waste acceptance criteria, various national waste acceptance criteria specifics, waste package design and specifics, non-conforming waste package issues and handling waste disposal, institutional control, responsibility and requirement management, as well as two excursions: to the UJV/CVR waste processing facilities and the Richard repository in Czech Republic. To conclude the summer school, practical work in groups was done on proposing WAC for challenging waste forms.

Usage

Lectures addressed potential issues that may arise during radioactive waste generation, storage, conditioning, transport and disposal. During the lectures, it was emphasized, that all organisations involved, in radioactive waste and disposal should work together, to prevent or reduce the potential impact of this dangerous class of waste on the environment. Generic and various national waste acceptance criteria were overviewed, with the similarities and differences inbetween them. How the WAC impacts waste package design and conditioning, as well as storage and disposal site design was demonstrated.

Benefits

During the Summer School, valuabe knowledge and skills about WAC it’s development and implementation were provided. This increased my competence as a researcher, and provided valuable insights for future work in the area of radioactive waste management and especially, disposal.

Limitations

For researchers, WAC needs to be coupled with various experiments, tests or computer models for evaluation of potential sites and/or waste package designs.

Applicability

Participation in the Summer School increased the LEI researchers competence in WAC implementation. The gained knowledge can be used for evaluating the conceptual models of deep geological repositories as well as near-surface repositories and can serve in the

provision of scientific support to the decision making bodies within the Lithuanian repository development programme.

2.2. Practice, technique, method, tool or system operated or studied during the mission

Klikněte nebo klepněte sem a zadejte text.

Description

Klikněte nebo klepněte sem a zadejte text.

Usage

Klikněte nebo klepněte sem a zadejte text.

Benefits

Klikněte nebo klepněte sem a zadejte text.

Limitations

Klikněte nebo klepněte sem a zadejte text.

Applicability

.

2.3. Practice, technique, method, tool or system operated or studied during the mission

Klikněte nebo klepněte sem a zadejte text.

Description

Klikněte nebo klepněte sem a zadejte text.

Usage

Klikněte nebo klepněte sem a zadejte text.

Benefits

Klikněte nebo klepněte sem a zadejte text.

Limitations

Klikněte nebo klepněte sem a zadejte text.

Applicability

Klikněte nebo klepněte sem a zadejte text.

2.4. Practice, technique, method, tool or system operated or studied during the mission

Klikněte nebo klepněte sem a zadejte text.

Description

Klikněte nebo klepněte sem a zadejte text.

Usage

Klikněte nebo klepněte sem a zadejte text.

Benefits

Klikněte nebo klepněte sem a zadejte text.

Limitations

Klikněte nebo klepněte sem a zadejte text.

Applicability

Klikněte nebo klepněte sem a zadejte text.

3. MISSION FINDINGS AND CONCLUSIONS

3.1. Lessons learned and conclusions

The mobility action provided an opportunity to get effective and efficient training in various topics related to Waste Acceptance Criteria (WAC). The topics related to both Generic WAC and national WAC, acceptance of problematic waste, WAC establishment were explored during the mobility action. As well as theoretical exploration of these topics, practical excercises were done to consolidate the acquired knowledge. Additionally, scientific visits to the UJV/CVR waste processing facilities and the Richard repository showed practical exaamples of the impact of WAC on the workflow of radioactive waste disposal as well as the design and treatment processes of the waste forms and disposal facilities.

3.2. Relevant findings and conclusions for home organisation

Participation in this Summer School has significantly expanded my personal knowledge of radioactive waste management, Waste Acceptance Criteria, as well as improved my competence in this field and, as knowledge sharing between researchers in LEI is a common practice, of other LEI researchers as well. The gained knowledge and skills will allow LEI scientists to contribute more to various projects as well as current and future EURAD projects.

3.3. Relevant findings and conclusions for host organisation

Klikněte nebo klepněte sem a zadejte text.

3.4. Relevant findings and conclusions for other organisations

Klikněte nebo klepněte sem a zadejte text.

4. POTENTIALS FOR IMPROVEMENT OR DEVELOPMENT

4.1. Generic potentials

Klikněte nebo klepněte sem a zadejte text.

4.2. Potentials for home organisation

Klikněte nebo klepněte sem a zadejte text.

4.3. Potentials for host organisation

Klikněte nebo klepněte sem a zadejte text.

APPENDICES

Mission journal

3rd September

Travel from Vilnius to Prague.

4th September

13:00 Travel to CVR to the site of the Summer School.

13:30 Registration to the Summer School at CVR

13:30-14:00 Lunch

Start of lectures

14:00-14:45 Introduction, goals of the course (L. Nachmilner)

14:45-15:30 RWM lifecycle (J. Faltejsek)

15:30-16:00 Break

16:00-16:45 Description of WAS (S. Konopaskova)

16:45-17:30 WAC in different stages of RWM

5th September

09:00-09:45 WAS development process (S. Konopaskova)

09:45-10:30 Types of WAC (L. Nachmilner)

10:30-11:00 Break

11:00-11:45 Responsibilities and requirement management (P. Zuidema)

11:45-13:30 Examples of national WAC systems: Switzerland (P. Zuidema)

13:30-14:00 Lunch

14:00-14:45 WAC specifics (Jeroen Mertens)

14:45-15:30 Acceptance of problematic waste (J.-L. Leganes Nieto)

15:30-16:00 Break

16:00-16:45 Treatment of non-conformances (J.-L. Leganes Nieto)

16:45-17:30 France (V. Wasseline)

6th September

09:00-09:45 Generic WAC (A. Baksay)

Examples of national WAC systems: Belgium (Ch. De Bock)

09:45-10:30 Hungary (A. Baksay)

10:30-11:00 Break

11:00-11:45 Spain (Jose Luis)

UK (L– Harvey)

11:45-13:30 Discussion of national differences/commonalities (all)

13:30-14:00 Lunch

14:00-17:30 Excursion to UJV/CVR waste processing facilities

7th September

9:00-13:30 Excursion to Richard repository

Czech RWM system Waste acceptance process (M. Macelova)

13:30-14:00 Lunch

14:00-14:14 Excursion follow up discussion

8th September

09:00-10:30 Exercise: Proposal of WAC for challenging waste forms (L. Nachmilner)

10:30-11:00 Break

11:00-11:45 Exercise: reporting about results (L. Nachmilner)

11:45-12:30 Wrap up discussion evaluation of the event, conclusions,closing.

9th September

Return to Vilnius from Prague

Mission bibliography

MISSION BENEFICIARY

Povilas BALČIUS
P.h.d. student and junior research associate
Nuclear Engineering Laboratory
Lithuanian Energy Institute

PARTNER EXPERTS CONTRIBUTING TO THE MISSION

Host organisation experts

- Lumir Nachmilner, CV Řež, Task Leader, Waste Acceptance System, PREDIS
- S. Knonopaskova, CV Řež
- J.Faltejsek, CV Řež
- Dr. Niels Belmans, Leader, Training and Mobility WP, EURAD
- Dr. Jan Prehradny, Director of CVR, Division of Science and Technology

Home organisation experts

Klikněte nebo klepněte sem a zadejte text.

Other organisations experts

P. Zuidema,Zuidema Consult GmbH / Switzerland, former Director Science & Technology Nagra, Switzerland

J. Mertens, Bel V, Belgium

J. L. Leganes Nieto, ENRESA, Spain

V. Wasseline, ANDRA, France

A. Baksay, TS Enercon Ltd., Hungary

Ch. De Bock, ONDRAF/NIRAS, Belgium

L. Harvey, Galson Sciences Ltd, United Kingdom

M. Macelova, SÚRAO

REPORT APPROVAL

Date	Beneficiary	Home mentor/supervisor	Host mentor/supervisor
2023.09	Povilas Balčius	Povilas Poškas	Niels Belmans
	Visa	Visa	Visa