Deliverable D9.13: Case studies on shared solution between Member states

Work Package 9 “ROUTES”

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Disclaimer

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Executive Summary

This deliverable gathers case studies on shared solutions between Member States in different stages of the waste lifecycle. In this document, shared solutions are defined as knowledge sharing and the sharing of facilities/technologies.

This deliverable will summarise the regulation about the importation and exportation of RAW and/or SNF by the countries participating in Subtask 6.2 (Shared solutions between Member States) and those in force in the European Union. It will also cover the technology owned by each country that can be shared others.

During this study, 31 cases of past and future shared solutions from 13 countries have been reported. The gathered information is not exhaustive and is only the image of the cases stated by the countries (and organizations) participating to EURAD WP, ROUTES.

The number of reported cases is relatively important. Nonetheless, there is a strong heterogeneity in terms of countries which have provided solutions and countries which have used them. Furthermore, the number of collaborations per country varies significantly and only a small number of countries has both shared and used solutions.

The number of facilities authorized to receive foreign RAW/SNF stays relatively low on the European territory. However, these facilities cover a large range of technologies. This reflects the fact that many sharing cases between MS are concentrated in a limited number of facilities.

Some mobile equipments are counted among the participating countries. However, no case of sharing of these mobile equipments between MS have been identified to dates.

The regulations regarding the import of foreign RAW is also quite diverse. A significant number of countries either allow or do not prohibit, the hosting/treatment of foreign waste. There is a relatively uniform legislative framework between MS, and only a few countries need to consider changes in their regulation to accommodate overseas waste treatment.

Most countries that allow the import of foreign RAW or do not prohibit it only require a commercial agreement and the consent of relevant authorities to set up a collaboration.

It can be noted a relative homogeneity in the way WMOs and facility operators' communicate about the collaboration between MS. In most cases, the fact that a facility is authorized to receive/treat foreign RAW is a public information. However, civil society is rarely involved in the establishment of a collaboration. It can be regrettable sometime, that the information shared to the public presents a high level of technicity that may not be easily understood by the general population.

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Glossary

AT: Austria

BE: Belgium

BG: Bulgaria

BNFL: British Nuclear Fuels Limited

CH: Switzerland

CS: Civil Society

CY: Cyprus

CZ: Czech Republic

DGR: Deep Geological Repository

DK: Denmark

DRS: Disused Radioactive Sources

ECN: Energy Research Center

EIA: Environment Impact Assessment

EU: European Union

EURATOM: European Community of Atomic Energy

FI: Finland

FR: France

GE: Germany

GR: Greece

IAEA: International Atomic Energy Agency

IT: Italy

HLW: High Level Waste

LI: Lithuania

LILW: Low Intermediate Level Waste

LLW: Low Level Waste

MS: Member State

N/A: Not Answer

NES: Nuclear Engineering Seibersdorf

NGO(s): Non-Governmental Organization(s)

NL: The Netherlands

NPP: Nuclear Power Plant

NO: Norway

PO: Poland

PT: Portugal

RAW: Radioactive Waste

RWM: Radioactive Waste Management

SI: Slovenia

SK: Slovakia

SNF: Spent Nuclear Fuel

SP: Spain

UA: Ukraine

UK: United Kingdom

WAC: Waste Acceptance Criteria

WMO(s): Waste Management Organization(s)

1. Introduction

Waste management routes in Europe from cradle to grave (ROUTES) WP9 is one of the work packages in the European Joint Program on Radioactive Waste Management (EURAD). The objectives of ROUTES are to:

- Provide an opportunity to share experience and knowledge on waste management routes between interested organizations (from different countries, with programs at different stages of development, with different amounts and types of radioactive waste to manage).
- Identify safety-relevant issues and their R&D needs associated with the waste management routes (cradle to grave), including the management routes of legacy and historical waste, considering interdependencies between the routes.
- Describe and compare the different approaches to characterization, treatment and conditioning and to long-term waste management routes, and identify opportunities for collaboration between MS (Member-States).

The objectives of Task 6 are to:

- Describe and assess knowledge on and approaches to sharing technology and facilities between Member-States.
- Provide an overview of the interest in and experience with sharing technology/facilities in the different steps of waste management.
- Identify gaps and define needs for R&D, strategic priorities and opportunities for collaboration between Member States, as applied to challenging wastes as defined in Task 1 and early stage RWM programs and Small Inventory Programs.

Task 6 is divided in three subtasks to produce the following three deliverables:

1. D9.12 - Studies and plans for developing shared solutions for radioactive waste management in Europe.
2. D9.13 - Case studies of shared development and use of technologies and facilities.
3. D9.14 - Report on the feasibility of developing further European shared solutions for waste management from cradle to grave.

Developing new facilities or solutions to manage specific waste streams could be very challenging and depend on the volumes and the time for which the solution is needed. European countries have therefore experimented for many years the sharing of technologies and facilities at different steps of the waste life cycle.

The objectives of subtask 6.2 are to investigate the shared solutions between Member States not only to list the sharing options regarding the regulations of countries but also to collect the lessons learned from these past experiences.

This deliverable will summarise the information collected about the case studies of sharing experiences and the current regulation about the importation and exportation of RAW and/or SNF by the countries participating in Subtask 6.2 (Shared solutions between Member States). It will also cover the technology owned by each country that can be shared to others.

During this study, 31 cases of past and future shared solutions from 13 countries have been reported. The gathered information is not exhaustive and is only the image of the cases stated by the countries (and organizations) participating to EURAD WP, ROUTES.

2. Essentials about European regulation about export and import of RAW/SNF

The member states of the European Union gathered to create a community in charge of the problematic and the development of the civil nuclear matter. Founded in 1957 by treaty, this community named European Community of Atomic Energy or Euratom has now as main objectives putting in common knowledge and financing common projects regarding atomic energy and protecting the people. Since 1967, the head of Euratom and the ones of the EEC (European Economic Commission) and the ECSC (European Coal and Steel Community) have merged and since then Euratom has been based on an institutional triangle, which is composed of: the Council, the Commission and the Parliament, but Euratom keep its integrity; instituted for an illimited period. The Commission writes European directives which must be adapted in each countries' legal regulation. The Commission cannot overpass in any ways the sovereignty of the member states. All member states of the EU are part of Euratom.

One of these directives, the directive 2006/117/Euratom[1] is about the regulation on import and export of radioactive waste and spent fuel across Europe. According to this directive import and export of radioactive waste or/and Spent Nuclear Fuel (SNF) for treatment, conditioning or reprocessing to or from another member state or a tier is authorized under certain conditions. This directive also states:

- The member state wishing to export their waste or SNF has to fill an authorization request with the receiving country and the countries where the waste will transit to do so and vice versa.
- The member state who exports their waste or SNF has to make sure the other country has an accord with the European Union or respect the regulation of the latter.

According to another directive, the directive 2011/70/Euratom[2], before each transfer the country exporting the waste must inform the European Commission about the deal and the country welcoming the waste must have an equal waste management program and safety level than the ones fixed by Euratom. The disposal of foreign RAW is allowed only if an agreement based on the criteria from the 2nd paragraph of the 16th article of the directive 2006/117/Euratom is made between the MS welcoming the waste and another MS or a tier, that is to say only if the country exporting the waste can respect the exigences about the exportation of RAW[3].

[1] COUNCIL DIRECTIVE 2006/117/EURATOM of 20 November 2006 on the supervision and control of shipments of radioactive waste and spent fuel, https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32006L0117&from=EN

[2] Council Directive 2011/70/Euratom of 19 July 2011 establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste, https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32011L0070&from=EN

[3] Art 16:

(1) The competent authorities of Member States shall not authorise shipments:

(a) to a destination south of latitude 60° south; or

(b) to a State which is party to the Partnership Agreement between the members of the African, Caribbean and Pacific Group of States of the one part, and the European Community and its Member States, of the other part, (Cotonou ACP-EC Agreement) which is not a Member State, without prejudice to Article 2, or

(c) to a third country which does not, in the opinion of the competent authorities of the Member State of origin, in accordance with the criteria referred to in paragraph 2 of this Article, have the administrative and technical capacity and regulatory structure to manage the radioactive waste or spent fuel safely, as stated in the Joint Convention. In coming to an opinion on this issue, Member States shall take duly into account any relevant information from other Member States. In this respect, Member States shall inform the Commission and the Advisory committee, as set up under Article 21 on a yearly basis.

(2) The Commission shall, in accordance with the procedure laid down in Article 21, establish criteria, taking due account of, inter alia, relevant safety standards of the International Atomic Energy Agency (IAEA), facilitating Member States to evaluate whether requirements for exports are met.

3. Subtask 6.2 methodology

The participants of Subtask 6.2 participated to a kick-off meeting in October 2020 to define the methodology for the collection of data concerning national regulation and the sharing case studies.

A questionnaire specific to Subtask 6.2 have therefore been created and send to all participants in November 2020. This questionnaire covers questions about the existence of past experiences of sharing solutions between countries and the current national regulation concerning importation and exportation of radioactive waste. A specific working group with task 7 has been created to define specific questions to this questionnaire regarding the public involvement and information of shared solution in their countries.

Concerning the past experience of sharing solutions between countries, participants were asked to list the different experiences involing their country whether as a supplier or a beneficiary of the shared solution. For each case study, these following questions were asked:

- Provide a description of the sharing experience: what waste? what solution? why? when?
- What level of agreement was needed to set the collaboration: commercial only or governmental?
- What difficulties were encountered to settle the collaboration?
- Did the public was involve in the preparation of this collaboration? How?
- Did the public was informed of this collaboration? When? How?

The specific cases of mobile equipments have been included in the list of shared solutions between countries.

Regarding the regulation status for import or export of radioactive waste, the following questions were asked:

- Regulation about export of domestic RAW or SNF and level of agreement needed?
- Regulation about import of foreign RAW or SNF and level of agreement needed?
- Process of consultation/sharing information with Civil Society?

To be sure that the answers collected by the questionnaire have been correctly understood, individual interviews have been scheduled from February to April 2021.

The collected data are listed in Appendix A and Appendix B of this deliverable.

Data have then been analyzed and synthesized in this current deliverable until summer 2022 before starting the deliverable review process.

4. Synthesis on shared solutions between Member states

4.1 Cases of shared solutions between Member States

During this study, 31 cases of past and future shared solutions from 13 countries have been reported (cf Appendix A). The gathered information should not be considered as exhaustive but provides the image of the case stated by the countries (and organizations) participating to EURAD WP, ROUTES.

The identified case studies cover a large panel of shared solution including:

- sharing of scientific or technologic knowledge,
- radioactive waste treatment,
- SNF reprocessing,
- radioactive waste disposal.

The figure 1 below illustrates the division of solutions between MS, whether it is for providing, a service, a technical solution, a knowledge or for using a service, a technical solution or the reception of a knowledge from a MS.

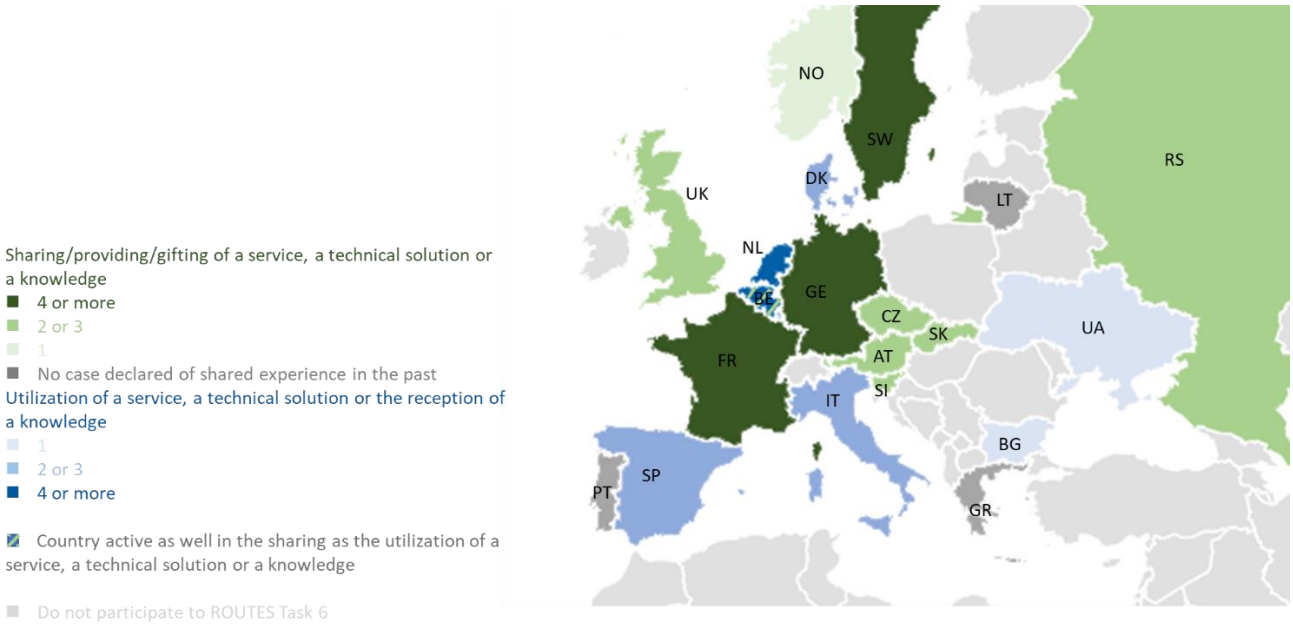

Figure 1 - Distribution of the case studies collected per country

The number of reported cases is relatively important. Nonetheless, there is a strong heterogeneity regarding the number of past experiences between countries which have provided solutions and countries which have used them.

Among the consulted countries, few countries did not declare any collaborations in the past.

The number of countries, which has both shared and used solutions, stays low.

Figure 2 represents the mapping of facilities allowed to treat foreign RAW/SNF picked up in the different cases and mobile equipment declared by countries participating to the study.

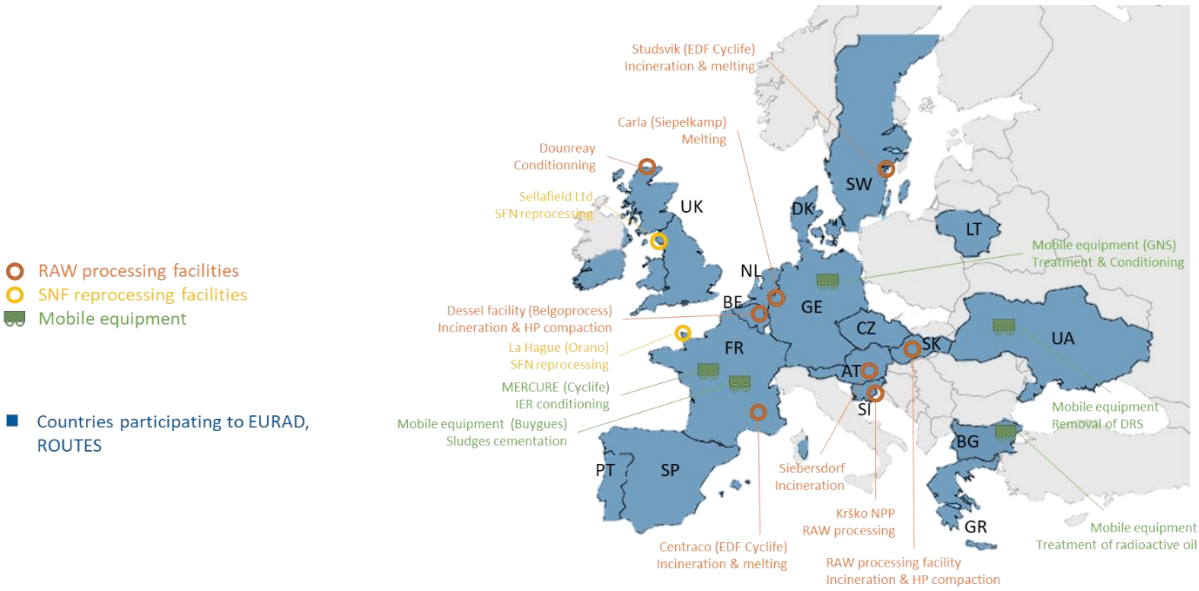

Figure 2 - Mapping of facilities allowed to treat foreign RAW/SNF and mobile equipment

The number of facilities authorized to receive foreign RAW/SNF stays relatively low on the European territory. However, these facilities cover a field of diversified technologies. Besides, that translates the fact that an important number of sharing cases between MS is done on a limited number of facilities.

Some mobile equipments are counted among the participating countries. No case of sharing of these mobile equipments outside the member state was identified to this day.

4.2 Legislation and level of agreement

The following map represents the status of importation of foreign RAW for treatment according to national regulation and situation in 2021.

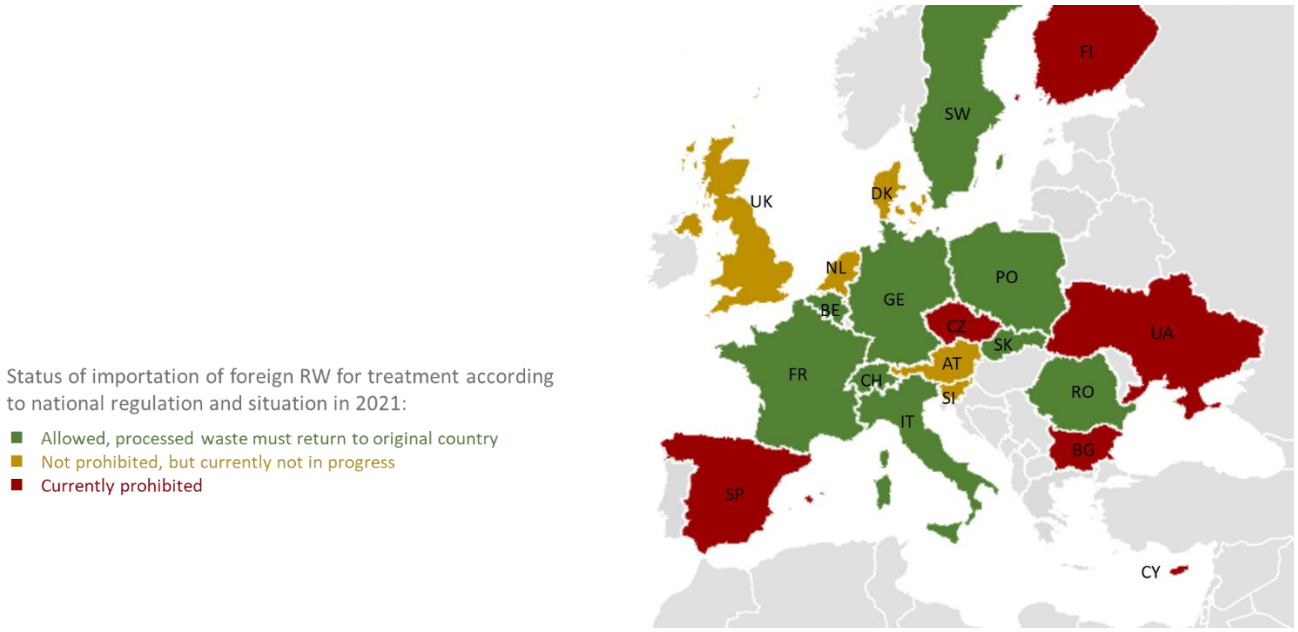

Figure 3 - Regulation about the importation of RAW in 2021 for the countries participating in EURAD

It can be seen on the map that different regulations prevail in Europe about the importation of RAW.

The number of countries allowing (or at least not prohibiting) hosting/treating foreign waste is important.

It can be noted a coherence between these countries and the facilities allowed to treat foreign waste (see §5.1). However, in some of these countries, general public opinion does not allow to foresee the construction of a new collaboration.

Except for the case of Luxembourg and Belgium, every country allowing the importation of RAW/SNF for treatment require the return of the induced waste, which activity is above the release threshold, in their home country.

Figure 4 is a representation of the legislation about exportation of RAW in the countries participating to EURAD ROUTES.

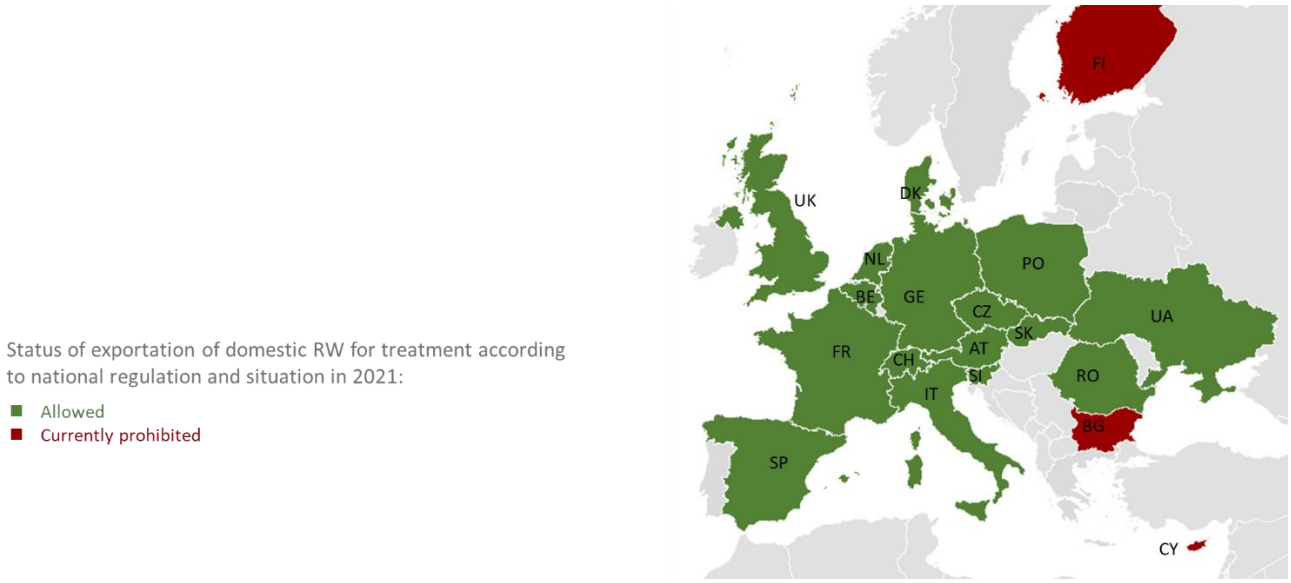

Figure 4 - Legislation about exportation in countries participating to EURAD

A relative homogeneity regarding the legislation between MS can be noted on the map and the number of countries that may consider a change in their regulation in order for their waste to be treated oversee, is low.

The map in figure 5 represents the level of agreement needed in 2021 to establish a collaboration between MS.

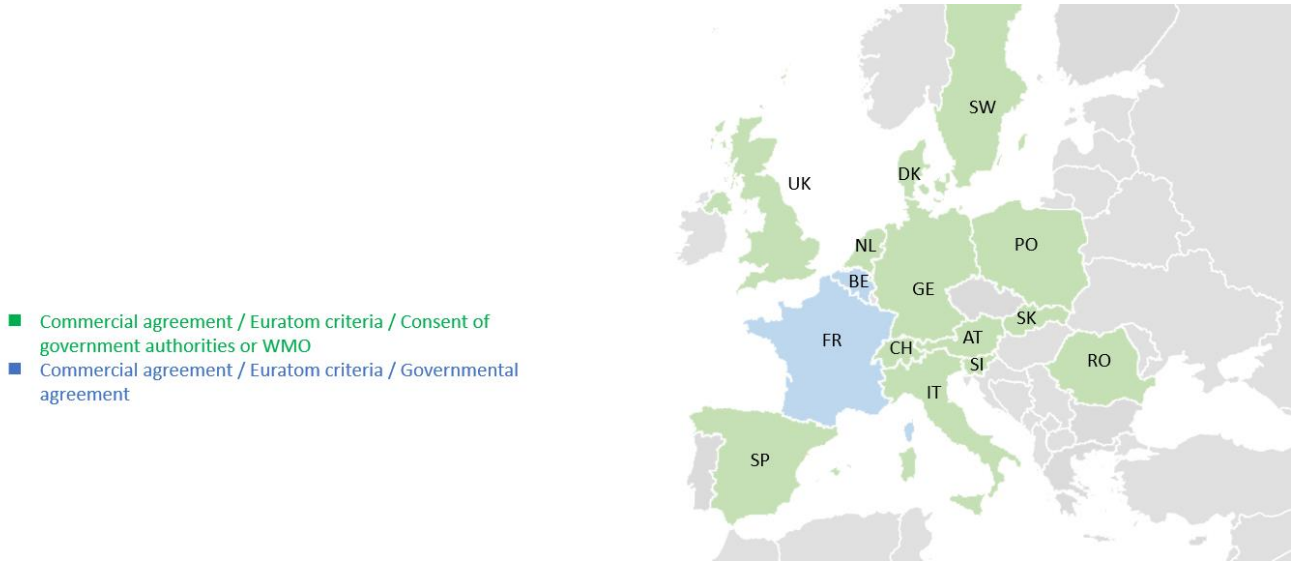

Figure 5 - Level of agreement needed in 2021 to establish a collaboration between MS

The majority of the countries, for which the import of foreign RAW is allowed or not prohibited, only requires a commercial agreement and the consent of the relevant authorities to set up a collaboration. In addition to the commercial agreement, France and Belgium require an intergovernmental agreement to import foreign RAW for treatment.

4.3 Public involvement in collaborations

It can be noted a relative homogeneity about the WMOs and facility operators' way to communicate about the collaboration between MS.

In most cases, the fact that a facility is authorized to receive/treat foreign RAW is a public information. However, the civil society is rarely involved in the establishment of a collaboration. The information regarding collaborations about treatment of RAW is most of the time released after the start of the latter or after they have been done. The government/facility informs the population of their activities through website, local meetings, or local information channel.

The information shared to the public presents a high level of technicity which sometimes do not allow an easy understanding of the activities.

In most cases also, the activities of treatment of RAW and the reprocessing of SNF are more susceptible to be told to the public than knowledge sharing.

Note that in some cases, the discovery of the treatment of foreign RAW by the public led to an early stop of the collaboration.

4.4 Lessons learned

4.4.1 Knowledge sharing

Throughout all the collected shared solutions it can be noticed that there are several instances of knowledge sharing.

These past collaborations of knowledge sharing notably involve the following subjects:

- transfer of technology for RAW processing,
- knowledge sharing regarding waste storage facilities,
- collaboration among multiple countries on the subjects of RWM and disposal,

- knowledge sharing about repositories between public agencies,
- efforts to mutualize resources for the purpose of conceiving and conducting R&D for geological disposal,
- knowledge sharing for regulatory purposes.

It is worth noting that collaborations on the scale of a group of countries, especially in areas like decommissioning and RWM, not only facilitate sharing of waste management routes, but also promote continuous improvement and the establishment of active links and trusting relationships.

The increase in the number of members in a collaboration can be seen as the illustration of the need to exchange information, particularly among WMOs, regarding about available technics.

The capitalization of knowledge acquired through collaborations can be a long-term challenge.

4.4.2 RAW processing

Service exchanges related to RAW processing are the predominant type of solution exchanges among MS. In particular, sharing services for RAW processing includes:

- incineration of technological waste,
- treatment and melting of contaminated metals (including large pieces),
- treatment and conditioning of RAW.

It has been noticed that the time required to complete the paperwork to initiate a first collaboration on RAW treatment between MS could be particularly long. Effective teamwork and trust among the involved partners increase the chances of success of new collaborations and reduce the complexity of the process.

The intricate procedures could also require a long time to set up a collaboration with an international organization.

Lessons learned from previous shared solutions among MS highlight that public consultation and acceptance are important in order to ensure the durability of agreements between countries. Some collaborations in RAW processing involve an intergovernmental agreement in addition to a commercial agreement. The success of collaborations that require an intergovernmental agreement depends on the good political relationships between the participating MS.

4.4.3 SNF reprocessing

Among past shared solutions, there are several examples of SNF reprocessing between MS.

The involvement of third parties in the preparation of a collaboration about SNF reprocessing increases international confidence about SNF transfer transparency.

Harmonization of regulations could be required for the return of the waste generated by the reprocessing of SNF.

Collaborations related to SNF reprocessing are particularly subject to unexpected interruptions due to political decisions.

4.4.4 Repository sharing

The shared solutions about repository sharing are rare.

Several attempts of repository sharing between MS have been identified but only one successful example of an intergovernmental collaboration for the processing, storage and disposal of small quantity of RAW is currently under way between Luxembourg and Belgium.

A good level of confidence might exist between partners to share a disposal strategy.

In the case of attempt of a joint repository, the options selected for construction, operation, decommissioning and closure must result in cost levels that are acceptable for all participating countries.

References

Council Directive 2006/117/Euratom (OJ 11.20.2006)

Council Directive 2011/70/Euratom (OJ 19.07.2011)

Conference of February 3rd, 2021 with Chris De Bock (Nirond), Belgium

Conference of February 3rd, 2021 with Jitka Miskova (SÚRO); Zdena Lahodová (SÚRO); Hana Vojtěchová (SÚRO), Czech Republic

Conference of February 3rd, 2021 with Elisa Leoni (IRSN); Virginie Wasselin (ANDRA), France

Conference of February 4th, 2021 with Ole Kastbjerg Nielsen (Dekom), Denmark

Conference of February 4th, 2021 with Marja Vuorio (COVRA), The Netherland

Conference of February 4th, 2021 with Adela Mrskova (NJF); Miroslav Kover (NJF), Slovakia

Conference of February 5th, 2021 with Nadja Železnik (EIMV), SloveniaConference of February 5th, 2021 with Markus Calderon (SKB); Claes Johansson (SKB); Arne Larson (Cyclife, EDF), Sweden

Conference of February 5th, 2021 with Oleksii Tokarevsky (SSTC), Ukraine

Conference of February 7th,2021 with Peter Rampl (NES); Eileen Langegger (NES); Roman Beyerknecht (NES), Austria

Conference of February 7th, 2021 with Liz Harvey (Galson Sciences LTD); Mark Cowper (NDA); Sally Scourfield (Galson Sciences LTD); Jenny Kent (Galson Sciences LTD), United Kingdom

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Conference of March 8th, 2021 with Guido Bracke (GRS); Giuseppe Modolo (FZ Juelich) Guido Deissmann (FZ Juelich), Germany

Conference of March 10th, 2021 with Audrius Šimonis (Lei), Lithuania

Mails of March 19th, 24th, 26th, 2021 about Swedish cases sent by Arne Larsson (Cyclife, EDF)

Mail of March 29th, 2021 about Cyprus' regulation sent by Ioannis Paschalidis (Environmental & Radioanalytical Chemistry Lab, University of Cyprus)

Mail of April 26th, 2021 about the Switzerland' regulation sent by Irina Gaus (Nagra)

Mail of April 29th, 2021 about Bulgaria's regulation set by Ivan V. Ivanov (Technical University of Sofia)

Mail of April 29th, 2021 about Finnish's regulation sent by Erika Holt (VTT)

Mail of May 5th, 2021 about Sweden's regulation sent by Markus Calderon (SKB)

Mail of May 4th, 2021 about the Italian's regulation sent by Angelo Paratore (Sogin)

Mail of May 4th, 2021 about Romania's regulation sent by Crina Bucur (Institute for Nuclear Research Pitesti (RATEN ICN))

Mail of May 13th, 2021 about Poland's regulation sent by Grazyna Zakrzewska (Institute of Nuclear Chemistry and technology)

Appendix A. Case studies on shared solution between countries

➢ Knowledge sharing

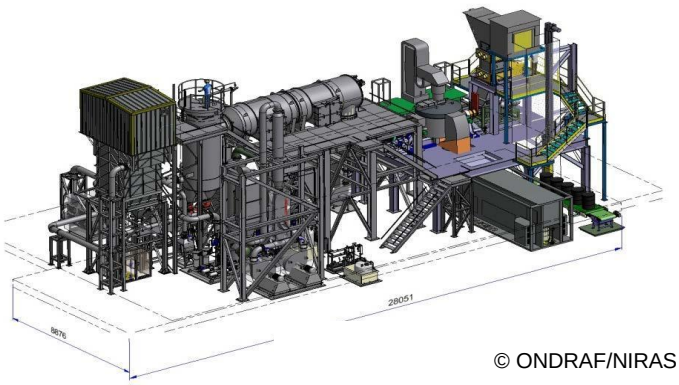
Design of a plasma incineration facility for Kozloduy NPP (Bulgaria) by Belgoprocess (Belgium) and IBERDROLA

Description:

Belgoprocess and IBERDROLA have provided Kozloduy NPP (Bulgaria) with a plasma treatment facility.

This facility reduces and immobilizes the waste through a thermal process, in which inorganic waste is melted and organic waste is burnt, resulting in slags as robust end product.

The facility consists in a tilting plasma furnace with a 500 kW torch as heat source. It will treat 250 t of LILW per year, over 40 operational weeks.



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Level of agreement:

N/A

Difficulties encountered to settle the collaboration:

N/A

Involvement of the public in the preparation of this collaboration:

N/A

Informing the public:

N/A

Lessons learned from this collaboration:

A pragmatic example of transfer of technology having proved their worth.

Belgium shared knowledge on RW repository with Slovenia

Description:

In 1996, Belgium nuclear institute SCK.CEN shared its knowledge on LILW repository with Slovenia. The collaboration between the two countries lasted for nine years as it was supported by IAEA - Technical Cooperation programs and included many trainings, workshops and scientific visits to inform Slovenian experts on safety assessment and safety case development.

Level of agreement:

N/A

Difficulties encountered to settle the collaboration:

N/A

Involvement of the public in the preparation of this collaboration:

Slovenia: The Slovenian public was only involved in the discussion to choose the repository site.

Informing the public:

N/A

Lessons learned from this collaboration:

Example of knowledge sharing about repositories between public agencies. The capitalization of the knowledge can be a challenge over the long term.

Memorandum of understanding concluded between JAVYS (WMO of Slovakia) and SÚRAO (WMO of the Czech Republic)

Description:

The Memorandum of understanding between SÚRAO (CZ) and JAVYS (SK) was signed on June 5th, 2018. It gives the possibility to JAVYS to utilize capacities of the Bukov Underground Research Facility (CZ) and to share its skills in decommissioning. The Memorandum will bring closer cooperation in the field of radioactive waste disposal between Czech and Slovak experts. SÚRAO will mainly provide the capacity of the Bukov Underground Research Facility. JAVYS will provide its knowledge and experience in the decommissioning of NPP. The Memorandum is based on good experience with cooperation between Czech and Slovak institutions from the time of Czechoslovakia.

Planned experiments and mutual cooperation is waiting for a meeting of SÚRAO and JAVYS representatives, which was postponed due to the Covid-19 situation. No agreement based on this memorandum has been signed yet.

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Level of agreement:

The level of agreement was an agreement between WMOs.

Difficulties encountered to settle the collaboration:

Some difficulties arose during the collaboration:

- The project got delayed due to a change of the head of SÚRAO and in the management of JAVYS.
- The project is now on hold because of the Covid-19 situation.
- The project of DGR in Slovakia is stagnating.

Involvement of the public in the preparation of this collaboration:

Czech Republic: The collaboration was established only with SÚRAO on the Czech Republic side.

Slovakia: Public was not involved.

Informing the public:

Czech Republic: The information about the collaboration is available on the web site of SÚRAO (Czech Republic WMO). At the time of signing the memorandum, the public was informed through the press office.

Slovakia: Public was informed (press release, information through JAVYS regional magazine and web page).

Lessons learned from this collaboration:

A good example of an attempt of pooling efforts for the purpose of conception/R&D of a geological disposal. A change of head of organizations could delay the start of a cooperation.

Bilateral interaction with several countries, primarily on knowledge management and knowledge sharing (Denmark, The Netherlands and other Scandinavian countries)

Description:

Bilateral interaction is an ongoing activity since Dekom started its activities in 2003, both in relation to decommissioning and RWM. The knowledge sharing is very valuable in both fields. Dekom has had – and still has – very good relations with several countries, e.g., the other Scandinavian countries and the Netherlands.

Level of agreement:

In many cases, there was no formal agreement (non-commercial interaction). In some cases, a political approval and agreements are needed (EURAD, ERDO).

Difficulties encountered to settle the collaboration:

No difficulties arose beside the amount of paperwork needed to establish a collaboration.

Involvement of the public in the preparation of this collaboration:

Denmark: The public was not specifically involved in the preparation of the collaborations, but Dekom is open about their activities, a.o. through Contact Fora on both national level and locally in Roskilde. Members of the Contact Fora are from CSO, relevant ministries and organizations working with RW, and in Roskilde also civil servants and politicians from the Municipality of Roskilde. See also below.

Informing the public:

Denmark: There is an ongoing communication about international cooperation on the website of Dekom and through the national contact forum, where CS is represented through NGOs (Non-Governmental Organizations) and citizen groups.

Lessons learned from this collaboration:

Collaborations at the scale of a group of countries about subjects like decommissioning and RWM allow not only to share points of view about a.o. waste management routes, but also to establish active links and relationship of confidence.

The amount of time necessary to seal an agreement must be taken into account and anticipated in order not to lose much time.

The Netherlands has shared plans of facilities with Spain, Denmark and Italy

Description:

In this case no waste was handled, only facility plans.

This was not a commercial enterprise, but the information was shared for free with other non-commercially working companies.

- With Spain: HLW storage facility plans and operational experiences were shared.
- With Italy and Denmark: LLW storage facility plans and operational experiences were shared.

Level of agreement:

The agreement between COVRA (NL) and the other party was a bilateral decision.

Difficulties encountered to settle the collaboration:

There were no difficulties in the settlement of this collaboration.

Involvement of the public in the preparation of this collaboration:

The Netherlands: Only COVRA was involved in the preparation of the collaboration.

Informing the public:

The Netherlands: Between COVRA and the public there was no genuine communication about the activity regarding this collaboration.

Lessons learned from this collaboration:

The case above is an example of knowledge sharing about the waste storage facilities.

Regional seminars on Radioactive waste Disposal (Czech Republic, Slovakia, Hungary, Austria, Slovenia and Croatia)

Description:

The history of regional seminars began in 1997 as a bilateral Czech-Slovak seminar. It is a 2-3 days professional seminar held annually. Its aim was to share information on the progress of DGR development in partner countries.

The seminar was initiated on the basis of intensive cooperation in national projects, the level of which was at a comparable level.

With the expansion of international contacts, the bilateral seminar has expanded to the Central European region and its organization regularly rotates between the participating countries – the Czech Republic, Slovakia, Hungary, Austria, Croatia and Slovenia.

The original topic of the seminars (DGR) was extended to RAW management in general and the organization of the seminar is mostly associated with an excursion to some of the local RAW management facilities.

Level of agreement:

There is no written agreement between the participating countries. The seminars are organized based on the goodwill of the participating organizations.

Difficulties encountered to settle the collaboration:

There were no major difficulties in this collaboration. Indeed, the sole difficulties could be associated with determining the topic for the individual seminars, as the development in the field of DGR and RAW management is not at the same level.

Involvement of the public in the preparation of this collaboration:

The seminars are open to the professional public only.

Informing the public:

The public is informed of the seminar through traditional information channels of WMOs participating such as websites or information magazines.

Lessons learned from this collaboration:

Example of increasing collaboration between multiple countries about the subjects of disposal and RWM illustrating the need to exchange between WMOs for the purpose of knowing and sharing the available technics.

Joint work on characterization: development of the "Guideline for characterization, accounting and control of radioactive waste" (France, Germany and Ukraine)

Description:

This case is a joint project gathering experts from Ukraine, Germany and France. The aim of this guide is to provide general recommendations on how to perform radioactive waste characterization and for the verification of compliance of radioactive waste with WAC.

Level of agreement:

A governmental agreement between the European Commission and Ukraine at the higher level was needed and a commercial agreement between two companies (SSTC NRS and RISKAUDIT).

Difficulties encountered to settle the collaboration:

No difficulties were encountered during this collaboration.

Involvement of the public in the preparation of this collaboration:

Ukraine: The public was not directly involved but the guide was submitted to interested national organizations and institutions in the field of radioactive waste management for comments.

Informing the public:

Ukraine: The public can consult a paper about the result of the work done for the guide.

Lessons learned from this collaboration:

Example of approach of knowledge sharing for the purpose of continuous improvement.

Development of two high-level regulations by the Ukrainian experts with the support of Norwegian regulatory authority (DSA)

Description:

Two high-level regulatory documents for the Ukrainian law were developed in cooperation with Norwegian regulatory authority:

- General Safety Provisions for Predisposal Radioactive Waste Management.
- General Safety Provisions for Disposal of Radioactive Waste.

Level of agreement:

A governmental agreement between Norway and Ukraine at the higher level was needed for this collaboration, as well as a commercial agreement between two companies (SSTC NRS and DSA).

Difficulties encountered to settle the collaboration:

No difficulties were encountered during the collaboration.

Involvement of the public in the preparation of this collaboration:

Ukraine: The public was not directly involved but the documents were submitted to interested organizations and institutions for comments.

Informing the public:

Ukraine: the two regulations created are available on the Ukrainian government website with the Ukrainian legislation.

Lessons learned from this collaboration:

Example of knowledge sharing for a regulatory purpose.

➢ RAW processing

Treatment of Italian LLW in Austria

Description:

From the 1990s up to 1996, ion exchange resins from Italian NPP have been treated (incinerated) and conditioned by NES (Austria). Cemented ashes have been sent back to Italy. After this agreement became public, further treatment of foreign waste was stopped due to political decision.

Level of agreement:

To achieve this collaboration, a full/supplier-contract with performance description was needed as well as an authorization from the government.

Difficulties encountered to settle the collaboration:

No difficulties were related about this case.

Involvement of the public in the preparation of this collaboration:

Austria: The contract was established with the participation of the Austrian Government.

Informing the public:

Austria: The public was informed of the collaboration afterward.

Lessons learned from this collaboration:

Even though it could exist technical interests about shared solutions of treatment of RAW between countries, the public consultation is important, and its point of view must be considered in order to ensure the durability of agreements between countries.

Processing of waste from ECN (Petten, the Netherlands) and waste from Cernavoda (Romania) in the PAMELA and CLIVA facilities (Belgium)

Description:

Belgoprocess has treated and conditioned about 1700 drums of historic LILW from the ECN (Netherlands). The waste was treated (around 2014) in the PAMELA facility in Belgium. The resulting conditioned waste was sent back to COVRA for storage.

Belgoprocess has incinerated 35 t of LLW from the Cernavoda NPP (Romania) in the CILVA facility in Belgium. The waste was transported by road to Belgium (4 transports). The residue (radioactive ashes) was sent back to Romania.

Level of agreement:

N/A

Difficulties encountered to settle the collaboration:

N/A

Involvement of the public in the preparation of this collaboration:

N/A

Informing the public:

N/A

Lessons learned from this collaboration:

Good example of commercial agreement of incineration and conditioning of RAW.

Incineration of German waste in Centraco (Cyclife, Marcoule plant, France)

Description:

In 2001, hundreds of tons of German technical waste was incinerated in the French facility Centraco. Since then, Centraco incinerated German waste again in 2002 and 2003. The resulting ashes were sent back to Germany.

Level of agreement:

To reach this collaboration, an intergovernmental agreement was needed.

Difficulties encountered to settle the collaboration:

N/A

Involvement of the public in the preparation of this collaboration:

France: The contract was handled by the regulators and Centraco on the French side.

Informing the public:

France: Local authorities are informed that Centraco can treat some foreign waste but are not consulted in the preparation of commercial contracts. The public was informed of the collaboration through annual review of activities presented by Centraco to the local information commission mainly composed of local elected representatives.

Lessons learned from this collaboration:

This case is a good example of incineration of a large amount of technological waste. It is also a good example of successful collaboration, even though it has required an intergovernmental agreement in addition to a commercial agreement.

Incineration of a small amount of Spanish waste in Centraco (Cyclife, Marcoule plant, France)

Description:

In 2010, the potential incineration of rinsing effluents from the steam generator of the Spanish nuclear plant Vandellos in the French facility Centraco had been discussed. Unfortunately, this collaboration did not happen because of the required level of agreement.

Level of agreement:

An intergovernmental agreement was needed for this collaboration.

Difficulties encountered to settle the collaboration:

Due to political reasons between both countries, the collaboration could not be reached.

Involvement of the public in the preparation of this collaboration:

France: The collaboration was established with the French regulators and Centraco only.

Spain: The collaboration was only established with the operator of the NPP Vandellos.

Informing the public:

France: Local authorities are informed that Centraco can treat some foreign waste but are not consulted in the preparation of commercial contracts.

Spain: No communication about the collaboration to the public.

Lessons learned from this collaboration:

In some cases, a collaboration cannot be reached because of political reasons. Hence, when a collaboration can only be established by an intergovernmental agreement, it automatically fails.

Melting of Austrian contaminated metals in Germany

Description:

In the course of the first re-melting campaign 2007/09, around 110 t of scrap metals (steel, aluminum, lead) were successfully processed. The metal scrap came mainly from the decommissioning of the ASTRA research reactor (Austria). The melted metal could be completely released for recycling in Germany. Of the waste incurred (slag, dust, plastic parts, rubbish, etc.), around 4 t were released for disposal in Germany, around 7 t were returned to Austria (NES) as radioactive waste. This was taken to the interim storage after high force compaction and sizing in waste drums. A second re-melting campaign is currently ongoing since 2020 until today (2022).

Level of agreement:

A full supplier/customer contract was required for this collaboration between the two companies and the authorization of the competent authorities.

Difficulties encountered to settle the collaboration:

There were no difficulties worth noticing during this collaboration.

Involvement of the public in the preparation of this collaboration:

Austria: The contract was established with the participation of the Austrian Government.

Informing the public:

Austria: The documents about this collaboration are not public.

Lessons learned from this collaboration:

So far, this collaboration is an example of commercial collaboration of melting of contaminated metals.

Recycling/processing of Belgian metals in Siempelkamp facility (Germany)

Description:

Belgoprocess (Belgium) makes use of the services provided by Siempelkamp Nucleartechnik (Germany). Low active metal waste is treated by cutting and melting. Radioactive residues are being sent back to Belgoprocess.

Services happened e.g. in 2015 and 2019 (public tender).

Level of agreement:

A commercial agreement, with involvement of the authorities, was required.

Difficulties encountered to settle the collaboration:

N/A

Involvement of the public in the preparation of this collaboration:

N/A

Informing the public:

N/A

Lessons learned from this collaboration:

Example of a successful commercial collaboration about the treatment (cutting and melting) of low active metals.

Treatment of contaminated metals from the Netherlands in the melting plant CARLA Siempelkamp (Germany)

Description:

The Netherlands shipped contaminated metal (600L barrels from COVRA) to the plant CARLA Siempelkamp in Germany to be melted. The commercial agreement ended because of social and economic reasons (Germany did not want to provide the services anymore).

Level of agreement:

The agreement between both countries was a commercial one.

Difficulties encountered to settle the collaboration:

N/A

Involvement of the public in the preparation of this collaboration:

Germany: The preparation of the collaboration involved the plant CARLA and the relevant authorities.

Informing the public:

Germany: There was no official communication about this case.

Lessons learned from this collaboration:

A good illustration of commercial collaboration of melting of contaminated metals.

Commercial collaborations can be stopped for social and economic reasons.

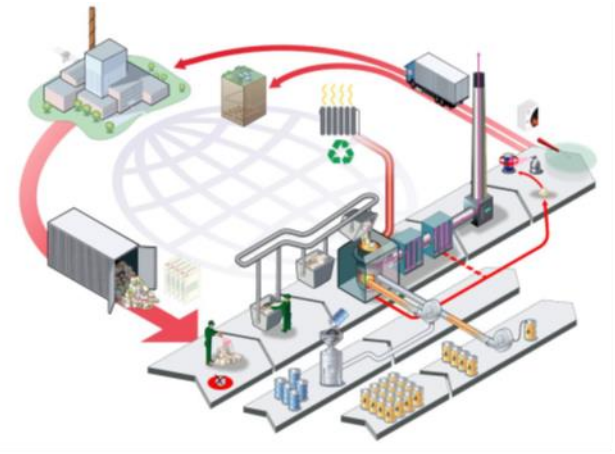
Incineration of Spanish waste by Cyclife Sweden AB (ex Studsvik Cyclife)

Description:

120 m^3 of Spanish water-based liquid from cleaning of heat exchangers were incinerated. The liquids were shipped by truck in large classified containers for liquids in Sweden.

By this treatment a significant weight reduction was achieved (more than 100 times). In addition, the organics, which could have a negative impact on the final repository were destroyed and the final waste form was a dry waste containing the inorganic particles.

The treatment was performed in an isolated campaign and the residual waste was returned to Spain.



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Level of agreement:

A commercial agreement was needed for this collaboration.

Difficulties encountered to settle the collaboration:

No difficulties related to the shipment and treatment in Sweden.

Involvement of the public in the preparation of this collaboration:

Sweden: The contract was established with the company Cyclife and the relevant authorities.

Informing the public:

Sweden: No specific sharing information with public for this contract was done.

Lessons learned from this collaboration:

The case above is a good example of commercial collaboration about the incineration of waste.

Incineration of Danish waste by Cyclife Sweden AB (ex Studsvik Cyclife)

Description:

Approximatively 15 t of Danish waste was incinerated at the Cyclife facility in Sweden (first batch in 2015, and second batch in 2019). It is considered as a success, as the amount of organic waste was considerably reduced, and a considerable volume reduction was obtained (75% reduction in 2015 and 90% reduction in 2019).

Level of agreement:

The level of agreement to reach this collaboration was commercial.

Difficulties encountered to settle the collaboration:

The paperwork took time the first time a collaboration was established.

Involvement of the public in the preparation of this collaboration:

Denmark: The public was not involved prior to the agreement. But there is an overall consensus about the benefits of obtaining volume reductions by incineration, reuse, melting, etc.

Informing the public:

Denmark: Information about cooperation is publicly available.

Lessons learned from this collaboration:

A good example of a commercial agreement about the incineration of waste.

Enough time needed for the paperwork to set up a first collaboration has to be reserved.

Melting of Austrian contaminated metals and secondary waste by Cyclife Sweden AB (ex Studsvik Cyclife)

Description:

In the course of the remelting campaign 2015, around 72 t of Austrian scrap metals (only steel) were successfully processed by Cyclife Sweden AB. The metal scrap came mainly from the decommissioning of a high compaction press (Fakir/GNS). The melted metal could be completely released for recycling. Around 3,6 t were returned to Austria (NES) as radioactive waste. This was taken to the interim storage after high force compaction and sizing in waste drums.

Level of agreement:

A commercial agreement was needed for this collaboration to be achieved.

Difficulties encountered to settle the collaboration:

There were no difficulties to reach the collaboration or during the collaboration between the two companies involved.

Involvement of the public in the preparation of this collaboration:

Austria: The contract was established with the participation of the Austrian Government.

Informing the public:

Austria: The documents about this collaboration are not public.

Lessons learned from this collaboration:

A good illustration of a commercial collaboration of melting metals.

Processing and recycling of Belgian metals by Cyclife Sweden AB (ex Studsvik Cyclife)

Description:

Cyclife Sweden regularly provides services to Belgian producers for treatment of radioactive metal waste by cutting and melting, resulting in recuperable metal, cleared and recycled in Sweden, and residues in the form of radioactive slags, which are then sent back to Belgium (several hundreds of tons were treated during more than two decades).

It is planned to send 5 steam generators from a Belgian NPP for treatment to Cyclife Sweden. The secondary waste resulting from the melting process will be sent back to Belgium. At present, the steam generators have not yet been shipped.

Level of agreement:

Projects for most Belgian customers are commercial orders. There also are long time agreements with governmental customers.

Difficulties encountered to settle the collaboration:

N/A

Involvement of the public in the preparation of this collaboration:

Sweden: There was no public involvement in the preparation or execution of the contract.

Informing the public:

Sweden: Notifications to regulators and licenses are public documents, which are accessible.

Lessons learned from this collaboration:

N/A

Melting of Italian waste by Cyclife Sweden AB (ex Studsvik Cyclife)

Description:

In the strive for circular economy, SOGIN, representing the Italian state, presented a public tender for the treatment of approximatively 1800 t of metal scrap arising from the decommissioning of the three NPPs Latina, Garigliano, and Trino. Cyclife was awarded the contract in 2017 to process the scrap metal, including the bulk clearance from regulatory control, recycle the metal back into the society as valuable material.

Level of agreement:

A commercial agreement was needed to achieve this collaboration.

Difficulties encountered to settle the collaboration:

No difficulties arose during this collaboration.

Involvement of the public in the preparation of this collaboration:

Sweden: There was no specific consultation with the public because it was considered that the public was already represented by each national authority and that Cyclife and SOGIN have frequent communication with the public through their operational permit.

Informing the public:

Sweden: The documents about the collaboration are available to the public, but the public must ask the government regulators to access these documents (on the Sweden side).

Lessons learned from this collaboration:

The case above is a good example of collaboration about melting of contaminated waste.

Melting of contaminated metal parts from the Netherlands in Cyclife Sweden AB (ex Studsvik Cyclife)

Description:

The crashed centrifuges of Urenco (the Netherlands) were melted down in Cyclife Sweden AB.

Level of agreement:

N/A

Difficulties encountered to settle the collaboration:

N/A

Involvement of the public in the preparation of this collaboration:

N/A

Informing the public:

N/A

Lessons learned from this collaboration:

This case is good example of a commercial collaboration of melting contaminated metal parts.

Transfer of UK metallic wastes for melting by Cyclife Sweden AB (ex Studsvik Cyclife)

Description:

Size reduction, decontamination and melting of large LLW metallic items (15 boilers/heat exchangers from Magnox Berkeley Nuclear Power Station in the UK) took place at the Studsvik (now EDF Cyclife) facility in Sweden.

It was a successful project, with treatment completed in 2014, involving UK and Sweden, plus stakeholder engagement with Finland.

This project treated approximatively 4,600 t of metal and resulted in approximatively 160 m^3 of LLW being returned to the LLWR for disposal.

Level of agreement:

To achieve this collaboration, a commercial agreement was needed.

Difficulties encountered to settle the collaboration:

No difficulties were encountered because of close teamwork between all the parties involved in the collaboration.

Involvement of the public in the preparation of this collaboration:

UK: Early engagement was conducted with the following stakeholders: Office for Nuclear Regulation, Environment Agency, Berkeley Site Stakeholders Group, Swedish Regulator (SSM), Finnish Regulator (STUK), Maritime & Coastguard Agency, Gloucestershire County Council, Highways Agency, Sharpness Port Authorities & Trustees.

Informing the public:

UK: The boiler treatment project received significant attention in local and national press.

Lessons learned from this collaboration:

The collaboration above is a good example of commercial collaboration in order to melt big metallic pieces. Good teamwork and confidence between involved partners increased the opportunities for successful new collaboration.

Melting of Romanian waste by Cyclife Sweden AB (ex Studsvik Cyclife)

Description:

In 2012, around 98 m^3 of solid waste from Cernavoda NPP has been transported by road to Cyclife Sweden AB for incineration (in three transports). Between 2010 and 2016, around 8 500 m^3 of radioactive waste has been sent for incineration to Cyclife Sweden AB.

Level of agreement:

N/A

Difficulties encountered to settle the collaboration:

N/A

Involvement of the public in the preparation of this collaboration:

N/A

Informing the public:

N/A

Lessons learned from this collaboration:

N/A

Treatment and conditioning of IAEA secondary LLW from the Seibersdorf laboratories (Austria)

Description:

In the 1960s, a contract was established to treat laboratory waste from IAEA site in SEIBERSDORF. The waste is treated like any other radioactive waste of Austrian origin. The agreement can be considered as successful as it is covered with standard procedures in the course of the operational day.

Level of agreement:

To achieve this collaboration a full/supplier-contract with performance description was needed as well as an authorization of the government.

Difficulties encountered to settle the collaboration:

The main difficulty here was the time and the complexity of the procedures in order to establish the contract.

Involvement of the public in the preparation of this collaboration:

Austria: The contract was established with the involved authorities.

Informing the public:

Austria: The information regarding this collaboration is not public.

Lessons learned from this collaboration:

Good example of collaboration between a country and an international organization about the treatment of RAW. The complexity of procedures could require a long time to set up a collaboration with an international organization.

➢ SNF reprocessing

Reprocessing of Belgian NPP spent fuel in La Hague (France)

Description:

Belgian NPP SNF has been reprocessed in La Hague (France). The contract was suspended after the decision by the Council of Ministers of December 4th, 1998.

A new reprocessing contract for 225 t of fuel was canceled. Since then, SYNATOM (the owner of the SNF) was asked not to sign new reprocessing contract without the Council formal agreement.

Level of agreement:

An intergovernmental agreement was needed to achieve this collaboration.

Difficulties encountered to settle the collaboration:

N/A

Involvement of the public in the preparation of this collaboration:

N/A

Informing the public:

N/A

Lessons learned from this collaboration:

A good example of collaboration about SNF reprocessing. Commercial collaboration can be stopped for political reasons.

Reprocessing of SNF from Czech Republic in Mayak plant (Russian Federation)

Description:

Highly enriched (36%, 80%) SNF from the Czech Republic's LVR-15 experimental nuclear reactor was transported to the Russian Federation for reprocessing (Mayak reprocessing plant). There were two shipments of SNF to Russia, one in 2007 and the other in 2013. The residual waste generated by reprocessing was poured into 200 L canisters and will be returned to the Czech Republic between years 2026 and 2033.

State and private organizations from the Czech Republic, the USA, the Russian Federation and all transit countries and IAEA participated in the preparation of the shipments and in the SNF transport itself.

All permissions needed for export/import, package system, transport and storage of this waste must be obtained. State authorities, ÚJV Řež a.s. (producer), ŠKODA JS (designer of a container), SÚRAO (WMO) participate in this negotiation.

Level of agreement:

The level of agreement needed is commercial for this collaboration between the Russian Federation and the Czech Republic.

Difficulties encountered to settle the collaboration:

There were no significant difficulties encountered during the elaboration of this collaboration.

Involvement of the public in the preparation of this collaboration:

Czech Republic: The agreement was created only with the participation of the Ministry of Industry, the State office and the authorized organizations.

Informing the public:

Czech Republic: The public was informed of the collaboration after the SNF was sent away to the Russian Federation because of a legal request to prevent misuse of the SNF and security reasons.

Lessons learned from this collaboration:

Good example of SNF reprocessing.

The involvement of tiers in the preparation of a collaboration about SNF reprocessing increases the international confidence about SNF transfer transparency.

Reprocessing of Belgium's research reactor spent fuel in Dounreay (UK)

Description:

240 fuel elements from Belgium's BR2 research reactor have been reprocessed at Dounreay (UK). The resulting 123 drums of medium active cemented waste were sent back to Belgium between 2012 and 2015.

Level of agreement:

A commercial agreement (contract between UKAEA and SCK.CEN) was in place to reprocess material test reactor fuels and then subsequent agreement for immobilization into a final form to meet the customer's requirements.

Difficulties encountered to settle the collaboration:

No difficulties were explicitly defined.

Involvement of the public in the preparation of this collaboration:

UK: Although there was no formal consultation on the actual operations within the UK, the public were given the opportunity to provide comments on any Authorisations to be issued by the environmental regulator Scottish Environmental Protection Agency (SEPA).

Informing the public:

UK: The local community was informed of the collaboration through the several meetings held each year.

Lessons learned from this collaboration:

Successful example of collaboration about SNF reprocessing.

SNF from German NPPs delivered to Sellafield (UK) for reprocessing

Description:

German SNF was sent for reprocessing in the English facility Sellafield until 2005. Because of safety issues about transportation and economic reasons, the collaboration ended.

Level of agreement:

The collaboration was achieved thanks to an intergovernmental agreement between the two countries.

Difficulties encountered to settle the collaboration:

The transport of highly irradiated wastes arose as one of the difficulties encountered to establish this collaboration.

Involvement of the public in the preparation of this collaboration:

Germany: There was no official discussion between the plant and the public. Moreover, reprocessing was stopped by a political decision since the opinion of the public was not in favor of reprocessing anymore.

Informing the public:

Germany: N/A

Lessons learned from this collaboration:

Successful example of collaboration about SNF reprocessing.

Intergovernmental collaboration can be stopped for political reasons.

Reprocessing of Dutch Spent Nuclear Fuel in Sellafield (UK)

Description:

The vitrification of Dutch waste was done by British Nuclear Fuels Ltd (BNFL) at the Sellafield site. They had ownership of the technology used and specified the process. Members of COVRA, BNFL and GKN worked together to bring Dutch and British requirements on the quality of canisters to the same level under the oversight of the Dutch regulators. This co-operation ended 2010.

28 vitrified canisters in total were processed.

Level of agreement:

The contract was taken care of by the regulators of both countries.

Difficulties encountered to settle the collaboration:

It took time to establish the collaboration because of the differences in the regulations of The Netherlands and United Kingdom.

Involvement of the public in the preparation of this collaboration:

The Netherlands: N/A

UK: National public consultations were held during the development of government policy on waste substitution activities.

Informing the public:

The Netherlands: N/A

UK: UK nuclear sites have site stakeholder groups that meet several times per year.

Lessons learned from this collaboration:

Successful example of collaboration about SNF reprocessing.

Regulation harmonization could be required for a collaboration about the return of the resulting waste.

Reprocessing of Dutch spent fuel in La Hague (France)

Description:

The French company ORANO Cycle (previously Cogema and later AREVA) provides EPZ (the Dutch nuclear operator) with the services of used reactor fuel evacuation from the reactor site, its treatment to recover the uranium and the plutonium, and the service of packaging the radioactive residues of this treatment into canisters that allow easy and safe handling and long-time storage.

The collaboration is still ongoing, with an estimate for disposal of 450 CSD-v canisters.

Level of agreement:

This collaboration is supported by intergovernmental agreements signed between the Dutch and French governments.

Difficulties encountered to settle the collaboration:

EPZ reprocessing contract is implemented under French law, so the Dutch authorities had to comply with specific French regulations.

Involvement of the public in the preparation of this collaboration:

The Netherlands: The public has been involved *via* a public Environmental Impact procedure which took several years.

Informing the public:

The Netherlands: The public has been involved *via* a public Environmental Impact procedure which took several years.

Lessons learned from this collaboration:

N/A

➢ Repository sharing

Treatment, conditioning, storage (awaiting disposal) of waste from the Grand Duchy of Luxemburg in Belgium

Description:

Radioactive waste from the Grand Duchy of Luxemburg is imported to Belgium for treatment, conditioning and storage (awaiting disposal). The imported waste consists mainly of smoke detectors, sealed sources and small amount of burnable waste.

Between 1995 and 2016, 3.76 m^3 of waste has been imported from the Grand Duchy of Luxemburg. In 2016, a new agreement valid for 30 years was signed between both countries. The importation of waste is limited to 30 m^3.

Level of agreement:

To achieve this collaboration, an intergovernmental agreement was signed between the competent ministers of Belgium and Luxembourg.

Difficulties encountered to settle the collaboration:

N/A

Involvement of the public in the preparation of this collaboration:

N/A

Informing the public:

N/A

Lessons learned from this collaboration:

Successful example of intergovernmental collaboration for the processing, storage and disposal of small quantities of RAW from a foreign country.

Management of radioactive waste at the NPP Krško (Slovenia and Croatia)

Description:

The Krško NPP is co-owned by the Slovenian state-owned company Gen-Energija and the Croatian state-owned company Hrvatska elektroprivreda. The collaboration between Slovenia and Croatia for the disposal of LILW waste from the operation of NPP could not be reached until now and decision from 2020 requires that each country manage the ½ of LILW from NPP operation and decommissioning (in the future). For SF management, currently on-site facilities are available, but in the future, the decision should be still taken.

Level of agreement:

An intergovernmental agreement was targeted for this collaboration. The two countries already have an historical agreement.

Difficulties encountered to settle the collaboration:

- The level of confidence between the two countries was not good enough to reach an agreement on joint LILW disposal
- The cost of the future facility (LILW disposal facility) was not accepted by both countries

Involvement of the public in the preparation of this collaboration:

Slovenia: The implementation of intergovernmental agreement was decided by representatives of governments. No public participation was employed.

Informing the public:

Slovenia: The construction of NPP started in Yugoslavia without public participation in the 70‘s (as was the case in all other countries).

Lessons learned from this collaboration:

A good level of confidence must be existing between two countries to share a disposal strategy.

The options selected for construction, operation, decommissioning and closure of a joint repository must lead to level of costs which is well accepted by all participating countries.

Appendix B. Regulation, level of agreement and public consultation and information

In this part, the regulation about export and import of domestic RAW or/and SNF, the level of agreement needed to create a collaboration between two (or more) countries, and the process of consultation/sharing information with Civil Society in each country participating in Subtask 6.2, and countries who agreed to share some information, are presented. The following information was obtained for the most part within the Subtask 6.2 Questionnaire sent to all participants in December 2019 and the answers were presented during the individual sessions in March 2021.

➢ Austria

i. Regulation about export of domestic RAW or SNF and level of agreement needed:
Sending waste abroad for treatment is a standard procedure according to an Austrian ordinance based on the COUNCIL DIRECTIVE 2006/117/EURATOM on the supervision and control of shipments of radioactive waste and spent fuel.
The level of agreement required is commercial.

ii. Regulation about import of foreign RAW or SNF and level of agreement needed:
Handling and storage of RW from abroad is prohibited in Austria. To change this situation, an official request would have to be made at the political level.

iii. Process of consultation/sharing information with Civil Society:
In Austria, there is no process of consultation of the CS, only the approval of the authority is necessary.

➢ Belgium

i. Regulation about export of domestic RAW or SNF and level of agreement needed:
Belgium can export its waste. To do so, governmental and commercial agreements are needed.

ii. Regulation about import of foreign RAW or SNF and level of agreement needed:
Belgium can welcome foreign waste. To do so, governmental and commercial agreements are needed.

iii. Process of consultation/sharing information with Civil Society:
No formal process of public consultation is installed in Belgium. However, the local communities are well informed about the waste treatment facilities and about planned campaigns of foreign waste treatment.

➢ Bulgaria

i. Regulation about export of domestic RAW or SNF and level of agreement needed:
According to the Bulgarian regulation (Safe Use of the Nuclear Energy Act, 2002, supl.2020), the exportation of RAW and SNF is prohibited.

ii. Regulation about import of foreign RAW or SNF and level of agreement needed:
According to the Bulgarian regulation (Safe Use of the Nuclear Energy Act, 2002, supl.2020), the importation of RAW and SNF is prohibited.

iii. Process of consultation/sharing information with Civil Society:
Not relevant in this case.

➢ Cyprus

i. Regulation about export of domestic RAW or SNF and level of agreement needed:
The legislation of Cyprus does not allow the export of domestic waste.

ii. Regulation about import of foreign RAW or SNF and level of agreement needed:
As for the exportation, the Cyprus Government prohibits the importation of foreign RAW.

iii. Process of consultation/sharing information with Civil Society:
Not relevant in this case.

➢ Czech Republic

i. Regulation about export of domestic RAW or SNF and level of agreement needed:
Shared disposal facility cannot be sited in the territory of the Czech Republic. However, export of RAW for disposal abroad is not forbidden, but limited according to the conditions of Directive 2011/70/Euratom.

ii. Regulation about import of foreign RAW or SNF and level of agreement needed:
The import of RAW is prohibited by the section 7, paragraph 3 of the Atomic Act.

iii. Process of consultation/sharing information with Civil Society:
Czech Republic has no formal process of public consultation or information.

➢ Denmark

i. Regulation about export of domestic RAW or SNF and level of agreement needed:
A commercial agreement is needed to send Danish waste abroad for treatment, as well as a permit from the regulator.

ii. Regulation about import of foreign RAW or SNF and level of agreement needed:
In the regulation of Denmark, there is no prohibition regarding the treatment of foreign waste. To treat foreign waste in Denmark, a permit from the regulator is required.

iii. Process of consultation/sharing information with Civil Society:
Even though Denmark doesn't have a formal process of consultation or information, they are open to communication about the treatment of RAW, a.o. through Contact Fora where CSO is represented.

➢ Finland

i. Regulation about export of domestic RAW or SNF and level of agreement needed:
Normally, the Finnish regulation does not allow the export of domestic RAW and SNF, except in some cases. In these rare cases, the exportation is made by following the Council Directive 2006/117/Euratom regarding the shipment of RAW.
To effectuate the shipment, the waste/SNF holder must apply for authorization to STUCK (Finnish WMO).
A commercial agreement is also needed to export domestic RAW.

ii. Regulation about import of foreign RAW or SNF and level of agreement needed:
As for the exportation, the Finnish regulation does not allow the import of RAW/SNF, except for some cases (for small amounts with research purposes).
If the country of origin is a EU member, the holder of the waste must obtain the permission of the competent authority in his country and the latter is required to obtain the authorization of STUCK.
If not, in its application to STUCK, the consignee has to include evidence that the waste/SNF will be taken back by the holder in case the shipment cannot be completed in addition to the authorization of the holder of the waste by the competent authority in his country.

iii. Process of consultation/sharing information with Civil Society:
N/A

➢ France

i. Regulation about export of domestic RAW or SNF and level of agreement needed:
In order to export domestic RAW or SNF, an intergovernmental agreement is needed.

ii. Regulation about import of foreign RAW or SNF and level of agreement needed:

The French regulators authorize the import of foreign waste but not its disposal. Consequently, the secondary waste originating from the processing or reprocessing of the waste must be returned to the country of origin of the waste.
An intergovernmental agreement is needed to establish a collaboration.

iii. Process of consultation/sharing information with Civil Society:
In France, a process of consultation of the CS is not held for each collaboration created. Nevertheless, the CS is informed annually about the activities, which have been conducted in a facility throughout the meeting of the local information commission.

➢ Germany

i. Regulation about export of domestic RAW or SNF and level of agreement needed:
German waste can be processed or conditioned abroad if the waste is taken back to Germany, but Germany does not plan to reprocess SNF abroad in the future.
A commercial agreement is needed in order to treat German waste abroad.

ii. Regulation about import of foreign RAW or SNF and level of agreement needed:
Germany cannot host foreign waste because of the amendment to the Atomic Energy Act of 2002.

iii. Process of consultation/sharing information with Civil Society:
There is no formal process of consultation or sharing information with public, but public consultation is foreseen to some extent when a new facility is built.

➢ Italy

i. Regulation about export of domestic RAW or SNF and level of agreement needed:
The exportation of Italian waste is allowed and requires a commercial agreement and an authorization from the Italian competent authorities and from the country the RAW or SNF are shipped to.

ii. Regulation about import of foreign RAW or SNF and level of agreement needed:
Even though the Italian law allows the importation of RAW and SNF and, as for the exportation requires an authorization, it will be difficult to import them because of the social acceptance regarding this matter.

iii. Process of consultation/sharing information with Civil Society:
There is no formal process of public consultation foreseen in case of shipment or importation of waste for treatment.

➢ The Netherlands

i. Regulation about export of domestic RAW or SNF and level of agreement needed:
When Dutch waste is sent abroad, the rules and regulation of the receiving country are obeyed.

ii. Regulation about import of foreign RAW or SNF and level of agreement needed:
There is no precedent of treatment of foreign waste in the Netherlands.

iii. Process of consultation/sharing information with Civil Society:
The public is consulted when an Environmental Impact Assessment is conducted and is informed of an activity when it is the first time the activity is being done through press releases or events.

➢ Poland

i. Regulation about export of domestic RAW or SNF and level of agreement needed:
Exportation of domestic RAW is not prohibited and requires the license referred to in Article 62c, Section 1 (Atomic Law) of the president of the National Atomic Energy Agency.

ii. Regulation about import of foreign RAW or SNF and level of agreement needed:
The import of foreign RAW or SNF is allowed but to do so the license referred to in Article 62c, Section 1 (the import from EU) or permit referred to in Article 62d, Section 1 (the import from third country –

country which is not a European Union Member State) of the president of the National Atomic Energy Agency must be obtained.

iii. Process of consultation/sharing information with Civil Society:
The Polish public is not consulted for the importation or exportation of RAW and SNF.

➢ Romania

i. Regulation about export of domestic RAW or SNF and level of agreement needed:
Export of RAW and SNF fuel is prohibited with the following exemptions:

- export of sealed spent sources which must be repatriated to the supplier or manufacturer;
- export of RAW or SNF in view of processing, with subsequent return of radioactive waste resulting from processing;
- export of RAW and SNF for disposal if the country of destination has technical and administrative capacity and the regulatory structure to meet the international standards;
- export of SNF from research reactors to a country that supplies or produces nuclear fuel for research reactors.

An intergovernmental agreement is needed for the export of SNF and a commercial one for the export of RAW and sealed spent sources.

ii. Regulation about import of foreign RAW or SNF and level of agreement needed:
Import of RAW and SNF fuel is prohibited with the following exemptions:

- import of sealed spent sources which must be repatriated to the supplier or manufacturer;
- import of RAW generated directly from the processing of RAW or SNF as a result of an export or an intra-community transfer from Romania, previously authorized.

A commercial agreement is needed for the import of RAW and sealed spent sources.

iii. Process of consultation/sharing information with Civil Society:
In Romania, there is no process of consultation/sharing information with public regarding the transfer of waste abroad for processing.

➢ Slovakia

i. Regulation about export of domestic RAW or SNF and level of agreement needed:
The exportation of Slovak waste is allowed, even though there was no precedent. A commercial agreement with Javys (the Slovak WMO) will be needed and the permission of the competent authorities.

ii. Regulation about import of foreign RAW or SNF and level of agreement needed:
Processing foreign waste is authorized in Slovakia and requires a commercial agreement as well as the consent of the Slovak permitting authorities (Nuclear Regulatory Authority, Public Health Authority and Ministry of Transport). Import of RAW/SNF for storage or disposal is forbidden according to the Atomic Law (Atomic Act §21 (6), (12)). Import of RAW for treatment by incineration is forbidden according to the Act 388/2021 Coll. (excluding contracts signed by 1. October 2021).

iii. Process of consultation/sharing information with Civil Society:
There is no special regulation or requirement on public consultation due to processing of foreign waste neither in case of sending waste abroad. Consultation is required for EIA process of any new facility or treatment activity, regardless it is a domestic or foreign waste processed.

➢ Slovenia

i. Regulation about export of domestic RAW or SNF and level of agreement needed:
The export of Slovene waste abroad is allowed and to do so, a license or the consent of the authority competent for nuclear safety must be obtained.

ii. Regulation about import of foreign RAW or SNF and level of agreement needed:
The import of foreign waste is not allowed in Slovenia. However, an exception is made for Croatia because of the historical relationship between the two country and the shared NPP.

iii. Process of consultation/sharing information with Civil Society:
In general, every major change in nuclear facilities (NPP, Research Reactor, Central Storage and future repositories) should go through licensing process. This includes also screening from environmental impact point of views. If there are possibilities for environmental impacts, the licensing will include EIA with environmental impact report, which has to be open for public participation including public hearing and responding the received comments.
In case of sending waste abroad, there is no public participation foreseen, but there is a licensing process.

➢ Spain

i. Regulation about export of domestic RAW or SNF and level of agreement needed:
The export of Spanish waste for treatment can be done with the permission of the government and with a commercial agreement between the expeditor and the receiving party.
Spain does not plan to export its waste for treatment in another country.

ii. Regulation about import of foreign RAW or SNF and level of agreement needed:
Spain does not have any plan to host or treat foreign waste.

iii. Process of consultation/sharing information with Civil Society:
There is no process of consultation or sharing information with Spanish CS.

➢ Sweden

i. Regulation about export of domestic RAW or SNF and level of agreement needed:
N/A

ii. Regulation about import of foreign RAW or SNF and level of agreement needed:
In general, Sweden is not allowed to host foreign waste. However, an operator/facility can host and treat foreign waste temporarily; to do so, the operator must have a license which allows that kind of operation. In that case, it is mainly commercial agreement and it is mandatory that all residues are returned to the country of origin.

iii. Process of consultation/sharing information with Civil Society:
Hosting foreign waste is only allowed if an operator has a license for that kind of operation. During the process to get such license, there are public consultations which play an important role.

➢ Switzerland

i. Regulation about export of domestic RAW or SNF and level of agreement needed:
The Swiss legislation stipulates that the waste produced in Switzerland should be managed, in principle, in Switzerland.
Art. 34 paragraph 3 of the Nuclear Energy Act specifies that a licence may be granted for the export of radioactive waste for treatment and conditioning, provided the following conditions are met:

- the country of destination has consented to the import of radioactive waste for conditioning purposes in an agreement under international law
- the country of destination has a suitable waste management installation that corresponds to the latest international standards of science and technology
- all countries concerned have given their consent to the transit of the radioactive waste in question
- the exporter has entered into a binding agreement with the importer of the radioactive waste that has been approved by the Federal Council or its designated authority and which stipulates that the exporter shall take back any radioactive waste that may result from conditioning or – if applicable – any radioactive waste that may not have been conditioned.

SNF cannot be reprocessed abroad but an exception can be made for the research purposes.

For storage and disposal an exception can also be made if the conditions above are met. In particular, the exporter and the importer of the waste should enter into a binding agreement that is approved by the authority designated by the Federal Council.

The export of domestic waste is subject to the approval of the Swiss government or the relevant authorities.

ii. Regulation about import of foreign RAW or SNF and level of agreement needed:

Regarding the importation of foreign waste for treatment the law states that it is prohibited but an exception can be granted if the following conditions are met:

- Switzerland has consented to the import of radioactive waste for management purposes in an agreement under international law
- Switzerland has a suitable waste management installation that corresponds to the latest international standards of science and technology
- all countries concerned have given their consent to the transit of the radioactive waste in question
- the importer and the exporter of the radioactive waste consignment have signed a legally binding agreement that has been approved by the country of origin and stipulates that the exporter shall accept the consignment if it has to be returned for any reason.

The licenses to do the importation should be delivered by the Swiss government.

iii. Process of consultation/sharing information with Civil Society:

The Swiss government does not have any formal process of consultation/sharing information with CS for the importation of RAW as for the exportation of their waste.

➢ UK

i. Regulation about export of domestic RAW or SNF and level of agreement needed:

The level of agreement for the export of domestic RAW or SNF depends on the level of liaison between the WMOs and regulators and usually working in accordance with all applicable national or international laws and regulations.

ii. Regulation about import of foreign RAW or SNF and level of agreement needed:

It is the same as the export of domestic waste. An evolution of the regulation is expected.

iii. Process of consultation/ sharing information with Civil Society:

The Nuclear Decommissioning Authority holds national public consultations on its strategy every four years.

➢ Ukraine

i. Regulation about export of domestic RAW or SNF and level of agreement needed:

A contract agreement between the Ukrainian government and the other state government has to be made in order to export Ukrainian waste to that state.

ii. Regulation about import of foreign RAW or SNF and level of agreement needed:

The importation of foreign RAW on the Ukrainian territory is forbidden by the Ukrainian law.

iii. Process of consultation/sharing information with Civil Society:

There are no public consultations in Ukraine regarding collaboration with other states. But public consultations are required for the creation of radioactive waste management facilities.