ORIENT- NM

Organisation of the European Research Community on Nuclear Materials

A Coordination and Support Action in Preparation of a Co-Funded European Partnership on Nuclear Materials

This project has received funding from the Euratom research and training programme 2019/2020 under grant agreement No. 899997

Start date of project	01/10/2020
Duration	30 months
Reporting period	2 - 01/04/2022 – 31/03/2023

Work Package 4 – Interaction with other bodies, initiatives and stake-holders, including infrastructures

Deliverable D4.1: Draft protocol of EJP interaction with international organisations

Author(s) name and affiliation	(1) Lorenzo Malerba	CIEMAT
	(2) Contacts at organisations	IAEA, NEA, GIF, ENEN, FORATOM

Date of issue	28/04/2022
Date of final approval	06/05/2022

Dissemination Level		
PU	Public	X
CO	Confidential, only for partners of the ORIENT-NM Action and the EC	

Version	Date	Description
1	04/04/2022	First draft
2	05/05/2022	Revision

Disclaimer

This project has received funding from the Euratom research and training programme 2019/2020 under grant agreement No. 899997.

Table of contents

List of abbreviations

AC	Associated Country
CEP	Co-funded European Partnership
CRP	Coordinated Research Project
EC	European Commission
EJP	European Joint Programme
ENEN	European Nuclear Education Network
ENS	European Nuclear Society
EU	European Union
FORATOM	The Voice of the European Nuclear Industry
FR	Fast Reactors
GCR	Gas-Cooled Reactors
GIF	Generation IV International Forum
IAEA	International Atomic Energy Agency
LTO	Long-Term Operation
MS	Member State
NKS	Nordic Kärnsäkerhet / Nordic Nuclear Safety
OECD/NEA	Organisation for the Economic Cooperation and Development / Nuclear Energy Agency
pSSC	Provisional System Steering Committee
R&D	Research and Development
SAB	Scientific Advisory Board
SMR	Small and Medium Size Modular Reactors
SSC	System Steering Committee
WNA	World Nuclear Association

Summary

This document briefly describes how the future European partnership on nuclear materials may seek for grounds of interaction and collaboration with a number of international organisations and European associations, with mutual benefit, namely: IAEA, NEA/OECD, GIF, ENEN and FORATOM. While legal agreements are unlikely or impossible, several ways of cooperation have been identified.

1. Introduction

The goal of this deliverable is to identify possible protocols of interaction of a Co-funded European Partnership (CEP) on nuclear materials with international organisations, with mutual benefit and with a view to optimising the use of resources and minimising the potential duplication of initiatives and activities.

Several European and international organisations were contacted, through appropriate channels, in order to organise an exchange of information in the form of a web meeting, namely:

- IAEA (International Atomic Energy Agency): Widely known as the world's "Atoms for Peace and Development" organisation within the United Nations family, the IAEA is the international centre for cooperation in the nuclear field. The Agency works with its Member States and multiple partners worldwide to promote the safe, secure and peaceful use of nuclear technologies.

- OECD/NEA (Organisation for the Economic Cooperation and Development / Nuclear Energy Agency): NEA is an intergovernmental agency that facilitates co-operation among countries with advanced nuclear technology infrastructures, operating within the framework of the Organisation for Economic Co-operation and Development (OECD). The objective of the Agency is to assist its member countries in maintaining and further developing, through international co-operation, the scientific, technological and legal bases required for a safe, environmentally sound and economical use of nuclear energy for peaceful purposes.

- GIF (Generation IV International Forum): It is an intergovernmental co-operative based on a signed charter that provides a framework for international collaboration in research and development of the next generation of nuclear energy systems. It is organised in different groups, dealing e.g. with policy and technical progress revision, as well as in committees and boards, each dedicated to the various reactors systems and relevant issues.

- WNA (World Nuclear Association): It is the international organization that represents the global nuclear industry: its mission is to promote a wider understanding of nuclear energy among key international influencers by producing authoritative information, developing common industry positions, and contributing to the energy debate.

- ENS (European Nuclear Society): It is a Learned Society that brings nuclear societies and professionals in Europe together, allowing them to exchange knowledge and experience about nuclear science and technology. ENS promotes the development of nuclear science and technology and the understanding of peaceful nuclear applications.

- ENEN (European Nuclear Education Network): It is an international non-profit organisation, the main purpose of which is the preservation and the further development of expertise in the nuclear fields by higher education and training in Europe; this objective is realized through the co-operation between universities, research organisations, regulatory bodies, the industry and any other organisations involved in the application of nuclear science and ionising radiation.

- FORATOM - The Voice of the European Nuclear Industry: It is the Brussels-based trade association for the nuclear energy industry in Europe. It acts as the voice of the European nuclear industry in energy policy discussions with EU Institutions and other key stakeholders. Its membership is made up of 15 national nuclear associations representing nearly 3,000 firms.

- NKS (Nordic Kärnsäkerhet / Nordic Nuclear Safety): It is a funding organisation in the Nordic countries: Denmark, Finland, Iceland, Norway and Sweden. The owners and main financiers of NKS are a number of central authorities, safety organisations and one ministry, and it is supported by industry. It has two programs, one on reactor safety, including materials, and one on radiology.

- vgbe energy: International association of companies from the electricity and heat supply industry. The association is based in Essen/Germany. One topic vgbe deals with is nuclear energy. In this area, vgbe provides the communication platform for questions concerning technology, operation and safety of nuclear power plants, both in the operating phases and in the phase of dismantling and decommissioning. The focus is on short-term and practice-oriented issues as well as long-term, strategically oriented topics.

Of all, no answer was received from ENS, NKS and vgbe. WNA replied declining interest. All other organisations participated in an online meeting that was organised on 25th June 2021. In this meeting the participants received information concerning the ORIENT-NM purposes and a discussion was launched to sketch possible ways of interaction between the future partnership on nuclear materials and each organisation. All were also invited to participate in the ORIENT-NM workshop on 22-23 November, 2021.

2. Draft protocols of interaction

IAEA

A formal legal agreement with a EU consortium of organisations is not feasible, however IAEA can easily sit in a stake-holder group or advisory board (in the case of the partnership perhaps a seat for the IAEA could be foreseen in the Scientific Advisory Board, SAB). Who will do so will depend on the actual topics addressed in the CEP. Intellectual property rights should be clarified in terms of possibility of disclosing project results. However, since the policy of the EC is towards open access and open data, this should not be a problem. It is possible

to think of coordinated research projects (CRPs) dedicated to a topic of common interest, where the CRP would benefit from the research funded by the CEP and the CEP would benefit from inclusion of non-EU countries to contribute to the research topic. The IAEA Sections that have a specific potential interest and benefit to be collaborating with the partnership are:

Nuclear Power and Engineering Section (NPES) – Long-term operation (LTO).

The NPES cooperates with Member States with operating and expanding nuclear power programmes. It provides a wide range of services, such as expert missions, training courses, technical meetings, workshops and guidance documents. In support of safe, secure and sustainable nuclear power operations, NPES disseminates good practices and helps share experiences to improve operational performance, technical infrastructure, management systems, human resource development and stakeholder involvement. In this framework, it is conceivable that any type of advance in terms of materials behaviour monitoring and prediction achieved within the partnership will be of interest for the NPES, while collaboration in the organisation of training courses, technical meetings and workshops in connection with materials aspects seems to be a good ground for mutually beneficial interaction.

Nuclear Power Technology Development Section (NPTDS) - Advanced reactors including small and medium size modular reactors (SMR), gas-cooled reactors (GCR), fast reactors (FR) and fusion.

The NPTDS fosters information exchange and collaborative R&D on nuclear technology development and innovations. It manages six international Technical Working Groups and, on average, 12 CRPs every year with institutions and stakeholders in MS, covering different technical aspects of advanced reactors and non-electric applications. The NPTDS provides technical documents, databases, toolkits and portals on development and deployment of evolutionary and innovative nuclear power plants and their applications. It develops, maintains and updates the Advanced Reactors Information System (ARIS) and trains embarking countries in reactor technology assessment for near term deployment. Human resource capacity building in embarking and expanding countries is supported through training courses and workshops and includes a suite of basic-principle nuclear reactor simulators for education and training of engineers and researchers in MS. Here, therefore, the possibility of collaboration through CRPs having materials in the focus exists, as well as collaboration in the organisation of training courses and workshops.

Nuclear Fuel Cycle and Material Section (NFCMS)

To contribute to the sustainable development of nuclear power, the NFCMS supports interested Member States via Sub-Programmes that are dedicated to:

(1) Develop adequate infrastructures for uranium (and thorium) resources exploration and production; (2) Improve nuclear fuel performance during nuclear power reactors operation; (3) Manage safely the spent fuel generated by their NPPs, through long-term storage, reprocessing and recycling; (4) Develop new nuclear fuel concepts and technologies as well as nuclear fuel cycles for innovative nuclear reactors (including SMRs). The scope of (2) and (4) has clearly significant overlap with the objectives of the partnership, especially considering that important issues addressed in NFCMS are: raw materials for nuclear reactor fuel; power reactor fuel technology (fabrication and in-reactor behaviour as well as advanced nuclear fuel cycle technologies, such as ATFs).

OECD/NEA

The interaction between the CEP stemming from ORIENT-NM and the NEA would be beneficial to both organisations and, in general, to efforts devoted to nuclear materials related research. In terms of outreach, the NEA is a key partner that would allow bridging the work done within the European Union framework with similar undertakings worldwide. In particular, when standard methods and approaches are to be developed, cooperation with the NEA would allow broadening the community of practices. Furthermore, improving the efficiency of any research strategy implies avoiding duplication of efforts within the same country or continent. This requires surveying ongoing initiatives, analysing their contents and objectives, exploring areas for potential cooperation among countries and organisations by identifying sufficiently significant overlaps of objectives that would justify joining efforts and removing hurdles to cooperation. The NEA is well placed to contribute to coordinate and optimise research efforts through its member states.

Considering the above, it is worth designing an interaction scheme allowing cooperation between the CEP on nuclear materials and the NEA. The simplest way of progressing along these lines would be to liaise with appropriate NEA representatives and to suggest nominating an observer from the future CEP in NEA working parties and expert groups relevant to material science research, and possibly vice versa have an NEA observer in the SAB of the CEP, thus ensuring direct communications and sharing of information. Below is a list of the NEA standing technical committees (and underlying activities) and joint projects that would be important to consider for interaction.

Nuclear Science Committee:

- Working Party on Material Science Issues in Nuclear Fuels and Structural Materials (WPFM). In preparation.
  Contact: Tatiana Ivanova, tatiana.ivanova@oecd-nea.org
- Working Party on Scientific Issues of Advanced Fuel Cycles (WPFC), Expert Group on Reactor Coolants/Components Technology.
  Contact: Gabriele Grassi, Gabriele.GRASSI@oecd-nea.org

Committee for the Safety of Nuclear Installation:

- Working Group on Integrity and Ageing of Components and Structures (WGIAGE).
  https://www.oecd-nea.org/jcms/pl_25598/working-group-on-integrity-and-ageing-of-components-and-structures-wgiage
  Contact: Diego Escrig Forano, diego.escrigforano@oecd-nea.org

NEA Joint Projects:

NEA also coordinates international R&D joint projects. Not all the NEA member states contribute to these projects, whose membership changes from a project to another and results are generally only accessible to contributing countries during an embargo period which is specific to each project. The European Union participates to some of these efforts through the JRC and, when it is not the case, information exchanges could be organised between the projects management boards and CEP representatives. In the latter case, the NEA could help organising such exchanges while complying with potential confidentiality constraints. Below is a list of Joint Projects that could be relevant to the nuclear materials CEP activities.

Projects that ended or are about to end:

- Thermodynamic of Advanced Fuels – International Database (TAF-ID).
  EC-JRC Karlsruhe is a member of the project.
  https://www.oecd-nea.org/jcms/pl_24703/thermodynamics-of-advanced-fuels-international-database-taf-id
  Contact: Tatiana Ivanova, tatiana.ivanova@oecd-nea.org

- Thermodynamic Characterisation of Fuel Debris and Fission Products Based on Scenario Analysis of Severe Accident Progression at Fukushima-Daiichi Nuclear Power Station (TCOFF).
  EC-JRC Karlsruhe is a member of the project.
  https://www.oecd-nea.org/science/tcoff/
  Contact: Tatiana Ivanova tatiana.ivanova@oecd-nea.org

On-going projects that will overlap with the CEP:

- Studsvik Materials Integrity Life Extension (SMILE)
  https://www.oecd-nea.org/jcms/pl_53316/new-joint-project-studsvik-material-integrity-life-extension-smile
  Contact: Markus Beilman, Markus.BEILMANN@oecd-nea.org

- Framework for Irradiation Experiments (FIDES): Promote international fuels and materials irradiation campaigns

https://www.oecd-nea.org/jcms/pl_15313/framework-for-irradiation-experiments-fides
Contacts: Tatiana Ivanova. tatiana.ivanova@oecd-nea.org; Michelle Bales, Michelle.bales@oecd-nea.org

- Nuclear Education, Skills and Technology (NEST) framework.
  https://www.oecd-nea.org/jcms/pl_21786/nuclear-education-skills-and-technology-nest-framework
  Contact: Antonella Di Trapani, Antonella.ditrapani@oecd-nea.org

The last two frameworks are of special importance, the first one as a framework for irradiation campaigns (to be analysed in task 4.5.3, deliverable D14), the second one because of its potential connection with the education and training activities planned in task 3.5 (deliverables D3.6, D3.11).

GIF

The GIF has established System Steering Committees (SCCs) to implement the research and development (R&D) for each Generation IV Reactor Concept, with participation from GIF Members interested in contributing to collaborative R&D. Each SSC plans and integrates R&D projects contributing to the development of a system. The participants in SSCs and projects sign agreements that govern intellectual property rights and other matters in order to work co-operatively on the concepts.

Four System Arrangements have been signed (GFR, SCWR, SFR and VHTR) while for the last two systems, LFR and MSR, Memoranda of Understanding have been signed to allow for collaboration until System Arrangements have been put in place. In these last cases a provisional SCC (pSCC) is established.

The collaboration between the CEP stemming from ORIENT-NM and the GIF may take place through the SCCs and pSCCs.

Experts selected by the CEP may participate, upon request, in technical meeting of each (p)SCC, to support the collaborative R&D that is being implemented in the framework of the GIF, favouring mutual alignment and reinforcing synergies among the R&D program that are being implemented under the umbrella of the CEP and the GIF, respectively. (p)SCCs EURATOM representatives will act as contact points with the CEP, proposing jointly organised dedicated meetings, workshops and seminars, to enable the CEP contribution to each GIF initiative and vice versa.

ENEN

ENEN can provide the link with universities and students. Materials are a good and important subject as they are the base for innovation. Joint summer schools that target nuclear materials subjects can be considered. ENEN is also launching a new mobility programme, ENEN++, certainly of interest for the CEP. Plans for education & training, as well as mobility, activities within the

partnership are elaborated in task 3.5 of ORIENT-NM. Therefore, more details on possible interactions with ENEN will be given as part of that task (deliverables D3.6, D3.11).

FORATOM

Key topics for FORATOM are: security of energy supply, competitiveness, economics of nuclear, nuclear safety, nuclear liability, radioactive waste, decommissioning, nuclear transport, environment, new projects, R&D, energy mix, non-proliferation, public opinion, EURATOM treaty, emergency preparedness.
The main activities of FORATOM are:

- to provide information and expertise on the role of nuclear energy; by producing position papers, newsfeeds, responses to public consultations, analyses of public opinion;
- to organise regular networking events like dinner debates, workshops, one-on-one meetings, press briefings and visits to nuclear facilities.

In this context, the interaction with the future European partnership on nuclear materials can be envisaged to pivot around two axes:

- FORATOM can act as a springboard and amplifier towards its members and beyond for any communication action undertaken by the partnership, be it in the form of newsletters, factsheets, or flyers;
- In the framework of its networking events, especially R&D&I-oriented workshops, FORATOM can periodically provide the occasion for the partnership to inform about its activities, ambitions and results, and possibly obtain feedback in terms of industrial needs that may be taken into account in the drafting of the forward programme of the partnership.

This project has received funding from the Euratom research and training programme 2019/2020 under grant agreement No. 899997