

Dear Colleagues and Friends,

from the research communities collaborating at European level in the Euratom programme on radioactive waste management,

I wish to say hello, thank you, and at the same time goodbye for the last time.

I will soon leave the European Commission, because I am affected by a neurologic disease from which I am not recovering for more than one year. Even if I have followed EURAD from the distance during that period, I cannot expect to be able to go back to work. So, I need to turn the page.

Nevertheless, before I leave, I am pleased and eager to write a few words to you on Euratom and thank you for your contributions.

I am so pleased to have worked for the longest part of my career in the same domain of Euratom, and the same unit, for a total of six 5/7-year Framework Programmes (FP), since 1993, and without changing, as it is fashion practice nowadays.

Looking back at the successive programmes, the Commission has tried to be of most useful help to Member States over the years.

In the nineties, the objective was to build 'basic' knowledge and tools. In waste, up to 80 small projects were co-funded in a single programme. In the first decade of this century, the objective became gradually more targeted: to support implementation-oriented RD&D on all remaining key aspects of geological disposal, including demonstration of technologies.

Many of you will certainly remember the large Integrated Projects and Network of Excellence, such as ESDRED, NF-PRO, FUNMIG, LUCOEX and NetExel. The Commission also launched the concept of a European Research Area (ERA). In our area of RWM, work towards building a Technology-Platform was engaged. This was a concrete step for ERA to integrate further the Waste Management Organisations (WMO). IGD-TP was launched in 2009 with secretariat support from Euratom via two successive SecIGD projects. On the same line, since 2011, the Commission opened the opportunity to Technical Support Organisations (TSOs) to work together, with the two successive SITEX projects. This was also to help TSOs to converge their views and methods of analyses of the license applications for repositories, in particular for GD, which had been submitted in two EU countries. TSOs have now established the SITEX.Network.

For the last ten years, I have been on my own to manage the programme on RWM. My objective has been to ensure that eventually all the RD&D communities work together on the same Strategic Research Agenda (SRA). The SRA and its implementation in Joint Programming (JP), would replace to the usual competitive calls for project proposals. I believe this is more efficient if the national programmes decide jointly on what needs to be done together. Hopefully, JP is becoming a central point at European level to manage and deliver/transfer knowledge to the different national programmes and across generations.

The objective is also to ensure that the JP addresses the needs of -and is of use to- all Member States (MS), recognising that there is a large knowledge gap and readiness level between MS to implement their own national programmes.

Looking back at the enlargement of the number of EU MSs over the years, we were only 12 MSs up to 1995, when Austria, Finland and Sweden joined. "Colleagues" from the so-called 'central and eastern European countries gradually joined in the first decade. We are now 27 MSs since Croatia joined in 2013. We need to be of use to all.

This has taken time to convey the message and convince WMOs and TSOs to work together. Inclusion of the Research Entity (RE) organisations into the Joint Programming concept was triggered following the EURADWASTE '13 conference. Two keynote speeches reinforced the Commission strategy towards Joint Programming. The first one: '*Challenges in Geological Disposal Programmes: from Policy to Research and Implementation*', by Piet Zuidema, NAGRA, CH. The message retained is that each geological repository is a 'first-of-the-kind'. Hence, although some basic knowledge can be transferred between programmes, each programme will have to build its own knowledge with RD&D to support its safety case (SC). The second one: '*Review of the Scientific Issues and Uncertainties in Geological Disposal*', by Bernd Grambow, SUBATECH, FR. The message retained is that it has taken some 40 years to advanced programmes to build their knowledge for the SC. During all these years, the scientific knowledge has continuously deepened due to RD&D and the modelling tools improved too. In addition, even if a license for GD construction is granted, the SC will have to be updated regularly. So RD&D will be needed for decades and also to allow new generations to acquire and maintain competence. Collaboration between REs at European level has led to the establishment of the EURADSCIENCE network. The three groups IGD-TP, SITEX and EURADSCIENCE have worked together to build the EURAD EJP.

The EURAD (2019-2024) European Joint Programme in Radioactive Waste Management has now been launched. I believe this is a great achievement of your joint work. All the tools are in place for efficient work of added-value for all communities and national programmes. We are not talking of competition on RD&D, at least on knowledge for GD. The ball is in your hands, to make it attractive for all and ensure its perennity for the future.

There is the question of the extent of inclusion of RD&D on pre-disposal in EURAD. This needs to be discussed. If developments in this domain leads to commercial use then is it compatible with the principle of joint SRA and knowledge of disposal in EURAD ?.

I intended to organise a workshop to discuss the future of EURAD and Euratom strategy. This will not be possible for some time and before I leave the Commission. Should the Commission services decide to renew a call for a EURAD 2, this would be in the Euratom call for the work programme covering 2023-24. In preparation for your interaction with the Commission on the future of Euratom support to RD&D in RWM, I propose that you think of a number of questions, see document below.

In the meantime, I want to thank you all for your work at European level in the Euratom programme. I would be happy to write a souvenir of the many interactions I have had with so many of you, but this would be so long that I am going to mention those of you who have managed the largest projects, specific events and tools and coordination actions towards integration of work at European level:

FP4-FP5

Antonio Gens, Eduardo Alonso, UPC, CIMNE (Code_Bright started in the DAM project, 90ies), Fernando Huertas, ENRESA, José Luis Fuentes-Cantillana, AITEMIN, José Luis García-Siñeriz, AMBERG (2x FEBEX, 1996-2000), Juan-Carlos Mayor, ENRESA (EB, 1999, VE, 2001), Jesus Alonso, ENRESA (BENIPA, 2000), Christer Svemar, Agneta Lindgren, SKB, Roland Pusch, Clay Tech (Prototype Repository, 2000, Net.Excel, 2002); Werner Bechthold, KIT (FZK-PtWT+E), Tilmann Rothfuchs, GRS, Wilhelm Bollingerfehr, DBE-Tech (2x BAMBUS, 2000 & Project); Gilles Hériard-Dubreuil, Mutadis (2x COWAM, CIP, 2000-2007); Frédéric Bernier, FANC (ex-SCK CEN EIG EURIDICE) (SELFRAC, 2001, CLUSTER EDZ conference, 2003: with ARMA award 2007 (American Rock Mechanics Association) and many of the papers in the Proceedings still cited as references), Wernt Brewitz, GRS (Net.Excel, 2002, CLUSTER EDZ conference, 2003). Associated to this domain I still have deep thought for Peter Blümling, NAGRA, who passed away in 2011.

FP6

Alain Sneyers, SCK/CEN (NF-PRO, 2004), Wolf Seidler, Jean-Michel Bosgiraud, ANDRA (ESDRED, 2004), Gunnar Buckau, FZK & KIT, Lara Duro, Amphos 21 (FUNMIG, 2005), Jörg Mönig, GRS (PAMINA, 2006), Xiang Ling Li, EIG EURIDICE (TIMODAZ, 2006, Euratom THMC conference, 2009); Alan Hooper, NDA (CARD, 2006) and Juhani Vira, Marjatta Palmu, POSIVA (post CARD, pre-IGD-TP, 2007-2009), Ewoud Verhoef, COVRA, Charles Mc Combie, ARIUS (2x SAPIERR, 2005-2008), Behrooz Bazargan-Sabet, BRGM (3x PETRUS, FP6, 2009-2013),

FP7-Horizon 2020

Gunnar Buckau, Marcus Altmaier, KIT, Lara Duro, Amphos 21 (Recosy, 2008), Richard Shaw, BGS (FORGE, 2009); Stefan Mayer, IAEA & Samira Ouchhi (ex-ANDRA), Nicolas Solente, Johan Bertrand, ANDRA (MoDeRn & 2020, 2009-2015); Annika Schaefers, BGR (PEBS, 2010); Marjatta Palmu, POSIVA, Jacques Delay, ANDRA (Sec-IGD & 2, 2010-2013); Jan Gugala, SKB (LUCOEX, 2011), Anne Bergmans, Univ. Antwerpen (InSoTec, 2011 & MoDeRn projects), Kjell Andersson (†), Karita (ARGONA, 2006, IPPA, 2011), Lena Zetterström Evins, SKB, (REDUPP, 2011, DISCO, 2017), Bernhard Kienzler, KIT (First-Nuclides, 2012), Johanna Hansen, POSIVA (DOPAS, 2012), Patrick Sellin, Mary Westermarck, SKB (BELBaR, 2012, BEACON, 2017), Christophe Serres, Delphine Pellegrini, IRSN, Valérie Dettelleux, Frank Lemy, Belv (2x SITEX, 2012-2015), Simon Norris, NDA (CAST, 2013); Jacques Delay, ANDRA, Marie Garcia, ex-ANDRA (JOPRAD, 2015); Marcus Altmaier, KIT (CEBAMA, 2015); Birgitta Kalinowski, Petra Christensen, SKB (MIND, 2015); Denise Ricard, Stéphane Plumeri, ANDRA (CHANCE, 2017); Matti Nieminen, VTT

(THERAMIN, 2017), Danièle ROUDIL, CEA (INSIDER, 2017); Marie Garcia, ex-ANDRA, Louise Théodon, ANDRA (EURAD, 2019); Erika Holt, VTT (PREDIS, 2020).

I would also like to pay tribute to all the pioneers and actors who have contributed to allowing the European Joint Programme – EURAD to see life. I wish to mention and thoroughly thank ANDRA for adhering and taking the lead in JOPRAD and now in EURAD. ANDRA the largest Waste Management Organisation in Europe and surely also in the world has assumed its leadership role. Great many thanks to Frédéric Plas, Research Director at ANDRA, without you Frédéric, JOPRAD and EURAD would not have existed. You shared the Commission strategy when at IGD-TP level support to Joint Programming was quite lukewarm. Still, IGD-TP has been an example on how to build and manage a SRA and its implementation with the excellent secretariat work of Torsten Eng, SKB. Jacques Delay, ANDRA, continued IGD-TP secretariat efficiently, and developed JOPRAD, gathering WMOs and TSOs, which was not an obvious situation. Marie Garcia did a great job in taking over JOPRAD and coordinating the preparation of the EURAD proposal, together with Stéphan Schumacher, ANDRA, and the shadow EURAD bureau, thank you. I want to thank also NDA (UK) and in particular Jon Martin, Science Director, who supported the integration idea in JOPRAD by being in charge of developing the programme document for the future Joint Programme, even if there was not full support in IGD-TP. Rob Winsley, NDA, and Tara Beattie, MCM Environmental, did and continue to work efficiently and for the European roadmap. Thank you, to all UK colleagues in this weird political climate. The research community called Research Entities organised itself in such a short time to be structured in the Joint Programme. Christophe Bruggeman, SCK-CEN and Bernd Grambow, Subatech, did a great job to lead this work, well done and to all the other colleagues. Gunnar Buckau, EC JRC, worked to develop knowledge management even before JOPRAD. Thank you also to Piet Zuidema, ex-NAGRA, who brings his recognised competence in guiding the evolution and future of EURAD.

I also want to thank other colleagues:

In the EU MSs who hosted/helped the Euratom EURADWASTE conferences, 2008, Gérald Ouzounian, Pierre Forbes, ex-ANDRA; 2013, Povilas Poskas, LEI (Lithuania); 2019, Daniela Diaconu, Alina Constantin, RATEN ICN (Romania).

At the Commission, retired colleagues: Heads of unit, Euratom fission, Hans Forsström (1998-2005), who is still committed to Research at European level and Simon Webster (2005-2011), Bertus Haijink (2001), Henning von Maravic (2009), Roger Garbil, current head of sector in fission, who supports the Joint Programming vision and is available to help. Colleagues at IAEA, Ian Gordon, Section Head – Waste Technology, Stefan Mayer and the section colleagues; at OECD NEA, RWMC & IGSC, in the nineties, Dan Galson (Galson-Sciences), Philippe Lalieux (ONDRAF-NIRAS), in 2000's, Sylvie Voinis (ANDRA), Elizabeth Forinash (US), Claudio Pescatore, Gloria Kwong.

Colleagues in charge of R&D carried out in Underground Research Laboratories and performed as part of Euratom programmes: Äspö Hard Rock Laboratory, SE; Grimsel Test Site, CH; HADES underground laboratory, BE; Tournemire, FR; Mont Terri Project, CH;

Olkiluoto/ONKALO Research Tunnel, FI; JOSEF Underground Research Centre, CZ; Asse salt mine (DE); Bure (France).

I could have mentioned many more of you, sorry if I didn't, this is not intentional. In return, I would like to acknowledge the many messages of recognition I receive from you colleagues outside the European Commission, for the work we have done together to build an integrated community with a truly common purpose. This is more than from the Commission. I have the impression that the value of this work is more understood within the Member States. So, I am somehow, also, handing-over to you !.

Now is the time to say goodbye.

I wish to express my gratitude to all of you and wish you all the best in your national programmes and jointly at European level.

Christophe Davies



FUTURE EURATOM RESEARCH IN RADIOACTIVE WASTE MANAGEMENT

Status in RWM at the end of Horizon 2020 (2014-2020)

Horizon 2020 - Euratom (2014 - 2018)			Extension (2019-2020)
WP 2014 / 2015	WP 2016 / 2017	WP 2018	WP 2019 / 2020
Projects - started mid-2015	Projects - started mid-2017	Started mid-2019	Started mid-2020
Geological Disposal (IGD-TP priorities)	GD - HLW/SF (IGD-TP priorities)	RWM	
CEBAMA - Cement / rock & bentonite interactions Modern2020 - Repository monitoring strategy & tech MIND - Microbiology in repositories	DISCO - Modern SF disso. & charact. Beacon - Bentonite Mech. Evolution	EURAD - European Joint Programme on Radioactive Waste Management	
	Predisposal - Other wastes		Predisposal
TSO support	CHANCE - Charact. of conditioned waste THERAMIN - Thermal treatment for waste mini.		PREDIS - Predisposal management of radioactive waste
SITEX II - Structure TSO community for safety case reviews			
Preparatory phase for Joint Programme	Dismantling / Decommissioning (D&D)	D&D	D&D
JOPRAD - Prepare for European Joint Programme	INSIDER - Charact. for waste mini. in Decom. & Dism.	SHARE - R&D Roadmap	CLEAN-DEM Digital Robotics INNO4GRAPH Graphite LD-SAFE : Laser technologies
E&T + Social Science & Humanities	E&T	MICADO: Instrumentation for characterisation	PLEIADES Digital D&D planning software module platform
ANNETTE - Euro Master & vocational E&T Prog. in Nuc. Science & Technology HoNEST - History of factors influencing successes and failures of nuc. energy developments	MEET-CINCH - Radiochemistry teaching ENENplus - Post academic educ. & mobility scheme		

Total EU funding, Horizon 2020, in RWM = € 99.5 million

Disposal - HLW / SF:	€ 56.59 million
Predisposal:	€ 21.88 million
Dismantling / Decommissioning:	€ 21.03 million

Other funding, horizontal activities

E&T + Social Science & Humanities:	€ 10.66 million
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Anticipated budget for the new Horizon Europe Framework Programme for research (2021-2025/2027)

In line with the negotiation on the EU budget, Multi Financial Framework (MFF) for the period 2021-2027, MSs are finalising negotiation on Horizon Europe. It is foreseen that the Euratom budget would be decreased by 20+%.

If the Commission services decide to renew the EURAD JP as part of the Work Programme 2023-24, you should prepare in advance and interact with the colleagues at the Commission, on the strategy, content, suggested budget. The reimbursement rate currently at 55% of the total cost should be analysed, to discuss its suitability with the proposed budget for Knowledge Management and its internal financial rate.

Ideas / debate for the future Framework Programme in RWM

We can expect that, decision-makers at European Union level and Member States for the Euratom research programmes would be in favour to include all RD&D activities of Radioactive Waste Management in a single Joint Programme (JP) or similar partnership tool.

This would probably be perceived as top-level integration and efficiency for European intervention. It would also probably reinforce arguments to reinforce or maintain budget to Euratom fission, RWM to a level justified by the achievements of existing activities.

In addition, policy in DG research of the Commission is not to generate additional JP in sub-domains of R&D.

Is such integration of Disposal, Predisposal and Decommissioning feasible in RWM ?.

Until the EURAD JP, the Commission has offered its support to competitive excellence in research and Innovation. The switch in EURAD is to work on a common Strategic Research Agenda (SRA), Roadmap. The aim is to develop and manage open science/knowledge of common use.

If we maintain this approach as a principle for participation in a JP, is it compatible with predisposal and Decommissioning ?.

Should we fix limits to the confidentiality of R&D results for integration of predisposal and decommissioning in a future RWM JP ?.

Or should the JP concentrate on technology development that we be of use by all actors involved in the concerned RD&D ?.

Is it relevant and how could we include RD&D that will be commercially exploited by beneficiaries in the JP ?.

Joint Programme Founding documents for collaboration at European level

Geological disposal of high-level waste and spent fuel remains the most difficult challenge of RWM in all national programmes. Indeed, experience indicate that requirements from regulations and society in all the steps of a disposal programme become more difficult to fulfill, take longer to address and are different between countries. As a result, the status and the differences of constraints, concerns, priorities and the timelines of implementations seem to increase between the European countries. This does not mean that collaboration at European level becomes less relevant. The purpose of working together, taking into account the differences of status of national programmes, needs to be clear and analysed regularly. The actors of RD&D and the decision-makers in all countries should be able to understand and adhere to the strategy of Joint programming at EU level: Why, What, How and for what use.

Based on the evolving situations, the suggestion would be to consider revising and adapting the founding documents of the EURAD mechanism before the end of each JP, in order to be ready for the next one.

Specific questions on the development and management of the Knowledge in EURAD

State-of-knowledge documentation: In order to maintain the budget to a reasonable level when we call for external expertise, EURAD should fix a standard price to pay to produce the document.

Training and mobility-training:

EURAD should become a kind of central training school at European level for professionals on all the science, processes and modeling tools including Performance Assessment, laboratory and in-situ testing for the management and disposal of waste. We should not duplicate those courses of higher strategic levels delivered by IAEA, NEA and ENEN association. Close interaction, cooperation and potentially co-development of courses should be done with academics via the ENEN, the European Nuclear Education Network.

Principles of training costs: Costs of courses should be maintained low and any participation fees should only be applied to third-countries i.e. other than EU or associated MSs if the course has not been developed jointly with IAEA or NEA. Training courses should not lead to financial benefits by the organisers.

Participation of Civil Society and social scientists

Inclusion of Social Science is a decision of the EURAD bureau (based on the SRA), which represents the official mandated actors of the national programmes. Specific topics of social science may be included when relevant to the research topic being addressed e.g. as in the Modern projects on monitoring. The principle of collaboration with civil society should be based on genuine partnership and not independence.