

JOPRAD – establishing the programme: views of the waste management organisations

JOPRAD Mid-Term Workshop
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Aims and ToR of the WMO WG

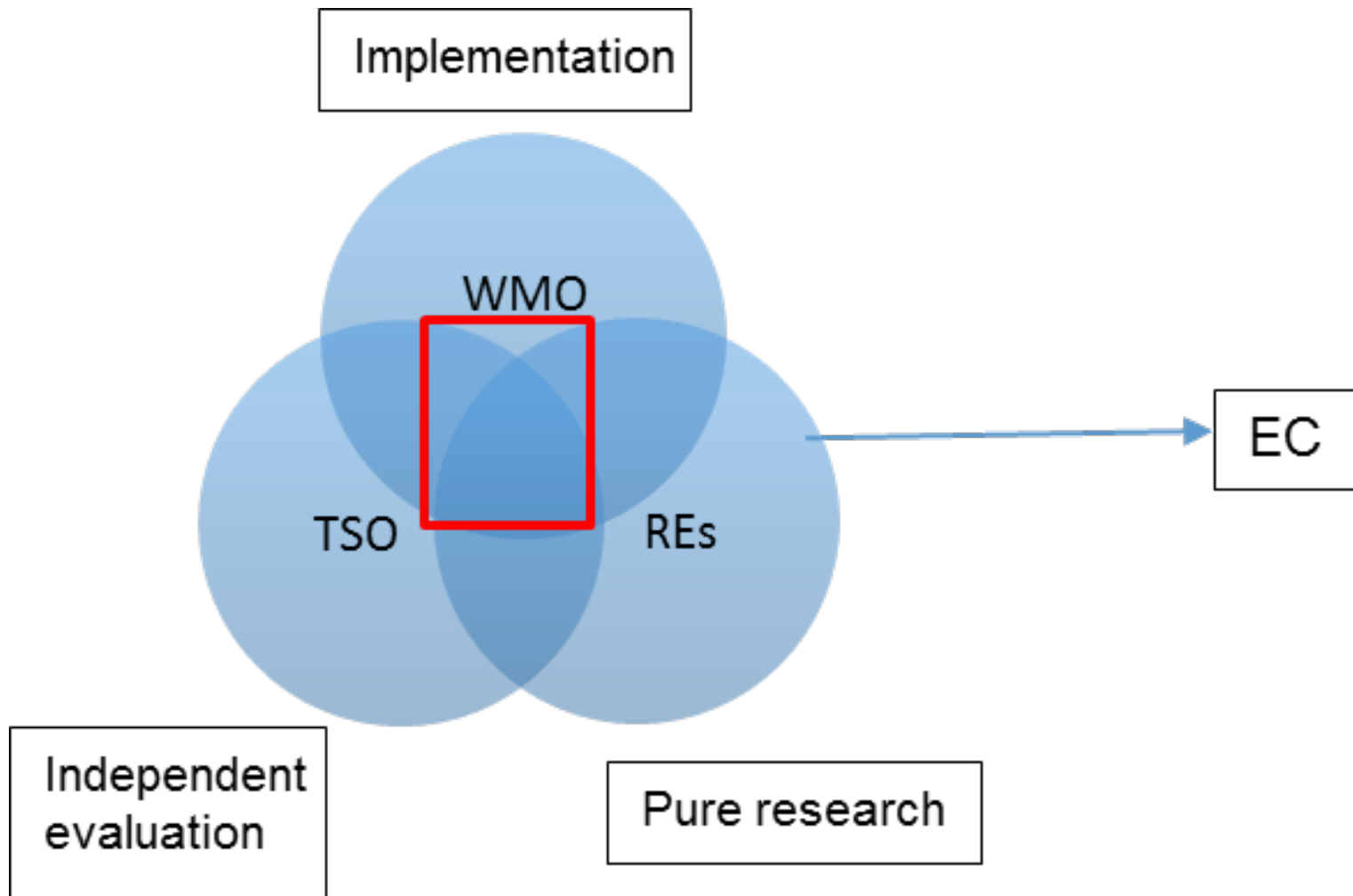
Task 3.1 of the project Work Package 3 (WP3) was aimed at:

- Task 3.1: Identify key aspects of the IGD-TP's SRA that could be included in a common programme

The specific aims of the WMO working group (WG) were to:

- Identify the boundary conditions of the involvement of members of the IGD-TP Executive Group (EG).
- Identify from the WMO key topics/joint activities/planned proposals those that may be of potential interest for joint programming.
- Rank potential topics suitable for joint programming.
- Draw up a timescale for implementation of these potential topics.
- Liaise with other working groups (TSO's and research entities) and amalgamate potential projects together.

Aims and ToR of the WMO WG (continued)



Members of the WMO WG

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Astrid Göbel (BFS, Germany)

Phillipe Lalieux (Ondraf/Niras, Belgium)

Daniela Diaconu (RATEN INR, Romania) (Observer)

Dirk Bosbach (Jülich, Germany) (Observer)



WMO WG meetings

4 WG meetings have been held (2015-2016):

- Meeting 1 April 2015, London
- Meeting 2 September 2015, Ecurey
- Meeting 3 January 2016, London
- Meeting 4 May 2016, Prague



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WG Activities 2015

- Established the Terms of Reference of the WMO working group
- Explored the boundary conditions for Joint Programming from a WMO perspective based on questions from the IGD-TP Executive Group
- Developed an RD&D topic prioritization table/questionnaire for WMO's
- Issued questionnaire to European WMOs August 2015

WMO Questionnaire

Questionnaire structure

Topic number	List and Contents of the Topics for a given Key Topic	Past /current /future projects	Yes/no	What aspects of topic are you interested in	Timescale	To improve knowledge	To maintain competences	To develop new knowledge	To support LAPs	Others	Comments
1	Key Topic 1: Safety case										
1.3	Increase confidence in and further refinement of methods to make sensitivity and uncertainty analyses	REDUPP									

- Questionnaire sent out to 25 European countries (several countries have no WMO contact)
- 13 responses received from: RWM (UK), Surao (Czech Republic), Puram (Hungary), Andra (France), Enresa (Spain), Ondraf/Niras (Belgium), RATA (Lithuania), BfS (Germany), NES (Austria), Sogin S.p.A. (Italy), ARAO (Slovenia), Nagra (Switzerland). Sweden responded informally (but not as part of JOPRAD)

Analysis of questionnaire

% support calculated for each topic (% support from 12 responses). Top topics, based on % support were:

- Topic 1.1 – increased confidence in, and testing and refinement of the tools used in safety assessments (89%)
- Topic 1.2 – improved safety case communication (78%)
- Topic 4.1 – methodologies for adaptation and optimisation during the operational phase (78%)
- Topic 6.1 – monitoring strategies and programmes for performance confirmation (78%)
- Topic 7.1 – governance of decision making process (78%)
- Topic CC2 - competence maintenance, education and training (78%)
- Topic CC4 – communication (78%)

Analysis of questionnaire (continued)

There were several suggested additional topics arising from the analysis:

- Analogues
- Chemotoxics
- Co-disposal
- Societal aspects
- Biosphere models
- Siting and site characterisation
- Development of the State of the Art
- Preparation of Site Descriptive Models
- Climatic evolution

WG Activities 2015 (continued)

The 2nd WMO working group meeting, Ecurey, September 2015:

- Reviewed the 37 existing IGD-TP SRA topics, 16 current joint activities, 4 related H2020 proposals and newly proposed joint activities were reviewed
- Reviewed responses from the questionnaire sent out to European WMOs
- From these 51 topics were selected to be considered for joint programming
- Members of IGD-TP developed a list of eligibility categories to be used as a benchmark to determine the final list of topics to be included in a 'common area' for Joint Programming



Eligibility categories

JP topic eligibility Categories **A** to **Q**

Fully eligible as technical activity	What might be acceptable by WMOs according to gov. rules	Unsuitable
A - Develop. & maint. of competence & fundamental science	F - Large scale demonstrator (e.g. DOPAS, ESDRED)	L - Compliance demonstration
B - Increasing confidence in supporting concepts (e.g. Cebama, Belbar, Mind)	G - Projects having an impact on social acceptance (e.g. aspects of MoDeRn)	M - Detailed technical development & design of repository (e.g. aspects of DOPAS)
C - Early state RD&D	H - Benefit on gaining scientific & SOTA technical consensus	N - Time & mission critical RD&D
D - Very long-term studies (>10 years)	I - Development of common understanding of safety case content	O - Issue under discussion with regulation activities
E - Pooling of information, knowledge management	J - Development & validation of codes through benchmarking	P - Activities close in time to licencing
	K - Novel disposal components technologies (low TRL)	Q - Monitoring of complementary technologies & impact on geological disposal

Executive Group meeting 18 November 2015, London

At the 18th IGD-TP Executive Group (EG) meeting London, November 2015, members reviewed:

- RD&D topics identified at the 2nd WMO working group meeting, Ecurey, September 2015
- Topics resulting from the questionnaire not in the Ecurey list
- Some SRA topics which were discounted at Ecurey were reinstated

Several topics were amalgamated with 20 topics identified by the EG to be progressed for further consideration for Joint Programming

WG Activities 2016

List of topics was reviewed by WG members during meetings, January, May 2016:

- Eligibility categories were applied
- Prioritisation of the list of topics took place (some topics were amalgamated)
- Potential projects were assigned to topics

17 topics were chosen to take forward for Joint Programming
These were sent out to IGD-TP Executive Group and WMO list
25 European countries in June 2016.

Provisional list of WMO topics for JP

Key Topic No.	Topic title	Priority Score	Eligibility category	Potential Projects
CC2	Communication of science, progress and Societal Aspects	1 st (out of 17)	E and G	
1.1	Increase confidence in tools and methods used in safety cases taking into account uncertainty and communication	2 nd (out of 17)	A, E, H and I	<p>Benchmarking (using natural analogues) and international comparisons to communicate safety case arguments.</p> <p>Improving understanding of role of geochemistry and hydrogeological conditions to benchmark and enhance confidence /validate safety cases for different geological environments.</p> <p>Interaction with IGSC topics.</p>
3.5	Long term behaviour of seals & plugs including cement based seals	3 rd (out of 17)	B, D, F and G	



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Provisional list of WMO topics for JP

Key Topic No.	Topic title	Priority Score	Eligibility category	Potential Projects
2.1	Release, dissolution and criticality issues of wasteforms	4 th (out of 17)	A, B, C, D, E, H and J	<p>Impact of duration of dry vs. wet storage on high-burn-up fuels before transport to a repository.</p> <p>Laboratory and modelling based experiments to characterise dissolution and release rates.</p> <p>Sharing information/knowledge between programmes.</p> <p>Laboratory and modelling based experiments to characterise dissolution and release rates.</p>
4.1	Adaptation and optimisation of disposal concept before and during the operational phase	5 th (out of 17)	E, F, G and I	<p>Transfer of knowledge from WMOs from more to less advanced programmes.</p> <p>Methods of increasing efficiency and safety during operational phase.</p> <p>Topic 3.3 is an example of a project identified during assessment of how disposal system could be optimised.</p> <p>Feedback from WMO's with operational experience.</p>



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Provisional list of WMO topics for JP

Key Topic No.	Topic title	Priority Score	Eligibility category	Potential Projects
3.3	Behaviour of bentonite-waste container interactions.	6 th (out of 17)	A, B, C, D, E, F, G H, I, J, K	PEBS project scope. Temperature effects >100°C are part of a Working Group under Exchange Forum 7. Link to Topic 1.1 (safety case communication).
Others	Site characterisation and preparation of site descriptive models	7 th (out of 17)	C, E, F, G and H	Improving understanding of geochemistry and hydrogeological condition to benchmark and enhance confidence in safety cases in different host rocks. Data management tool good practice.
3.7	Development of alternative HLW container materials	8 th (out of 17)	A, C, D, E, H and K	The relative corrosion properties of specific container materials in isolation and in-situ within a composite under different chemical conditions.



Provisional list of WMO topics for JP

Key Topic No.	Topic title	Priority Score	Eligibility category	Potential Projects
5.1	Evaluation of the impact of op. safety issues on the disposal system	9 th (out of 17)	F, G and I	<p>How to evaluate impact of operational safety issue mitigation on the initial post-closure state/safety case - resolving conflicts between operational and post-closure safety? For example, early backfilling would enhance early post-closure performance by preserving waste containers, however it could impact on retrievability?</p> <p>Sharing lessons learned from operational experience from more advanced to less advanced programmes to integrate changes into optimised designs.</p>
CC1	Nuclear knowledge management, preservation and development of state of the art	10 th (out of 17)	A, E and H	<p>Wiki production and population.</p> <p>Broad range of topics including: collecting and managing nuclear knowledge over very long timescales; issues that arise from the limited experience in building, operating and closing deep geological disposal repositories; knowledge transfer and sharing; information technology; stakeholder relationships; education and training issues.</p>

Provisional list of WMO topics for JP

Key Topic No.	Topic title	Priority Score	Eligibility category	Potential Projects
3.1	Non-destructive testing information exchange	11 th (out of 17)	B and E	<p>Review of NDT techniques that may be capable of development to be applicable to the monitoring and inspection of active and simulant wastefoms during storage, including X-ray radiography, neutron radiography, ultra-sonics, thermography and acoustic emission.</p> <p>Analysis of new techniques such as photofission delayed neutron measurement to quantify mass of fissile material.</p>
3.4	Development and demonstration of low pH cements	12 th (out of 17)	A, C, D, E, F and K	<p>Demonstration experiment in URL with representative glass samples, investigation of plume formation and interaction with host rock. Supported by laboratory programme.</p> <p>Investigation of the potential of low pH (phosphate based) cements to retard uranium migration.</p>
3.6	Salt backfill	13 th (out of 17)	A, B, D, E and F	<p>Long-term behaviour and properties.</p> <p>Influences of pressure and temperature on behaviour.</p>

Provisional list of WMO topics for JP

Key Topic No.	Topic title	Priority Score	Eligibility category	Potential Projects
6.1	Monitoring strategies and programmes for performance confirmation	14 th (out of 17)	D, E, F and G	
6.2	During post closure institutional control period and control period monitoring parameters & strategies	15 th (out of 17)	C, E, F, G and H	Transfer of knowledge from monitoring experience during storage of waste.
Others	SNETP/IGD-TP WG	16 th (out of 17)	C, E, H and K	Elaboration of issues introduced in the fact sheet.
Others	Chemotoxics	17 th (out of 17)	E and I	

Thank You !



TSOs



WMOs



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