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D7.4 Publishing in total six newsletters in pdf-format at 9 months interval on the IGD-TP/DOPAS website

Author(s) *Posiva Oy, Johanna Hansen*

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RE	Restricted to a group specified by the partners of the DOPAS project	
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ABSTRACT:

This is the fifth DOPAS Newsletter (one of six), and this is the final Newsletter including interview of DOPAS WP leaders. The DOPAS Newsletter will be published at IGD-TP site http://igdtp.eu/ and at DOPAS internet site http://www.posiva.fi/dopas and also within DOPAS participants and participating organisations.

RESPONSIBLE:

Posiva Oy, Johanna Hansen

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DOPAS Final Newsletter

DOPAS project completed

Full-scale Demonstration Of Plugs And Seals project has reached it's goals and met objectives. The project reporting with almost 100 Deliverables and 70 scientific publications, presentations/posters was a major achievement. Full scale structures, which are continously providing new data about plug and seal behaviour are implemented and monitoring continues in underground conditions in Sweden, Finland and Czéch Republic. One seal structure has been dismantled and it produced valuable information about the construction in full scale. Over 200 persons worked for this project in participating organisations and taking into account the other experts, designers, laboratory personnel, construction specialists and other staff the total amount is double.

DOPAS Training workshop was arranged in Czech Republic and hosted by CTU, SURAO and UJV. The students and tutors in front of the Josef Gallery. The training workshop was lead by Marjatta Palmu, Posiva Oy. DOPAS Training workshop materials are available at: http://www.posiva.fi/en/dopas/wp_7/dopas_training_workshop_2015

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EURATOM

Contact information:

Project Coordinator
johanna.hansen@posiva.fi

Project Information inquiry:
dopas@posiva.fi

www.posiva.fi/en/dopas

DOPAS

DOPAS WP leaders

Johanna Hansen, Posiva, Oy, DOPAS Coordinator and WP1 and WP7 leader

The role of the system responsible for closure of the disposal facility among other duties at Posiva belongs to me and I have been developing both backfill materials and cementitious materials for repository purposes. The coordination of DOPAS project was therefore a good opportunity to get understanding how other European countries are handling similar challenges. Posiva had before initiating the DOPAS a clear target to demonstrate the feasibility of wedge type plug in ONKALO.

The main achievements in participating at DOPAS and POPLU from Posiva point of view were increased preparedness to work as a nuclear licensee holder when designing, planning and implementing the engineered barrier system (EBS) components. All participating organization have been able to learn from Posiva about the requirements and processes in real repository conditions, while POPLU experiment was conducted as it would have been constructed in real repository.

The next phase at Posiva is to test the whole disposal concept with prototype equipment and a demonstration tunnel nearby POPLU tunnel have been constructed to host the canister, buffer, backfill and plug. The design of this coming full scale in situ system test (FISST) has been initiated and the practical installations take place in 2018. The material development for POPLU have been already now modified for other purposes and is currently being tested for closure of deep investigation boreholes.

Co-operation within European framework have been important and valuable. It seems that among the DOPAS consortium all information have been shared without any restrictions and experts and researchers have changed information freely, and therefore the use of resources and time have been efficient.

What have you learned from plugs and seals during the DOPAS Project?

How your organisation will continue now when the DOPAS Project is finished?

Esther Jonsson, SKB, WP2 leader

I am responsible for technology development of clay barriers and plugs in SKB:s planned spent fuel repository.

The important outcome of WP2 is a structured process that captures the iterative development of the design basis in parallel with the iterative development of the design. This process is similar to SKB:s way of working and illustrates the importance of a systematic approach when working with design basis and design work for repository purposes.

The DOPAS project has given valuable insight into other WMO's concepts for plugs and seals. Participation in the project was also a good opportunity for SKB to get valuable feedback on our plug design by other experts in the DOPAS project.

The next phase at SKB is to dismantle and evaluate the function of DOMPLU and based on the results create design specifications for the detailed design of the plug.

Jean-Michel Bosgiraud, Andra, WP3 leader

At Andra I am in charge of technological development (a task that is intrinsically coordinated with scientific R&D), for all the technical issues related to our Deep Geological Repository (DGR) project, named Cigéo.

Andra's participation to DOPAS was well in line with the timeline of our "General Development Plan of Repository Components", where we must demonstrate our capacity to build at an industrial scale the various types of seals considered in Cigéo. In those circumstances, the collaborative work implemented in DOPAs was extremely fruitful:

The information related to the FSS experiment ("Full Scale Seal") activities were shared, without restriction, with all the partners. The DOPAS Partners reciprocated and the Andra engineers could benefit from the scientific and technical input generated by the other experiments (POPLU, DOMPLU, EPSP, ELSA…). This was an opportunity to learn about different technical solutions provided (as technical/scientific answers to different requirements).

An excellent work was the common approach in WP2 on Design Basis (for seals and plugs) which came as a major achievement of DOPAS: with different requirements and at different stages of design/concept development, the Partners managed to find a common rationale and methodological approach (Flow Chart) to address sealing and plugging issues.

Staff Secondment and Student training was also an opportunity to share/confront knowledge with "new comers and young professionals".

Finally the Expert Elicitation process which took place at the end of DOPAS was a "refreshing mean" of evaluating the works carried out and the ways they are reported in the DOPAS Summary Reports.

I must also say that DOPAS was my third important participation to an EC funded Project and was certainly the most fruitful for me.

The next step for the Cigéo seal concepts is two-fold:

- We must continue our modelling work to optimize the number, the nature and the location of seals in Cigéo;
- We must carry-on with our characterization with "long shot" experiments like REM (Saturation at metric scale of bentonitic material) in a surface facility or underground in the Bure URL.

Dean Gentles, Radioactive Waste Management (RWM), WP4 Leader

At RWM, I am an Engineering Manager (Civil Engineer) responsible for specifying, co-ordinating and maintaining design studies to investigate design solutions for various aspects of our generic geological disposal facility designs, including the backfilling and sealing of a geological disposal facility. RWM is currently in a generic phase of developing its plans for geological disposal, where RWM is developing and maintaining three different generic designs, for three different host rock environments. Development of the siting process, in the UK, is ongoing and no site has yet been identified for a GDF in the UK.

As well as a number of supporting underpinning experiment specific reports, the WP4 Integrated Report was also produced. The Integrated Report provides a state-of-the-art summary of the outcomes of WP4 of the DOPAS project, including the main findings of WP2 and WP3, to evaluate the performance of the plugs and seals with respect to their ability to meet the safety functions specified in disposal concepts and to present the technical and operational issues that have been resolved in the project.

Due to being in a generic phase, RWM has not, to date, developed designs for the plugging and sealing of a GDF, as the designs will be site specific. However, RWM has started to develop the safety functional requirements for plugging and sealing systems. Participating in the DOPAS project has allowed RWM to gain invaluable access to the latest plugging and sealing designs which are being developed by WMOs who are close to, or have already submitted licence applications, and therefore have well underpinned designs. The lessons learned from the project will help RWM when we come to the point of designing plugging and sealing systems, as rather than starting from a blank piece of paper, RWM has access to the design development of a number of developed plugging and sealing systems. I now have a greater appreciation of the complex nature of plugging and sealing systems, which must be appropriately integrated into the EBS design.

Although it is unlikely that RWM will develop designs for plugging and sealing systems during the generic phase, work is ongoing to investigate the materials associated with the backfilling, sealing and closure of a GDF.

André Rübel, GRS, WP5 leader

I am a member in a Safety Analyses group of the Repository Safety Research division at GRS. I am mainly working in the field of integrated safety assessment for national and international projects and I was the DOPAS Work Package Leader of WP5, Performance assessment of plugs and seals system. Within DOPAS the different mathematical models were used to assess the plug behavior simultaneously with the laboratory part and full scale demonstrations. Mostly the used models were developed earlier, but now they were applied to the full scale experiments and it was good to see that they were helpful for design and in the evaluation of the plug behavior. The results from the WP5 in the DOPAS project does provide additional data for the Safety Case work in different organisations.

From my perspective since the site selection process for a HLW repository in Germany is started again considering different host rocks, the DOPAS offered a good opportunity to see what are the status and issues in different host rock environments. Similar type of questions needs to be answered in future as well in Germany and in other countries with developing programme's.

Marjatta Palmu, Posiva Oy, WP6 leader

I am a senior adviser at Posiva. I have worked with the development of our expert elicitation system as a part of the quality assurance for the Safety Case and I have developed much of the nuclear waste disposal related training content for Posiva's staff in addition to the production of integrated reports like Posiva's first site specific facility description together with Posiva's subcontractors.

The WP6 looked at enhancing the quality assurance process of the DOPAS Project's final work package deliverables with the help of peer review using the expert elicitation process and producing the integrated final technical report of the Project. Further the WP6 provided opportunities for peer learning by the three different staff exchanges organized under the work package. These experiences complemented the major knowledge transfer activities of the WP7 (the training workshop and the International DOPAS Seminar). The work carried out in WP6 demonstrated that the elicitation process was well suited for its quality assurance task and the descriptions produced during the process contributed to giving an orientation for the integration of the DOPAS Project work in the final technical summary.

The Project has taught much about the need for advance planning and interaction between the different participants in the Project consortium and also in our own organisation. For any future demonstration, we have a wider knowledge base about the details needed in matching the work on development, design and construction activities together for a large scale demonstration underground. The Project produced also useful generic frameworks for overall management and running of activities including deriving the design bases from requirements. These frameworks can be applied not only for plugs and seal development but also with suitable modifications for other EBS component development.

See Johanna's reply on FISST. The materials produced including the well photographed and filmed development work will provide a valuable knowledge base and documentation also for the future developers and a refresher for the people who worked on the project.

Few DOPAS Dissemination activities

- FSS Experiment and casting the SCC wall was presented in WMSYM 2015, Phoenix, USA in March 2015 http://www.wmsym.org/
- DOPAS Experiment EPSP was presented in Icone 23 conference in Japan in May 2015. http://www.icone23.org/
- DOPAS and its experiments and performance indicators were presented in Clay Conference in Brussels, Belgium in March 2015. http://www.clayconferencebrussels2015.com/
- DOPAS and Design basis for plugs and seals and Experiment 1 FSS and Experiment 3 DOMPLU Experiment were orally presented in LUCOEX conference and workshop in Oskarshamn, Sweden in June 2015. In addition DOPAS were represented in few posters and in panel discussion as well. http://www.lucoex.eu/conference/index.html
- DOPAS and POPLU experiment were presented in Global 2015 in Paris, France in September 2015 https://www.sfen.fr/GLOBAL
- Modelling for shaft seal in salt rock were presented in Eurosafe 2016 in Munich, Germany in November 2015 https://www.eurosafe-forum.org/
- DOPAS Training workshop were presented in Nestet 2016 in Berlin, Germany in May 2016 https://www.euronuclear.org/events/nestet/nestet2016/index.htm

DOPAS DELIVERABLES AND PUBLISHED MATERIALS

The most important and significant Deliverables produced by DOPAS project can be found at www.posiva.fi/en/dopas under Deliverables
The reports are worth of reading and they give a good overview of the whole DOPAS. More details are available in bakground reports, which are available at the same site. DOPAS 2016 seminar materials can be found under DOPAS 2016.

- DOPAS Deliverable D6.4 DOPAS Project summary report (technical report)
- DOPAS Final report (to be available at Cordis site)
- DOPAS Deliverable D2.4. WP2 Final Report: Design Basis for DOPAS Plugs and Seals
- DOPAS Deliverable D3.30. WP3 Final Summary Report. Summary of, and Lessons Learned from, Design and Construction of the DOPAS Experiments
- DOPAS Deliverable D4.4. WP4 Integrated Report. Summary of Progress on Design, Construction and Monitoring of Plugs and Seals
- DOPAS Deliverable D5.10. WP5 Final Integrated Report. DOPAS Project Deliverable D5.10
- DOPAS Deliverable D4.8. FSS Experiment Summary Report
- DOPAS Deliverable D4.7. EPSP Experiment Summary Report
- DOPAS Deliverable D4.3. DOMPLU Summary Report
- DOPAS Deliverable D4.5. POPLU Experiment Summary Report
- DOPAS Deliverable D7.2. Plug and seal training workshop planning and implementation report. DOPAS Training Workshop 2015
- DOPAS Deliverable D7.3. DOPAS 2016 Proceedings

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