



TIMODAZ

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DELIVERABLE 3

Summary of the end-user needs for the project

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Dissemination Level

PU	Public	PU
RE	restricted to a group specified by the partners of the TIMODAZ project	
CO	confidential, only for partners of the [acronym] project	

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Feedback on the TIMODAZ project at month 8 (June 2007)

Based on the TIMODAZ contract, the role of the end-user group is to

- Define the end-user needs
- Integrate the research results of the TIMODAZ project in a broader, safety case oriented context
- Review and give feedback on the deliverables
- Recommendations to or, if found necessary, reorientation of the project.

During the end-user meeting, June 13th 2007, the partners of the TIMODAZ project gave a clear overview of the general framework of the project and the specific scientific topics that will be addressed. The presentation by P. Zuidema (NAGRA on behalf of the end user members) and X. Sillen (SCK-CEN on behalf of the TIMODAZ consortium) gave a good overview of the end-user needs and how the scientific research is integrated in the safety case and how the interaction between science and performance assessment (PA) should occur. Moreover, the partners provided the end-users with several deliverables in order to

- Review and comment on the deliverables as such
- Evaluate the applicability of the foreseen project results within a safety case.

First of all, the review of the available deliverables (D2 and D4) will be discussed. Concerning D2 – *state of the art on THMC*, we would like to inform that we were impressed by the amount of work that was performed in order to gather all the available information and to gather the huge amount of data and references, which is certainly very useful. However, we would like to inform that the current version is not that easy to read from an end-user point of view. With this respect we would propose to focus this report more on the summaries, which are already included, and to transfer the technical details to an annex. Moreover, an overall integration would certainly be of interest. Concerning D4 – *Significance of DZ for PA and the safety case*, there are no general remarks by the end-user group. On the contrary, the document clearly describes the safety case point of view and the list of five questions seems to us a good tool to structure the work, collaboration and integration of the TIMODAZ project. A more detailed remark on question 4 mentioned on p13 of D4 is given below.

Next, the end-users are asked to formally approve the currently foreseen programme or to suggest deviations of the work programme, based on the discussions of the end-user meeting and the documents available. Moreover, any comments or suggestions could be made as well by the end-users.

The end-user group would like to stress that clearly a lot of work has been put in drafting two important reports with respect to the further evolution of the project, namely D2- *state of the art on THMC* and D4-*Significance of DZ for PA and the Safety Case*. Moreover, the presentations given during the end-user meeting, clearly showed that the partners and especially the WP leaders and coordinator did a great effort in integrating the work foreseen in each WP and between WP's. Both were very much appreciated by the end- user group, as they certainly facilitated their work.

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Based on the information available, the end-user group agrees with the continuation of the project according to the work programme presented and does not suggest a reorientation. However, several recommendations are put forward by the end-user group, mainly in order to

- Strengthen the interaction between experimentalists, modellers and performance assessors
- Increase the possible direct use of the final outcome of the TIMODAZ project for a safety case.

As a first recommendation, the end-user group would like to propose to clearly check, in the course of the project, to what extent the processes concerning TDZ are really similar for all three types of clays. During the presentations at the end-user meeting, it seemed that similar processes were expected for the three types of clay considered (going from plastic clay to indurate clay). We acknowledge that for the EDZ this reasoning holds, but would like to suggest a more careful approach until more information on the TDZ is available.

A second recommendation is focused on the integration of the three domains of expertise (experimental, modelling and PA) present within the project. A possible way of integration might be achieved by making joint presentations at meetings, conferences and certainly end-user meetings of the project.

A third recommendation is also focused on integration of the different disciplines, but now at the level of the project evolution, in order to make the outcome of the project directly useful for a safety case. Within deliverable 4 – *Significance of DZ for PA and the safety case*, five different questions are put forward that need to be answered from a safety case point of view. The end-users appreciated very much the listing of these questions and believe that these might be used as a tool in order to strengthen the collaboration between different partners and different disciplines. However, the other presentations and most of the other documents (e.g. programme description of the WP's for the coming months) do not inform on how and to what extent they will produce an answer to (some of) these questions. As end-users we have used these five questions to give some additional feedback on how we think collaboration might be enhanced and on how it might lead to useful output for a safety case.

Q1: What is the expected evolution of the DZ around a disposal system for heat-emitting waste during the thermal period?

It is indeed one of the major tasks of a Safety Case to clearly describe the expected evolution of the disposal system. As part of this, a description of the expected evolution of the Damaged Zone around a disposal system for heat-emitting waste during the thermal period is needed. First of all, we want to stress that from a PA point of view, it is important to have an idea on how the damaged zone looks like at the moment of radionuclide release. For all concepts (linked to the host rocks) considered in the project, the engineered barriers are such that radionuclides (RN) will only be released after several thousands of years. Taking this into account, it is most important to inform on the evolution for let's say the next 10 000 years. Moreover, in order to clearly focus the modelling work and experiments, we would suggest to the modellers of the TIMODAZ project to make already now predictions/evaluations of the evolutions for the next 10 000 year, taking into account all the limitations that (still) exist for our understanding and the models. Based on these models it would be possible to clearly indicate the uncertainties, knowledge gaps and issues that need to be addressed within the project. Finally, the description of the experimental work should try to indicate how their experiments will help in describing this expected evolution.

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Q2: What are the main uncertainties about the DZ evolution and how can these uncertainties be dealt with?

Within a safety case, it is not only necessary to describe how the system will evolve, but also to describe which uncertainties remain on the described evolution. Consequently, it is suggested to inform on the uncertainties that are identified by the modellers (and others) and on how the experimental work is focused on these uncertainties. To this end, the uncertainties described in D2 – *state of the art on THMC* and the uncertainties resulting from the model exercise proposed above under *Q1*, should be addressed. Once, again we would like to stress to consider the long term (thousands of years) as this is the eventual input needed for performance and safety assessment.

Q3: Under which thermal, mechanical and chemical conditions can the favourable clay properties be modified during the thermal period and how much can these properties be affected?

It is correct that based on the description of the expected evolution of the system, it will be indicated which safety relevant favourable properties are affected and these changed properties will be taken into account in the eventual performance and safety assessment calculations. However, for the experimentalists and modellers it would be most interesting that PA people already now inform on

- Which properties are the most important ones with respect to safety
- What would be a significant change of these properties.

Additionally, we have a specific recommendation for WP3.2. We would like to remind the partners that chemical changes in these clay environments take a lot of time. In this respect, we recommend to clearly indicate the experimental limits and certainly compare the obtained results with geological evidence (from sedimentary basin history, etc).

Q4: Under which conditions do the changes in clay properties become irreversible?

As end-users we would like to inform the partners of the TIMODAZ project, that we do not feel very comfortable with the used wording and would like to suggest being very careful with the term ‘irreversible’. It is asked whether another term can be found or at least to clearly define the meaning of the term ‘irreversible’ within this context. Without better constraining the meaning of ‘irreversible’ every evolution might be considered irreversible and on top of that the term might have a rather negative connotation.

Q5: To which extent can temporary or permanent alterations of favourable clay properties really affect individual barriers and the safety functions of the repository, i.e. to which extent are these alterations significant from a PA point of view?

This is of course the eventual question that needs to be answered within a Safety Case. However, to which extent this question can be answered is probably strongly depending on the results that will be obtained during the project and to which extent the aforementioned questions can be answered. In order not to postpone this question to the very last moment of the project, the end-user group would like to repeat once more their recommendation to ensure interaction between PA and experimentalists and modellers already during the project. This will certainly help to evaluate in how far this question can be addressed with this project. We hope that the above listed recommendations can help the TIMODAZ partners to establish this interaction.



Finally, we would like to thank all partners of the TIMODAZ project for the fruitful discussions we had during this first end-user meeting. We look forward to be informed on the progress and first results obtained at the second end-user meeting within about one and a half years.

Yours sincerely

The TIMODAZ end-user group

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