**Integration Group for the Safety Case (IGSC) Symposium 2024***MOVING TOWARDS THE CONSTRUCTION OF A SAFE DGR – GETTING REAL*

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| **Abstract Title: ONDRAF-NIRAS, BELGIUM,** [**c.depaus@nirond.be**](mailto:c.depaus@nirond.be)    **“Decisional reversibility and technical retrievability for a geological disposal : ethical issues”** | |
| **Abstract (300-500 words):** ONDRAF/NIRAS has already performed several studies in ethics using the normative tool of ethical matrixes, initially conceived as a two-dimensional table combining affected stakeholders and ethical principles in order to highlight potential ethical conflicts. In order to account appropriately for future generations, this tool has been further developed as a three-dimensional framework, where the time dimension is added to account for the specification of future generations**1**. This three-dimensional framework is used here to clarify the ethical impacts associated with decisional reversibility and with physical retrievability in the context of Belgian national policies which will determine the modalities of these concepts for a period to be determined in consultation with all stakeholders. In the study presented here, it is recognized that reversibility and retrievability are not unequivocal and that various provisions can be implemented to enhance these. The focus here is on the provisions that are foreseen in Belgium in order to ensure reversibility and retrievability. They relate namely to the decision-making process, to the type of waste containers, to the choice of backfill materials, to the facility layout and to the closure process. The impact of these provisions on various stakeholders are studied with ethical matrices using the principle of well-being, the principle of autonomy and the principle of justice (i.e. intergenerational equity; intragenerational equity; polluter pays principle) over several time intervals: licensing, construction, operational, institutional control and post-control phases. It can be shown that during the licensing phase, the decision-making process is the only factor that plays a role with respect to reversibility, retrievability is not at stake at this stage. A highly reversible decision-making process favours psychological well-being and free and informed consent of local communities. On the other hand, a less reversible option favours psychological well-being and safety of the communities where the waste is currently stored, intragenerational equity, the polluter pays principle and the economic impacts, as well as security. During the construction phase, the same reasoning can be held for the decision-making process but the facility layout also plays a role at this stage, with an advantage of a layout with twin access galleries and long disposal galleries in terms of nuisances, and advantages of a layout with a single access gallery and long disposal galleries in terms of polluter pays principle, economic impacts, and operational safety. During the operational phase, we can first note that all the provisions that enhance reversibility and retrievability are penalizing security. Finally, with respect to the closure process, a closure process maintaining galleries and shafts open for a very long time is favoured in terms of psychological well-being and free and informed consent of local communities, but a closure process planning a backfilling as soon as possible is favoured in terms of all the other relevant ethical impacts. Ultimately, the research conducted here has shown that it makes no sense to analyse reversibility and retrievability as if it is one global feature of the geological disposal.  **1**Céline Kermisch & Christophe Depaus (2024) Accounting for Future Generations in Energy Ethics: The Case for Temporalized Ethical Matrices, Ethics, Policy & Environment, 27:1, 30-47, DOI: 10.1080/21550085.2023.2170156 | |