**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:**  **Inadvertent Human Intrusion: Applying the HIDRA methodology. [Proposed for an oral presentation]** | |
| **Abstract (300-500 words):**  The United Kingdom is committed to the safe management and disposal of higher activity radioactive waste through a policy of secure interim storage prior to final disposal in a deep geological disposal facility (GDF). The UK’s approach to finding a suitable site for a GDF is laid out in the “Implementing geological disposal – working with communities: long term management of higher activity radioactive waste” policy. As part of this policy a suitable location for a GDF will be identified through a consent-based process with the UK Government and its agencies working in partnership with communities. Nuclear Waste Services (NWS), formerly RWM, is the delivery organisation responsible for the implementation of a safe, sustainable and publicly acceptable programme for geological disposal.  System evolution scenarios are central to the development of a safety case for a GDF. In the NWS approach, scenarios are grouped into three categories which impact the safety case in different ways. The first is the expected or normal evolution scenario(s) in which the safety functions operate as designed. It may be that there are very limited releases in these scenario(s) and their performance will lie well within regulatory dose or risk guidelines. The second are variant scenarios which may disrupt the expected evolution, which are less likely to occur but are still credible and hence need to be considered as possible within the safety case. A GDF safety case would need to be robust to such scenarios and therefore these scenarios are used for GDF design optimisation. In the UK, we refer to the first and second group of scenarios collectively as the ‘base scenario’. In our performance assessment we aim to demonstrate that we have adopted a broad-brush base scenario that is consistent with our regulatory risk guidance level. As we do not apply any probability weighting to events within the base scenario set (in effect the weighting factor is one for this scenario set), in our performance assessment we can subsume all scenarios that would give a lower consequence than the base scenario into the base scenario when assessing the radiological risk from the GDF.  The third are ‘what-if’ scenarios, designed to test the limits of the safety functions in hypothetical situations. Such scenarios may be implausible (for example complete failure of a safety barrier) and therefore the safety case does not necessarily need to be robust to ‘what-if’ scenarios, rather they are used to explore the limits of robustness. As such, modifications to the GDF which do not reduce the robustness of the base scenario should be considered, assuming such measures are consistent with principles such as ALARA.  In the UK, consistent with international best practice, inadvertent human intrusion (IHI) is treated as a ‘what-if’ scenario for a GDF. Recent work in the IAEA HIDRA project (Human Intrusion in the context of Disposal of Radioactive Waste) has provided guidance to developers of radioactive disposal facilities on the treatment of IHI in safety cases. Consistent with the NWS approach to ‘what-if’ scenarios, the HIDRA approach advocates developing stylised scenarios for the assessment of human intrusion and the adoption of protective measures which may reduce the likelihood or consequence of IHI, if such measures do not disrupt the expected evolution scenario and are consistent with the ALARA principle.  NWS will present a methodology for treating IHI, based on the HIDRA recommendations and will illustrate the initial stages of its implementation. NWS has elicited and assessed an initial set of stylised IHI scenarios, including those associated with resource extraction such as drilling or mining; these assessments include doses to the intruder and long-term impacts on future populations resulting from the hypothetical intrusions. Measures for the mitigation of IHI have been compiled based on a literature review, largely based on those of HIDRA. The assessments are then used to inform initial judgements about the potential adoption of mitigating measures within the GDF programme. | |

1. NWS – Nuclear Waste Services [↑](#footnote-ref-2)
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