“Current Mined Geologic Disposal System Concept of Operations”

Introduction

The Concept of Operations for the Mined Geologic Disposal System (MGDS) provides an integrated, conceptual description of the physical architecture and operating concept of the potential repository. The document facilitates a common understanding of the operations among system planners, developers and implementors by summarizing design solutions and operating concepts.

During this past year, the MGDS Concept of Operations document was updated to reflect the Viability Assessment (VA) design and operating concept. Previously, this document reflected the Advanced Conceptual Design (ACD). This paper presents a description of the significant operational changes from ACD to VA design that are now captured in the Concept of Operations document.

Off-site Transportation Within Nevada

Two transportation formats are addressed for waste transported by rail to the state of Nevada. These two formats are rail car operations to within 100 miles of the MGDS with heavy-haul trucks to the repository and the addition of a rail spur to provide rail access all the way to the repository.

Operating Environment and Waste Description

The MGDS Concept of Operations was expanded to include a top level description of the natural environment conditions at Yucca Mountain. This incorporated scientific data related to the most recent climate, surface hydrology and seismic information being used by the Project. In addition, this section of the MGDS Concept of Operation was expanded to discuss types and quantities of waste that will be accepted by MGDS for disposal. These include commercial, DOE and Navy SNF as well as HLW. The specific characteristics of each of these different waste forms vary appreciably and are addressed in the document.

The waste disposal concept was updated to reflect the HLW/DOE SNF being co-disposed between disposal containers containing commercial SNF. This approach includes a co-disposal container which holds 5 defense HLW canisters arranged around a center position DOE SNF canister. This co-disposal container is emplaced between commercial SNF disposal containers, which are spaced to provide an areal mass loading of 85 MTU/acre.

System Operations

The key changes to the MGDS systems operations occurred in the construction phase and the waste handling and emplacement operations phase. The construction phase has been updated to reflect the placement of the central exhaust main drift under the emplacement block. The construction phase of operations also includes subsurface and surface development as well as the preparation of ventilation systems for the emplacement and development sides of the subsurface facility.

The MGDS Concept of Operations presents the key operations required to receive the waste at the repository, package the waste in preparation for disposal, and emplace the waste. The operations have been updated to reflect the change in waste receipts from multi-purpose canisters to the receipt of dual purpose canisters or transportation casks with bare spent nuclear fuel. The waste receiving operations include the receipt, inspection, and preparation of both rail casks and legal weight truck casks. The waste handling operations have been updated to reflect wet handling of bare SNF and dual purpose canisters and dry handling of HLW, DOE SNF and commercial SNF in disposable containers. In addition, the emplacement operations have been updated to reflect the disposal container being emplaced with a gantry system. The gantry system lifts the loaded disposal container from the subsurface transporter rail car and places it onto steel pedestals at a preselected emplacement drift location.

Conclusion

During the past year, the MGDS Concept of Operations for the potential repository has progressed to a level which will allow a viability assessment to be completed. The concept of operations has been updated to reflect the following key advances in reference design since the Advanced Conceptual Design in March, 1996:

- utilization of a wet handling system for bare SNF or SNF in non-disposable canisters;
- revision of the underground ventilation system to include an exhaust main drift under the emplacement drifts;
- utilization of an areal mass loading of 85 MTU per acre; and
- utilization of a gantry system for emplacement of the waste packages.