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Overview of NRC's Regulatory Perspective on Performance Confirmation

R. Fedors and J. Pohle

U.S. Nuclear Regulatory Commission, Rockville, MD 20852

Regulations governing the disposal of high-level radioactive waste at 10 CFR Part 63, Subpart F, require the implementation of a Performance Confirmation Program for a geologic repository at Yucca Mountain, Nevada. The goals of the Performance Confirmation Program are to confirm that the: (i) actual subsurface conditions and potential changes in these conditions during construction and waste emplacement operations are within the limits assumed during the licensing review; and (ii) natural and engineered barriers are functioning as intended and anticipated.

For a license application for construction authorization, only a plan is required by the regulations. Proposed activities might include: (i) monitoring the repository environment, both engineered and natural components; (ii) field and laboratory investigations under more controlled conditions to better understand processes; and (iii) scientific and programmatic evaluation of the data to support operational decisionmaking and guide adaptive design alterations. NRC review of vadose zone monitoring methods revealed limitations in current technological solutions such that many presently available hydro-environmental sensors would likely not be suitable for long-term, deep-subsurface, fractured rock monitoring activities, particularly with respect to the temperatures and radiation environment that will occur near or within waste emplacement drifts. Sensor deployment strategies will also have to be developed considering the repository environment. Thus, achieving the goals of the performance confirmation program could be affected by limits on sensor capabilities or on an as yet to be proposed sensor deployment strategy. A performance confirmation program implemented over a lengthy operational period allows for future evolution and development of sensors and strategies to further advance the collection of information relevant to processes important for performance of the potential repository at Yucca Mountain.

The NRC staff views expressed herein are preliminary and do not constitute a final judgment or determination of the matters addressed or of the acceptability of a license application for a geologic repository at Yucca Mountain.