

**§ 197.12 What definitions apply in subpart B?**

All definitions in subpart A of this part and the following:

*Accessible environment* means any point outside of the controlled area, including:

- (1) The atmosphere (including the atmosphere above the surface area of the controlled area);
- (2) Land surfaces;
- (3) Surface waters;
- (4) Oceans; and
- (5) The lithosphere.

*Aquifer* means a water-bearing underground geological formation, group of formations, or part of a formation (excluding perched water bodies) that can yield a significant amount of ground water to a well or spring.

*Barrier* means any material, structure, or feature that, for a period to be determined by NRC, prevents or substantially reduces the rate of movement of water or radionuclides from the Yucca Mountain repository to the accessible environment, or prevents the release or substantially reduces the release rate of radionuclides from the waste. For example, a barrier may be a geologic feature, an engineered structure, a canister, a waste form with physical and chemical characteristics that significantly decrease the mobility of radionuclides, or a material placed over and around the waste, provided that the material substantially delays movement of water or radionuclides.

*Controlled area* means:

(1) The surface area, identified by passive institutional controls, that encompasses no more than 300 square kilometers. It must not extend farther:

(a) South than 36°40'13.6661" north latitude, in the predominant direction of ground water flow; and

(b) Than five kilometers from the repository footprint in any other direction; and

(2) The subsurface underlying the surface area.

*Disposal* means the emplacement of radioactive material into the Yucca Mountain disposal system with the intent of isolating it for as long as reasonably possible and with no intent of recovery, whether or not the design of the disposal system permits the ready

recovery of the material. Disposal of radioactive material in the Yucca Mountain disposal system begins when all of the ramps and other openings into the Yucca Mountain repository are sealed.

*Ground water* means water that is below the land surface and in a saturated zone.

*Human intrusion* means breaching of any portion of the Yucca Mountain disposal system, within the repository footprint, by any human activity.

*Passive institutional controls* means:

(1) Markers, as permanent as practicable, placed on the Earth's surface;

(2) Public records and archives;

(3) Government ownership and regulations regarding land or resource use; and

(4) Other reasonable methods of preserving knowledge about the location, design, and contents of the Yucca Mountain disposal system.

*Peak dose* means the highest annual committed effective dose equivalent projected to be received by the reasonably maximally exposed individual.

*Performance assessment* means an analysis that:

(1) Identifies the features, events, processes, (except human intrusion), and sequences of events and processes (except human intrusion) that might affect the Yucca Mountain disposal system and their probabilities of occurring during 10,000 years after disposal;

(2) Examines the effects of those features, events, processes, and sequences of events and processes upon the performance of the Yucca Mountain disposal system; and

(3) Estimates the annual committed effective dose equivalent incurred by the reasonably maximally exposed individual, including the associated uncertainties, as a result of releases caused by all significant features, events, processes, and sequences of events and processes, weighted by their probability of occurrence.

*Period of geologic stability* means the time during which the variability of geologic characteristics and their future behavior in and around the Yucca Mountain site can be bounded, that is, they can be projected within a reasonable range of possibilities.

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*Plume of contamination* means that volume of ground water in the predominant direction of ground water flow that contains radioactive contamination from releases from the Yucca Mountain repository. It does not include releases from any other potential sources on or near the Nevada Test Site.

*Repository footprint* means the outline of the outermost locations of where the waste is emplaced in the Yucca Mountain repository.

*Slice of the plume* means a cross-section of the plume of contamination with sufficient thickness parallel to the prevalent direction of flow of the plume that it contains the representative volume.

*Total dissolved solids* means the total dissolved (filterable) solids in water as determined by use of the method specified in 40 CFR part 136.

*Undisturbed performance* means that human intrusion or the occurrence of unlikely natural features, events, and processes do not disturb the disposal system.

*Undisturbed Yucca Mountain disposal system* means that the Yucca Mountain disposal system is not affected by human intrusion.

*Waste* means any radioactive material emplaced for disposal into the Yucca Mountain repository.

*Well-capture zone* means the volume from which a well pumping at a defined rate is withdrawing water from an aquifer. The dimensions of the well-capture zone are determined by the pumping rate in combination with aquifer characteristics assumed for calculations, such as hydraulic conductivity, gradient, and the screened interval.

*Yucca Mountain disposal system* means the combination of underground engineered and natural barriers within the controlled area that prevents or substantially reduces releases from the waste.

### § 197.13 How is subpart B implemented?

The NRC implements this subpart B. The DOE must demonstrate to NRC that there is a reasonable expectation of compliance with this subpart before NRC may issue a license. In the case of the specific numerical requirements in

§ 197.20 of this subpart, and if performance assessment is used to demonstrate compliance with the specific numerical requirements in §§ 197.25 and 197.30 of this subpart, NRC will determine compliance based upon the mean of the distribution of projected doses of DOE's performance assessments which project the performance of the Yucca Mountain disposal system for 10,000 years after disposal.

### § 197.14 What is a reasonable expectation?

Reasonable expectation means that NRC is satisfied that compliance will be achieved based upon the full record before it. Characteristics of reasonable expectation include that it:

(a) Requires less than absolute proof because absolute proof is impossible to attain for disposal due to the uncertainty of projecting long-term performance;

(b) Accounts for the inherently greater uncertainties in making long-term projections of the performance of the Yucca Mountain disposal system;

(c) Does not exclude important parameters from assessments and analyses simply because they are difficult to precisely quantify to a high degree of confidence; and

(d) Focuses performance assessments and analyses upon the full range of defensible and reasonable parameter distributions rather than only upon extreme physical situations and parameter values.

### § 197.15 How must DOE take into account the changes that will occur during the next 10,000 years after disposal?

The DOE should not project changes in society, the biosphere (other than climate), human biology, or increases or decreases of human knowledge or technology. In all analyses done to demonstrate compliance with this part, DOE must assume that all of those factors remain constant as they are at the time of license application submission to NRC. However, DOE must vary factors related to the geology, hydrology, and climate based upon cautious, but reasonable assumptions of the changes in these factors that could affect the