



EPA's Proposed Standards for Yucca Mountain

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Overview

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Background: EPA's Role

Nuclear Waste Policy Act defined basic roles:

- EPA establishes public health and environmental protection standards for high-level waste disposal
- NRC licenses and regulates the repository, using EPA's standards as a compliance measure
- DOE constructs and operates the repository

Energy Policy Act of 1992 maintained these roles, but specific to Yucca Mountain

- Required EPA to contract with the National Academy of Sciences (NAS) for a technical study of “reasonable” standards
- EPA's standards to be “based upon and consistent with” the NAS findings and recommendations



Background: EPA's 2001 Rule

Storage standards provided protection of the public during storage of waste at the site

Disposal standards applied for 10,000 years:

- Doses projected to the Reasonably Maximally Exposed Individual (RMEI) from the undisturbed repository and in circumstances of human intrusion
- Concentrations in ground water equivalent to today's drinking water standards

DOE was required to continue RMEI dose projections beyond 10,000 years to the time of peak dose, but no dose limits imposed by EPA



Background: The Court Ruling

Federal Court, July 2004:

- The court vacated 40 CFR Part 197 after it determined that the 10,000-year compliance period was not ‘based upon and consistent with’ the following NAS recommendation

National Academy of Sciences, 1995:

- “We believe there is no scientific basis for limiting the time period to 10,000 years or any other value. . . . We recommend that compliance assessment be conducted for the time when the greatest risk occurs [within limits of geologic stability].”
- “Although the selection of a time period of applicability has scientific elements, it also has policy aspects that we have not addressed.”



Regulatory Development

To respond to the Court ruling:

- We re-examined the NAS' recommendations
- We studied the Court ruling
- We reviewed international regulatory approaches and guidance on radioactive waste disposal - such guidance represents the only precedents for regulation for such long times



Regulatory Development

Proposal published 22 August 05 (70 FR 49014)

Public comment period ended 21 November 05

- Hearings and information meetings held in
 - Amargosa Valley, NV (town nearest Yucca Mountain)
 - Las Vegas, NV
 - Washington, DC
 - Blended format for dialogue plus opportunity for comments on the record

Additional outreach to tribes during the comment period



Regulatory Development

Our primary goal is to protect public health and safety

We also:

- Addressed the issues raised by the Court and NAS
- Reflected sound science
- Recognized the inherent limitations in projecting performance for up to 1 million years
- Provided clear guidance to NRC to consider in implementation and licensing



Regulatory Development

The proposal focused on those elements of our standards affected by the Court, e.g., no changes to RMEI or ground-water standards

We followed standard EPA and Federal regulatory development processes including meeting with outside parties, e.g.,

- Nevada's Nuclear Waste Project Office
- Affected counties
- Environmental and public interest groups
- Nuclear industry groups



Overview of the Proposal

Our proposal maintains all the protections from the 2001 rule for the first 10,000 years, including 150 microsieverts per year ($\mu\text{Sv}/\text{yr}$)

We proposed adding protection by extending the standards to cover the time of peak dose within one million years, including the effects of potentially disruptive events at Yucca Mountain

We proposed a post-10,000-year standard of 3.5 mSv

Our approach is consistent with expert technical recommendations from national and international organizations



Public Comments: The Statistics

About 2600 sets of comments submitted

- ~2350 are included in mass mailings

About 3000 pages of comments plus about 1100 pages of attachments

53 speakers at five public hearings

Go to www.regulations.gov and do an “Advanced Search” on Docket EPA-HQ-OAR-2005-0083



Public Comments Overview

Commenters

- Senators Reid and Ensign
- Representative Berkley
- State Agency for Nuclear Projects (Governor's office)

Other States: Maine, Vermont, California

Nevada counties: Clark, Lincoln, Eureka, White Pine

Nuclear Industry Interest Groups

- Nuclear Energy Institute

National Association of Regulatory Utility Commissioners

Environmental and Public Interest Groups: NRDC, Public Citizen, Citizen Alert, NNWTF, and several others

Department of Energy



Summary of Comments by Topic

Post-10,000-year dose limit (350 mrem/yr)

- Rationale for higher limit (risk, equity, etc.)
- Derivation in relation to background radiation
- Consistency with Court decision and NAS

Mean vs. median as statistical measure

Long-term events and processes

Other comments



Post-10,000-Year Dose Limit (1 of 2)

Proposal: Apply a dose limit of 350 mrem/yr beyond 10,000 years (up to 1 million years) to account for modeling uncertainties, timeframe

Comment: Dual-standard approach is

- Intended to allow the site to “pass”
- Inconsistent with Court decision and NAS report
- Unfair to future generations (use 15 mrem/yr for all time)
- Inappropriate to address uncertainties
- Weaker than standards in other countries



Post-10,000-Year Dose Limit

Proposal: Take difference in background radiation in Amargosa Valley and Colorado

Comment: Use of background radiation is:

- Inconsistent with EPA risk policies
- Equating natural sources with man-made
- Unjustified in using Colorado as point of comparison
- Based on inaccurate figures for Amargosa Valley
- Misleading because indoor radon should be excluded



Mean vs. Median as Compliance Measure

Proposal: Use median of distribution as the measure of compliance after 10,000 years

Comment: Use mean because

- NAS recommended use of the mean
- Median allows unacceptable exposures at higher end
- Median masks the real change in overall standard
- Median does not adequately consider important events

Comment: Use median because

- Median appropriately focuses on expected outcomes
- NAS did not consider significant statistical issues



Long-Term Events and Processes

Proposal: Use 10k analysis as basis for longer-term; assess climate, seismic, igneous, corrosive

Comment: The analysis is too restrictive

- “Insignificant” events can have cumulative impact
- Events occurring much later could be important
- EPA relies on DOE estimates of package integrity
- Climate should vary, not be held constant
- Seismicity effects should not be limited to barriers
- Volcanism should be based on longer history



Other Comments

- Updating dose methodology is appropriate
- Ground-water should apply for 1 million years
- 350 mrem/yr has implications for DOE and other cleanups/sites
- Public process not long/inclusive enough
- Consider risks of continued storage
- Outside EPA authority:
 - Transportation
 - Suitability of Yucca site
 - Alternatives to geologic disposal



Next Steps

Respond to Comments

- EPA is in the process of preparing responses to each significant comment

Assess potential changes to proposal

- Legal or technical arguments
- Evaluate new information provided by commenters
- Complete any necessary additional technical work
- Complete policy review

Prepare final rule and preamble

Interagency review of final rule currently ongoing

