



Proposed Standards for Yucca Mountain

for the
Nuclear Waste Technical Review Board

by

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Purpose

- Provide background on the Yucca Mountain standards
- Outline the provisions in the proposed standards
- Present the plans for the final standards

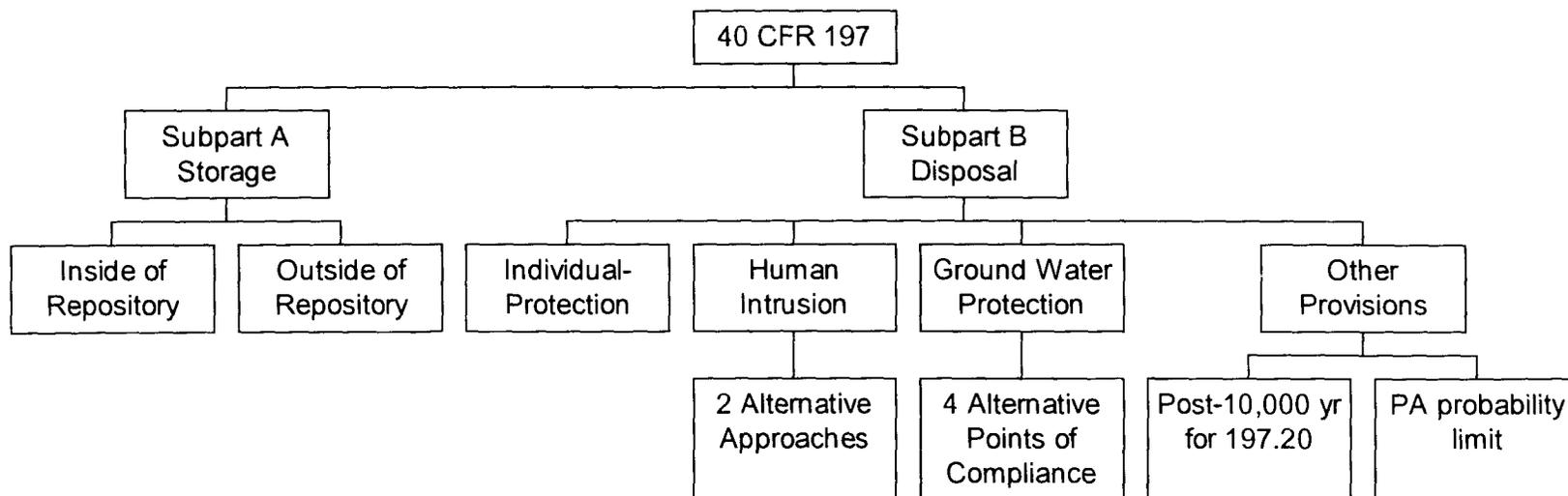
Background

- Energy Policy Act
 - EPA to set site-specific standards for YM
 - NAS to provide technical recommendations
 - NRC licensing regulations to be consistent with EPA's standards
- EPA proposed the standards on
27 Aug 99

Background (continued)

- EPA not bound to NAS Report, but weighs it heavily
 - Many findings written as suggestions
 - Congress directed EPA to set standards “by rule”
 - Federal function
- 40 CFR Part 191 is a precedent

Organization of the Standards



Subpart A

Storage

- 150 microsieverts (μSv) CEDE/year (yr)
- Doses from repository (Part 197) and surface operations (Part 191) combined
- Consistent with Part 191 and NAS suggested annual risk levels (10^{-6} to 10^{-5} or about 20 to 200 μSv)

Subpart B

Individual-Protection Standard

- 150 μSv CEDE/yr through all pathways over 10,000 yr
- Reasonably maximally exposed individual (RMEI)
 - Located near Lathrop Wells intersection
 - Similar to mean of critical group
 - Representative of current residents of Amargosa Valley
 - Drinks 2 liters (L) per day of ground water

Why RMEI not Critical Group?

- Other EPA programs use RMEI
- RMEI is representative of most highly exposed part of the general population
- Uses mixture of 95th percentile and average values for exposure parameters
- Used to estimate high-end doses
- Goal is to project doses within an expected range rather than most extreme case
- Results similar to CG approach

Subpart B

Human Intrusion

- NAS recommended that EPA set scenario through rulemaking
- 150 $\mu\text{Sv}/\text{yr}$ over 10,000 yr
- Scenario
 - Single intrusion as a result of water exploration
 - Borehole to the aquifer; not carefully sealed
 - Occurs as soon as a canister is sufficiently degraded that it is not noticed

Subpart B -- Human Intrusion (cont.)

- Alternative approach
 - If intrusion could not occur at or prior to 10,000 yr, results of assessments and their bases must be placed into the Yucca Mountain environmental impact statement (EIS)

Ground Water Protection

- Limits are the maximum contaminant levels (MCLs as est. under the Safe Drinking Water Act) in a representative volume of ground water
- MCLs:
 - 5 picocuries (pCi)/L of Ra-226 and -228
 - 15 pCi/L of gross alpha (excl. Rn and U)
 - 4 mrem/yr beta and photon

Why Have Separate Ground Water Standards?

- Administration policy to protect ground water
- Protect current and future resource
- Prevention easier and cheaper than mitigation
- Consistent with other programs, e.g.,
 - 40 CFR Part 191
 - WIPP certification
 - Hazardous and municipal waste disposal
 - Underground injection control

Representative Volume of Ground Water

- Volume of ground water withdrawn to meet a specified demand
- Centered on the highest concentration
- Position and dimensions based upon average hydrologic characteristics along the flow path

Representative Volume of Ground Water (cont.)

- Two alternatives for calculating the dimensions
 - Well-capture zone
 - Slice of the plume

Representative Volume of Ground Water (cont.)

- Proposed: 1,285 acre-feet (ac-ft)/yr
 - Small farming community - 25 people
 - 255 acres of alfalfa x 5 ac-ft/yr =
1,275 ac-ft/yr
 - Plus 10 ac-ft/yr (family of four with a garden)

Representative Volume of Ground Water (cont.)

- Other volumes (ac-ft/yr) for comment
 - 10 (minimum volume of a public water supply system)
 - 120 (150-person community based upon current water use for the area and 20 yr projection of land use at 20 km)
 - 4,000 acre-feet (annual yield of Jackass Flats sub-basin)

Ground Water Point of Compliance

- Two approaches -- Four alternatives
 - Controlled area
 - 5 kilometers from repository
 - 5 kilometers plus NTS boundary
(the “18-km” alternative)
 - Designated points (w/fixed distance alternative)
 - Lathrop Wells intersection (~20-km)
 - Southern Amargosa Valley (~30-km)

Other Provisions

- Post-10,000 yr results for individual-protection
 - Peak dose after 10,000 yr
 - Include the results in the Yucca Mountain EIS
- Limit on PA consideration
 - Consider only processes and events with probability $\geq 10^{-8}$ /yr

Subpart B

Reasonable Expectation

- All disposal standards based upon “reasonable expectation”
- Takes into account inherently greater uncertainty of long-term projections
- Less stringent than “reasonable assurance” used for reactor systems

Subpart B

Reasonable Expectation (cont.)

- Includes all important parameters/ processes, even if not precisely quantifiable
- Compliance determination not heavily influenced by “worst case” assumptions
- Includes full range of reasonable parameter-value distributions

Next Steps

- Public hearings in October in Washington, DC (13th), Amargosa Valley (19th), Las Vegas (20th-21st), and a Midwest location (final week)
- Comment period is open until 26 Nov 99
- Response-to-comments document
- Final technical background documents
- Target for final is August 2000