40 CFR Part 191

Standards for the Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Wastes

Briefing for The Nuclear Waste Technical Review Board

by
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History of 40 CFR Part 191

- Started 1976 - Atomic Energy Act and Reorganization Plan No. 3
- Nuclear Waste Policy Act of 1982
- Rule Promulgated - August 1985
- Sued by several States and environmental groups
- Rule vacated and remanded - July 1987
- Subpart A reinstated Sept 1987

Parts of 40 CFR Part 191
Working Draft #3

- *Subpart A - Management & Storage*
- *Subpart B - Disposal*
  191.12 - Containment Requirements
  191.13 - Assurance Requirements
  191.14 - Individual Protection Requirements
  191.15 - Demonstration of Capability to Comply
  191.16 - Emplacement for Experimental Purposes
- *Subpart C - Ground-Water Protection*
  - 191.22 - Management and Storage
  - 191.23 - Disposal
- Appendix A - Calculation of CEDE
  Appendix B - Release Limits for 191.12
  Appendix C - Guidance for Implementation

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Development of the Level of Protection
1,000 HE/10,000 Yr/100,000 MTHM

- Purpose: rough approximations of the capabilities of geologic disposal to provide a basis for limits
- Employed four media
  - Granite
  - Tuff
  - Bedded salt
  - Basalt
- Geochemical parameter values were developed
- Probabilities were estimated for disruptions e.g., faulting and human intrusion
- A relatively simple computer program was used to calculate consequences

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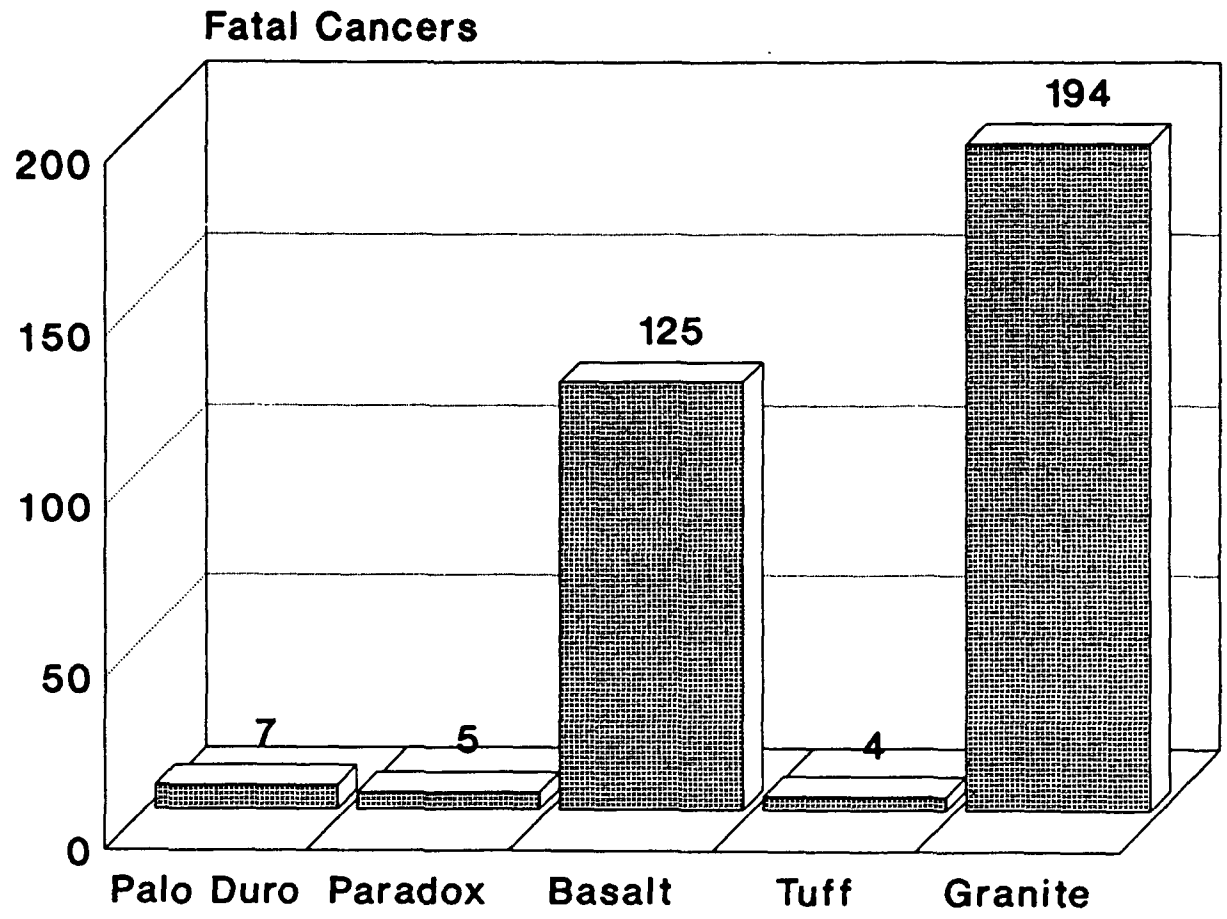
Results of the Generic Repository Analyses



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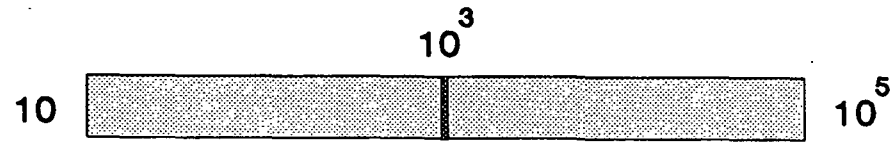
The Uranium Ore Body Study

- Purposes: Examine the question of intergenerational risk and provide perspective on the reasonableness of the level of protection (LOP)
- The impacts vary considerably, 10 -> 10^5 because of ranges in the size of ore bodies, ground-water flux and chemistry, and release rates
- The risks are no greater than if the ore had not been mined, *an indication of reasonableness*
- Used as a comparison with, *NOT* a basis of, the LOP



Projected Health Effects

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Why 10,000 Years?

- Less than 1,000 years does not show important differences; ground water travel time at most sites is too long to allow significant releases

- More than 10,000 years would entail greater uncertainties and could involve significant climate changes which are very uncertain and could overwhelm the results

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Individual and Release Limits
Why Include Both?

- Release limits are intended to
  - Control population risks
  - Avoid the dilution solution
  - Provide a measure for repository integrity

- Individual and ground-water limits are intended to
  - Protect individuals in the vicinity of the system
  - Protect ground water outside the controlled area

- The two types of limits are protecting different aspects and are not intended to be linked or equivalent

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Gaseous Releases

- No one considered a gaseous release pathway during undisturbed performance in the process of developing the 1985 standards

- The current carbon-14 release limit is based on 1,000 health effects using a model developed by Killough to calculate exposures

- We are currently re-evaluating the appropriateness of that analysis and investigating technical and geochemical actions which might affect the releases

Changes from the 1985 Standards
Subpart A

Working Draft #3	1985 Standards
Effective dose equivalent	Critical organ dose
Requires dose levels to be met	Reasonable assurance that the dose levels will be met
10 and 25 mrem/yr options for for both NRC and DOE	NRC facilities: 25/75/25 mrem per year (mrem/yr) limits DOE facilities: 25/75 mrem/yr limits
Deleted	Alternative Standards section

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Changes from the 1985 Standards
Subpart B (Page 1)

Working Draft #3	1985 Standards
100,000-year qualitative projection	Relied on similar DOE Siting Guideline (10 CFR 960)
Effective dose equivalent	Critical organ dose
Options of 10 and 25 mrem/yr and 1,000 and 10,000 years	25 mrem/yr individual dose limit for 1,000 years
New Subpart C based on the Safe Drinking Water Act, essentially 4 mrem/yr EDE; 1,000 and 10,000-yr options; applies to Subparts A and B	Ground-water protection requirements based on EPA's former ground-water classification

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Changes from the 1985 Standards
Subpart B (Page 2)

Working Draft #3	1985 Standards
Demonstrate compliance before emplacing waste into the facility	No equivalent
Temporary emplacements for performance assessment, if necessary and providing that: 1) a preliminary PA exists to guide the tests; 2) written plans exist describing the tests; 3) ability is demonstrated remove the waste; and 4) the Administrator concurs (Not applicable to NRC)	No equivalent

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Changes from the 1985 Standards
Appendices B and C

Working Draft #3	1985 Standards
Options of 1 and 3 MCi	TRU waste unit of 1 MCi
Suggests iterative PA's before waste is put into the system, throughout operations, and a final confirmation before closure	No equivalent
Guidance for undisturbed performance, i.e., gradual events and effects <u>not</u> disruptive events	No equivalent

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The Three-Bucket Proposal
Distributed Separately for Comment

Suggested Wording	1985 Standards
Bucket One: Scenarios >1/10: quantitative probabilistic performance assessment	Quantitative, probabilistic performance assessment for processes and events down to 1/1,000
Bucket Two: Scenarios <1/10 but >1/10,000: individual scenario, deterministic analysis, comparison to 10X the release limits	
Bucket Three: Scenarios <1/10,000: analysis not required	

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Schedule

- Early 1992: Propose revised Part 191
- Spring 1992: Public hearings
- Early 1993: Final revised Part 191
- Possible Congressional deadline of 9 - 24 months

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