UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

COMMISSIONER

August 11, 1998

MEMORANDUM TO: John C. Hoyle, Secretary

FROM: Edward McGaffigan, Jr.

SUBJECT: RESPONSE TO COMSECY-98-020--NRC ISSUES WITH THE ENVIRONMENTAL PROTECTION AGENCY'S DRAFT YUCCA MOUNTAIN STANDARD (40 CFR 197)

I approve the staff's proposed list to be provided to the White House Office of Science Technology and Policy by August 14, 1998 pursuant to their request, and offer the following edits to the list.

1. Items 1 and 2 should be reversed in order.
The opening of new item 1 should be revised to read: "The U.S. EPA's groundwater protection requirement uses an approach making compliance....."
The opening of new item 2 should be revised to read: "Furthermore, EPA's groundwater protection requirement will not improve public health and safety....."

2. New Item 1, second bullet--The following sentence should be added to the end of the paragraph. "Therefore, demonstration of compliance may require a degree of assurance beyond what science can provide and result in a protracted licensing hearing process with no commensurate benefit to public health and safety."

3. New Item 2, third bullet--The following sentence should be added to the end of the paragraph. "It should be noted that the 4 mrem/yr ground-water limit includes highly variable natural background radioactivity that may, in some locations, be much higher than 4 mrem/yr."

4. Item 3, first bullet--"limit of 25 mrem/yr" should be revised to read, "limit in the range of 25-30 mrem/yr" to be consistent with earlier Commission direction on an acceptable high-level waste standard.

cc: Chairman Jackson
Commissioner Diaz
EDO
OGC
OCA
OPA
CFO
CIO

DS14

NRC'S ISSUES WITH EPA'S OMB SUBMITTAL DRAFT OF THE YUCCA MOUNTAIN'S SPECIFIC HLW STANDARD

Furthermore,

2 A) ~~The U.S. Environmental Protection Agency's~~ (EPA's) ground-water protection requirement will not improve public health and safety, but adds complexity and additional cost, regarding compliance with the standard.

- Potential health effects are determined by the total effective dose equivalent radiation exposure from all pathways. Limiting the expcsure through a particular pathway (drinking ground-water) will not reduce health effects.

- Implementation of a separate ground-water protection standard will, at best, require duplication of a part of the all-pathways analysis, provided the locations, receptor, and scenarios are the same. It would involve a separate analysis that would need to be supported by additional data and separately justified and defendec in the licensing proceeding, if any of these differ.

- EPA implements the separate ground-water standard using 35-year-old radiation protection methodology (NBS Handbook 69) to calculate the concentrations of radionuclides in ground-water. This results in concentration limits for most beta-gamma emitters being more restrictive than the 4 mrem/yr beta-gamma limit in the Office of Management and Budget's submittal draft, when compared with current International Commission on Radiation Protection (ICRP) methodology

- The National Academy of Science (NAS) Technical Basis Report on Yucca Mountain Standards, as well as national and international authorities on radiation protection, recommends an approach to radiation protection that limits exposures to the average member of the critical group via all pathways.

- EPA, in implementing its Safe Drinking Water Act authority, does not consider cost beyond the feasibility of compliance by public water suppliers, whereas under the Atomic Energy Act, the U.S. Nuclear Regulatory Commission (NRC) takes into consideration cost-effectiveness within its regulatory process for achieving adequate protection of public health and safety.

The U.S. EPA's ground water protection requirement uses

1 A) Ground-water protection is required using an approach making compliance at any location with potable water very difficult if not impossible.

- EPA applies drinking water concentration limits to the point of highest concentration in the plume (cannot average in fresh water or water with contamination significantly below the limit), which is very conservative and does not allow reasonable credit for mixing and dilution effects that would take place in a well.

- It is not feasible to define precisely the shape of the plume over the time and space scales that would be required for implementation, nonetheless. EPA's

It should also be noted that the 4 mrem/yr ground water Attachment 2
limit includes highly variable natural background radioactivity which may in some locations be much higher than 4 mrem/yr.

Therefore, demonstration of compliance may require a degree of assurance beyond what science can provide and may result in a protracted licensing hearing process with no benefit to public health and safety.

approach requires extremely detailed models, with supporting characterization data, to estimate precisely the shape of the plume with no commensurate increase in safety over simpler approaches that average concentrations over the production zone appropriate to withdrawal wells of the critical group.

- EPA specifies a compliance period of 10,000 years, but requests comment on time period, including time of peak concentration. NRC believes a 10,000-year performance period is the longest period for which quantitative estimates to demonstrate compliance should be required. Although it is scientifically possible to estimate performance hundreds of thousands of years in the future, as NAS suggests, NRC does not consider it prudent to base regulatory decisions on such analyses, particularly in its adjudicatory licensing process.

- EPA seeks comment on five alternative locations for compliance, including the repository boundary. Location of receptors at the repository boundary is inconsistent with the concept of geologic disposal that uses the geologic systems as barriers that provide isolation.

- EPA's analysis of the capture zone of a single family well is inconsistent with current agricultural practices in Amargosa Valley. The U.S. Department of Energy (DOE) and NRC estimate the capture zone to be about two orders of magnitude less, resulting in significantly lower estimates of dilution and for greater difficulty in demonstrating compliance.

3) EPA's overall performance standard of 15 mrem/yr to the reasonably maximally exposed individual (RMEI) for a rural-residential scenario is unduly restrictive.

- NRC considers that a limit in the range of 25-30 ~~of 25~~ mrem/yr to the average member of a critical group is protective of public health and safety. Based on current lifestyles and practices, as recommended by NAS, NRC considers the critical group to be a small farming community located in Amargosa Valley (20 km distant from Yucca Mountain).

- EPA specifies a 10,000-year period, but seeks comment on time periods up to peak dose. NRC does not consider quantitative assessments of performance past 10,000 years a sound basis for regulatory decisions.

- EPA considers that 50 percent of the diet of a rural-residential individual consists of food grown in the local area , which appears very conservative - NAS has recommended that the lifestyle and diet be based on the characteristics of current populations.

4) The Appendix to 10 CFR Part 197 provides a "...binding framework for implementation of the rule in the Commission's licensing proceeding," which is stated to be binding in the same manner as the Standard. In previous comments to EPA, NRC has viewed implementation as an area of NRC jurisdiction. Some examples are: