



OFFICE OF THE GOVERNOR
AGENCY FOR NUCLEAR PROJECTS

1761 E. College Parkway, Suite 118

Carson City, Nevada 89706

Telephone: (775) 687-3744 • Fax: (775) 687-5277

E-mail: nwpo@nuc.state.nv.us

May 9, 2007

EPA Docket Center (EPA/DC)
Air and Radiation Docket
U.S. Environmental Protection Agency
EPA West, Mail Code 6102T
1200 Pennsylvania Avenue, N.W.
Washington, D.C. 20460

Attn: Docket ID No. OAR-2005-083

To Whom It May Concern:

Please consider this as a comment on behalf of the State of Nevada regarding the EPA's proposed rule on radiation standards for the Yucca Mountain repository. The State's comment is prompted by recent arguments by repository proponents touting the Finnish repository program as an example for the United States to follow.

For more than twenty years, Finland has been studying potential geologic repository sites for its reactor spent fuel, including an igneous site near the Olkiluoto nuclear plant in Eurajoki. Since 2004, the Finnish waste disposal company Posiva Oy has been building an underground rock characterization facility (called ONKALO) at Olkiluoto in order to study the suitability of the site. Posiva Oy plans to prepare a pilot safety case in 2009 and, if things go well, file a construction license application in 2012, with a goal of commencing operation by about 2020.

This suggests that authorities in Finland are proceeding along a parallel path with DOE's proposed Yucca Mountain repository program, except that in Finland the goal for commencement of operations is somewhat earlier and, more importantly, the Finnish program has apparently avoided the numerous and pervasive quality assurance, management, and standard-setting problems that DOE's program has suffered in the decades since it began.

Nevada has heard some Yucca Mountain proponents recently draw favorable comparisons between EPA's proposed rule for Yucca and the Finnish standard, promulgated by its Radiation and Nuclear Safety Authority ("STUK"). In fact, as explained below, the Finnish standard (an English translation is attached) is far more protective and responsible than what EPA has proposed for Yucca. Indeed, the two standards are night and day.

First, the STUK standard requires that the *maximum* radiation dose over long time scales be comparable to that from naturally occurring radioactive substances. Communications between the State and STUK have confirmed that this refers to doses from radionuclides of terrestrial origin, to the exclusion of doses from atmospheric fallout, cosmic radiation, natural radionuclides in houses such as radon, and other human-enhanced impacts. This means that the STUK dose standard is on the order of 50 mrem per year for the *maximum*, in contrast to EPA's proposed post-10,000-year standard of 350 mrem per year for the *median* dose, or about 1000 mrem per year for the *mean* dose, to EPA's reasonably maximally exposed individual ("RMEI").

Second, the Finnish standard applies to the most exposed individual subsisting at the site, in contrast to EPA's use of an artificial person who drinks water with concentrations of radioactive material that are assumed to have been very heavily diluted.

Third, the Finnish performance assessment must be conservative (*i.e.*, it must err on the side of overestimating the dose), while EPA (and NRC) calls for a "realistic" estimate, leaving no margin for error.

Fourth, unlike EPA (and NRC), STUK requires that the site have low groundwater flow, a reducing environment, and otherwise favorable chemistry. DOE is still struggling to address the fast groundwater flow paths and unfavorable geochemistry in the Yucca Mountain repository disposal drifts.

Fifth, STUK requires that the spent fuel be retrievable for the period during which reliance is placed on the waste packages. In contrast, neither EPA nor NRC draw any connection between the retrievability period and the reliance on the waste packages, and are content with a retrievability period of about 100 to 300 years. EPA's proposed standard allows DOE to rely almost exclusively on the waste packages for repository performance for tens of thousands of years, during which time retrievability is not a consideration.

Finally, STUK requires that there be genuine redundant barriers to the release of radioactive materials, while NRC, which once insisted on such redundant barriers, now relies only on the results of a total system performance assessment with no explicit requirement for safety redundancy. This again permits almost total reliance by DOE on man-made engineered barriers to the exclusion of natural geologic barriers.

It is also instructive to compare with suggestions in the IAEA's Scientific and Technical Basis for Geological Disposal of Radioactive Wastes (Technical Report Series No. 413, IAEA, Vienna, 2003, p. 22), which talks about national standards being generally set on the basis of internationally agreed standards and that the main emphasis is on radiological criteria, such as:

- (a) Meeting quantitative dose (mSv/a) or risk constraints to individuals within groups that might potentially be exposed to radioactivity from the repository;
- (b) *Providing similar levels of radiological protection to future generations as are provided at present;.....*

The proposed EPA long term standard is about 600 times weaker than the near term standard.

Rather than accepting proponents' claims that the proposed EPA standard compares favorably with the Finnish standard, Nevada asks that EPA carefully consider what the Finnish standard actually requires. The differences are stark, and EPA's proposed standard would be far less protective. Surely it cannot be EPA's position that the citizens of Nevada deserve less protection than the Finns.

Sincerely



Robert R. Loux
Executive Director

cc: OMB
ACNW
DOE
TRB