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EPA's Draft Radiation Standards for the Proposed Yucca Mountain Repository Will Not Protect the Public

Why is EPA Revising These Standards?

On July 9, 2004, the DC Circuit Court of Appeals ruled that the Environmental Protection Agency (EPA) illegally set a 10,000-year compliance period for radiation protection standards at the proposed high-level radioactive waste dump at Yucca Mountain, Nevada. The EPA's 10,000-year compliance period, and the Nuclear Regulatory Commission licensing rule that implemented it, were voided.

Congress mandated in the 1992 Energy Policy Act that EPA set public health and safety standards for allowable radiation exposure from Yucca Mountain "based upon and consistent with" the findings and recommendations of a National Academy of Sciences (NAS) study directed to identify the scientific bases for such standards at Yucca Mountain. The NAS study, which was issued in 1995, recommended "that compliance with the standard be measured at the time of peak risk, whenever it occurs," and found "no scientific basis for limiting the time period of the individual-risk standard to 10,000 years, or any other value." Yet, EPA "unabashedly rejected NAS's findings, and then went on to promulgate a dramatically different standard, one that the Academy had expressly rejected," according to the Court ruling.

On August 22, 2005, EPA released its draft rule for public comments, which are due by November 21, 2005. EPA's proposed standards do not protect public health, do not comply with the law, and ignore science. EPA's proposal is yet another example of setting regulations to guarantee that the site gets licensed, rather than setting health-based regulations that the site must meet.

What is EPA Proposing?

- ◆ Retain, as in the original rule, the radiation exposure limit of 15 millirems per year to the Reasonably Maximally Exposed Individual for a period of 10,000 years.
- ◆ For the time period between 10,000 and one million years, set the radiation exposure limit of 350 millirems per year to the Reasonably Maximally Exposed Individual.
- ◆ Retain, for the first 10,000 years as in the original rule, the Groundwater Protection Standard that limits exposure to an individual from drinking ground water to 4 millirems per year. After 10,000 years, when the exposure is expected to be the highest, EPA throws out the groundwater protection standard.

Why Is EPA's Proposal Completely Inadequate?

❖ EPA is proposing the least protective radiation standard in the world.

No other U.S. or international radiation protection standard permits a dose of 350 millirems per year to individuals. Most other countries that are investigating sites for a geologic repository have proposed or established a constant radiation standard of 10 millirems per year. Swiss regulations explicitly set no "expiration date" on protecting future generations.

EPA has for decades declared any radiation dose above 15 to 25 millirems per year to be inadequate to protect public health. It has repeatedly gone on record that doses of 100 millirems per year produce unacceptable levels of risk. For example, EPA regulates radioactivity in water at 4 millirems per year, air emissions at 10 millirems per year, and toxic waste site cleanup (under Superfund) at the equivalent of about 0.03 to 3 millirems per year. The EPA's proposed rule also exceeds:

- the maximum acceptable radiation exposure from man-made sources in all industrialized countries by a factor of 3.5 to 10.5;
- the National Academy of Sciences' recommended acceptable range of radiation exposure, which is 2 to 20 millirems per year;
- the U.S. Nuclear Regulatory Commission's radiation health standard for low-level radioactive waste disposal sites, which is 25 millirem per year;
- the U.S. Nuclear Regulatory Commission's radiation health standard for the Private Fuel Storage interim storage site, which is 25 millirem per year; and
- the maximum proposed cleanup standard for DOE sites by a factor of 3.5 to 10.5.

❖ EPA inappropriately claims that the level of radiation is satisfactory as long as it does not exceed the highest levels of background radiation in the highest radiation-prone states. Moreover, EPA actually inflates those levels by improperly including radon exposure as part of natural background radiation.

No U.S. or international regulations use background radiation to set public health standards for radiation exposure. According the National Academy of Science, any amount of radiation will increase an individual's risk for getting cancer. In fact, about 3 percent of fatal cancers are due to exposure to background radiation, which means that 18,000 people die each year in the U.S. from exposure to background radiation.

EPA incorrectly argues that a radiation standard of 350 millirems per year is protective of the public. When added to the presumed background radiation level of 350 millirems per year in Amargosa Valley near Yucca Mountain, the total (estimated by EPA to be 700 millirems per year) is equal to an inflated estimate of the current average background radiation in Denver, Colorado.

This is not a sound basis for EPA's standard, however, because not only is background radiation not a safe level of exposure, but background levels of radiation across the U.S. are highly variable, with Colorado being significantly above the average. EPA also improperly

includes indoor radon exposure as part of its estimates of natural background radiation. Radon is normally never included as part of background dose, because indoor radon exposure is a man-made public health risk. According to the EPA, radon exposure is the second leading cause of lung cancer in the U.S. When high levels of radon are detected in buildings, renovations are usually made to reduce radon that goes into the building. The EPA has found that radon comprises about 87% of the background radiation in Denver.

❖ **It is unethical to expose future generations to much higher levels of radiation than current generations.**

Intergenerational equity—the principle that the health of future generations should be as protected as current generations—has been the foundation of U.S. and international public health and safety laws. Yet, in its draft rule, EPA throws this fundamental principle out by applying a standard that is more than 23 times weaker for hundreds of future generations. EPA is proposing to allow an action that will kill people for hundreds of thousands of years - people who had no say in the decision nor received any benefit from it.

The Court declared that the original 15 millirems per year standard was artificially cut off at 10,000 years, and required EPA to come out with a rule that would extend though the time when the radiation dose to the public would be highest (called “peak dose”) as recommended by the NAS. EPA claims that “rising uncertainties justify adopting a different (higher) dose level” after 10,000 years. But in its study, NAS concluded that the uncertainty for one million years is manageable because of the known geologic processes affecting the site, clearly contradicting EPA’s statements. Thus, EPA’s reasoning for increasing the dose after 10,000 years is not substantiated.

EPA’s draft rule is yet another example of setting the standards to fit the site, rather than setting a health-based standard that a site must meet to get licensed. DOE has estimated that the individual radiation dose in 200,000 to 300,000 years would be 250 millirems per year. Clearly, the site could not meet a 15 millirems per year standard, but could meet a 350 millirems per year standard.

❖ **EPA incorrectly uses the median dose to set its standard, rather than the mean (or average) dose, which ignores cases of very high dose. The result is that EPA’s proposed radiation standard would allow 1 cancer in every 10 people exposed.**

In its draft rule, EPA determines exposures based on the projected median exposure instead of the projected mean exposure. Scientists around the world have rejected this approach for decades, as the projected median exposure does not take into account the higher of the possible doses, and thus artificially lowers the average. EPA itself has always used the projected mean exposure for its work in the past. According to DOE’s Total System Performance Assessment for Site Recommendation, at the time of peak dose (after the waste packages corrode and fail), the mean dose of the many computer simulations is about 600 millirems per year, while the median dose is about 200 millirems per year. The repository could not meet a standard that required the mean to be less than 350 millirems per year, but would meet the standard if the median were used instead of the mean.

EPA's general position for decades has been to regulate exposures to keep the risk to the public at one cancer in one million people. In some circumstances, EPA has allowed workers to be exposed to a higher risk of cancer – one in one thousand. According to a recent National Academy of Sciences report on radiation health risks, 350 millirems per year over one's lifetime will cause cancer in approximately one out of every 36 people exposed—a risk 3 to 5 orders of magnitude greater than the range that EPA has always used before.

DOE calculations show that the mean exposure at the site would be more than 3 times the median exposure. Therefore, under EPA's 350 millirem per year standard, *some people will actually receive about 1,000 millirems per year, producing a cancer in 1 in every 10 people.* Because this is not a maximum, but rather an average dose, more people would get doses far higher, resulting in proportionately higher risks. Under the EPA's rule, there is no upper limit of dose for the half of the exposures that would be above the median. In other words, under the EPA standards, significant numbers of people could legally be exposed to doses that would produce a statistical 100% chance of inducing a cancer in the exposed individuals.

- ❖ **After 10,000 years, the EPA abandons its groundwater protection standard completely. Moreover, EPA is refusing to consider public comments on this issue.**

In response to the Nuclear Energy Institute's challenge, the DC Court of Appeals upheld the EPA's right to set a groundwater protection standard as supplement to the individual-protection standard. The groundwater under Yucca Mountain provides drinking and irrigation water to Amargosa Valley, an organic farming community, and Southern California.

Yet, in its draft rule, the EPA proposes to discard the groundwater standard after the first 10,000 years—when the groundwater will become increasingly contaminated, according to DOE's models. The EPA claims that the public will be protected after 10,000 years by extending the concept of individual dose standard, but this standard is more than 23 times higher than the first 10,000 years. Moreover, the EPA has declared that it will not consider public comment on this vital aspect of the proposed regulation, despite the fact that this decision is integral to the overall radiation standard.

- ❖ **EPA assumes in its climate and water models for evaluating radionuclide movement through the site that in the long-term conditions will be, on average, nearly the same during the next 1 million years as they are currently, which climate experts say is 99.9% certain to be wrong.**

EPA's proposed rule assumes that there will be twice as much precipitation at the site in 10,000 years as there is now, and that from 10,000 years onward, this amount of average annual precipitation will remain constant. Studies of past climate indicate that this conclusion cannot be correct. A range of possible climate changes should be incorporated into EPA's assessment models, as DOE has done previously in its models for Yucca Mountain.

Climate and water models are important for determining how much water will be seeping

through the site in the future. More water means faster corrosion of the metal containers, faster movement of radionuclides through the soil to the groundwater below the mountain, a higher concentration of radionuclides in the groundwater, and thus higher doses to individuals that drink the water. In addition to underestimating the possible increase in precipitation, EPA claims that exposures to contaminated groundwater would be less likely if the area were to become wetter in the future, because surface water would become more available and reduce use of the groundwater (even if the groundwater is more contaminated as a result of increased precipitation and water infiltration into the repository). EPA does concede, however, that a wetter climate means that more people are likely to live closer to the site and, thereby, use groundwater closer to the site. This alone, increases the risk posed, and must be taken into account.

❖ **EPA has arbitrarily limited public comments to a restricted number of issues on its draft rule.**

In its draft rule, EPA discussed, then dismissed, many aspects directly related to the rule as “outside the scope of the proposal” and has stated that it will only “consider or respond to comments” on a very limited number of issues. Despite the fact that the EPA is now claiming to have extended protection to people for one million years, EPA is refusing to accept comments on key aspects of the regulation, including:

- EPA’s decision not to extend the groundwater standard beyond 10,000 years, despite the fact that this is integral to the overall radiation standard.
- EPA’s decision not to re-evaluate the boundary of the controlled area, despite the fact that the groundwater would be allowed to become 23 times more contaminated after 10,000 years and the possibility that people will move closer to the site under wetter climate conditions in the future.
- EPA’s decision to not reconsider its definition of the Reasonably Maximally Exposed Individual as a “rural-residential” individual, rather than the more conservative analysis that this person would be a “subsistence farmer” who raises his/her own food and drinks water near the site.

Clearly, EPA is afraid of the input of scientists and the public on these issues.

❖ **The EPA’s proposed standards are not simply about people living in Nevada now and in the future: lowering the bar on public health standards sets a precedent for other sites and regulations around the country.**

The draft rule, if made final, would set a precedent that could be applied to other sites around the country, such as a second high-level waste repository, decommissioned nuclear sites, and Superfund sites.