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In reply refer to 94RC-01607

Secretary of the Commission
U. S. Nuclear Regulatory Commission
Washington, DC 20555
Attention: Docketing and Service Branch

Subject: Comments on NRC proposed Draft Radiological Criteria for Decommissioning

Gentlemen:

Rocketdyne appreciated the opportunity to review the draft rule on Radiological Criteria for Decommissioning. We agree with the Commission's decision to expand the regulations to include criteria for satisfactory completion of decommissioning nuclear/radioactive facilities. A comprehensive, authoritative set of acceptable requirements has long been needed. We agree that licensees with NRC approved Decommissioning Plans prior to the implementation date of the final rule should not be subject to the rule, and we agree that the proposed rule should not be retroactive. It is commendable that the EPA and NRC intend to promulgate consistent criteria for licensed and unlicensed facilities.

As we understand the proposed rule, the regulations would require, for unrestricted release, a decommissioning goal of 3 mrem/year cumulative TEDE and a limit of 15 mrem/year TEDE, to an average member of the Critical Group considered appropriate for future use of the property. Demonstration that decontamination of a facility had satisfied this requirement would be based on model calculations of the future exposures, to be verified as possible by actual measurements. Detailed guidance on methods for satisfying these requirements is to be provided before promulgation of the new regulations.

On reviewing the Draft Radiological Criteria for Decommissioning we have some serious concerns about some of the detailed requirements and wish to present our considerations. We think that the specific numerical dose limits are somewhat too low, for the necessity to minimize risk to the public and for the practical purpose of demonstration, for the following reasons:

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Firstly, we are uncertain as to what is meant by "cumulative" TEDE. We do not find this modified dose measure defined in the draft and must speculate as to its exact meaning. Is it the lifetime average TEDE to an individual spending his/her entire life at the decommissioned facility? This might be reasonable since some effort toward limiting lifetime risk is discussed in the draft. Regardless, a clear understanding of what is intended by this term is essential to judging the significance of the goal and to considering the possibility of success in demonstrating compliance.

Secondly, we think that a choice of 3 mrem/year, as contrasted to the operational limit of 100 mrem/year, is unduly conservative and leads to serious problems in demonstrating compliance. Philosophically, we are concerned that a dose (3 mrem/year) has been chosen for application to a situation of only potential or possible exposure, that is lower than the EPA Safe Drinking Water limit (4 mrem/year) that is applied to certain (albeit calculated) exposure.

Further, while the goal that residual radioactivity should be indistinguishable from background is certainly achievable for those licensees using only sealed sources, and in principal for those using short-lived isotopes, these are not the significant facilities that this regulation would impact. It is misleading to suggest that major facilities, such as reactors, fuel fabrication plants, radiopharmaceutical producers, and accelerator research facilities, could approach this goal without total removal of affected material. This is compounded by the difficulty in establishing "background radioactivity" for those radionuclides that are common in the environment and have been used at a specific facility, such as uranium and thorium, radium, tritium, ^{137}Cs, and others. The environmental activities of these radionuclides are extremely variable and distinctly different from place to place and time to time. Also, ambient radiation, from cosmic rays and extra-terrestrial sources, and from atmospheric radioactivity as well as from soil, rocks, and structural materials, is variable at any given location far in excess of 3 mrem/year. (It should be noted that 3 mrem/year is equivalent to 0.3 μR/hr gamma radiation. At our site, careful measurements have shown differences of more than 7 μR/hr, with standard deviations, in well defined areas, of $\pm$0.5 to $\pm$1.1 μR/hr. The variation in annual exposure has been as high as $\pm$35 mrem/year over a period of 13 years.) Since instruments of different types or manufacturers, and with different calibrations, will show different values for "background", the determination of background itself will become a point of contention rather than agreement, when searching for "indistinguishable from background".

Even the limit of 15 mrem/year poses difficulties in measurement, as should be clear from the preceding discussion, since this corresponds to 1.7 μR/hr above background. In addition, the proposed regulation would require demonstration that residual radioactivity has been reduced to as close to "indistinguishable from background" as reasonably achievable. Since the "elevated" dose may quite likely result from statistical variations, this requirement may be difficult to satisfy.

Estimate of doses by use of a computer model will require data representing the quantity and distribution of radioactivity in the environment. This must be obtained by sampling and analysis, and identification of radionuclides at concentrations that barely exceed the ambient values, often by less than the variability of the radionuclides that did not result from the licensee's operations. As an example, the concentration of ^{137}Cs in soil that is estimated to produce an annual dose to a resident (with minor onsite food production) of 3 mrem/year is just less than 1 pCi/g. A recent environmental survey in our vicinity showed concentrations of ^{137}Cs in surface soil of up to 0.34 pCi/g. (Differences between split samples analyzed by separate, competent laboratories approached a factor of 2.) The data obtained from this survey were shown to follow a log-normal distribution, and therefore were from global fallout. Another example is naturally occurring Th-232. A soil concentration of 0.2 pCi/gm will give a dose of 3 mrem/year. Typical "clean" soil Th-232 concentrations are ~ 1 pCi/gm with a possible range of 0.14-1.3 pCi/gm, depending on soil type. The normal variability far exceeds the single isotope release criteria of 0.2 pCi/gm. Thus, any comparison of "suspect" soil to background "clean" soil would result in regulatory decisions being made on variations of background rather than "real contamination". Note that a mixture of nuclides such as ^{60}Co, ^{90}Sr, ^{137}Cs, ^{234}U, ^{235}U, and ^{238}U, may present even more of a problem, since multiple isotopes will bring down the allowable concentration of each single radionuclide to concentrations that are equivalent to or less than background, even at doses above 3 mrem/year.

The regulation would require removal of all "readily removable" contamination, rather than allowing a numerical value for removable surface contamination as the current guides allow. There is an ambiguity in the wording of the proposed regulation defining "readily removable": it is removable using common ... techniques ... that do not generate large volumes of radioactive waste. However, attempting to remove the last contamination by these techniques does generate much waste, in the form of slightly contaminated water and wipers, that must be disposed of as radioactive waste. Is it the criterion of "generating large volumes of waste" that determines if contamination is readily removable, or is it the selection of apparently simple decontamination techniques?

The NRC should recognize that validation of model estimates by use of actual measurements is essentially impossible at the dose levels proposed in this regulation. Actual measurements are needed to establish the input for the model but in general cannot confirm the estimates. The concentration of a radionuclide in soil may be measurable at a few tenths of a pCi/g, but the dose to an individual resulting from the transfer of radioactivity from soil to water to plant to crop to food to person cannot be measured at these levels. Similar considerations apply to radioactivity in air and water. Even the most straightforward situation, gamma-ray exposure, is not measurable to any worthwhile accuracy at these levels.

We note on page 32 of the draft rule that NRC proposes to issue conservative radiation levels, surface contamination limits and radioactivity (soil) concentrations for use by licensees who elect not to apply pathways dose models to demonstrate compliance with the 3 mrem/year goal. We await, with interest, such guidance, given the demonstrated impossibility of distinguishing those small levels of contamination/radiation from background variability.

We feel that the use of a 15 mrem/year limit and a 3 mrem/year goal raises the possibility, or rather probability, of protracted wrangling over whether all possible remediation efforts have been made to reach the goal. Licensees and taxpayers will rightly be concerned with unnecessary costs, and will focus on meeting the 15 mrem/year limit. Environmentalists on the other hand will want the 3 mrem/year goal to be met, irrespective of costs. We recommend that NRC choose a single criterion. The NRC is avoiding its responsibility by failing to propose a single criterion. The current two-criteria proposal will unnecessarily complicate the decommissioning process with questionable and judgemental ALARA/cost benefit analyses used to determine where one should be within the 3-15 mrem/year envelope.

These problems would be diminished if a single criterion were set at somewhat higher values. We think that a criterion of 10 mrem/year would be a satisfactory compromise and would reasonably satisfy all the needs.

Many of our concerns are related to demonstration, and therefore assurance, that a facility has been adequately decontaminated, and is "safe" for release. We think that the present proposal promises too much that cannot be achieved, and so will fail to satisfy the needs of all members of the community.

Very truly yours,

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