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October 31, 1979

Director
Division Waste Management
Office of Nuclear Waste
Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: Comments on Draft Generic Environmental Impact Statement on Uranium Milling, NUREG-0511, April 1979.

Sir:

1. Time Scale of the problem

The DEIS suffers from one major, crucial shortcoming: It fails to emphasize that the timescale of the radiotoxicity of the mill tailings is determined by the half-life of thorium-230, which is 80,000 years. The consequences of this omission can be traced throughout the DEIS, and render its major conclusions useless. A few examples will serve to make the point:

a) In the Summary, p. 1, it is stated that "continued surveillance of mill tailings disposal sites is recommended to confirm that sites are not disrupted by unexpected natural erosion or human activity". Such a recommendation is useless on the time scale involved, since it cannot be fulfilled.

b) The comparison of the total costs of the alternative disposal modes (Table 4, p. 15) does not even contain the cost estimates of the continued surveillance; their inclusion (Appendix R) would completely invert the ranking of cost effectiveness of the alternatives, if realistic time frames were considered.

c) In considering longterm seepage from tailings piles (p. E-21), evidence is presented which supposedly indicates that the radioactive elements are effectively trapped in the soil. However, what conclusion can be drawn from the observation that from a large thorium waste pile in West Chicago radium and thorium travelled not more than 100 meters in approximately 50 years? In 100,000 years, this rate of migration would result in a migration of 200 km!

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d) The successful containment of radionuclides in a shallow below-grade disposal site depends on such factors as the longevity of liners, as well as on variations of precipitation and the height of the watertable. On the time scale in question, no liner will survive, and the climatic conditions will certainly vary such that the mill tailings may be within, rather than above the water table, thus greatly increasing the risks of ground water pollution.

e) In the evaluation of the environmental impacts, present-day population patterns and climate have been assumed. The variability of these factors on the time scale in question is entirely unpredictable.

2. Environmental Impact

While the authors of the DEIS ought to be commended for their careful study of the long-range, low-level effects of radon emissions from mill tailings, their conclusion, that these effects will be small relative to those resulting from natural background radiation, have been expected on the basis of previous, less detailed studies of this problem. On the other hand, there exists an enormous body of information of environmental pollution which has resulted from improperly handled mill tailings: Grand Junction has become famous for problems resulting from inadvertent misuse of mill tailings for construction purposes; the Vitro pile in Salt Lake City, the Middlesex sampling Plant, the Vitro Rare Metals Plant in Canonsburg, or the Ashland/Seaway sites near Buffalo all demonstrate the local environmental pollution from mill tailings requiring remedial action. Most remarkably, situations of this kind have been entirely ignored in the DEIS. The argument that no mill tailings to be produced in the future will ever be allowed to spread as those in the above mentioned cases through "remedial actions", if needed, is clearly specious, considering the long time scale of the problem. Hence, these situations ought to be discussed, in order to arrive at a better appreciation of the environmental impact of the different disposal alternatives. We mention in passing that all the mill tailings from the Climax mine used as foundation material under and around occupiable structures in Grand Junction contained less than 40 Ci of radium, while the model tailings pile considered in the DEIS contains more than 100 times that amount, 4500 Ci.

In the assessment of the environmental impact, far too little attention has also been payed to potential accidents. On p. 9-38, intrusions into mill tailings by people digging basements or wells have been briefly mentioned and discounted, since "they do not lend themselves to prediction". This is clearly not an argument to be used in an impact statement, in particular since scenarios of this kind can very likely lead to serious health risks. A far more thorough discussion of these scenarios is required.

On the basis of our knowledge of the toxicity of radium and its daughters, a mill tailings pile containing 4500 Ci of Ra-226 is a very serious matter. Although this point hardly needs to be belabored, the

following comparison may be useful: The radiotoxicity of uranium mill tailings, expressed by the amount of water they could contaminate to maximum permissible concentration $(MPC)_w$, equals that of spent LWR fuel which has aged 1000 years, referred to equal amounts of energy produced. From then on, the two kinds of waste remain equally toxic up to one million years. Hence, disposing of mill tailings above grade or in shallow burial grounds would be as risky as grinding up 1000 year old spent fuel, from 1 GW(e)y of energy, mixing it with 200,000 tons of sand (the amount of ore to be mined for 1 GW(e)y worth of LWR fuel), and disposing of it in the same manner. Considering the enormous concern about assuring the isolation of high level radioactive waste from our biosphere for periods up to hundreds of thousands of years, it seems entirely illogical to consider above or below-grade disposal as adequate for mill tailings.

3. Disposal alternatives.

While the authors of the DEIS have failed to assess the longterm shortcomings of above-grade or below-grade disposal of mill tailings [the Alternatives (1-7)], they have made those alternatives appear rather unattractive which would indeed provide long-term protection. Certainly, deep mine disposal of the mill tailings after fixation with cement or asphalt (alternative 8) offers far greater long-term protection than the alternatives favored by the staff, while alternative 9, chemical removal of the radiotoxic elements, would permit their permanent disposal in a licensed high level waste disposal site.

The arguments offered on ps. 12-8 and 12-20 in the DEIS against these alternatives are entirely unsatisfactory. While "uncertainty as to the long-term stability of bonding between the tailings and the cement or asphalt" cannot be denied, the combination of this kind of fixation with burial at a depth of 100 meter or more presents clear long-term advantages over the alternatives involving disposal above ground or below grade. Furthermore, this disposal method is bound to be less expensive than alternatives which would require costly surveillance and remedial actions for the indefinite future.

It is, unfortunately, true that nitric acid leaching has not yet been developed to a point where it can be used on a commercial basis, as stated in the DEIS. However, if we look into the reason for the almost complete absence of research and development efforts on this subject in the U. S.,we will trace it to the lack of recognition for the need for this kind of work. The negative attitude expressed in the DEIS will further contribute to its neglect.

4. Summary

The DEIS has failed to face the time scale of the radiotoxicity of the mill tailings. Consequently, the evaluation of the environmental impact and the costs of the disposal alternatives are inadequate and need to be revised.

Sincerely,

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