

Docket No. 50-320

A circular stamp with the word "RECEIVED" at the top, the date "OCT 29 1981" in the center, and "U.S. NUCLEAR REGULATORY COMMISSION" at the bottom. The stamp has a clock-like border with numbers 1 through 12.

This is in response to Mr. Hovey's letter LL2-81-0214 of September 11, 1981, concerning the use of EPICOR-II for SDS effluent polishing, which included Metropolitan Edison's plans for EPICOR-II liner radioisotope loading and disposal. In that letter, Met-Ed proposed to load the EPICOR-II liners to a maximum concentration of 1 uc/cc of isotopes with half lives greater than five years and dispose of the liners (with resins in a dewatered, but unsolidified form) at the bottom of a disposal trench (approximately 10 meters deep). Even though not specifically stated, we understand that Met-Ed is proposing to dispose of the EPICOR-II liners at an arid disposal facility.

Prior to final promulgation of Part 61, your proposal would be allowable under current NRC regulations. Subsequent to final promulgation of 10 CFR 61, the remaining waste covered by your proposal would require an exception to the Sr⁹⁰ concentration limit (0.04 uc/cc) in Table 1 for Class A waste if the regulation is approved as proposed by the staff.

The NRC staff has performed an evaluation of the waste and disposal conditions proposed by Met-Ed. The evaluation indicates that the proposed conditions would be acceptable for the waste to be considered a Class A unstabilized waste under 10 CFR 61, provided all other requirements of the proposed 10 CFR 61 for Class A wastes were met (e.g., the waste is segregated from Class B and C stabilized wastes and disposed of in a separate trench).

Since the existing commercial disposal sites are regulated by the individual States, acceptability of the waste form and disposal conditions would rest with them. However, it is our position that we would recommend acceptance of your proposal.

[illegible]

Mr. John J. Barton

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OCT 22 1981

It is requested that you continue your careful analytical program to determine the content of these isotopes in the various waste containers to ensure conformance with the disposal criteria discussed above.

Sincerely,

Bernard J. Snyder, Program Director
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Acceptability for Disposal of Unstabilized TMI-2 Dewatered Resin

Wastes Having Sr⁹⁰ Concentrations Greater than 0.04 uc/cc

Purpose: The purpose of this evaluation is to determine the acceptability of disposing of unstabilized TMI-2 dewatered resin wastes having Sr⁹⁰ concentrations greater than 0.04 uc/cc, the upper limit for Sr⁹⁰ concentrations for Class A wastes specified in the proposed 10 CFR 61.

References:

1. Proposed rule, 10 CFR 61, Licensing Requirements for Land Disposal of Radioactive Waste, Federal Register, Vol. 46, No. 142, July 24, 1981, pp. 38081 - 38105.
2. Draft Environmental Impact Statement on 10 CFR 61 "Licensing Requirements for Land Disposal of Radioactive Waste," NUREC-0782, Appendix G.
3. INVERSI code run, June 12, 1981.

Results: Disposal of TMI-2 dewatered resin wastes having Sr⁹⁰ concentrations less than 24 uc/cc would be acceptable for disposal in an unstabilized condition at depths greater than 5 meters at an arid disposal site. If other isotopes listed in Table 1 of the proposed 10 CFR 61 are also present, these isotopes would also need to be accounted for using the concentration ratio factor identified in Table 1.

Evaluation: The proposed rule for low-level waste management, 10 CFR 61, includes a waste classification system (Reference 1). The upper concentration limit for the disposal of unstabilized wastes (Class A) for Sr⁹⁰ is given as 0.04 uc/cc. This limit was determined by evaluating the effects of intruder pathways at a reference disposal facility. The intruder pathways included construction and agricultural cases. The

draft environmental impact statement for 10 CFR 61 (Reference 2) provides a detailed description of these pathways.

The allowable concentrations for the intruder pathway evaluations in the waste classification system are based on a performance objective that the intruder receives an annual dose to the whole body of less than 500 mrem.

The waste classification system in Reference 1 requires that wastes buried at normal depths (includes disposal at less than 3 meters) at either humid or arid sites having Sr^{90} concentrations greater than 0.04 uc/cc be stabilized. However, 10 CFR 61 does provide for exemptions if the specific disposal conditions provide assurance that the performance objectives are met. In evaluating certain options which could provide the assurance that the performance objectives are met, several Sr^{90} alternatives could be considered for unstabilized wastes with Sr^{90} concentrations greater than 0.04 uc/cc. These alternatives include: burial at depths greater than 5 meters (that is, with an intruder barrier), burial at an arid site, or a combination of these.

Because the proposed waste would be unstabilized, the wastes would be disposed of in a trench containing Class A wastes. Class A wastes would be segregated from the stabilized Class B and C wastes. The basic assumptions in the Class A waste scenarios for normal depths and deeper depths (greater than 5 meters) are as follows:

1. The reference disposal site is located in a humid Southeastern site.
2. Inadvertent intrusion is made after institutional control is lost following an active control period of 100 years.
3. At the time of intrusion the wastes have degraded to the extent that they are unrecognizable as waste and undistinguishable from soil.
4. The waste degradation takes place at a rate independent of site location. That is, the degradation is the same for an arid and a humid site.
5. Agricultural activities occur only in wastes located less than 3 meters below grade. This is based on the construction of a residence with a basement excavated to 3 meters. The soils

removed for the building are graded about the residence and foods are grown in the excavated soils.

6. Construction events normally take place at depths less than 3 meters.
7. When deep disposal is assumed, it is judged less likely that significant construction will take place at these depths (high rise building construction, for example). For wastes thus disposed, it is assumed that only 10 percent of the wastes are contacted and become available for dispersion into the air and subsequent inhalation by humans. Further, potential direct gamma exposures from working on homogeneously contaminated ground are assumed to be reduced by a factor equal to one meter of soil shielding (1/1200).

With these basic assumptions the allowable Sr^{90} concentrations for the stated options were computed using the INVERSI code which was also used to determine the limiting radionuclide concentrations for the 10 CFR 61 waste classification system (Reference 3). The results are provided in Table 1.

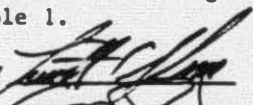
Table 1
Allowable Sr^{90} Concentrations for Unstabilized Wastes

<u>Option</u>	<u>Allowable Concentration, Construction Scenario, uc/cc</u>	<u>Allowable Concentration, Agricultural Scenario, uc/cc</u>
Unstabilized waste, regular disposal (normal depths)	2.0	0.04
Unstabilized waste, burial at depths greater than 5 meters	24	NA*


- * Agricultural activities are not assumed to take place for wastes disposed at depths greater than 5 meters.

Since the disposal effects for an arid and a humid site are assumed to be the same, the allowable concentrations would be the same. However, the above evaluation has considered only the isotope Sr^{90} and has not evaluated the effects of other limiting long-lived isotopes such as C^{14} , Tc^{99} , or I^{129} which might be present in a waste of this nature. These isotopes have high migration potentials at humid sites but are generally not specifically measured at power plants due to low concentrations and analytic complexity. Allowing disposal of higher activity unstabilized wastes at humid disposal sites could result in increased groundwater migration of such limiting long-lived mobile isotopes as well as increased post operational maintenance costs. Since it is possible that TMI-2 wastes might also contain some of these longer-lived isotopes in concentrations near their Class A limits, it is judged to be prudent to dispose of such higher activity unstabilized wastes at an arid site where it can be assumed that migration is not a significant pathway.

This evaluation, therefore, concludes that disposal of unstabilized TMI-2 dewatered resin wastes having Sr^{90} concentrations up to 24 uc/cc would be acceptable provided the wastes were buried at depths greater than 5 meters at an arid disposal site. Other isotopes listed in Table 1 of Reference 1, of course, would need to be accounted for using the concentration ratio factor identified in Table 1.

Evaluation performed by 

Date 10/4-81

Checked by 

Date 10/14/81

Approved by _____

Date _____