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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

October 18, 1979

Docket No. 50-10

POOR ORIGINAL

Mrs. Leo Drey
515 West Point Avenue
University City, Missouri 63130

Dear Mrs. Drey:

In response to your letter dated July 23, 1979, in which you expressed your concerns related to the decontamination wastes, the following answers are provided for each of your specific questions:

Q1. Would you please explain to me how it was decided that the estimated 1200 55-gallon drums of the mixture of radioactive corrosion products, chelating solvent, and a vinyl ester resin solidification agent proposed to be shipped and stored subsequent to the Dresden Unit One decontamination experiment would qualify as "low level wastes" rather than "high level"?

A1. Radioactive wastes are separated into two broad classifications: "high level wastes" and "other than high-level wastes". High-level wastes are radioactive wastes produced in the first solvent extraction cycle of fuel reprocessing operations. If fuel is not reprocessed, the unprocessed fuel will be classified as high-level waste should it be discarded. High level wastes are highly radioactive, contain significant quantities of transuranic radionuclides, and require extensive shielding, sophisticated remote handling techniques, and often require cooling to remove the heat generated by the decay of the contained fission products.

The second waste classification "other than high level wastes" includes wastes that are not produced in the first step of the solvent extraction cycle of fuel reprocessing or the unprocessed fuel. The Dresden 1 waste that will be produced from the decontamination falls into this class and therefore may be buried in a commercial waste burial site.

Q2. Wouldn't the concentrated first cycle decontamination effluent containing irradiated metal oxides, mixed with trapped fission and activation products accumulated over the 19-year operation of the plant -- plus chelating agents designed to solubilize the crud -- constitute a higher level hazard than, for example, discarded HEPA filters, evaporator condensate, workers' clothing or similar "low level" wastes irradiated over a much shorter period of time and not bonded to chelates?

A2. The level of hazard associated with the disposal of any waste is controlled by the precautions taken in the disposal process to isolate the waste from the biosphere. A graded range of safety precautions are applied to waste according to the type and level of radioactivity. Therefore, liquids are transformed into solids to preclude leakage during transportation or after burial. Highly radioactive waste shipments are shielded as needed to keep transportation exposures below applicable Department of Transportation or NRC limits. At the burial site the level of hazard of highly radioactive waste is controlled by burying it deeper. Therefore, an equivalent level of hazard is achieved by applying additional precautions as necessary.

Q3. Do you really believe shallow burial in trenches is sufficient to keep the Dresden wastes isolated from the biosphere? If so, for how long?

A3. An ERDA study carried out by Drs. Means, Crerar, and Dugried, Science Vol. 200 June 30, 1978, was related to the disposal of 35 million gallons of liquid waste which had been pumped into disposal trenches on the top of a hill. Subsequent to this liquid waste disposal activity radioactive liquids seeped to the surface at a down hill location.

In the present situation, the Dresden decontamination wastes are being turned into a solid waste form and will be buried in an arid desert site where the water table is approximately 300 feet below the surface.

The absence of liquid in the waste and the large separation from the ground water will assure that the radioactivity in the waste will be isolated from the biosphere.

The following table lists the expected nuclides and quantities expected to be present in the Dresden 1 decontamination waste:

NUCLIDE	CURIES	HALF LIFE	Ci/55 Gal. DRUM
^{60}Co	2160	5.3 years	1.65
^{58}Co	630	22 days	0.53
^{144}Ce- ^{144}Pr	117	290 days	0.10
^{54}Mn	30	25 days	0.03
^{95}Zr- ^{95}Nb	21	63 days	0.02
^{57}Co	15	270 days	0.01
^{141}Ce	15	32 days	0.01
^{103}Ru	9	41 days	<.01
MFP	3	*	<.01
	3000		2.50

*The half life of mixed fission products may be approximated by assuming that $T_{\frac{1}{2}} = t$ where t is the time since fission.

Based on the above, it is seen that after 6 half lives (about 31 years) the only significant activity remaining will be approximately 35 curies of Co^{60}, an insignificant quantity from a hazards standpoint because the protective shielding of the burial facility was originally adequate for 2160 curies at the time of burial.

Q4. Would you please tell me how much the crud will weigh which is to be removed from the reactor and piping?

A4. It is estimated that approximately 450 to 1100 pounds of total deposit will be dissolved and removed during the decontamination.

Q5. Which radioisotopes other than cobalt-60 (5.26 year half-life) you expect to find in the crud; and how many curies of each isotope you expect to be dissolved by the solvent -- both the shorter lived ones which may only impact upon the health of the workers participating in the project, and the others which will persist during shipment and burial?

A5. See Table 1, Answer 3.

Q6. Is it correct that if a drum contains any transuranic wastes totaling more than 10 nanocuries per gram it will not be allowed to be buried at one of the three remaining commercial low-level burial sites (that is, in South Carolina, Washington or Nevada) -- or is this restriction not yet in effect at commercial burial sites?

A6. The licenses for the Barnwell, South Carolina and Beatty, Nevada sites contain a 10 n Ci/gm limit on transuranic nuclides. The Hanford site does not have a 10 n Ci/gm limit.

I hope this information is responsive to your request.

Sincerely,

Richard H. Vollmer, Acting Assistant Director for Systematic Evaluation Program
Division of Operating Reactors