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STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

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February 16, 1994

Mr. Steven H. Wisness
U.S. Department of Energy
P.O. Box 550 MSIN: A5-15
Richland, WA 99352-0550

Dear Mr. Wisness:

Re: Transmittal of 4843 Alkali Metal Storage Facility (AMSF) Cleanup Considerations (S-4-1, M-20-14)

I recently received a memorandum from Dick Boose of the Washington State Department of Ecology's (Ecology) Toxics Cleanup Program which discusses cleanup considerations relating to the above referenced unit. Prior to entering into the Data Quality Objectives (DQO) process and the revision of the 4843 AMSF Closure Plan, portions of the memorandum are enclosed in an effort to transmit information the Unit Manager intends to utilize as technical support during the decision making process related to the approval of the 4843 AMSF Closure Plan.

Currently, Ecology is drafting the response table in response to the U. S. Department of Energy's Notice of Deficiency Response Table dated October 14, 1993, submitted on November 4, 1993. It is anticipated that Ecology's response table will be finalized by February 28, 1994.

If you or your staff have any questions regarding the enclosure or this transmittal schedule, please call me at (509) 736-3034.

Sincerely,

Alisa D. Huckaby
Nuclear and Mixed Waste Management Program

AH:mf
Enclosure

cc: Randy Krekel, USDOE
Jason Adler, WHC
Fred Ruck, WHC

Dan Dunca, EPA
Doug Sherwood, EPA
Administrative Record



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4843 Alkali Metal Storage Facility Unit
(Group # S-4-1, Milestone M-20-14)

The information provided below represents cleanup considerations relating to the above referenced unit received from Dick Boose, Dept. of Ecology, Toxics Cleanup Program via memorandum to Alisa Huckaby, Dept. of Ecology, Nuclear and Mixed Waste Management Program, dated February 10, 1994. The information provided below represents direct quotes taken from the above described memorandum.

Sodium

Elemental or metallic sodium must be stored in kerosene to prevent decomposition. In any unlikely scenario that metallic sodium would have "broken through" the storage containers one or more of the following sequences should have happened:

- Kerosene or a similar petroleum product spilling out would have left evident stains and other problems which would have required cleanup.
- What was the original state of the stored sodium? If a single solid then it would not likely have passed through the container lesion. Further, the air exposed sodium solid would probably self-ignite and combust in moist air.
- If the sodium in a granular or pellet form had passed through the 'container lesion' auto-ignition in a pool of kerosene would have been a likely consequence.
- If the sodium pellets had contacted water on the floor of the building or from other moisture sources, a strong exothermic reaction would have occurred. Hydrogen and sodium hydroxide (NaOH--a corrosive) would have formed. Assuming the hydrogen didn't auto-ignite, the wet sodium hydroxide should show visible evidences of corroding the concrete.
- Sodium hydroxide contaminated concrete should give a much higher Ph than unaffected concrete when pulverized and added to water.

Soil has substantial natural buffering capacity and I can't conceive NaOH contaminated concrete, if broken up and landfilled, being a serious problem. We are not looking at a systemic poison but a simple caustic substance. If it will help to alleviate concern and if the concrete floor is contaminated with NaOH you might suggest that the floor may be scrubbed with either citric acid or acetic acid. These are weak acids and biodegradable.

591-6125146

Lithium

Lithium occurs in nature most often in insoluble mineral complexes with aluminum and silicon oxides. Quite possibly the 28-37 ppm natural background of lithium in the Benton-Franklin soil is in one or more insoluble mineral forms such as Spodumene, Lepidolite, Amblygonite, etc.

Lithium metal reacts exothermically with nitrogen in the presence of moisture at ordinary temperature. The reaction with water to form LiOH is slow in cold water but could occur on a damp concrete floor. Lithium hydroxide will draw CO out of the air to form the carbonate.

EPA "Proposed Criteria for Water Quality" October 1973, page 36, reports that the maximum acceptable concentration of lithium in water for continuous irrigation is 2.5 ppm except for citrus where 0.075 ppm is the maximum acceptable concentration.

I have not found an MCL for lithium in drinking water but many persons use lithium carbonate for therapy at doses of 1,000 mg and more a day (1994 PDR). I recommend that Ecology consider 2.5 ppm for lithium in drinking water and for continuous irrigation.

891-672146

