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Department of Energy

Richland Operations Office
P.O. Box 550
Richland, Washington 99352

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JUN 1995 RECEIVED EDMC

Mr. Randall F. Smith
U.S. Environmental Protection Agency
1200 Sixth Avenue HW-124
Seattle, Washington 98101

JUN 5 1995

Dear Mr. Smith:

REQUEST FOR A CONTAINED-IN DETERMINATION FOR HAZARDOUS DEBRIS CONTAMINATED WITH LISTED WASTE AT 183-H SOLAR EVAPORATION BASINS, HANFORD SITE

In reference to the U.S. Department of Energy, Richland Operations Office (RL), letter to Mr. S. M. Alexander, State of Washington, Department of Ecology (Ecology), and Mr. D. R. Sherwood, U.S. Environmental Protection Agency (EPA) from Mr. J. E. Rasmussen, RL, and Mr. S. D. Liedle, Bechtel Hanford, Inc., "Waste Designation of Concrete and Soil at 183-H Solar Evaporation Basins," dated February 22, 1995, RL has requested that a contained-in determination be granted by EPA for the 183-H Solar Evaporation Basin concrete subject to the Land Disposal Restriction Debris Rule and as provided in 40 Code of Federal Regulations 261.3(f)(2). This request is directed to EPA rather than Ecology because Ecology has not yet received authorization for the Federal Land Disposal Restriction Program. The purpose of this letter is to request EPA's immediate action and to provide EPA with more information to further support decisions regarding this determination. 40348

A contained-in determination is needed from EPA by July 12, 1995. If a contained-in determination is granted, sampling and analysis of residuals will occur by this date in order to ensure that they do not exhibit a characteristic of hazardous waste. If a contained-in determination is not granted, sampling will not occur since the listed waste designation will identify the residuals as mixed waste. It is not expected that the residuals will exhibit a hazardous waste characteristic. Therefore, with the granting of a contained-in determination, the residuals from the closure of this unit will be disposed of as solid waste at a cost savings to the cleanup in excess of $200,000.

A meeting on this subject was held on May 1, 1995, with Mr. Dan Duncan, EPA, and Mr. Bob Cordts, Ecology. In addition, two data requests for summaries of concrete data have been generated in response to informal requests between RL, Mr. Duncan, and Mr. David Bartus, EPA. These summaries are attached. Attachment 1, "Conservative Calculations for Listed Constituents Within the Top 6 mm Concrete Layer at 183-H Solar Evaporation Basins," contains a summary of listed constituent concentrations under a worst-case assumption that all listed constituents found in concrete data (based on a 5 inch core sample) were concentrated into a 6 mm layer. A 6 mm layer will be generated from extraction of the top layer of concrete in order to radiologically decontaminate the basins. This summary utilizes worst-case assumptions for deposition of listed constituents and concludes that concentrations for these constituents are at or below the most stringent cleanup levels for groundwater protection and are well below direct contact soil exposure levels. Attachment 2, "Summary of Constituent Concentrations in 183-H Concrete for the Purposes of Obtaining a Contained-in Determination," provides a summary of all nonlisted Appendix VIII constituents of concern that were placed in the basins and analyzes them relative to cleanup levels. This analysis concludes that

Mr. Randall F. Smith

the concrete does contain constituents of concern above groundwater protection levels, but below characteristic designation levels and at or below State of Washington Model Toxics Control Act Method C direct contact soil exposure levels.

Data provided in these attachments continues to support RL's request for the granting of a contained-in determination. If granted, contingent management of residuals from the cleanup of basin concrete will be provided through disposal at a 200 Area plateau disposal unit (Low-Level Burial Grounds if the residuals are noncharacteristic or the Mixed Waste Trench if they are characteristic). Such disposal will provide further management control over these residuals.

If you have further questions regarding this information, please call Mr. Jeffrey M. Bruggeman on (509) 376-7121.

Sincerely,

Julie K. Erickson, Director
River Sites Restoration Division

RSD:JMB

Attachments: As stated

cc w/attachs:
S. Alexander, Ecology
C. Clarke, EPA
R. Cordts, Ecology
D. Duncan, EPA
M. Janaskie, EM-442
R. Jim, YIN
D. Powaukee, Nez Perce
D. Sherwood, EPA
J. Wilkinson, CTUIR

cc w/o attachs:
L. R. Miller, BHI
J. W. Badden, BHI

ENCLOSURE 1

CONSERVATIVE CALCULATIONS FOR LISTED CONSTITUENTS WITHIN THE TOP 6 MM CONCRETE LAYER AT 183-H SOLAR EVAPORATION BASINS

Background

In review of the letter sent to EPA and Ecology regarding a listed waste contained-in determination for concrete and soil at the 183-H Solar Evaporation Basins, a question was raised by Mr. Dan Duncan, EPA Region 10, regarding the amount of constituents contained in the top layer of the concrete to be scabbled off during decontamination. The data provided to the Agencies in the letter is based on sampling of a 5 inch core of basin concrete. No direct analytical information exists to describe what the scabbled layer would contain relative to listed constituents. Due to the lack of analytical information to substantiate levels, and in order to answer Mr. Duncan's concerns, highly conservative assumptions were applied to the data to determine whether listed constituents in the scabbled layer could be above a health-based standard. The results are compared against the most stringent cleanup standard, 100 times the Federal MCL or the MTCA Method B groundwater protection value, whichever of the two is lower. However, because scabbled concrete will be disposed to the 200 Area plateau (either as mixed waste or as low-level waste), the direct soil exposure level is also indicated. Assumptions and results are delineated below.

Assumptions

Two scenarios were used to determine worst case listed constituent concentrations in the scabble layer of the concrete. Scenario 1 utilizes the assumption that, lacking data on the top 6 mm, a conservative number can be reached by attributing all constituent concentrations to the top layer, therefore deleting any potential dilution of the concentration by the lower concrete portion. Scenario 2 assumes that a maximum concentration of constituent can be determined using the assumption that all constituent concentrations added to the basins are distributed into the top layer of a basin.

Scenario 1 is considered to be the preferred approach in that it better reflects reality because it is based on actual concrete data. This scenario assumes that all of the listed constituent concentrations found in the composite layer (5 inches) is concentrated into the first 6 mm of the concrete that will be scabbled off. Scenario 1 was utilized to determine constituent concentrations for two listed constituents: formic acid and cyanides. Where data was below detection limits, the data was quantified at half the detection limit per WAC 173-340-740(8)(g).

Concrete data for 183-H reveals clean concrete samples that have levels of vanadium comparable to that of the concrete that contacted the listed waste. Scenario 1 was not utilized for vanadium pentoxide because of this abundance of vanadium inherent in the clean concrete. Concentrating the indigenous concrete into the top layer would not account for vanadium concentrations attributable to a listed source. For vanadium, Scenario 2 was utilized. Assumptions were made that the total vanadium pentoxide solution (0.25

gallons) was discharged to one basin rather than the existing four basins and that all of it evenly dispersed into the concrete (i.e., none of it remained in solution in the 2.6 million gallons of liquid removed from the basins). The quantity of concrete from the floor and the walls of the basin was calculated for 6 mm of scabbled concrete at the surface.

Results

FORMIC ACID - SCENARIO 1

No formate ion was detected in any of the samples. Using a mean value of 15 mg/kg formic acid (half the detection limit), and dividing this concentration by 0.048 (6 mm/5inch composite core sample), the concentration of formic acid that could be contained in the top 6 mm is **312.5 mg/kg**. Using the most conservative health-based level (100 X MTCA Method B groundwater protection level), the allowable formic acid level would be **3,200 mg/kg**. Soil standards are listed for formic acid at **16,000 mg/kg**.

Using the conservative assumption that all formic acid is attributable to the top 6mm, concentrations of this listed constituent would be approximately one order of magnitude below the most stringent groundwater protection level.

CYANIDES - SCENARIO 1

Using a mean value of 1.0 mg/kg cyanides (using half the detection limit where data was below detection), and dividing this number by 0.048, the concentration of cyanides that could be contained in the top 6 mm is **20.8 mg/kg**. Using the most conservative health-based level (100 X Federal MCLs), the allowable cyanide level would be **20.0 mg/kg**. Soil standards are listed for cyanides at **160 mg/kg**.

Using the conservative assumption that the cyanide concentration in the composite samples is attributable to the top 6mm, cyanide concentrations would be at the more stringent groundwater protection level but well below the soil value.

VANADIUM PENTOXIDE - SCENARIO 2

The weight of 6 mm of concrete in the floor and walls of one basin is 14, 000 kg (based on the weight of concrete equalling 2.7 g/cc). The vanadium pentoxide solution (0.25 gallons) contained 7.6 grams of vanadium pentoxide in the aqueous saturated solution. Therefore, **0.54 mg/kg** of vanadium pentoxide would be deposited by this solution in the top 6 mm of concrete. The most conservative cleanup level (100 X MTCA Method B groundwater protection level) lists vanadium pentoxide at **14.4 mg/kg**. The soil standard for vanadium pentoxide is listed at **72.0 mg/kg**.

Vanadium pentoxide, using the conservative assumption that the discharged solution is evenly distrubuted on the floors and walls of one basin, would be well below the groundwater protection level.

ENCLOSURE 2

SUMMARY OF CONSTITUENT CONCENTRATIONS IN 183-H CONCRETE FOR THE PURPOSES OF OBTAINING A CONTAINED-IN DETERMINATION

BACKGROUND

On Thursday, May 5, 1995, a conference call was placed between Jeff Bruggeman, RL, Rex Miller and Janet Badden, ERC, and Dan Duncan and Dave Bartus, EPA Region 10, regarding the EPA position on granting a contained-in determination (requested by RL in a February 22, 1995 letter) for the concrete at 183-H Solar Evaporation Basins. Mr. Bartus stated that EPA could not give a contained-in determination until all environmental consequences for all hazardous constituents of concern in the concrete were examined. Hazardous constituents are defined as any Appendix VIII constituents that may be in the concrete as a result of deposition from the waste in the basins. It does not include state-only regulated constituents such as fluoride and nitrate. Comparisons against hazardous waste characteristic levels, health-based levels, and/or groundwater protection levels may be made to determine environmental consequences of future management of the concrete.

CONSTITUENTS SUMMARY

In review of the closure plan for 183-H (Attachment 11 of the Hanford Facility Part B Permit, effective September 28, 1994), a list of constituents of concern for concrete analysis was developed. This information was based on chemical waste disposal forms contained in the unit's operating record. Constituents of concern include heavy metals identified under the toxicity characteristic (40 CFR 261.24) as well as beryllium and nickel.

Constituents of Concern in 183-H Concrete

ARSENIC	LEAD
BARIUM	MERCURY
BERYLLIUM	NICKEL
CADMIUM	SELENIUM
CHROMIUM	SILVER
CYANIDE	VANADIUM PENTOXIDE
FORMIC ACID	

Listed constituents (cyanide, formic acid, and vanadium pentoxide) were analyzed relative to health-based numbers in the February 22, 1995 letter requesting a contained-in determination from EPA Region 10. More conservative analysis has been performed in Attachment 1. These analyses conclude that all listed constituents are at or below the most stringent 100 times groundwater protection level in the concrete. Therefore, no further conclusions regarding these constituents will be made in this discussion.

Nonlisted constituent concentration means, standard deviations, and 95% upper confidence limits are identified in the attached table. These concentrations

can be compared to various regulatory thresholds: mean concentrations of constituents of concern in background concrete; Toxicity Characteristic Leaching Procedure designation limits; 100 times groundwater protection levels contained in MTCA or a default value, as described; and MTCA Method C direct soil exposure levels for nonindustrial and industrial soil scenarios. MTCA levels were obtained from " MTCA Cleanup Levels and Risk Calculation (CLARC II) Update," dated August 31, 1994. A summary of this information is presented below by constituent.

Arsenic: Arsenic concentrations in the concrete do not exceed characteristic designation limits for definition as a hazardous waste nor exceed soil exposure levels for MTCA Method C industrial soil exposure levels. Arsenic contamination exists in the concrete at levels both above concrete background and above 100 times groundwater protection levels.

Barium: Barium concentrations do not exceed characteristic designation limits nor MTCA Method C direct soil exposure levels. Barium concentrations are above background concrete and 100 times groundwater protection levels.

Beryllium: Beryllium concentrations do not exceed MTCA C direct soil exposure levels but do exceed 100 times groundwater protection levels.

Cadmium: Cadmium concentrations do not exceed characteristic designation limits nor MTCA Method C direct soil exposure levels. Cadmium concentrations are above background concrete and 100 times groundwater protection levels.

Chromium: Chromium concentrations do not exceed characteristic designation limits nor MTCA C direct soil exposure levels. Chromium concentrations are above background concrete and 100 times groundwater protection levels.

Lead: Lead concentrations do not exceed characteristic designation limits nor Method A cleanup levels. No groundwater protection or direct soil exposure levels exist for lead. Lead concentrations are above background concrete levels.

Mercury: Mercury concentrations do not exceed characteristic designation limits, 100 times groundwater protection levels nor background concrete.

Nickel: Nickel concentrations do not exceed 100 times groundwater protection levels but are above background concrete.

Selenium: Selenium concentrations are all below a relatively high level of detection. Using half the detection limit for the data (as is recommended by "Washington State Department of Ecology Toxics Cleanup Program Statistical Guidance for Ecology Site Mangers," dated August 1992) the concrete would not designate as hazardous waste. Given that the background concrete data for selenium is comparable to the contaminated concrete, selenium would be excluded from consideration as a hazardous waste. Selenium concentrations are above 100 times groundwater protection levels using half the detection limit (in accordance with MTCA guidance pertaining to such data) but are below MTCA Method C direct soil exposure levels.

Silver: Silver concentrations do not exceed characteristic designation limits and 100 times groundwater protection levels based on half the detection limit.

Silver concentrations are at background concrete values.

CONCLUSIONS

No constituent of concern is present at levels that would regulate the concrete as characteristic hazardous waste. Constituents of concern are present above the most stringent groundwater protection level for arsenic, barium, beryllium, cadmium, chromium, and selenium. No constituent of concern is above Method C soil exposure levels with the exception of arsenic which is above Method C direct soil exposure levels but below Method C industrial soil levels.

Constituents present in the concrete that caused the concrete to be designated as listed waste are far below health or environmental levels of concern (Attachment 1). Nonlisted constituents of concern are present in the concrete at levels that are of concern from a groundwater protection standpoint (based upon conservative values, i.e., 100 times groundwater cleanup standards) but none are present at levels exceeding those considered protective from a soil ingestion standpoint where institutional controls are provided to ensure protection, as in an industrial setting.

The overriding reason for RL's request for a contained-in determination for the concrete at the 183-H Solar Evaporation Basins is to avoid the unnecessary expenditure of resources that would need to be applied to listed residuals generated from the decontamination of the concrete. As stated in earlier verbal discussions with EPA Region 10, this cost would exceed $200,000 for storage alone of the residuals as mixed waste with no commensurate increase in the level of environmental protection. Further treatment needs, including the need to obtain an approved treatability variance from EPA-HQ for the formic acid (Land Disposal Restriction treatment standard specifies incineration) would significantly increase this cost.

However, given the analysis of the constituents in association with the contaminated concrete and given already established plans to dispose of the waste in a protective manner, RL considers that a contained-in determination should be granted for the concrete. A contained-in determination is requested from EPA that concludes that the concrete (and therein its residuals) be designated as nonlisted. This determination should be contingent on actions that RL must perform in order to dispose of the concrete and its residuals as nonlisted waste:

1. Verification sampling of the concrete should be performed to ensure that constituents in the concrete residuals do not exceed characteristic or criteria designation as dangerous waste.

2. Management of the residuals from the concrete should be protective of human health and the environment. Further treatment of the residuals will be contingent upon sampling results. If the residuals contain concentrations of constituents that regulate it as characteristic or criteria dangerous waste, compliance with treatment standards contained in WAC 173-303-140 and 40 CFR 268 will be met through further treatment or alternate options available through the Land Disposal Restriction program.

3. Disposal of the residuals must occur in a 200 Area plateau landfill. Options for disposal may include the Low-Level Burial Grounds if the residuals are not regulated due to chemical constituents, the Mixed Waste Trench if the residuals exhibit a characteristic or criteria that regulate them as dangerous waste, or the Environmental Remediation Disposal Facility if such waste is determined to be appropriate for disposal under a CERCLA authority. Any of these options are considered to provide the institutional controls necessary for protective management.

In complying with these contingent management actions and with the granting of a contained-in determination, EPA and RL can assert a common sense application of the regulatory requirements that will result in a significant cost savings while continuing to provide protection to both human health and the environment.