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CLEANUP LEVELS FOR LEAD AND CADMIUM IN SOILS FOR CLEAN CLOSURE

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

MAR 2 1988

MEMORANDUM

SUBJECT: Cleanup Levels for Lead and Cadmium
in Soils for RCRA Clean Closures

FROM: Jeffery D. Denit, Acting Director
Office of Solid Waste

TO: David A. Wagoner, Director
Waste Management Division
Region VII

In your memorandum of December 29, 1987, you requested guidance on setting soil cleanup levels for lead and cadmium at RCRA facilities that intend to achieve clean closure. As you know, the preamble to the March 19, 1987, final regulation (conforming 265.228(a) to 264.118(a)) stated that verified Reference Doses (RfDs) and Carcinogenic Potency Factors (CPFs) could be used as Agency-recommended limits for contaminants such as lead and cadmium, where appropriate, to set soil cleanup levels. The verified RfD would be the most appropriate criteria for setting a soil cleanup level for contaminants that are not known to have carcinogenic effects, and the CPFs would be the most appropriate limit for carcinogens.

The preamble also states that, in cases where no EPA recommended limit exists for a specific contaminant, a soil cleanup level may be based on either:

1. background levels; or

2. data developed by the owner or operator to support a health-based limit.

When neither of the above is feasible, clean closure cannot be achieved and the unit must be closed under the landfill closure requirements.

Presently, the Office of Research and Development is investigating recent data on the toxicity of lead and cadmium. Over the next several months, decisions will be made on an RfD for cadmium and an RfD and a CPF for lead. The Office of

Drinking Water will soon propose a Maximum Contaminant Level Goal (MCLG) for cadmium, and may be revising the current Maximum

Contaminant Level for lead. It is apparent, therefore, that the toxicological information on lead and cadmium is undergoing extensive Agency review, and decisions on relevant health-based standards are currently being made.

Although the RfD Workgroup has not formally approved the RfD for cadmium, it is likely that a value of 0.0005 mg/kg/day will be approved as an RfD for cadmium when the Workgroup meets in March. Since this value is the same as the one proposed in the Hickok study, I recommend that it be used to set a soil cleanup level at the Frit Industries site in Humboldt, Iowa. The cleanup level for cadmium is, therefore, 9 mg/kg, which agrees with the level stated in your memo, as calculated by Region VII.

Presently, the Carcinogen Assessment Group (CAG) of ORD is evaluating lead as a potential human carcinogen via the oral route of exposure. OSW has requested that CAG estimate a CPF for lead based on current toxicity studies, and has requested that an RfD be developed by the RfD Workgroup on the basis of new toxicological data on the non-carcinogenic, neuro-behavioral effects of lead exposure. It is not likely, however, that the CPF or the RfD will be developed and approved soon. Therefore, I am recommending that soil cleanup levels for lead should be based on local background soil levels.

You can use either of the following approaches to determine the background levels for lead in soils:

a. Take soil samples at uncontaminated areas of the facility and at various depths to ensure representativeness and random distribution. Analyze the sample for total lead.

   Refer to Mason, B.J., 1983 and Barth, S., et. al., 1984 for guidance on soil sampling and quality assurance procedures; or

b. Consult the open literature for published data on lead levels in soils of similar origin and chemical characteristics as the soils in the immediate area of the facility. Using the U.S. Department of Agriculture's Soil Conservation Service classification system, it should be possible to identify similar soils and corresponding levels of naturally-occurring lead that could establish background levels. One publication (Connor, J., et. al., 1975) reports average lead concentrations of 30 mg/kg or less in surficial soils across the United States.

Attached for your information are comments marked on a copy of the Hickok report by Lisa Ratcliff of OSW's Technical Assessment Branch, as well as a fact sheet on lead prepared by the Office of Waste Programs Enforcement (for internal EPA use only). These materials summarize the Agency's current recommendations on the effects of exposure to lead and cadmium.

The Surface Impoundment Clean Closure Guidance Manual that was provided to your staff on October 12, 1987, for review, provides additional information on adjusting soil levels to account for certain site-specific factors. Although this guidance has not been cleared through the Agency review process, you can use the information contained in Chapters 4 and 5 of the October 12, 1987, draft until such time that the final guidance manual is available. These chapters provide information on the removal of wastes, contaminated soils, ground water, and other materials, and on follow-up monitoring and sampling to ensure that the cleanup levels have been met. If there are any further questions on clean closure, please contact Jim Bachmaier of the Land Disposal Branch at FTS 475-8859. Any questions regarding toxicity studies should be directed to Lisa Ratcliff of the Technical Assessment Branch at FTS 382-4781.

Attachments

cc: Joseph Carra
Robert Tonetti
Alessi Otte
James Bachmaier
Lisa Ratcliff

References:

Barth, S., et. al., 1984. Soil Sampling Quality Assurance User's Guide- (EPA/600/4-84/043) USEPA-Las Vegas, Nevada (NTIS: PB 84-198-621)

Connor, J., et. al., 1975. Background Geochemistry of Some Rocks, Soils, Plants, and Vegetables in the Conterminous United States. (Geological Survey Professional Paper 574-F). U.S. Government Printing Office, Washington, D.C.

Mason, B.J., 1983. Protocol for Soil Sampling: Techniques and Strategies. (EPA/600/54/83/020) USEPA- Las Vegas, Nevada (NTIS: PB 83-206-979)