

MEMORANDUM
on the
FINAL DRAFT
TECHNICAL APPROACH FOR RISK ASSESSMENT
for
WORK ASSIGNMENT NO. XXXX
PALMERTON ZINC SITE RISK ASSESSMENT
PALMERTON, PENNSYLVANIA

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for:

The Palmerton Citizens For A Clean Environment

In Response to Task Schedule #15, Item #2

OVERVIEW

The following memorandum has been prepared in response to PCCE Task Schedule #15, Item #2, which requests a written review in memorandum form of the document titled: "Final Draft Technical Approach for Risk Assessment for Work Assessment No. XXXX, Palmerton Zinc Site Risk Assessment, Palmerton, Pennsylvania".

1. The major elements of the Technical Approach for Risk Assessment document are as follows:
 - ◆ Media to be evaluated and treatment of data
 - ◆ Exposure pathway analysis
 - ◆ Dose/response parameters
 - ◆ Risk characterization
 - ◆ Uncertainties in risk assessment

2. EPA will perform the risk assessment in accordance with the following general guidance documents:
 - ◆ *Risk Assessment Guidance for Superfund (RAGS), Volume 1, Human Health Evaluation Manual* (EPA/540/1-89/002, December 1989)
 - ◆ *Superfund Exposure Assessment Manual* (EPA/540/1-88/001, April 1988)
 - ◆ *Guidance for Data Useability in Risk Assessment* (Part A, 9285.7-09A, April 1992)
 - ◆ *Risk Assessment Guidance for Superfund (RAGS), Volume I, Supplemental Guidance: Standard Default Exposure Factors* (9285.6-03, March 1991)

In addition, EPA will also apply the following EPA Region III guidance documents to the risk assessment.

 - ◆ *Use of Monte Carlo Simulation in Risk Assessments* (EPA/903/F-94-001, February 1994)
 - ◆ *Selecting Exposure Routes and Contaminants of Concern by Risk-Based Screening* (EPA/903/R-93-001, January 1993)
 - ◆ *Assessing Dermal Exposure from Soil* (EPA/903/K-95-003, December 1995)

3. The SITE BACKGROUND information provided recognizes the "strong presence" the industry has developed in the community of Palmerton over the years, because "...the zinc company was the primary employer of the area". The same paragraph also discusses the current operations of recovering and processing zinc and other metals from secondary materials, including electric arc furnace (EAF) dust.

4. The SITE BACKGROUND section also states that the U.S. Atomic Energy Commission stored uranium ore at the East Plant from 1953 to 1973. The uranium ore was mined in the town of Jim Thorpe and brought to Palmerton for storage. The uranium was removed in 1973 and the final Palmerton site report indicated that the site met radiological criteria defined at the time of cleanup. However, the Department of Energy later decided that supporting radiological data were not sufficient to demonstrate that current standards were met everywhere on site. A comprehensive radiological study conducted by Oak Ridge National Laboratory in 1988 identified the presence of small isolated areas of residual radioactive material.
5. The PURPOSE OF THE RISK ASSESSMENT is to determine potential human health effects from exposure to contaminants present in soil, water, and dust in Palmerton (i.e. is specific to OU-3).
6. The risk assessment is being conducted in support of the remedial action, and is separate from the ongoing interim removal action. The goals of the risk assessment are to determine if further remedial action is required (beyond the interim removal action), and to assist in setting cleanup standards for the site.
7. The following documents will serve as the primary sources of analytical data for the risk assessment.
 - ◆ The CDM Federal Dataset - Fall 1991 - These samples were conducted by CDM Federal at the request of EPA, to provide environmental data for the ATSDR health study. Soil, dust, and water samples were collected from 193 residences in Palmerton. Samples were analyzed for lead, cadmium, zinc, and arsenic. The document states that only samples collected in the Borough of Palmerton will be evaluated in the risk assessment.
 - ◆ Interim Action Dataset - Spring 1994 through Present - This dataset represents over 200 samples collected at over 70 properties in preparation for the interim removal action. Samples were analyzed for lead, cadmium, and zinc, no perimeter soil samples were collected.
 - ◆ ORNL Dataset - 1988 - This dataset is specific to evaluating the potential for impacts due to exposure to uranium ore.
 - ◆ Pennsylvania Department of Environmental Resources (PADER) Air Dataset 1993 and 1994 - EPA proposes to use only air quality data collected from the air sampler located at Fourth and Franklin Streets from 1993 to 1994 to perform screening calculations for exposures to Palmerton residents via the inhalation pathway. Because this dataset is diminished by the single sampling location, EPA states that it will use screening or "worst case" scenarios to evaluate if the potential for exposure via the inhalation pathway is sufficiently significant to warrant further consideration (section 3.1.3).
 - ◆ University of Cincinnati dataset - September 1994 through Present - This document is apparently the same as the Palmerton Lead Exposure Study, Fall 1994, prepared by the Palmerton Task Force, Advanced Geoservices corp., Northeast Vector Control, and the University of Cincinnati. The information in this study includes sampling data from only dust, paint, and perimeter soils.

8. The media to be evaluated for the risk assessment include air quality samples, surface soil samples, interior dust samples, tap water samples, and measurements of soil radioactivity levels. EPA has data on street dust and entry-way dust samples, but for unknown reasons has chosen not to use this data for the quantitative analysis of risk.
9. All of the various media will be evaluated separately for the quantitative evaluation, and risk estimates will be generated for each dataset.
10. Pathways and Chemicals Of Potential Concern (COPC's) that contribute significantly to risks will be evaluated through the use of Monte Carlo simulations to provide distributions of possible exposures at the site. To carry out a quantitative uncertainty analysis (Monte Carlo simulations), distributions describing uncertainty in various exposure parameters are necessary. EPA solicited information from the Palmerton Environmental Task Force (PETF) on several such distributions for some of the more sensitive variables in exposure equations.
11. In the section on **EXPOSURE PATHWAY ANALYSIS**, EPA states that some exposure pathways may contribute little to overall exposure at a site. Quantitative analysis of insignificant exposures is unnecessary, and such exposures will only be addressed qualitatively or through the use of screening level calculations.
12. Occupational exposures will not be considered in the exposure pathway analysis.
13. The exposure pathways EPA will examine are as follows:
 - ◆ Inhalation of contaminants in ambient air
 - ◆ Incidental ingestion of contaminated soil
 - ◆ Incidental ingestion of contaminated indoor dust
 - ◆ Ingestion of garden grown vegetables grown in contaminated soil
 - ◆ Ingestion of contaminants in tap water (Palmerton Water Company)
 - ◆ Dermal contact with contaminated soils
14. EPA believes that other potential exposure pathways such as inhalation of contaminated respirable particles indoors and ingestion of contaminated products from locally raised farm animals, seem unlikely to contribute substantially to exposures. Oddly enough, EPA will incorporate a quantitative analysis of ingestion of indoor dust into the risk assessment.
15. Lifetime residents of Palmerton are considered the population most at risk for carcinogenic effects due to exposure to cadmium. Alternatively, young children are considered the population most at risk for chronic exposure to lead.
16. EPA may consider the use of bioavailability factors determined through the pig study to adjust their estimates of absorption rates for citizens residing in the Palmerton area. The results of the pig study are anticipated to be available in April of 1995 (?).
17. The IEUBK model will be used to evaluate potential risks from exposure to lead, unless a new version of the model becomes available before the risk assessment is completed.
18. The IEUBK model will be subjected to uncertainty analysis (Monte Carlo simulations). There is no previous precedent for the application of uncertainty analysis to the IEUBK model, but EPA believes that there may be a technical expert who may be able to develop an interface between the IEUBK model and the software commonly used for Monte Carlo simulations.

GENERAL COMMENTS

The risk assessment methodology outlined for the Palmerton Zinc Superfund site references the standard EPA risk assessment guidelines. At face value, one would suppose that EPA is applying the standard risk assessment methodologies, which are appropriately conservative for protecting the human health and the environment. However, when examined more carefully, it is clear that there has been an national initiative on the part of EPA to more closely refine lead and other heavy metal risk assessment studies which will allow for less stringent cleanup standards. This is especially true for the risk assessment at Palmerton, where EPA has consistently participated in scientific studies of various kinds which were specifically designed to demonstrate the fickle nature of lead bioavailability, and the relative difficulty of demonstrating human health effects from chronic low level lead exposure. It is a curious phenomenon why EPA should persist trying to justify a relaxation of the cleanup standards when health officials seem to be increasingly concerned with lower levels of blood lead in children.

Some risk assessment decisions made by EPA will clearly result in an under estimate of some exposure pathways. Take for example the decision to include ingestion of indoor dust in the risk assessment model, but to exclude inhalation of indoor dust from quantitative analysis. According to the EPA Superfund Health Risk Technical Support Center's "Toxicological Interactions" Memorandum, dated October 23, 1995, lead absorption via the inhalation pathway is as or more efficient than ingestion. The "Toxicological Memorandum" also states: "Absorption of inorganic Pb through the skin is of little significance compared to the inhalation and oral routes." Consequently, both ingestion and inhalation of indoor dust must be quantitatively analyzed in the risk assessment. Conversely, dermal exposure to lead contaminated soil and ingestion of garden vegetables grown in contaminated soil are remotely possible exposure pathways, but EPA is planning to include these pathways in the quantitative analysis.

The Technical Approach for Risk Assessment document states: "Dust loads in indoor air are expected to be low, and, in general, contaminant concentrations in dust indoors are lower than those found in outdoor soils. This statement requires qualification. Which dataset did EPA use to determine that contaminant concentrations in dust are expected to be low? A review of the CDM Federal Second Draft Field Trip Report dataset does not support the conclusion that indoor dust contaminant concentrations are lower than outdoor soils. Table 5 of the CDM Federal Second Draft Field Trip Report, titled "Number of Residences Sampled Exceeding 500 mg/kg Lead and 50 mg/kg Cadmium", indicates that more interior dust samples (64%) exceeded the 500 mg/kg threshold for lead than any of the individual soil sample categories (Bare Area - 44%, Facility Side - 44%, Garden - 12%, and Perimeter - 56%). Of the sample categories listed, only Street Dust/Soil (76%) and Exterior Dust (81%) had a higher percentage of samples with lead concentrations greater than 500 mg/kg than Interior Dust. While it may be true, applying the Fall 1991 CDM Federal dataset, that soil cadmium levels are generally higher than Interior Dust cadmium levels, 32% of the interior dust cadmium levels were still above the 50 mg/kg threshold.

The Final Draft Technical Approach for Risk Assessment document states that EPA has also decided to exclude street dust and exterior entry dust from the quantitative risk assessment. Once again, this will lead to an underestimate of environmental contamination and a subsequent underestimation of risk. Table 5 of the CDM Federal Second Draft Field Trip Report indicates that the highest percentage of samples with lead concentrations exceeding the 500 mg/kg threshold are Exterior Dust (81%) and Street Dust/Soil (76%). Consequently, EPA must include these media in the quantitative risk assessment.

Given the limited resources available, these observations clearly indicate that the Technical Approach for Risk Assessment, as presently proposed, will result in an underestimate of risk and the establishment of unacceptable cleanup levels in Palmerton. If and when the resources for a more thorough examination of the Risk Assessment Work Plan become available, these and many similar aspects of the risk assessment need to be more carefully examined. Otherwise, it is likely that the PCCE will only have the capability to comment on the draft risk assessment document when it becomes available. Given the most recent initiative to use scientific studies as a means to justify more relaxed cleanup standards, the risk assessment document should be viewed with the appropriate level of scientific skepticism. In an honest world, applied scientific principals combined with a prudent measure of cautious conservatism, sufficient to protect the broadest segment of the human population, would form the basis for environmental cleanup policy; not the other way around. EPA should more clearly state their intentions regarding the need for an environmental cleanup.