Agency for Toxic Substances and Disease Registry

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Butte, MT.

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Comments: Sara - please excuse the appearance of this document, it was apparently edited here in the region.

4012007

11-89

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service
Agency for Toxic Substances
and Disease Registry

Memorandum

Date

From Environmental Health Scientist
Health Sciences Branch, OHA

Subject Health Assessment: Butte Mining District (SI-87-044; NPL)
Butte, Montana

To Mr. Michael A. McGeehin
Public Health Advisor
EPA Region VIII
Through: Director, OHA _____
Health Assessment Coordination Activity, OHA SAA
Acting Chief, Health Sciences Branch, OHA EGG

EXECUTIVE SUMMARY

The Environmental Protection Agency (EPA) has requested that the Agency for Toxic Substances and Disease Registry (ATSDR) review the Endangerment Assessment (EA) for Butte Mining District to determine if mining wastes are a public health threat. There are problems with quality and adequacy of data, but it is clear that people are living in close proximity to the sources of exposure and that potentially toxic levels of heavy metals are spread throughout much of the site. There are multiple exposure pathways by which some individuals may receive significant exposures to heavy metals and radon. Even if risk estimates are too high by one or more orders of magnitude, risks to the public from soil, dust, vapors, and directly and indirectly through surface water are high enough to conclude that there is a potential health threat to some individuals in the area. The size and location of the population at significant risk and the exact locations of contamination sources are not yet defined. EPA should [illegible] follow up on the report of radon in many homes, and further assess the health risk to Butte residents from radon in homes and businesses. Scientists from ATSDR and EPA should meet as soon as feasible

to discuss sampling needs, possible exposure and epidemiological studies, and general strategy and methods to assess health risks at the Butte Mining District Site and the entire Silver Bow Creek Site.

DOCUMENTS REVIEWED

Endangerment Assessment: Butte Mining District-Preliminary Draft dated October 21, 1986.

BACKGROUND

EPA has requested that ATSDR specifically address three questions:

1. What are the shortcomings of the data base and how do these affect conclusions reached?

2. What additional information is needed to address the gaps in knowledge about health threats and how that data should be assembled?

3. Is this EA consistent with reviews and conclusions reached at other mining sites and other subunits of the Silver Bow Creek Site?

Butte Mining District includes the City of Butte, Montana, and the adjacent town of Walkerville. Large-scale surface and deep mining over the last 100 years has resulted in widespread environmental contamination with heavy metals, radon, and more restricted dispersion of pentachlorophenol and polychlorinated biphenyls. Many parts of the city are built directly on or adjacent to waste dumps, smelter wastes, tailings piles, and leachpads.

REVIEW OF DATA

This review considers air, soil, and surface water contamination. Although groundwater in the area is known to be contaminated to varying degrees, there is no known use of the aquifer in the valley and hence

no exposure pathway. Groundwater movement into surface waters is known to occur. Future problems related to groundwater contamination and its effect on surface water quality have yet to be addressed.

Primary contaminants addressed in the EA are 10 heavy metals, radon, and pentachlorophenol (PCP). Five metals--arsenic, cadmium, chromium, lead, and mercury--were selected as indicator chemicals. There is no further discussion of the environmental data or health risk estimates for radon or PCP.

Concentrations of the metals in soil, surface water, groundwater, and in air (as dust) clearly demonstrate that there is widespread and extensive contamination in all environmental pathways in at least some areas of the city. The greatest difficulty in evaluating the individual risk is the paucity of environmental sampling data and, in some data, the lack of data quality information.

The EA states that there are adequate data to estimate health risks within an order of magnitude. Given the quality and quantity of data and lack of essential information about exposure to most of the potentially exposed population, only qualitative statements about risk may be appropriate. In either case, the general conclusion of the existence of a health risk is the same.

DISCUSSION

There is no information reported about dust particle size distribution. The percent of lead, cadmium, chromium, or arsenic in particles of respirable size, either indoors or outdoors, will determine true inhalation exposure risk. The calculations of concentrations of metals in dust particles less than 45 microns (in Table 3-8 not 3-6 as it is noted) assumes 75 ug/m^3 total suspended particulates (TSP). These assumptions could affect the exposure estimates.

1. It assumes that all of the 75 ug/m^3 TSP is in dust particles less than 45 microns. At locations near dust sources (tailings piles) dust particles as large as several hundred microns may become airborne during windstorms. It also assumes that particles 45 microns or less are respirable. Respirable particles are usually considered to be between 0.5 and 10 microns. These sizes are likely to be inhaled and retained in the lungs or carried by mucociliary action from the lungs and then to the stomach.

2. Background levels of TSP were stated to be 22-45 and 48-77 ug/m^3. If this is more representative of the usual TSP concentration, the assumption of 75 ug/m^3 will overestimate the true exposure.

3. No reasonable changes in these assumptions would be likely to affect the conclusions in the EA: the risk estimates are accurate to within an order of magnitude.

Soil contamination data was reported for four baseball fields in the northwest section of Butte, for nine mining waste dumps, and in street sweepings near tailings. Most of the data comes from the northwest section of the site. At least 100 additional smaller waste dumps are known to exist in the city. The scarcity of data and complexity of the site severely limits our confidence in extrapolating risk estimates to areas beyond the immediate vicinity of the sample sites. There are no samples of indoor dust or air, and both are potentially important exposure pathways, especially for infants. Since ingestion of dust by infants may be a critical exposure path, estimates of total exposure based on generic assumptions about indoor/outdoor ratios are only accurate for order of magnitude estimates.

CONCLUSIONS

Despite the limited ability to accurately estimate exposure and health risk due to the data problems described and the limited scope of sampling, it is still clear that people are living in close proximity to the sources of exposure and that the heavy metal contaminants have been spread throughout the site in soil, fugitive dust, and surface water.

There are multiple exposure pathways by which some individuals may receive significant exposures to heavy metals and radon. Levels of contaminants at sample locations are high enough that even if risk estimates are high by one or more orders of magnitude, risks to the public from soil, dust, vapors, and directly and indirectly through surface water are high enough to conclude that there is a potentially significant health threat to a persons in the area.

The size and location of the population at significant risk and the exact locations of contamination sources are not yet defined.

We cannot yet address the question of what additional information is needed. A meeting of EPA and ATSDR staff is planned for the near future to discuss this matter. Formal recommendations will come from that meeting.

ATSDR is currently reviewing other sites with similar contamination, but is not yet prepared to discuss consistency of problems, study approaches, and responses among these sites. The sites being reviewed include Reston/Tacoma, Washington (arsenic), Anaconda/Mill Creek, Montana (arsenic and perhaps other heavy metals), East Helena, Montana, (arsenic, and heavy metals), Silver Valley (Bunker Hill smelter), Kellogg, Idaho (arsenic and heavy metals), Idorado, northern Colorado (heavy metals), California Gulch, Colorado (arsenic and heavy metals, Park City/Prospector Square, Utah (heavy metals).

RECOMMENDATIONS

1. [redacted] should follow up on the reports of radon in many homes, and further assess the health risk to Butte residents from radon in homes and businesses.

2. Scientists from ATSDR and EPA should meet as soon as feasible to discuss sampling needs, possible exposure and epidemiological studies, and general strategy and methods to assess health risks at the Butte Mining District Site, and integrate assessment of the entire Silver Bow Creek Site.

B. Kim Mortensen, Ph.D.

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