UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

SEP 8 1988

OFFICE OF
SOLID WASTE AND EMERGENCY RESPONSE

MEMORANDUM

SUBJECT: Superfund Asbestos Workgroup Activities

FROM: Hans Crump, Deputy Director
Emergency Response Division

TO: See Addressees

Since last fall when the Superfund Asbestos Workgroup was formed, considerable effort has been directed toward the development of standardized national policy and technical guidance for OSCs and RPMs to use when dealing with asbestos at Superfund sites. We have learned since that time that the problems raised by asbestos are not easily solved and that there is considerably more work to be done before we can provide a substantive product. In order to successfully accomplish this task, we will need your continuing and active support and participation to complete the proposed asbestos guidance document which will be titled, "Superfund Environmental Asbestos Assessment Manual." Pursuant to this goal, the Regional offices are requested to provide the name and phone number of a contact for asbestos issues and are encouraged to participate in future workgroup activities. We also invite those Regions where asbestos-related site problems are particularly significant to name a workgroup member to represent those Regions.

Attachment A is the proposed outline for the "Superfund Environmental Asbestos Assessment Manual." As shown in the outline, the Manual will contain several methodologies for sampling and analysis of asbestos contamination in air, soil, and water. Your comments and input concerning the outline will be greatly appreciated.

In the interest of preparing interim guidance for your use, sections of the asbestos manual will be distributed for your review prior to the completion of the entire manual. Attachment B consists of the following sections described in the outline.

-- Introduction
-- Removal Program

Development is on-going on the remaining sections of the manual, and they will be provided to you for comment as they become available.

A bibliography containing approximately 165 references will also be forthcoming. The bibliography lists the reference documents currently being utilized in preparing the asbestos manual. Along with the bibliography, a list of research needs will be distributed for your review and comment. Upon receipt of the bibliography and the research needs list, we will request that you and your colleagues examine them and provide input to us on their contents.

Attachments C and D are comprised of a brief summary of topics which were discussed at the asbestos workgroup meeting on August 19, 1988, and a list of the attendees along with their organizations and telephone numbers.

Please review the outline (Attachment A) and the sections of the asbestos manual (Attachment B) and submit your comments to me no later than September 23, 1988. Your prompt attention to this matter is crucial to the success of the Superfund Asbestos Workgroup's efforts to provide guidance on handling current and future asbestos sites in a timely manner.

Please contact Don Kraft at 382-2452 if you have any questions. I appreciate your assistance and cooperation.

Attachments

cc: Henry Longest II
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Addressees:

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Terry Brubaker, Region IX
Kent Kitchingman, Region IX
Arnold Den, Region IX
Phil Millam, Region X
Jim Everts, Region X

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ATTACHMENT A

OUTLINE
SUPERFUND ENVIRONMENTAL ASBESTOS ASSESSMENT MANUAL

August 19, 1988

INTRODUCTION (Proposed completion date: 9/88) - Don Kraft, ERD
- Purpose
- Background
- Statutory Authorities

REMOVAL PROGRAM (Proposed completion date: 9/88) - Don Kraft, ERD
- Introduction
- Authority
- Monitoring
- Action Levels

REMEDIAL PROGRAM (Proposed completion date: 9/88) - Edie Pines, HSCD
- Introduction
- Authority
- Monitoring

DECISION TREE (Proposed completion date: to be determined) - Wayne Berman, PhD, ICF
- Step by step process to enable the OSC/RPM to make decisions using the methodologies developed for the Manual

ASBESTOS IN ROADS ISSUES (Proposed completion date: 9/88) - John Segna, ORD/OHEA
- Re: Region IX Asbestos in Roads Study
- Modification of Executive Summary from the roads project

RESEARCH NEEDS (Proposed completion date: 9/88) - Larry Zaragoza, OSWER/OPMT
- Approach to prioritization of research needs

METHODOLOGIES
- Methodology for Air Sampling and Analysis (9/88) - Wayne Berman/Eric Chatfield
- Methodology for Soil/Bulk Sampling and Analysis (3/89) - Wayne Berman
- Methodology for Water Sampling and Analysis (4/89) - Wayne Berman
- Methodology for Asbestos Risk Assessment - Wayne Berman
  - -- air portions (12/88)
  - -- soil/water portions (completed in conjunction with respective sampling/analysis methodologies)

BIBLIOGRAPHY

NOTE:
The "Superfund Environment Asbestos Assessment Manual" will reference a companion, "Technical Background Document" that traces the technical development of the proposed approach in sufficient detail to allow critical technical review of the work.

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ATTACHMENT B

I. INTRODUCTION

A. Purpose

The purpose of this document is to provide guidance on how to measure and evaluate ambient or environmental asbestos[1] contamination at Superfund sites. This document includes technical appendices that provide recommended sampling and analytical procedures for air, water, and soil matrices. The body of the report includes discussions about exposure and risk assessments at removal and remedial sites. In addition, while many unpaved roads containing asbestos may be present at either removal or remedial sites, a separate section has been devoted to roads due to the recent field studies and modeling efforts EPA has undertaken. Finally, this document identifies outstanding research needs.

Asbestos has been identified as a known human carcinogen and has been directly linked to lung cancer, mesothelioma, and asbestosis in humans. Asbestos is also suspected of contributing to gastrointestinal cancer. Nationwide, several environmentally occurring or ambient asbestos situations have required Superfund attention, including: road cuts exposing asbestos veins, unpaved roads constructed of asbestos-bearing serpentine gravel, abandoned and active mining sites, processing and manufacturing facilities, landfills containing discarded asbestos, and areas where asbestos-laden soil was used for fill material. While each of these situations may warrant a different response, the fundamental questions that need to be addressed are the same for each. Sampling, analytical, exposure, and risk assessment procedures, which have been developed, standardized, and widely accepted for occupational asbestos exposure situations, are sometimes applied, with difficulty, to environmental or ambient situations. Methods need to be developed or refined for air, water, and soil sampling and analysis of asbestos in ambient settings. Risk assessment procedures for occupational exposures need to be modified for environmental exposures and toxicity work done on environmental asbestos.

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[1]Within this document, ambient and environmental asbestos exposure refer to asbestos exposure other than occupational asbestos exposure.

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After extensive research, the Superfund program has found that standardized and widely accepted ambient monitoring and risk assessment procedures for asbestos are not available. Gaps in the scientific literature have precluded resolution of many associated issues such as the correlation of environmental measurements with health effects. However, in the absence of such formalized guidance, we are suggesting the use of the interim guidelines contained in this manual when conducting monitoring and risk assessment activities at asbestos-contaminated Superfund sites.

It should be understood that the approaches contained herein are limited and represent recommendations for use only until the issues are more fully resolved. Resolution of these issues may require years of additional research. We recognize that a given site may have conditions that would restrict the use of the approaches recommended within this manual and that modifications may be necessary. While environmental asbestos characterization and evaluation has been occurring for a number of years, this is still an emerging field. As new information surfaces and more experience is gained, these recommended protocols may change.

B. Background

Asbestos is a term used to describe several fibrous hydrated mineral silicates including chrysotile, amosite (fibrous cummingtonite or grunerite), crocidolite, fibrous tremolite, fibrous actinolite, and fibrous anthophyllite. Chrysotile is a serpentine mineral while the other types of asbestos are amphibole minerals. Chrysotile is the most extensively mined variety of asbestos and accounts for nearly all of asbestos mined in the United States.

Because asbestos is durable, flexible, noncombustible, versatile, and readily available, it has been widely mined and used throughout the world. Asbestos has been used for a number of commercial products for construction, industry, and home use. Asbestos products include insulation, fireproofing, flooring material, piping, gaskets, soundproofing, brake pads, and hundreds of others.

An EPA Emergency Response Division (ERD) survey of Regional offices indicated that there were over 50 asbestos sites of concern nationwide. Ten of the sites were listed on the National Priorities List. These sites are listed in Exhibit 1. To date, a number of different response actions have been taken, depending on the nature of the site. Capping has been used at sites where the waste was treated in place. At other sites, materials have been removed and landfilled.

The wastes at these sites included friable asbestos insulation materials, industrial processing wastes, asbestos-laden fill material, mine tailings, and upaved roadways of

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asbestos-bearing serpentine. These sites range in size from one acre to 100 square miles. Over 10 million dollars have been spent on these sites to date.

C. Statutory Authorities

CERCLA

Asbestos is a designated hazardous substance under Sections 101(14) and 102(a) of the Comprehensive Environmental Response Compensation and Liability Act (CERCLA or Superfund). Section 104(a) authorizes EPA to respond to situations where there is a release or threat of a release of a hazardous substance. Asbestos is classified as a CERCLA hazardous substance because it poses a threat to public health, welfare, and the environment. Therefore, CERCLA funds can be used for study and clean-up at asbestos sites. However, there are several legislative limitations on EPA response authority under CERCLA that are relevant to responses at asbestos sites. Section 104(a)(3) of CERCLA prohibits expenditure of Superfund monies if the release or threat of a release of a hazardous substance is:

> (A) of a naturally occurring substance in its unaltered form, or altered solely through naturally occurring processes or phenomena, from a location where it is naturally found;
>
> (B) from products which are a part of the structure of, and result in exposure with, residential buildings or business or community structures..."

Subsection (a)(3) limits response authority under Section 104 only; it does not affect notification requirements under Section 103 or abatement authority under Section 106. In addition, Section 104(a)(4) states that this limitation does not apply to emergency situations when no one else can effectively respond.

The practical effect of this provision is that most Fund-financed responses to natural outcroppings of asbestos and asbestos found in buildings, where it is used for insulation purposes, are prohibited. However, serpentine that has been mined and applied to road surfaces is not considered "unaltered," therefore Section 104(a)(3) does not limit EPA's response authority with respect to serpentine rock used as a surfacing material for roads or for other uses.

A second limitation concerns the limited applicability of Superfund to consumer products. "Consumer products in consumer use" are excepted from the definition of "facility" in CERCLA Section 101. Thus the requirements for release notification under Section 103, abatement actions under Section 106, and cost recovery under Section 107 are not applicable to a release from a "consumer product" in consumer use. Although "consumer product"

is not defined by the law, releases of asbestos resulting from the use of an asbestos-containing product for ordinary personal or household purposes would probably not be subject to these Superfund authorities. However, even if asbestos were to constitute a "consumer product" in certain cases, EPA would be authorized to respond to releases from those materials because the consumer product exemption is not relevant to Section 104 response actions. Thus, for example, the categorization of road construction materials as a consumer product would not prohibit a Section 104 removal action.

NESHAPs

National Emission Standards for Hazardous Air Pollutants (NESHAPs) establishes emissions standards for specific hazardous air pollutants from specific source categories (40 CFR Part 61). The NESHAPs for asbestos (Subpart M) contain requirements for asbestos from several sources, such as asbestos milling, manufacturing and fabrication operations, renovation and demolition operations, active landfills accepting asbestos waste material, and inactive landfills owned or operated by manufacturing, fabricating, or milling operations.

One of the NESHAPs reqirements directly applicable to CERCLA sites is related to inactive asbestos waste disposal sites owned or operated by manufacturing, fabricating, or milling operations. The regulations require prevention of visible emissions to the outside air or the placement of either six inches of compacted non-asbestos-containing material with a vegetated cover, or a two-foot cover of non-asbestos-containing material.

Other sections of the NESHAPs may be relevant and appropriate for CERCLA actions. Section 61.143, Standard for Roadways reads:

> " No person may surface a roadway with asbestos tailings or asbestos-containing waste material on that roadway, unless it is a temporary roadway or an area of asbestos ore deposits."

"Asbestos tailings" are defined by NESHAPs as "...any solid waste that contains asbestos and is a product of asbestos mining or milling operations." Based on this definition, it is possible that any waste material in a condition physically similar to asbestos tailings (i.e., quarry overburden material containing asbestos) should not be used to construct permanent roadways. If similar material is used for permanent roadway construction at a CERCLA site, the NESHAP could be considered relevant.

Revisions to the NESHAPs may be proposed in the near future, including a revised definition of friable asbestos that would clarify the applicability of the asbestos in roads standard. The draft revised definition reads: "materials that can be crumbled,

pulverized, or reduced to powder by mechanical forces expected to act on the material, as well as hand pressure". This revision would explicitly include quarry material containing asbestos as a "friable asbestos material." Therefore the use of quarry material, in this manner, at a CERCLA site would be subject to NESHAPs as a relevant standard.

CWA

The Ambient Water Quality Criteria guideline for asbestos established under the Clean Water Act (CWA), is 30,000 fibers/liter. This level corresponds to a lifetime cancer risk of 1×10^{-6}, as derived from human inhalation data. These fibers are measured using Phase Contrast Microscopy (PCM), which can only detect fibers wider than 0.25 microns. However, only fibers with an aspect ratio of greater than or equal to 3:1 and longer than 5 microns are counted. PCM cannot distinguish between asbestos and non-asbestos fibers. Under this guideline, 1 "PCM fiber" is considered equivalent to 210 total fibers.

SDWA

Under the Safe Drinking Water Act (SDWA), a Recommended Maximum Contaminant Limit (RMCL) of 7.1×10^{6} fibers longer than 10 microns/liter was proposed on November 13, 1985. Under amendments to SDWA, this standard will be reproposed later this year. Draft versions of the Notice include a Maximum Contaminant Level Goal (MCLG - which replaced RMCL) value of 7×10^{6} for fibers longer than 10 microns in length/liter, using Transmission Electron Microscopy (TEM) analysis. This method detects all fibers with a width greater than 0.05 microns and can distinguish between asbestos and non-asbestos fibers. The MCLG includes all fibers longer than 10 microns with an aspect ratio greater than or equal to 3:1.

AHERA

The Asbestos Hazardous Emergency Response Act (AHERA) regulations were published October 30, 1987. These regulations require that local education agencies inspect their schools for asbestos-containing building material, both friable and non-friable, and submit management plans to their state. In addition, the local agencies must begin appropriate response actions.

The standard for determining response actions is based on observation of the asbestos material. TEM is the primary method for measuring airborne asbestos collected on a sampling filter. Some details on the method are: the method counts only fibers longer than 0.5 microns and having an aspect ratio of at least 5:1. (The choice of a 5:1 aspect ratio was somewhat specific for the purpose of clearance testing and does not necessarily mean that a 3:1 aspect ratio should not be used for other purposes.) Smaller removal jobs may be monitored using PCM. Asbestos fibers narrower than 0.25 microns or shorter than 5 microns will not be

detected by PCM analysis. The regulations also include a phase in period for the mandatory use of TEM analysis. TEM analysis can detect fibers smaller and thinner than those seen by PCM and counts only asbestos unlike PCM which counts non-asbestos fibers also.

Proposed Ban

On January 29, 1986, EPA proposed a rule under Section 6 of the Toxic Substances Control Act (TSCA) that would ban a number of asbestos products that have effective substitutes. The proposed rule would also reduce or "phase down" the total amount of asbestos which would be imported or mined in staged increments over ten years. Several options were under consideration and as a result of numerous public comments and the need to reconsider much of the data, the final rule schedule has been revised. The final rule is expected sometime this summer.

OSHA/NIOSH

The Occupational Safety and Health Administration (OSHA) establishes exposure limits for occupational exposures. The OSHA asbestos standard for an 8-hour, time-weighted average (TWA), permissible exposure level (PEL) is 0.2 fibers/cubic centimeter and the action level is 0.1 fibers/cubic centimeter. These standards apply to private sector workers and by executive order, to all Federal employees. This standard applies to fibers with an aspect ratio of at least 3:1. The corresponding analytical method, PCM, detects only fibers that are longer than 5 microns and wider than 0.25 microns. PCM cannot distinguish between asbestos and non-asbestos fibers. (There is also an optional counting protocol using PCM, that counts fibers longer than 5 microns, having an aspect ratio greater than or equal to 5:1 and counts only fiber ends.) The National Institute for Occupational Safety and Health (NIOSH) recommends an 8-hour TWA exposure limit for chrysotile asbestos of 0.1 fiber/cubic centimeter. NIOSH also uses PCM analysis (Method 7400) and counts only fibers longer than 5 microns, wider than 0.25 microns, and having an aspect ratio of at least 3:1.

OTS Worker Protection Rule

This rule, from the Office of Toxic Substances (OTS), essentially reiterates the OSHA standards in order to protect State workers who are not otherwise included in state or Federal worker health and safety rules.

ACGIH

The American Conference of Government Industrial Hygienists (ACGIH) has established the following Threshold Limit Values (TLVs) for asbestos:

amosite	0.5 fibers/cubic centimeter, A1
crocidolite	0.2 fibers/cubic centimeter, A1
chrysotile and other asbestos minerals	2.0 fibers/cubic centimeter, A1

The TLVs are based on PCM analysis and count only fibers longer than 5 microns with an aspect ratio equal to or greater than 3:1. TLVs for all forms of asbestos carry the A1 designation indicating that they are "Confirmed Human Carcinogens."

II. REMOVAL

A. Introduction

This section outlines an approach for determining whether or not a removal action is warranted at an asbestos site. Appendices to this manual include specific sampling and analytical procedures. The following text describes removal authorities, monitoring concepts, and action levels. In May, 1987, ~~asbestos-contaminated roads were designated a "nationally significant issue" by EPA Headquarters.~~ As a result of this designation, Headquarters concurrence was required prior to certain activities related to asbestos-contaminated roads. These concurrence requirements are not directly applicable to non-road situations, but HQ-ERD should be consulted and notified of any controversial asbestos removal activities, as necessary. A separate section of this guidance will deal specifically with roads and will elaborate on the issue of HQ concurrence.

B. Authority

Under CERCLA Section 106, EPA has the authority to abate an "imminent and substantial endangerment to the public health, welfare or the environment because of an actual or threatened release of a hazardous substance from a facility . . ." While the removal program does not require that a comprehensive risk assessment be conducted at every site, certain aspects of risk assessment are relevant to the removal program. The removal program goal is to conduct removal actions to abate the imminent and substantial endangerment and to reduce the risk level associated with the site. A potentially exposed population and a pathway of exposure must be present to warrant a response action. The extent and degree of exposure should be factored into any removal action decisions.

In addition to the guidance contained in this document, other HQ and Regional staff such as Regional Coordinators and On-Scene Coordinators (OSCs) should be considered invaluable resources in handling a removal site. OSCs should consult closely with ERD when faced with an environmental asbestos site.

C. Monitoring

Conducting monitoring at any site requires site-specific decisions and adjustments. This is especially true with an asbestos site, since asbestos contamination is seldom distributed in a uniform manner. There are several factors to consider when designing the monitoring at the site:

- The homogeneity of the media being sampled. Soil with rock material and settled sediment in surface or subsurface water are difficult media to sample. Care must be taken to obtain uniform samples.

- The need for representative samples and activity-specific samples. Samples should be taken to confirm the representative nature of the data and to be able to draw conclusions from the data. Soil samples should be taken to identify the horizontal and vertical extent of contamination. Air samples should be taken upwind to establish background, as well as downwind to identify the area exposed to elevated levels. Surface water and ground sampling should be considered if a pathway to the population has been identified. In addition, activity-specific sampling should be considered to obtain information on actual exposure levels (i.e., conducting air sampling while cars travel through contaminated areas).

- The identification of hot spots.

- The data quality objectives should be carefully considered in developing a monitoring scheme. At least 10% duplicate samples should be analyzed to monitor laboratory precision. An additional 10% of the samples should be dedicated as blank samples to monitor field and laboratory contamination. Analysis of filters prior to sampling should be considered to check filter contamination.

D. [redacted]

In the past, a level of 1% asbestos by area in soils has been used as an action level in the Regions. Sites where the asbestos content in the soils exceeded 1% asbestos by area were considered for removal action based on population and exposure pathways (see Exhibit 2). Because asbestos is primarily an inhalation hazard, levels in soils alone are insufficient to evaluate the severity of the situation.

Air sampling is extremely costly and time-consuming and can yield inconclusive results. As a result, we are trying to develop a model for asbestos-contaminated roads that will correlate meteorological data such as humidity, wind velocity and

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wind direction, and soil data with expected air emissions. This information could then be used to predict the air concentrations of asbestos fibers.

However, until this model has been completed and verified, we need to continue to perform limited air monitoring at removal sites. When possible, air monitoring should be conducted at the same time that soil samples are taken. Alternatively, samples can be taken prior to the actual removal action itself. Air values in excess of 4×10^{-4} fibers/ml (PCM equivalent) are associated with a risk level of 10^{-4} (see Exhibit 3).

Until we have additional information about the entrainment of soil materials, removal actions should be considered at any site with soil values in excess of 1% asbestos by area or air values in excess of 4×10^{-4} PCM fibers/ml, presuming background levels are below these values. Information about population and explosure pathways must be considered in making a decision to take a removal action.

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