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ADMINISTRATIVE RECORD

TECHNICAL MEMO 7

PREPARATION OF REFERENCE MATERIALS AND PERFORMANCE EVALUATION SAMPLES FOR THE LIBBY METHODS PERFORMANCE EVALUATION STUDY

1.0 INTRODUCTION

Based on experience gained during the analysis of Interim Soil Test Materials (ISTMs), the design of the reference materials and blind test samples to be utilized during the Libby Methods Performance Evaluation Study have been revised from earlier designs. This memo specifies the materials that are to be prepared for use in the study.

2.0 SOIL MATRICES

Results to date suggest that the success of some analytical methods for asbestos in soil depends in part on the attributes of the soil matrix used to prepared the sample. Although data from USGS indicate that most soils in Libby have very similar mineral content, soils do vary somewhat in color and texture, and there are variations in the minor mineral components. For the purposes of this study, two different types of soil matrix will be used: "brown soil" and "tan soil".

Soil Source

"Brown soil" matrix material has been collected from two locations in Libby, identified as PE-00005 and PE-00013. "Tan soil" matrix material has also been collected from two locations in Libby, identified as PE-00002 and PE-00012. All four of these samples were collected from locations where previous samples were found to be below detection limits for asbestos by PLM and below detection limits for amphibole content by XRD.

Confirmation that the Samples are "Clean"

Prior to preparing any reference materials or PE samples with these soil matrices, representative samples will be re-analyzed by XRD and by SEM. Assuming that no evidence of significant asbestos contamination is detected by either method, these materials will be prepared as follows.

Soil Matrix Preparation

1. Dry all four samples

2. Composite the two samples of brown soil
   Composite the two samples of tan soil

3. Coarse-sieve the samples to remove any material larger than 1/4 inch.

The total mass required of each soil matrix (dried and coarse-sieved) is approximately 50 kg.

3.0 SPIKING MATERIAL

The asbestos spiking material to be used is derived from ore samples collected at the mine in Libby. The specific samples of ore to be used are selected to be relatively free of non-asbestos material (e.g., typically about 70-90% pure), and to provide a compositing of samples from multiple locations in the mine. This is to ensure that the spiking material is representative of the types of asbestos that occur in the mine.

The spiking material will be coarse-ground to produce a range of particles sizes, the largest of which is about 1-2 mm. This material is added to the soil matrix and treated further, as described below.

4.0 PREPARATION OF REFERENCE MATERIALS AND PE SAMPLES

Reference materials and PE samples are prepared by mixing measured masses of soil with measured masses of spiking material. Thus, all concentrations are expressed in units of mass percent.

Table 1 lists the target concentrations of asbestos in the Reference Materials and the PE samples.

All blending of soil matrix and spiking material will be performed as a slurry. After mixing, the material will be air dried and re-mixed.

After drying and re-mixing, the entire batch of each material will be ground by passing through a horizontal plate grinder set to produce a maximum soil particle of slightly less than 250 um. This setting will be established empirically by passing clean sand through the grinder and measuring the size of the particles produced.

5.0 PREPARATION OF SAMPLE BOTTLES

After grinding, all reference materials and PE samples will be distributed into bottles using a Jones splitter.

Bottles of reference material will contain about 50 grams each, and will be labeled as follows:

LIBBY PE STUDY REFERENCE MATERIAL
Nominal Asbestos Concentration = x% by Weight

Bottles of PE samples will contain about 20 grams each, and will be labeled as follows:

LIBBY PE STUDY PERFORMANCE EVALUATION SAMPLE
Sample Number = PE-xxxxx

TABLE 1 TARGET CONCENTRATIONS

Type	Nominal Concentration	Mass of Soil Matrix (brown soil or tan soil)	Mass of Asbestos
Reference Material	0	2.0 kg	0 g
	0.05%	2.0 kg	1.0 g
	0.2%	2.0 kg	4.0 g
	0.5%	1.99 kg	10 g
	1.0%	1.98 kg	20 g
	2.0%	1.96 kg	40 g
PE Samples	0	5.0 kg	0 g
	0.075%	5.0 kg	3.75 g
	0.15%	5.0 kg	7.5 g
	0.30%	4.98 kg	15 g
	0.75%	4.96 kg	37.5 g
	1.4%	4.93 kg	70 g
	2.6%	4.87 kg	130 g