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Asbestos Sampling and Analysis Plan

for

Building 771 Corridors and Selected Rooms

ROCKY MOUNTAIN REMEDIATION SERVICES, L.L.C.

REVISION 0

JANUARY 1999

ASBESTOS SAMPLING AND ANALYSIS PLAN

FOR BUILDING 771 CORRIDORS AND SELECTED ROOMS

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ACRONYMS

AHA	Activity Hazards Analysis
AIHA	American Industrial Hygiene Association
ASD	Analytical Services Division
CCR	Colorado Code of Regulations
CFR	Code of Federal Regulations
DQO	Data Quality Objectives
Ft^2	Square Feet
HUD	Housing and Urban Development
NVLAP	National Voluntary Laboratory Accreditation Program
OSHA	Occupational Safety and Health Administration
PCB	Polychlorinated Biphenyls
PLM	Polarized light microscopy
PPE	Personal Protective Equipment
RCT	Radiation Control Technician
RFETS	Rocky Flats Environmental Technology Site
TRM	Transuranic Mixed
TRU	Transuranic

ASBESTOS SAMPLING AND ANALYSIS PLAN

BUILDING 771 CORRIDORS AND SELECTED ROOMS

1.0 INTRODUCTION

1.1 PURPOSE

The purpose of this project is to prepare the existing Building 771 facility for decommissioning and demolition at the Rocky Flats Environmental Technology Site (RFETS). The pre-work characterization is to be implemented and completed within the FY99 budget cycle.

1.2 SCOPE

The scope of this plan includes the sampling of all areas under the scope of work for the demolition of Building 771 Corridors and Rooms 178, 179, 179A, 183, 184, and 185 at the RFETS. The scope includes characterization of building materials, specifically floor tile, which could be impacted by decommissioning and demolition of the buildings. A walkdown of the project was performed on 11/30/1998. Details of the review and tour are included in Table 2-1.

1.3 PROTOCOL

Contained herein is a preliminary sampling and analysis protocol for asbestos in building materials for Building 771 corridors and selected rooms . This approach will ensure that the process will be in compliance with applicable Federal and State regulations.

The survey practices outlined are specifically designed to provide occupational hazard assessment information in support of activities to facilitate the demolition of Building 771. However, the information may be used to provide support for a comprehensive operations and maintenance program during normal building activities covered under the site Integrated Work Control Program such as routine or scheduled maintenance, repair or remodelling until such time as the buildings are evacuated and demolished.

2.0 METHODOLOGY

The first step in sampling for asbestos in building materials in a building is to research the building records such as blueprints and specifications for documentation of the use of these materials in construction or remodelling efforts. Dates of construction are considered in this process. This research also takes into account the materials sampling events that may have taken place in the past. For example, many buildings at RFETS have had cursory inspections for suspect asbestos containing building materials. These data will be included in the report if the inspector feels these data are relevant and meets the minimum requirements of this plan and any related regulatory drivers. Should acceptable data be available, some of the sampling requirements listed in Table 2-1 may be met in this manner.

The second step in this process is to physically tour the building, entering every accessible area and room, looking for suspect (or affected) materials that may indicate through historical data or based on the inspector's experience, the presence of asbestos in building materials. A suspect list is generated, along with estimated quantities.

During the tour, several suspect materials that would be affected by the demolition effort were identified. Table 2-1 summarizes these suspect materials and the subsequent sampling requirements.

2.1 INSPECTION RATIONALE

Settled dust sampling for asbestos in building materials is used as an optional aid for assessment of industrial hygiene issues. Although material samples are to be collected from inconspicuous areas, proper safety precautions must be taken to prevent the spread of suspect materials.

2.1.1 Inspecting For Asbestos

When inspecting for asbestos, non-suspect (or unaffected) materials are those traditionally made of wood, glass or metal. However, the inspector will suspect the adhesives applied to secure non-suspect materials to the substrate. Suspect, or affected materials are separated into three general categories: thermal systems insulation (TSI), surfacing materials, and miscellaneous materials.

Table 2-1 Asbestos Survey Results/Sampling Requirements

Locations	ACM Category	Suspect Material	Sample Quanti
Corridor E	Floor Tile/Mastic	12" white/grey mottled over 9"lt. brown	6
Corridor 140	Floor Tile/Mastic	12" lt. tan/tan and grey streaks	3
Corridor A	Floor Tile/Mastic	12" lt. tan mottled	6
Corridor D	Floor Tile/Mastic	12" tan mottled over 9" unknown pattern	3
Corridor H	Floor Tile/Mastic	12" tan mottled	6
Room 179	Floor Tile/Mastic	Unknown under poured lt. brown epoxy	3*
Room 179A	Floor Tile/Mastic	Unknown under grey paint	3*
Room 181A	Floor Tile/Mastic	Unknown under grey paint	3*
Room 183	Floor Tile/Mastic	12" beige/lt. brown streaks	1
Room 184	Floor Tile/Mastic	Unknown under grey paint	3*
Room 185	Floor Tile/Mastic	12" green mottled sim. terr.	1
		Q.A.	2
TOTAL			40

*Note: samples may not be required based on further field investigation.

2.2 DATA COMPILATION

Data compilation will separate the materials into homogeneous areas within these general categories, which will lead to the number of samples necessary for regulatory compliance and statistical reliability of the outcome. Any homogeneous area may be assumed to contain asbestos, negating the need for samples.

3.0 SURVEY PROCEDURES

3.1 SAMPLE QUANTITY

Determination of sample quantity is based on the regulatory drivers attendant with each sample type. In the absence of a regulatory driver, process knowledge, historical data and the inspector's experience are the relevant deciding factors.

3.3.1 Sampling For Asbestos in Building Materials

The number of samples for asbestos for each homogeneous area is outlined in EPA 40 CFR 763.86. Sample quantity is decided first by a material's physical condition of friability, then by its general category. Friable materials are those that are capable of being crumbled or reduced to powder by hand pressure. Thermal systems insulation, such as that found on pipes or ducts, friable or non-friable, requires a minimum of three samples per homogeneous area, one sample from patches less than six linear or square feet, and one from cementitious or "mudded" fittings. Each mechanical system, such as hot and cold domestic water, may have several homogeneous areas. Each will be sampled accordingly. Only friable surfacing materials, such as fire-proofing or ceiling texture, will have a nine section grid applied to a blueprint of the area and samples will be acquired from the center of randomly selected grids. If the homogeneous area of friable surfacing material is less than 1,000 ft^2 (square feet), three samples are needed; if between 1,000 and 5,000 ft^2, five samples are needed; if the area is over 5,000 ft^2, seven samples are needed. Miscellaneous materials, such as floor and ceiling tiles are sampled according to the inspector's discretion, as outlined in EPA 40 CFR 763.86(C & D). For the purpose of this survey and based on the inspector's experience and discretion, a minimum of one sample of each suspected material in this category will be acquired.

3.2 SAMPLE LOCATION

Sample locations are selected randomly according to how each represents a homogeneous material. Since homogeneous areas are located throughout the building, the representation and number of samples is the driving factor rather than exact location of the sample in each room. Exact locations will be directly affected by the radiological concerns. In the absence of radiological surveys, a radiological control technician (RCT) will accompany the inspector. If a selected location is determined to exceed acceptable parameters, a second location will be selected. Should no radiologically acceptable location be found, a contaminated sample will be acquired and treated as a radiologically contaminated sample and cleared through Radiological Operations and Engineering.

4.0 SAMPLING

Although several types of samples are to be acquired, the methodology for acquiring those samples have many identical steps. The section on settled dust sampling is included in the event that issues arise during the demolition effort that would require this type of sampling.

Regardless of the sampling methodology, each acquired sample will recieve an individual number that ties the acquired sample to the location and the represented homogeneous area. The sample number is used in trracking the sample through the sanalytical and report writing process. In subsequent maintenance, remodelling and demolition efforts, the sample identification number, which is placed on the sample location as well as the field sample log sheets, the chain of custody, and the report, wiii be a valuable aid to field personnel in health and safety determinations. Each sample number contains the building, the date sampled, the sampler's code , and a three digit identifier. (Example: 771-990129-MS-001).

4.1 SETTLED DUST

Settled dust on horizontal surfaces will be sampled using a micro-vac technique that requires the use of a template that sequesters a 10 square inch pattern. The sampling tool is a low volume battery powered air sampling pump calibrated at 2 liters per minute with a 25 mm mce cassette attached. A two inch section of tygon tubing is attached to the upstream side of the cassette and facilitates pickup of all loose dust in the grid area. Each sample is documented as to location, the cassette is labeled with an identifying number, and sealed. The sample number is documented on the chain of custody form. The sample location may be photographed with a sample photo identification card in the focus area documenting the sample number and date, and orienting the viewer to the sample location with an arrow.

Each sample will be acquired with the intent of assuring the quality, representation, and safety of the process. The following steps will be performed for each sample acquired. Note that a RCT may be present as necessary to survey the area and location of the sample prior to proceeding.

4.2 ASBESTOS IN BUILDING MATERIALS

Sampling for asbestos is performed using destructive techniques that require acquiring a representative sample of the material down to the substrate. Each sample must contain a minimum of one cubic centimeter of material to facilitate analysis and archival processes.

All sampling will be in accordance with the Activity Hazards Analysis (AHA). The AHA, reviewed and approved by Industrial Hygiene, outlines potential hazards involved for sampling activities, PPE and outlines safety precautions to be utilized during the specified sampling activity.

Bulk sampling procedures as outlined:

- The location of the sample is visually verified against written descriptions.
- A polyethylene drop cloth or plastic bag is placed below the elevated sample areas.
- The immediate sample area is dampened with a mist of water and surfactant.
- A sampling tool, such as a hammer and chisel, razor knife, paint scraper, "Wondermaker" or hole saw is selected and the sample is acquired, making sure to take a complete sample to the substrate. During this process, the immediate surface is misted as necessary.
- The acquired sample is placed in a sealable container, such as a plastic bag or vial.

- The container is sealed and a pre-numbered label is placed on the container. The sample number label is placed on chain of custody papers and the container is verified to be sealed.

- The sampling tool is thoroughly cleaned using a mister and wipes before and after each use.

- The sample area is patched as needed.
- The sample container, drop cloth and immediate sample area is wet wiped and the drop cloth is carefully folded in to the center and placed in a sealable bag and the bag is sealed.

- The description and location is documented on a form, a sample label is placed on the form, and the location is documented on a blueprint.

- In the case of routine maintenance areas, a pre-numbered label is placed at the sample location. With permission of the building manager, labels will be placed on all sample locations.

- The sample location may be photographed with a sample photo identification card in the focus area documenting the sample number and date, and orienting the viewer to the location with an arrow.

- All used wipes, drop cloths, and PPE will be added to the appropriate waste stream.

5.0 LAB SUBMISSION ANALYSIS AND INSTRUMENTATION

All asbestos samples shall be submitted to a laboratory recognized by the EPA National Voluntary Laboratory Accreditation Program (NVLAP) for asbestos. Appropriate sample submittal forms shall be used.

The field sample number shall appear on the field sampling form, the laboratory submittal form, and the container label. The name of the laboratory, the date the samples were sent to the lab, and all personnel handling the sample from the time of collection to the time of arrival at the laboratory shall be recorded on a chain of custody form.

5.1 ANALYTICAL METHODOLOGY: ASBESTOS

The analytical methodology for bulk asbestos samples is polarized light microscopy (PLM) capable of 400x magnification augmented with dispersion staining. This method is outlined in the EPA 600/R-93/116 methods for the determination of asbestos in building materials.

Bulk samples of suspect materials are examined for homogeneity, layers and preliminary fiber identification using a stereoscope at 40x magnification. Layers are separated and mounted on slides. Refractive index oils are applied to the slide according to a morphology match. A light microscope equipped with two polarizing filters is used to observe seven specific optical characteristics of a sample at 400x magnification. The presence or absence of the characteristics determines the type of asbestos, or if not asbestos, the type of fiber present in the sample. The microscopist then visually estimates the percentage of asbestos or non-asbestos fibers in that layer. Each layer is reported separately. A layer or sample is determined to be an asbestos containing material if it contains more than one percent asbestos by this estimate. The limit of detection for PLM is less than five microns.

CCR 8 (Section iii.B.6.ii) mandates that results from PLM analysis of samples with asbestos percentages from trace (less than 1%) to 1% be re-assessed using point counting analysis. If point counting is chosen, these results take precedence over the PLM results. Point counting is a methodology that uses identical instrumentation, with the addition of a grid system on the stage. The analyst is required to look at a minimum of 100 locations on eight different mounts, estimate the percentage of asbestos, and add these percentages for a statistical representation of the content.

6.0 DATA ANALYSIS

Two types of data are generated during an asbestos in building materials inspection; the field data and the laboratory data. The field data consists of research on the building history, observation and identification of installed building materials, and measurements to determine quantities. The laboratory data consists of empirical observation through instrumentation, identification and quantification of sample information.

6.1 HISTORICAL RESEARCH

Historical research allows the inspector to compile information that is used to discover and verify the existence of asbestos in building materials. Maintenance and asbestos abatement records, blueprints, as-builts, specifications and emergency response documents are examples of the data used. Once the inspector arrives at the site, the visual inspection begins, usually at the basement level and proceeding throughout the building and ending up on the roof. The inspector is looking for suspect materials and damage to same. This information will be used later to provide a physical assessment of the materials found.

6.2 LABORATORY

The laboratory data is reported, usually in tabular format, to the inspector. In the asbestos report table, the inspector finds information on the fibrous and non-fibrous constituents in the sample, reported as percentages of the total material. If asbestos is discovered, the table will describe the geologic type (such as chrysotile) and which layer it was discovered in. Other common fibrous constituents are fiber glass, rock wool and nylon.

7.0 SUMMARY

The inspector compiles the field and lab data, cross-matches information, eliminates non-asbestos containing materials from the suspect list, and generates a report on the findings. The report consists of an executive summary, location and description of both asbestos and non-asbestos containing building materials either sampled or assumed, estimated quantities of same, physical assessment of the friable asbestos containing materials, location of samples acquired, optional photographs of sample locations and damaged materials, and blueprints indicating sample locations and homogeneous areas that contain asbestos.

8.0 QUALITY ASSURANCE

Although the U. S. Environmental Protection Agency's Asbestos Hazard Emergency Response Act on asbestos regulations are not applicable outside public and private primary and secondary schools, the procedure outlined in 40 CFR 763.85, *Inspections*, 763.86, *Sampling*, 763.87, *Analysis* and 763.88, *Assessment*, has become industry accepted and is outlined in Colorado Regulation 8 in Section IV (*School Requirements*, IV.C, D, E & F). In addition, OSHA 29 CFR 1926.1101 (Section k.2.i and k.5.ii) requires the building owner or manager to inspect for asbestos according to EPA 40 CFR 763 guidelines.

Both the field and laboratory data are verified for accuracy and consistency. Each sample location is verified for representative quality and the sampler verifies that the sample size or volume meets the analytical requirements, and that the sample includes depth to substrate. Sample numbers are continually cross-checked to avoid redundancy or omissions. Administrative and engineering controls are used in this process. Administrative controls include the mandate that all inspectors and lab analysts meet all applicable regulatory training certification and licensing requirements.

8.1 FIELD DATA

In the field, the inspector acquires quality control (or duplicate) samples at the rate of five percent. Sample locations are chosen randomly and a second sample is acquired at the same location. This sample is sent to the same lab for analysis. Should discrepancies occur, the issue is resolved by retracing the steps back to the sample acquisition point and following the process back to the lab. If the issue is still unresolved, the inspector will acquire an additional sample to be sent to a different lab. In addition, the Analytical Services Division (ASD) is required to validate laboratory data at the rate of 25%.

8.2 LAB DATA

In the lab, the analyst uses the same five percent criteria in performing quality control procedures for asbestos as outlined in the NVLAP and other programs. Samples are randomly chosen and another analyst re-assesses the sample. Results are compared, and discrepancies are resolved. All mathematical calculations are verified through peer review.

8.3 COMPARISON/MATCHING

A last step in quality assurance involves the comparison of field and lab data. The sample numbers and descriptions are checked against each other to verify that the lab saw the same material as the inspector. Problems may occur due to transposition of number sequences, and this is resolved by checking the field data sheets against the chain of custody and the lab report. Minor differences in the physical descriptions are allowed due to the fact that lighting in the building may be different than that in the lab. Major differences in descriptions are often traced back to the number transposition issue. In order to avoid this issue, inspectors will use pre-printed labels on the field data sheet, sample container, and chain of custody document.

8.4 DATA EVALUATION

Asbestos sample data are evaluated according to asbestos content and the field sampler's determination of friability. If a single sample from a homogeneous area contains more than 1% asbestos, the entire area is considered to be asbestos containing. If all samples from a homogeneous area contain less than one percent asbestos, the material may be considered as non-asbestos containing. Decisions regarding health, safety, industrial hygiene and waste are determined through this evaluation.

Asbestos sampling protocols require that quality control samples be acquired at the rate of five percent. These sample data are checked against the data on the samples acquired at the same location. A 10% variation is allowed. Should that data not meet this standard, lab and field data are cross-checked for anomalies. If no discrepancies are discovered, or if there is no resolution, additional samples will be acquired accordingly.

8.5 PEER REVIEW

Finally, the report itself is passed through peer review. This process assures the final product will be free of technical, grammatical, and mechanical errors prior to being passed on to the client or being used as a basis for future operations in the building such as abatement, maintenance, renovation, or demolition.

8.6 RECORDS MANAGEMENT

Throughout the process of characterization, data generated within the project scope will be retained in Project History files related to historical, field and laboratory data. These data are retained for the life of the project and are accessible to all project team members and any oversight personnel. Historical information including blueprints, interviews, previous sampling and analysis data, interviews with building staff, along with field generated (see Appendix A) forms, logbooks and laboratory generated data will be processed according to 1-77000-RM-001, Records Management Guidance for Records Service, and 1S78-ER-ARP-001, CERCLA Administrative Records Program.

9.0 REFERENCES

1-77000-RM-001 *Records Management Guidance for Records Sources*

Emission Standards for Asbestos, Excerpted from Colorado Regulation No. 8, *The Control of Hazardous Air Pollutants*, Part B, Emission Standards for Asbestos, November 30, 1996.

EPA 40 CFR 763, *Asbestos-Containing Materials in Schools*; Final Rule and Notice, October 30, 1986.

OSHA 29 CFR 1926.1101, *Asbestos Construction Standard*, August 10, 1994.

APPENDIX A:

PROJECT FORMS

BULK SAMPLE DATA SHEET

Job#_____ Name_____ Date_____

General description of building/area:_____

SAMPLE NUMBER	SAMPLE DESCRIPTION AND LOCATION	LAB