Rocky Mountain
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RF/RMRS-98-256

# Asbestos, Polychlorinated Biphenyls (PCBs), Metals, and Isotopics Paint Sampling and Analysis Plan

for

# Building 551

ROCKY MOUNTAIN REMEDIATION SERVICES, L.L.C.

REVISION 0

JULY 1998

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# ASBESTOS, PCBs, METALS, AND PAINT SAMPLING AND ANALYSIS PLAN FOR BUILDING 551

## REVISION 0

## JULY 1998

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Attachment 1—Project Forms

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# ACRONYMS

| | |
|---|---|
| AHA | Activity Hazards Analysis |
| ASD | Analytical Services Division |
| CCR | Colorado Code of Regulations |
| CFR | Code of Federal Regulations |
| DQO | Data Quality Objectives |
| EPA | U.S. Environmental Protection Agency |
| $Ft^2$ | Square Feet |
| HUD | Housing and Urban Development |
| K-H | Kaiser-Hill, L.L.C. |
| NVLAP | National Voluntary Laboratory Accreditation Program |
| OSHA | Occupational Safety and Health Administration |
| PCB | Polychlorinated Biphenyls |
| PLM | Polarized light microscopy |
| PPE | Personal Protective Equipment |
| QA/QC | Quality Assurance/ Quality Control |
| RCT | Radiation Control Technician |
| RFETS | Rocky Flats Environmental Technology Site |
| TRM | Transuranic Mixed |
| TRU | Transuranic |
| TSI | Thermal Systems Insulation |

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# ASBESTOS, PCBs, METALS, AND PAINT SAMPLING AND ANALYSIS PLAN FOR BUILDING 551

## 1.0 INTRODUCTION

### 1.1 PURPOSE

The purpose of this project is to upgrade the existing Building 551 facility for future use as a Transuranic/Transuranic Mixed (TRU/TRM) waste storage facility at the Rocky Flats Environmental Technology Site (RFETS). The pre-work characterization is to be implemented and completed within the FY98 budget cycle.

### 1.2 SCOPE

The scope of this plan includes the sampling of all areas under renovation required to upgrade Building 551 at the RFETS. The scope includes hazardous and radiological characterization of selected areas which could be impacted by renovation of the building. Significant renovations are required to meet waste storage requirements. In order to determine specific sampling and analysis requirements, the RMRS document, *Design Criteria For Building 551 Waste Storage Conversion* (RMRS, July, 1998) was reviewed and tours of the facility were conducted. This document set the study boundaries as Building 551 and the surrounding surface area extending 25 feet out from the exterior perimeter of the Building. As such, Building 556 is included in the Scope. 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, metals and PCB's in paint, and a preliminary study of isotopics in or under paint for Building 551. 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 upgrade process of Building 551 at the site. 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 building is evacuated and removed.

All decisions and processes are checked for veracity through the use of the site data quality objectives process guidelines (EPA QA/G-4).

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# 2.0 METHODOLOGY

The first step in sampling for asbestos in building materials, metals and PCBs in paint, and isotopics in or under paint 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 meet 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.

According to the RMRS document, *Design Criteria For Building 551 Waste Storage Conversion* (RMRS, July 1998), a drywall system in the 109 area must be removed, along with creating several new exterior doorways throughout the facility. The roof requires replacement (this requires installing a row of new center columns), the floor needs resurfacing, and some piping may require relocation. Building 556 will be removed from the area.

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 or metals in paint. A suspect list is generated, along with estimated quantities.

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

## 2.1 INSPECTION RATIONALE

Settled dust sampling for metals in paint and asbestos in building materials is used as an optional aid for assessment of industrial hygiene issues such as work practices and engineering controls and Personal Protective Equipment (PPE) that would be used in the decommissioning, removal or demolition of structures.

Bulk asbestos and/or paint chip sampling for metals and/or radiological constituents in paint is used as an aid for assessment of industrial hygiene issues such as work practices and engineering controls and PPE. These data are also utilized in the identification of appropriate waste streams for those materials that are not recyclable.

Asbestos in building materials and metals in paint sampling is a destructive method that may release a small quantity of dust. Although material and paint chip 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, surfacing materials, and miscellaneous materials.

### 2.1.2 Inspecting for Metals in Paint

When inspecting for metals in paint, there are components where it has been identified through historical research of building records or by visual inspection techniques that metals in paint and/or the aforementioned metals either in paint, chips, fragments, dust or material forms have been positively identified as existing. The following is a list of materials that may be coated with paint containing metals, or may have been constructed with metals in paint.

- Wall, floor and ceiling paint
- Paint on components (i.e., guard rails, tanks, machine guards)
- Gloveboxes and associated shielding equipment
- Piping
- Roof jacks
- Mounting plates and bracket bars
- Stationary shields
- Lead fill in walls
- Plaster additives

Non-suspect areas are those areas where there is a high level of certainty that metals in paint and/or the aforementioned metals do not exist due to the absence of either in paint, chips, dust, fragments or material forms.

### 2.1.3 Inspecting for PCBs in Paint

All areas of facilities or buildings do not have the same potential for PCB contamination and therefore, do not require the same level of characterization coverage to determine the initial classification.

By reviewing RFETS historical data and PCB industry equipment records, an effective and efficient characterization process will be conducted.

Two classifications for survey areas will be used when determining PCB survey requirements. These are affected and unaffected areas. These are defined as follows:

"Affected" areas are areas that have potential PCB contamination (based on historical reviews), known PCB contamination (based on past or preliminary RFETS and industry surveillance), or are PCB containing. This would normally include materials such as:

- Oil soluble and plasticizer application paints applied prior to 1982 - so used for the purpose of flame retardant, waterproofing and/or chemical resistance.

- Flexible coatings in high thermal heat environments or where thermal cycling or fluctuations were a concern (waterproofing, fire resistance, extreme chemical resistance).

- Stucco/masonry materials and asbestos surfaces such as siding, roofing and wallboard.

- Military specification paint used in system piping, system components and associated equipment (e.g., valves, heat exchangers, pumps, electrical cabinets, etc.)

- Electrical cable insulation for high voltage, underground use (Not in use at RFETS).

- Adhesive coating on, and ventilation gaskets in heating, ventilation, air conditioning systems (adhesives, lagging cloth/paste).

- Multi-layered steel siding materials consisting of steel, asphalt, or zinc; asphalt-impregnated asbestos felt; and asphaltic waterproofing coating (manufactured by H. H. Robertson, Circa 1917).
- Wool felt for sound dampening; may also have been incorporated in some ceiling tile (fireproofing).

Areas immediately surrounding, or adjacent to locations where PCB containing materials were used or stored, spilled, or buried are included in this classification because of the potential for inadvertent spread of contamination.

All areas not classified as "affected" will be labeled "unaffected". These areas are not expected to contain residual PCBs, based on a knowledge of site history and previous RFETS and industrial information concerning PCBs.

Before any removal, renovation, decommissioning or destruct activities are allowed, suspect and non-suspect areas will be evaluated to determine sampling criteria needs. See Table 2-1 for evaluations on this project.

### 2.1.4 Inspecting for Radiological Contamination in and under Paint

When determining radiological constituents in or under paint, sampling methodology is identical to that of sampling for metals in paint, except that it is allowable to acquire some of the substrate. As this is a preliminary study, sample locations were selected based on material locations and personnel traffic patterns within the structure.

***Table 2-1 Metals in Paint and Asbestos Survey Results/Sampling Requirements***

| Locations | Metals in paint Samples | Asbestos | Isotopics & PCB's |
|---|---|---|---|
| B-551 S end | Grey paint, SW restrooms & offices (1); blue paint, outer wall of SW restrooms & offices (1); tan paint on main area interior walls (1); battleship grey paint on floor (1). | Floor tile/mastic under carpet, SW offices (3); plaster ceiling, restrooms & SW offices (5); cementitious board, exterior window wells (1); exterior wall texture (3). | Isotopic on grey paint, walls SW offices (1); tan wall paint (1); floor paint (1). PCBs on blue paint (1). |
| B-551 NW corner, S end | | TSI on steam pipes (3). | |
| B-551 N end | Grey-green paint on interior walls (1); battleship grey paint on floors (1). | TSI on steam pipes (3); roofing mat'ls (3). | Isotopic on grey-green paint (1); battleship grey (1). |
| B-551 E extension | Off-white paint on drywall system near door 16-D (1). | Drywall, tape and joint compound, offices near door 16-D (5), exterior roofing mat'ls (3); exterior wall texture (2). | Isotopic on off-white paint (1). |
| B-556 interior | Grey paint, interior walls (1); off-white, interior columns (1). | TSI on pipes (3); ceiling tiles (3); cementitious wallboard (1); welder components (3). | Isotopic on grey paint (1). |
| B-556 exterior | Tan paint on sheet metal (1); brown paint on doors, gables, gutters & downspouts (1). | | Isotopic on tan sheet metal (1). |
| QA/QC Samples @ 5% | 1 | 2 | 1 |
| **TOTALS** | **12** | **43** | **10** |

## 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 by the certified inspector to contain asbestos, PCBs or metals in paint, negating the need for samples. Isotopic samples will be acquired as directed in Table 2-1.

# 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.

### 3.1.1 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.

### 3.1.2 Sampling for Metals in Paint

Paint sample quantity is outlined in the 1995 *HUD Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing.* Samples are determined by the colors present in the structure. Each color is sampled accordingly. Similar colors may also be sub-categorized into the type, such as oil-based, latex, gloss or semi-gloss for example. For each homogeneous area, one representative sample is acquired. Multiple layers of different colors are so noted if this can be determined visually. If not, the top layer is the determining color. The inspector also notes the substrate material.

### 3.1.3 Sampling for PCBs in Paint

PCB's in paint sampling requires that the facility be toured to identify whether or not suspect materials exist. Each of those suspect paints will be sampled according to homogeneity.

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### 3.1.4 Sampling for Radiological Contaminants in and under Paint

Isotopic or gross alpha/beta sample quantity is determined by process knowledge of the facility and is biased according to location. RFETS Radiological Engineering expertise will be utilized for the purposes of verifying selected sample locations. As the structure passes through phases of strip-out and relocation of stored materials and equipment, radiological surveys will be conducted. Those locations that exceed set radiological limits may require further isotopic or gross alpha/beta sampling and analysis. In the event of this type of occurrence, the afore-mentioned methodology will be utilized .

## 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, an 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. For this reason, paint sampling and asbestos sampling methodologies and steps are combined. The section on settled dust sampling is included in the event that issues arise during the remodelling effort that would require this type of sampling.

## 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 an RCT may be present as necessary to survey the area and location of the sample prior to proceeding.

## 4.2 ASBESTOS, PCBs AND METALS IN PAINT

Sampling for asbestos is performed using destructive techniques that require collection of 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.

Sampling for metals in paint requires that the paint chip sample be four square inches in size. Minimum weight is 40 grams. Sample size will be adjusted accordingly. The most common paint sampling method is to scrape paint directly off the substrate. The goal is to remove all layers of paint equally, but none of the substrate.

Sampling for PCBs in paint requires the acquisition of a minimum of five grams of media. The most common paint sampling method is to scrape paint directly off the substrate. The goal is to remove all layers of paint equally, but none of the substrate.

Sampling for isotopics in paint requires the acquisition of a minimum of 40 grams of media. As the goal is to discover radiological activity covered by the paint, it is necessary to expose the substrate. Some substrate material may be included in the sample material.

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 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.
- In the case of all paint samples, field weight measurements will be acquired. A tareweight of the container is subtracted from the gross weight to achieve correct sample amount.
- 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.
- The sample area is patched as needed.
- 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.
- 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.
- 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. As there are no regulatory drivers in place for photographing metals in paint samples, this step is optional for this process.

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

### 4.3 ISOTOPIC/GROSS ALPHA/BETA PAINT CHIP SAMPLING

As part of the characterization process, certain locations of painted surfaces will be also selected for radiological sampling and analysis. Table 2-1 identifies those locations. Selection of those locations is based on worst-case scenarios compiled from process knowledge and historical data on the facility. The procedures listed in Section 4.2 of this document for sampling for metals in paint will be utilized.

## 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. Metals in paint samples will be processed by an EPA/ American Industrial Hygiene Association laboratory. Appropriate sample submittal forms shall be used. Isotopics will be sent first to Thermo Nu-Tech (on-site) for radiological screen analysis to determine Department of Transportation classification and then to a qualified Nuclear Regulatory Commission or agreement State-licensed laboratory for isotopics analysis.

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 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 the building manager must be given the option of accepting results from PLM analysis of samples with asbestos percentages from trace (less than 1%) to 10%, or requesting 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.

### 5.2 METALS IN PAINT

EPA SW-846 determines details and methods for the determination of metals in solids, including metals in paint, cadmium, chromium, zinc and arsenic.

Solid samples are homogenized, weighed and digested in nitric acid. This digestate is brought to a known volume and analyzed for various metals using atomic absorption spectroscopy, Graphite furnace or inductively coupled plasma spectroscopy. The instrument detection limits for metals in paint and metals are both 0.25 ug/ml with the actual sample detection limit dependent on the sample size and volume.

### 5.3 PCBs IN PAINT

Analysis for characterization purposes will be performed using EPA approved procedures identified in, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, U.S. EPA SW-846, 1986, Third Edition. Laboratory facilities located on-site or off site will support the analysis. On-site methods for analysis of PCBs includes SW-846 Method 8081, GC Analysis for PCBs in oils and solids. Off-site methods include SW-846 Method 8080A. Data Quality Objectives (DQOs) are established for the analytical methods referenced and are available through the on-site Kaiser-Hill, L.L.C. (K-H) ASD office in Building 881. DQOs for off-site laboratories are established under individual QA/QC Programs which meet the intent of EPA SW-846 requirements.

### 5.4 ISOTOPICS/GROSS ALPHA/BETA

Laboratories that analyze materials for radiological constituents have set industry standards that rely on expertise, past experience and good laboratory practice for discovery.
Solid samples are homogenized, weighed and digested in nitric acid. This digestate is brought to a known volume and analyzed for various radionuclides using appropriate instrumentation. Detection limits are determined on a case by case basis depending on sample volume, count time and background radiation.

## 6.0 DATA ANALYSIS

Two types of data are generated during an asbestos and/or metals in paint building 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 or metals in paint 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.

In the case of metals in paint and PCBs in paint or liquids, the lab data is usually reported in tabular form to the inspector. In the table, the inspector will find information on the percentage or portion per sample that contains the suspect metal or PCBs. Should the sample not contain any suspected metals or PCBs, this information will be included in the report.

Isotopic and gross alpha/beta lab reports radiologic activity in the sample in tabular form. Units of measure are typically picocuires per gram. The type of radionuclide (americium, plutonium, etc.) is also reported.

# 7.0 SUMMARY

The inspector compiles the field and lab data, cross-matches information, eliminates non-asbestos and/or non-metals in paint 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, PCBs and/or metals in paint 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 and/or metals in paint. Solids and liquids sampled for PCB content will be reported as containing or non-containing, and whether or not regulatory threshold limits are exceeded. Findings on radiological activity in sampled areas will be reported accordingly, and will be included in any subsequent reports generated as final radiological surveys.

# 8.0 QUALITY ASSURANCE

Quality assurance for the asbestos in building materials, PCBs in liquids and paint, and metals in paint characterization of Building 551 begins by assessing the procedure through the data quality objectives process document. The veracity of the methodology also requires that data acquired during the inspection process be checked.

The EPA QA/G-4 process begins with a statement of the problem, which is outlined in Section 1.0. Step two, Identify the Decision, is covered in Section 2.0. Steps 3, 4, 5, 6, and 7 are driven by aforementioned regulatory requirements or guidelines. 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.

Paint sampling protocols are covered in the Housing and Urban Development (HUD) *Guidelines for the Evaluation and Control of Lead Paint Hazards in Housing* (June 1995). Chapter 7, Section G (Paint Chip Collection and Laboratory Analysis) provides the protocols for this process. The expert and diverse rationale used to develop these parameters are sufficient to preclude evaluation or selection of any alternatives. The methodologies inherent in these procedures have been accepted industry standards and tested in courts of law and need only to be applied on a site specific basis with the input from qualified individuals.

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.

For PCBs and metals in paint samples in the lab, the analyst is bound by protocol for quality assurance outlined in EPA SW-846 and requirements set out by the National Lead Laboratory Accreditation Program. All laboratory calculations are verified through peer review.

Quality assurance for radiological analysis are covered in each laboratory per Quality Assurance Program Plan.

## 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

Analytical data collected during this sampling and analysis will be evaluated using the guidance established by the Rocky Flats Administrative Procedure 2-G32-ER-ADM-08.02, *Evaluation of ERM Data for Usability in Final Reports*. This procedure establishes the guidelines for evaluating analytical data with respect to precision, accuracy, representativeness, completeness, and comparability Precision, Accuracy, Representativeness, Completeness and Comparability parameters. Data verification will be performed according to the RFETS ASD, Analytical Services Performance Assurance Group procedures, but will be done after the data is used for its intended purpose, and will be performed by a qualified peer. Analytical laboratories supporting this task have all passed regular laboratory audits by the ASD.

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.

Paint sample data are also evaluated according to metals in paint content. For the purposes of Industrial Hygiene, detectable levels of metals in paint require worker protection programs. For the purposes of waste, exceeding the Toxicity Characteristic Leaching Procedure limits set under Resource Conservation Recovery Act for leachable metals in paint in a material constitutes the need for specialized waste handling.

Isotopics and gross alpha/beta data are evaluated according to the amount of radiological activity within the sample. According to the Rocky Flats Cleanup Agreement, no radiological activity can be added to any waste stream. If activity is discovered, the material in question must be handled as radioactive waste at differing levels of concern.

Asbestos, PCBs and metals in paint 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 1) forms, logbooks and laboratory generated data will be processed according to 1-77000-RM-001, Records Management Guidance for Records Service.

## 9.0 REFERENCES

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

2-G32-ER-ADM-08.02, *Evaluation of ERM Data for Usability in Final Reports.*

EPA QA/G-4, *The Data Quality Objectives Process*, Quality Assurance Management Staff, Draft Final, March 3, 1994.

EPA Method SW-846-:3050A/7420, *Atomic Absorption Spectrometry.*

EPA Method SW-846, *Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods,* U.S. EPA 1986, Third Edition.

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

*HUD Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing*, June 1995.

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

OSHA 29 CFR 1926.32, *Metals in paint Exposure in Construction*, Interim Final Rule, June 1989.

RMRS, RF/RMRS-97-109, *Decommissioning Characterization Protocols*, January 1998.

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.

# Attachment 1

## Bulk Sample Data Sheet

# BULK SAMPLE DATA SHEET

Job# _____ Name _____ Date _____

General description of building/area: _____

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| SAMPLE NUMBER | SAMPLE DESCRIPTION AND LOCATION | LAB |
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# SAMPLE PHOTO DATA CARD

BUILDING_____ ROOM_____ DATE_____

SAMPLE NUMBER:

_____

23

# ROCKY FLATS
# ENVIRONMENTAL TECHNOLOGY SITE
# CHAIN OF CUSTODY NUMBER: 98A1012-002

SAMPLERS (Signature):

REPORT IDENTIFICATION NUMBER (RIN): 98A1012

LABORATORY: Paragon Analytics

AGGREGATE AREA:

RFETS CONTRACTOR: Rocky Flats Environmental Technology Site

RC01B003 (Isotopic (Soil))

| Bottle Num. | User Samp. Num. | Date | Time | Location | Container | Matrix | Preservation |
|---|---|---|---|---|---|---|---|
| 98A1012-001.003 | | | | | 125G G | SOLID | N/A |
| 98A1012-002.003 | | | | | 125G G | SOLID | N/A |

**CHAIN OF POSSESSION**

Sign/Print Names

| | | | |
|---|---|---|---|
| Relinquished By | Date/Time | Received By | Date/Time |
| Relinquished By | Date/Time | Received By | Date/Time |
| Relinquished By | Date/Time | Received By | Date/Time |
| Relinquished By | Date/Time | Received By | Date/Time |

REMARKS:

Charge #:

Project: Environmental Restoration

Shipping Requirements:

Air Bill No.:

RFP F 3791.3[illegible]/95)
Formerly RF-[illegible]

# Rocky Flats Environmental Technology Site

Golden, [illegible] 80402-0464

## Safety and Hygiene Chain of Custody Record and Analysis Request

Name of Originator: Title: Bldg/Ext: Date: Page of

| SAMPLE NUMBER Bldg/Y/M/D/P#/S# | ANALYZE FOR | VOLUME liters | SAMPLE TIME/ | MEDIA | P A B | Personal Area Bulk | REMARKS | Lab Number |
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| Relinquished by | Received by | Time/Date | Relinquished by | Received by | Time/Date |
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| Relinquished by | Received by | Time/Date | Relinquished by | Received by | Time/Date |
| Relinquished by | Received by | Time/Date | Relinquished by | Received by | Time/Date |
| Relinquished by | Received by | Time/Date | Relinquished by | Received by | Time/Date |

**Report and Billing Instruction**

Kaiser-Hill ☐ Verbal To: _____
RMRS ☐ Fax To: _____
SSOC ☐ Report To: _____
DynCorp ☐ Bill To: _____
WSI ☐ P.O.#/Release: _____
Lab: _____

**Analysis Request**

Industrial Hygiene Sample

☐ Standard Service ☐ Rush ☐ Other _____

Asbestos Samples

☐ Standard Service ☐ 24 Rush ☐ 2 Rush ☐ Other _____

**Seal# (Release #)**

Condition of Seal: ☐ Broken ☐ Unbroken

Signature: _____
Comments: _____

White - Return to Originator Yellow - Lab Copy Green - Sample Custodian Blue - Originator