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Decommissioning Characterization Protocols

Rocky Mountain Remediation Services, L. L. C.

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DECOMMISSIONING CHARACTERIZATION PROTOCOLS

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DECOMMISSIONING CHARACTERIZATION PROTOCOLS

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ACRONYMS

ACM	Asbestos Containing Material
AHA	Activity Hazard Analysis
APO	Analytical Projects Office
ASTM	American Society of Testing and Materials
Be	Beryllium
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cm^2	square centimeters
COEM	Conduct of Engineering Manual
DOE U.S.	Department of Energy
DOP	Decommissioning Operations Plan
dpm	disintegration per minute
DQO	data quality objective
EC	Environmental Coordinator
EPA	Environmental Protection Agency
HASP	Health and Safety Plan
HSP	Health & Safety Practices
HVAC	Heating, Ventilation, Air Conditioning
IH&S	Industrial Hygiene & Safety
IP	in-process
IVC	Independent Verification Contractor
K-H	Kaiser-Hill, L.L.C.
l/m (lpm)	liters per minute
µCi	microcuries
µR/hr	microroentogens per hour
MARSSIM	Multi-Agency Radiological Survey and Site Investigation Manual
mCi	millicuries
mrem	millirem
NIST	National Institute of Standards and Technology
NLLAP	National Lead Laboratory Accreditation Program
OSHA	Occupational Safety & Health Administration
PA	Protected Area
PARCC	precision, accuracy, representativeness, completeness and comparability
PCB	Polychlorinated Biphenyl
pCi/g	picocuries per gram
PEP	Project Execution Plan
PPE	Personal Protective Equipment
ppm	parts per million
QA	Quality Assurance
QAP	Quality Assurance Program
QC	Quality Control
RCM	Radiological Control Manual
RCT	Radiological Control Technician
RDR	Radiological Deficiency Report
RFETS	Rocky Flats Environmental Technology Site
RLCP	Reconnaissance Level Characterization Plan
RLCR	Reconnaissance Level Characterization Report
ROI	Radiological Operating Instructions
RWP	Radiological Work Permit
TEDE	total effective dose equivalent
TUM	Training User's Manual
WMP	Waste Management Plan
WSRIC	Waste Stream Residue Identification and Characterization

DECOMMISSIONING CHARACTERIZATION PROTOCOLS

1.0 INTRODUCTION

Over the next several years the facilities at the Rocky Flats Environmental Technology Site (RFETS) will be deactivated and decommissioned (including dismantlement). This effort will expose the workers at RFETS to new processes and different risks than those previously encountered. In order to properly plan the new decommissioning tasks and to protect the workers while they complete these tasks, a method of identification (characterization) of the potential hazards has been developed and is presented herein. These decommissioning activities are being completed as Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) removal actions.

2.0 PURPOSE

Characterization, as identified in this document, is the process of obtaining information about a site/facility/building (hereafter referred to as a site) which identifies the chemical, physical, biological, and radiological hazards within and around the site. The purpose of this document is to provide guidelines for a consistent and systematic approach to characterization which includes the use of data quality objectives (DQOs), as outlined in EPA QA/G-4, *Data Quality Objectives Process*, and tailored to decommissioning sites. The characterization information obtained using these protocols is used to support selection of decommissioning technology alternatives, development of a project execution plan (PEP), development of a project specific health and safety plan (HASP) including an initial exposure assessment and activity hazard analysis (AHA), development of the project specific waste management plan (WMP), determination of waste volumes, and the method for releasing a facility for reuse or demolition.

Note: The Decommissioning Characterization Protocols is a living document that will be updated to reflect lessons learned, regulatory requirements, and updated safety requirements.

3.0 SCOPE

The scope of this document is to provide characterization guidelines which can be implemented in any of the five characterization phases, (see Section 4.0) used in the decommissioning process. The guidelines allow for a graded approach to characterization and decommissioning. The guidelines are used to develop a set of characterization instructions (documented in the RLC Plan) which are in turn used to gather the desired information. If, the amount of information being obtained is substantial, or there is a need to maintain strict formality in obtaining the information, or there is a requirement to submit the characterization instructions for a formal review, the instructions developed using this document may be integrated into a characterization plan, (i.e., Reconnaissance Level Characterization Plan).

4.0 CHARACTERIZATION PHASES

The following characterization phases, identified for use at RFETS, were derived from NUREG/CR-5849; *Manual for Conducting Radiological Surveys in Support of License Termination,* DOE/EM0142P; *Decommissioning Handbook*, DOE/EM; *The Decommissioning Resource Manual*, and NUREG-1575; *Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)* and DOE Order 5820.2A.

In addition, characterization and decommissioning activities are performed in accordance with the appropriate regulatory requirements including CERCLA, Resource Conservation and Recovery Act (RCRA) and the Toxic Substance Control Act (TSCA) as necessary.

A. Safety Characterization

B. Scoping Characterization

C. Reconnaissance Characterization

D. In-Process Characterization

E. Final Building Survey (Demolition Survey)

F. Independent Verification Survey of the Final Survey

A brief description of each phase is provided in the following paragraphs.

4.1 SAFETY CHARACTERIZATION

Safety Characterization involves gathering information about the safety of a site before anyone is permitted to enter. This phase of characterization is necessary for older sites which have been unoccupied for substantial periods of time. Most of the sites at RFETS have been continuously occupied and do not require a safety characterization as the site environment is known and verified through routine surveys (i.e., radiological, maintenance). Areas within a site which have not been occupied will require a Safety Characterization.

4.2 SCOPING CHARACTERIZATION

The purpose of this characterization phase is to gather information on the physical, hazardous, radiological and chemical condition of the facility. This includes reviewing historical records, interviewing building personnel, reviewing operational records, reviewing radiological deficiency reports (RDRs) and any other pertinent building information including historical survey reviews, Safety Analysis Reports and Waste Stream Residue Identification and Characterization (WSRIC) information . Additionally, at this time, an evaluation should be made of any type of radioactive sources in the structure, (i.e., check sources, smoke detectors, moisture gauges, etc.).

The Scoping Characterization information provides a basis for preliminary evaluations of decommissioning efforts and aids in identifying the need for more extensive Reconnaissance Characterization and In-process Characterization surveys.

4.3 RECONNAISSANCE CHARACTERIZATION

This phase of characterization is performed to establish a definitive baseline of information when planning for the decommissioning activities. This phase includes reviewing information from the scoping characterization against the planned decommissioning activities to determine if additional characterization is necessary to support the chosen decommissioning activities or support selection of a different decommissioning approach. Additional sampling/survey instructions would be developed and documented in the form of a Reconnaissance Level Characterization Plan (RLCP). The reconnaissance characterization information obtained by completing the RLCP feeds into the following documents: Reconnaissance Level Characterization Report (RLCR), Waste Management Plan (WMP), the Decommissioning Waste Stream and Residue Identification and Characterization (WSRIC) Report, the project Health and Safety Plan (HASP) and the Final Survey Plan. The RLCR is a snapshot of all the known characterization information about the decommissioning site.

4.4 IN-PROCESS CHARACTERIZATION

The In-Process (IP) phase of characterization is used to verify daily pre-job conditions and to evaluate the effectiveness of on-going decontamination/decommissioning activities in preparation for final survey actions. The IP characterization aids in identification of new hazards which may be uncovered during the facility decommissioning.

4.5 FINAL BUILDING CHARACTERIZATION SURVEY (DEMOLITION SURVEY)

As the decontamination process is completed and before the building or structure is dismantled, a final survey is completed. The final building survey is used to ensure that the building surfaces and/or structure meet the release criteria established by the Department of Energy (DOE) DOE Order 5400.5 for RFETS reference. The Final Building Characterization Survey Plan is written using the final survey instructions developed from the guidelines in this procedure.

4.6 INDEPENDENT VERIFICATION OF THE FINAL BUILDING CHARACTERIZATION SURVEY

As the characterization and final survey activities are completed, an independent verification is completed by an independent survey team, (as designated by the DOE). The independent survey is outside the scope of this document.

5.0 CHARACTERIZATION OBJECTIVES AND DATA QUALITY OBJECTIVES

Data Quality Objectives are a quality requirement as well as a proven tool for optimizing sampling and analysis costs relative to attaining adequate confidence for technical project decisions. The DQO process was designed after EPA (EPA, 1994, G-4) and DOE decommissioning guidelines (DOE, 1994). The DQOs are intended to provide a fundamental basis by which data are acquired and used in compliance with applicable state and federal regulations applicable to the contaminants of concern.

Characterization objectives for decommissioning are developed to specify the data collection requirements and subsequent decisions to be made based on the data. The characterization identifies the types, quantities, conditions, and locations of radioactive and hazardous media/materials which are (or may be) present as residual contamination or hazards.

The purpose of defining and implementing data quality objectives (DQOs) is to optimize the quantity and types of samples necessary to make project decisions relative to the characterization objectives and to support the identification and disposition of contaminated media/materials generated by the decommissioning activities. Decisions based on sound data and defensible rationale will ensure the project's success. Optimization of samples through the DQO approach is achieved by minimizing the quantity of samples (and thus minimizing related project costs) while also establishing adequate confidence in the project's technical decisions.

The DQO process is NOT intended to duplicate or recreate existing protocols or controlled and approved procedures, but rather to complement existing protocols and requirements to ensure that all data collected and evaluated is directly linked to project decisions. Stated differently, a graded approach is appropriate with the DQO process when applicable protocols or procedures can be referenced within the DQO framework (given below) rather than create portions of the project's DQOs "from scratch". Examples would include use of established Waste Acceptance Criteria (WAC) to decide on waste shipments or use of approved/controlled procedures to decide on SNM disposition. For the examples cited, the project decisions (and error limits, if quantifiable) would still be explicitly stated within the DQO discussion, but chemicals of concern and the respective action levels constituting decision criteria could be referenced from a WAC, or procedure, as appropriate.

THE PROBLEM

Implementation of the DOE's decommissioning strategy for site buildings and infrastructure requires identification and disposition of contaminated media, materials, and equipment that are produced in the process, specifically relative to free release (of materials) or management of particular waste types or streams. Adequate samples must be taken to properly characterize and manage the materials and equipment produced from the decommissioning process, waste or not.

Other decisions or subdecisions that support final project actions may be put forth in the form of following questions, provided that the answers or conclusions relate directly to project decisions.

1) Why perform this characterization?

2) What is the end use of the equipment, facility, or structure (free release, restricted use, low level waste, etc.)?

THE DECISIONS

The critical technical decisions for a typical decommissioning project are as follows; decisions may vary relative to goals of the project:

1) What materials (e.g., paint, concrete, pipe insulation, etc.), media (e.g., water, oil, solid, sludge, etc.), or equipment within the facility are contaminated or, conversely, not contaminated?

2) What are the generic classification categories by which the materials, equipment, and/or media will be managed, relative to an eventual assignment as contaminated (hazardous, radiological, or mixed) or not contaminated (non-hazardous)? In other words, what are the categories of waste streams that will result from the Decommissioning?

3) What are the ultimate dispositions (i.e., waste classifications and TSD Facilities) of the waste streams, including quantities (e.g., a completed summary table)?

INPUTS to the DECISIONS

Inputs to the decisions are data, both qualitative and quantitative. Qualitative information will typically consist of nominal data (e.g., paint color, texture, or equipment type, etc.) derived from visual observation of buildings' equipment and materials. Quantitative data may be produced from analytical, radio chemistry, radiation surveys or petrographic analysis (asbestos) of samples. Waste Acceptance Criteria (WAC) are typically the drivers for decision inputs where data will be used to characterize waste streams destined for a particular TSD Facility (e.g., NTS, Envirocare or USA waste). Inputs to the decisions are COC-specific.

Radiation measurements can be determined based on either historical or current surveys, provided quality control was adequately established (documented and with tolerable error). Inputs to the decision must also include, directly or in other subsections, the following:

- analytical/radio chemistry results
- radiation survey results

- method-specific sensitivities (detection limits or minimum detectable activities)
- error tolerances associated with the measurements (e.g., accuracy and precision)
- action levels (regulatory thresholds)

Although professional judgment is instrumental to the execution of successful decommissioning, sampling must err to the conservative (i.e., collecting more samples) if there is any doubt regarding homogeneity of the materials sampled.

Other decisions or subdecisions that support final project actions may be put forth in the form of following questions, provided that the answers or conclusions relate directly to project decisions.

1) What information is required to make this decision?
2) What source(s) can be used to obtain the information?
3) Can the desired analysis be done at RFETS or will the samples be shipped off-site for analysis?
4) What types and kind of sampling measurements are required?
5) What type of instrumentation is required?
6) Has facility structural data been reviewed?
7) What suspect materials have been identified?
8) What are the required instrumentation sensitivities?
9) What method will be used to obtain the desired information?
10) What Quality Assurance (QA) program requirements are there for these samples (i.e., blanks, duplicates)?
11) Are there any alternatives to the discussion?
12) What number of samples/measurements will provide the desired certainty?
13) Have data quantity and quality control requirements for sampling been reviewed and incorporated into the characterization process?

PROJECT BOUNDARIES

Define the geographic, three-dimensional areas, and temporal boundaries of the characterization activity. This may be all the areas in a given building or just specific rooms within a building. Identify if any areas outside the boundaries of the building may be impacted. For decommissioning of buildings, environmental media outside the buildings are rarely included within the study boundaries.
Other decisions or subdecisions that support final project actions may be put forth in the form of following questions, provided that the answers or conclusions relate directly to project decisions.

1) What is the sample population of interest?
2) Are there any constraints on data collection?

DECISION RULES and ERROR LIMITS

All decision rules must be based on objective, reproducible, and verifiable, measurable criteria. If the decision is statistically based, decision error must address both the producer's (alpha) error and the consumers' (beta) error. "False Positive" error is usually equivalent to the alpha error while the "false negative" is equivalent with beta error, although this determination hinges on the way in which the hypothesis test is setup. Alpha and beta error typically range from 1% to 10% (i.e., confidences from 99% to 90%, respectively), based on standard statistical practice and historical acceptance by the regulators (public, CDPHE, and EPA Region VIII).

Decisions may also be based directly on protocols promulgated by the regulators, for example determination of asbestos.

Other decisions or subdecisions that support final project actions may be put forth in the form of following questions, provided that the answers or conclusions relate directly to project decisions.

1) What is the basis for the decision?

2) Are there any regulatory and statistical drivers for sampling frequency?

3) What action levels are applicable to the discussion or parameter of interest?

4) Define the discussions using "If ... then ..." statements. (ex. if paint containing >50 ppm PCBs is identified then all resulting waste material will be handled as TSCA waste .

OPTIMIZATION OF DESIGN

Modifications to the DQOs are typically based on visual observations, new information revealing data gaps as the project progresses, and professional judgment, all of which are documented., and are discussed in the Data Quality Analysis.

5.1 CONDUCT OF SAMPLING MEASUREMENT OPERATIONS

When performing sampling operations, biased, unbiased, affected and unaffected (see appendices for implementation) the characterization process will be utilized to obtain data.

To implement the various characterization elements of the survey, one or more of the following method(s) will be utilized: Survey instructions, sampling procedures, IWCPs or survey plans.

Personnel performing sampling will be trained specialists in their respective disciplines and maintain up-to-date qualifications. The specific training requirements for samples will be outlined in project specific documents including AHAs and Radiological Work Permits (RWPs).

To aid in development of sampling and survey instructions, specific protocols have been written for:

A. Beryllium Characterization Protocol
B. Metals and Lead Characterization Protocol

C. Asbestos Characterization Protocol
D. Liquids
E. Protocol for Polychlorinated Biphenyls (PCBs)
F. Radiological Characterization Protocol
G. Final Radiation Survey & Site Release

5.2 DOCUMENTATION

Collection and documentation of the characterization information is accomplished using existing RFETS procedures. Copies of characterization information are maintained in the project history file in accordance with QA 5.01, QA Non-Permanent Records. Because decommissioning activities at RFETS are being completed as Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) removal actions, the appropriate documents are placed in the Administrative Record.

6.0 CHARACTERIZATION CHANGES

Characterization is a dynamic process. As the deactivation and decommissioning efforts are completed within a facility, the hazards within that facility will be reduced and therefore the facilities characterization will change. The changing conditions will be tracked using a Characterization Matrix similar to the example in Table 6-1. The Characterization Matrix is initially completed when a facility has completed normal operations and the Scoping Characterization phase is completed. Then, as the facility changes, the Characterization Matrix is updated with the new information until the facility is ready to undergo its Final Building Survey.

Figure 6-1, Characterization Survey and Hazard Summary Matrix, is an example of the type of matrix used in decommissioning.

Table 6-1 Characterization Survey and Hazard Summary Matrix

Room/Area	Description	Sq. Ft.	Pu Holdup (grams)	Radiological Contamination	Asbestos	Beryllium	Work Description/ Remarks
001	Basement sumps	[illegible]	None	Moderate levels of loose and fixed surface contamination; Radioactive contaminated process wastewater with hazardous chromium and lead.	Floor /Wall/Ceiling materials and piping insulation, possible ACM*. To be characterized.	Potential present on sump surfaces and in sludge.	Standard Work Steps (Section 3.2.3) will be used. Confined Space Entry may be required. Aggressive decontamination techniques are expected to be used.
100	Main Entry Vestibule	48	None	No loose surface contamination on room surfaces. Possible isolated spots of fixed low-level contamination.	Floor /Wall/Ceiling materials and piping insulation, possible ACM*. To be characterized.	None	Standard Work Steps (Section 3.2.3) will be used.
101	Hallway & Stairs	510	None	No loose surface contamination on room surfaces. Possible isolated spots of fixed low-level contamination.	Floor /Wall/Ceiling materials and piping insulation, possible ACM*. To be characterized.	None	Standard Work Practice (Section 3.2.3) will be used.

EXAMPLE

Room/Area	Description	Sq. Ft.	Pu Holdup (grams)	Radiological Contamination	Asbestos	Beryllium	Work Description/ Remarks
103	Men's Locker Room	660	None	No loose surface contamination room surfaces. Possible isolated spots of fixed low-level contamination.	Floor /Wall/Ceiling materials and piping insulation, possible ACM*. To be characterized.	None	Standard Work Practice (Section 3.2.3) will be used.
103A	Men's Locker Room	120	None	No loose surface contamination room surfaces. Possible isolated spots of fixed low-level contamination.	Floor/Wall/Ceiling materials and piping insulation, possible ACM*. To be characterized.	None	Standard Work Practice (Section 3.2.3) will be used.
103B	Men's Locker Room	190	None	No loose surface contamination room surfaces. Possible isolated spots of fixed low-level contamination.	Floor/Wall/Ceiling materials and piping insulation, possible ACM*. To be characterized.	None	Standard Work Practice (Section 3.2.3) will be used.)

EXAMPLE

Room/Area	Description	Sq. Ft.	Pu Holdup (grams)	Radiological Contamination	Asbestos	Beryllium	Work Description/ Remarks
103	Men's Locker Room	660	None	No loose surface contamination room surfaces. Possible isolated spots of fixed low-level contamination.	Floor/Wall/Ceiling materials and piping insulation, possible ACM*. To be characterized.	None	Standard Work Practice (Section 3.2.3) will be used.
103A	Men's Locker Room	120	None	No loose surface contamination room surfaces. Possible isolated spots of fixed low-level contamination.	Floor/Wall/Ceiling materials and piping insulation, possible ACM*. To be characterized.	None	Standard Work Practice (Section 3.2.3) will be used.
104	Elevator	100	None	No loose surface contamination room surfaces. Possible isolated spots of fixed low-level contamination.	Floor/Wall/Ceiling materials and piping insulation, possible ACM*. To be characterized.	None	Standard Work Practice (Section 3.2.3) will be used.

EXAMPLE

7.0 QUALITY ASSURANCE

Analytical data collected 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 (PARCC) parameters. Data validation will be performed according to the RFETS APO, Analytical Services Performance Assurance Group procedures, but will be done after the data is used for its intended purpose. Analytical laboratories supporting this task have all passed regular laboratory audits by the APO.

7.1 QUALITY ASSURANCE PROGRAM

The RMRS Quality Assurance Program describes how RMRS implements the requirements of 10 CFR 830.120 through the RFETS site QA Program. Project specific organizational responsibilities must be identified.

7.2 TRAINING REQUIREMENTS

Training requirements for projects must be identified in a Training Implementation Matrix. Additional training identified will be documented through 1-31000-COOP-01 required reading Conduct of Operations and 1-31000-COOP 011, Pre-evolution Briefing.

7.3 CORRECTIVE ACTION

The site Corrective Action Process (CAP) and the RMRS QA-3.1, Corrective Action procedure and the occurrence reporting systems shall be utilized to handle items, services and processes not conforming to established requirements.

7.4 DOCUMENT CONTROL

All documents must be prepared, reviewed and approved in accordance with RMRS DC-06.01, *Document Control Program.* If the activity is considered a CERCLA removal action, all AR records generated shall be identified, handled and submitted in accordance with the RMRS *Administrative Record Document Identification and Transmittal* (RM 06.04) Procedure. All non AR records shall be handled in accordance with the RMRS *Records Identification, Generation and Transmittal* (RM-06.02) Procedure. All activities described in project documents shall be conducted in accordance with approved and controlled instructions and procedures identified in project specific documents.

7.5 CHANGE CONTROL

Design activities are conducted in accordance with the Site's *Configuration Change Control Program and the Integrated Work Control Programs*, 1-454000-CSM-001. Activities are also conducted in accordance with the RMRS Conduct of Engineering Manual (COEM).

7.6 PROCUREMENT

Procurement activities are conducted in accordance the site Procedure, 1-W36-APR-111, *Acquisition Procedure for Requisitioning Commodities and Services* and the RMRS QAPD.

7.7 INSPECTION AND ACCEPTANCE TESTING

Inspection and Acceptance Testing is conducted in accordance with Site Procedures 1-D23-QAP-10.02, *Inspection* 1-31000-COOP 019, *Returning Systems and Equipment to Service*, 1-V51-COEM-DES-210, *Design Process Requirements* and 1-I97-ADM-12.01, *Control of Measuring and Test Equipment.*

7.8 MANAGEMENT ASSESSMENTS

Management Assessments are conducted in accordance with the RMRS QA, 9.01, RMRS *Management Assessments.*

7.9 INDEPENDENT ASSESSMENTS

RMRS Independent Assessments are conducted in accordance with RMRS, QA-10.01, *Independent Assessment* and RMRS WI, QA-10.01, *Conduct of Surveillances.*

7.10 QUALITY CONTROL (QC)

The following QC sampling requirements will be used as necessary on a project specific basis:

QC samples will be collected as part of the characterization at a frequency of 1 in 20 samples. The following types of QC samples will be collected to support characterization:

Duplicates: Duplicate (collocated) samples will be collected in the same manner and analyzed by the same analytical methods, in the same laboratory as the regular samples. These samples will be submitted blind to the laboratory. All duplicate samples will be collected using the same sampling equipment used for collection of the regular samples. Sampling equipment will be decontaminated while collecting regular and QC samples from the same location.

Equipment Rinsate Blanks: Will be prepared by collecting distilled water, poured over decontaminated sampling equipment, between collection of regular samples and collected only when sampling equipment is used. If equipment rinsate blanks will not be collected, all detections of COCs will be considered real and not attributable to cross contamination.

7.11 ANALYTICAL DATA

Analytical data collected in support of specific projects 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 (PARCC) parameters. Data validation will be performed according to the RFETS APO, Analytical Services Performance Assurance Group procedures, but will be done after he data is used for its intended purpose.

8.0 REFERENCES

E.H. & E.M. *Handbook for Occupational Health and Safety During Hazardous Waste Activities* (June 1996).

U.S. Department of Energy. *Decommissioning Resource Manual* (August 1996).

U.S. Department of Energy. *Decommissioning Handbook* (1994), Branch Technical Position Paper on Site Characterization for Decommissioning.

1.0 INTRODUCTION

This protocol describes the decisions to be made to determine how to perform a room by room Beryllium (Be) survey. The criteria outlined are specifically designed to provide occupational hazard assessment and waste management information in support of decommissioning activities while performing Beryllium activities. However, in some cases the results, particularly those from locations not affected by beryllium operations, may be used as final status results or to support a final survey.

No activity that may cause Be to become airborne will be authorized without the proper personal protective equipment and controls. Controls may include decontaminating materials, use of fixatives, and use of containments.

2.0 PURPOSE

The survey practices outlined are specifically designed to provide occupational hazard assessment information in support of decommissioning activities within a facility. However, in some cases, the results, particularly those from locations which are not affected by Be operations, may be used as final status results or to support a final survey.

2.1 INSTRUCTION DEVELOPMENT

This protocol serves as a guide in the preparation of specific instructions to obtain all of the answers to the questions referenced in Section 5.0 of this document. Additionally the Be characterization instructions should contain:

- Specific instructions, including sample location maps,
- Be Surface Sample procedure,
- Be Smear Sample log,
- Chain of Custody, and
- Job Briefing sheet for sampling personnel.

2.2 INITIAL CLASSIFICATION

In an effort to provide an organized approval to the characterization activities, rooms are identified as being in one of two classifications, affected and unaffected. These classifications aid in focusing the sampling effort in the areas with a high potential for contamination. This protocol reflects information currently available and will be enhanced to as new information and characterization data becomes available.

Areas will initially be placed in one category or the other based upon a review of historical and current data and interviews with personnel familiar with the work activities in the building. The initial classification may change as additional information, and smear sampling results become available. The designation of areas as affected or unaffected are established as a guideline to aid in monitoring worker health and safety and waste management issues.

Affected areas: For the purpose of characterizing a building for Be, an affected area will be defined as an area with historical or current use or storage of Beryllium. As smear results become available. Areas with >1 $\mu g/ft^2$ will be categorized as affected.

Unaffected areas: Areas with no historical or current use or storage of Beryllium or have smear results <1 $\mu g/ft^2$ will be defined as unaffected.

The controls and any PPE used will be determined for each activity to be performed. Decisions will be based on the surface contamination level, airborne levels as available, the specific activity to be performed and an evaluation by the IH representative. Controls and PPE will be specified in the Activity Hazard Analysis (AHA).

2.3 IMPLEMENTATION OF PROTOCOL

Review the locations of Be areas (Historical/Present) for information regarding the use of Beryllium in the building is evaluated first. This list includes locations where Be was machined, stored, analyzed, etc. A review of building documentation, interviews with personnel regarding processing information and historical Be sampling results should also be performed.

Perform a building walk-through and the following:

- Equipment present, its size, location, and relation to beryllium use
- Labs and hoods present
- Local exhaust ventilation equipment
- Heating, ventilation, air conditioning (HVAC) system components, location
- Areas where dust may accumulate

Also note other issues that may impact sample collection for Be such as radiation areas or difficult to reach areas and any additional engineering controls, equipment or personal protective protection (PPE) that may be necessary.

Areas of high probability and targeted smear locations are:

- Floor sumps
- Equipment footprint areas
- Return air vent grills
- Horizontal pipe and duct runs
- Local exhaust duct work
- General area exhaust ventilation
- Light fixtures
- Machine working surfaces
- Machine interior surfaces
- Wall ledges and shelves
- Two to three feet inside exhaust ducts
- Hard to get to areas not normally part of the housekeeping program

Other equipment or furniture may also need to be smeared. On porous surfaces, vacuuming may need to be used to collect samples. Desk drawers, bookcases, shelves and other internal surfaces may need to smeared. Pay particular attention to horizontal surfaces.

Areas with the highest potential for Be dust accumulation will be sampled. Industrial Hygiene and Safety (IH&S) personnel will determine the minimum number of samples to be obtained as a baseline for each affected area. Additional samples including air monitoring will be considered based on the experience and judgment of the industrial hygienist and Radiological Control Technicians (RCT), where necessary, conducting this work.

Sampling of equipment should be performed in accordance with the example in *Table A-1, Decommissioning Project Characterization Instruction Sheet* as outlined. An instruction sheet will be developed for each room, and inserted into the work package before the equipment is sampled.

Each sample location will be identified on a room diagram. All sample results will be provided to industrial hygiene for review and will be included in the project files.

2.4 ANALYSIS REQUIREMENTS

The beryllium smears will be obtained by a trained/qualified individual. All smears should be identified and tracked using a chain of custody form.

The smears will be analyzed at a facility capable of a standardized analysis to a detection limit of < 1 microgram per square foot. The laboratory will have a site approved quality control (QC) program and will report the data validation methodology for each requested analysis set.

Standard sample collection techniques, such as those listed below, will be used.

- Use of building and room maps, mark location on maps
- Photos of sampling locations, as deemed necessary
- Use of equipment reference numbers such as hoods, tanks, pipes, gloveboxes, etc.

Table A-1 Decommissioning Project Characterization Instruction Sheet

Location/Room: 150

Radiological Survey (2)				
Item/Area[1]	**# of Swipes[3] (Alpha/Beta)**	**# of Direct Measurements (Alpha/Beta)**	**# Be Swipes[4]**	**Special Instructions**
Work Table w/Hood	5	5	3	Obtain measurements on suspected contaminated surfaces.
Motor Generator Set	5	5	1	Obtain measurements on external equipment surfaces and points where contamination is potentially present.

SAMPLE

Notes

1. See Attached Map of Room And Component Layout.
2. Surveys To Be Performed In Accordance With 4-K62-ROI-03.01, *Performance of Surface Contamination Surveys.*
3. Large Area Wipe Technique May Be Used As Deemed Appropriate.
4. When Possible Use Radiological Swipes For Be Survey Requirements.

Review And Approval

Prepared By _____ Date_____

Radiological Engineer _____ Date_____

2.5 BERYLLIUM SURFACE SAMPLING

The following are supplies necessary and general guidelines for collection of beryllium surface samples:

- The supplies necessary to perform the sampling include:

  - Whatman 41, 4.7 cm Smear Tabs or equivalent. Other smear papers may be used with approval of IH&S.
  - Glassine Bags
  - Beryllium Smear Sample Log
  - Chain of Custody Form
  - Tamper Proof Seals
  - Labels (optional)
  - Sharpie (optional)

- Dry wipe an area of 1 square foot (ft^2) using Whatman 41 Smear Tabs. The determination of the area that is to be surveyed shall be made by the IH&S representative on the job.

- Fold smear tab in half, with the potentially contaminated side in, place in a glassine bag, and place smear number on the bag. **CAUTION:** Do not place more than one sample in a glassine bag.

- Collect the sample in a manner that your hands will not come in contact with surface being sampled. If contact is made, the sampler shall wash hands or change gloves before collecting the next sample.

- The sample number and a detailed description of the sample collected is to be entered on Table A-2, the Beryllium Smear Sample Log.

- The sample number consists of the Building number - Year, Month, Day - Industrial Hygienist number - Sequence number, (e.g., 779-961120-00-01). The Industrial Hygienist number that will be used for RCTs is 00.

- Once samples have been collected, they shall be counted on the SAC-4, BC-4 and/or equivalent instrumentation to assess radiological contamination. This will assist the Analytical Projects Office in determining which analytical facility will be utilized, and if additional packaging will be required to transport samples.

- At a minimum, the packaging required to transport the samples is to place the glassine bags inside of a ziplock bag, and place a tamper proof seal over the ziplock bag opening.

- Complete the appropriate Chain of Custody Form obtained from APO. If samples are to be transported to the laboratory by someone other than the sampler, then the sampler must relinquish the samples by signing the chain of custody form and the person receiving the samples must sign for the samples. Samples must be under chain of custody at all times.

- Transport samples to the laboratory identified by the APO representative for the job. Formally relinquish custody for the samples to the laboratory.

- Give the IH&S representative the Beryllium Smear Sample Log, associated maps and other documentation relevant to the samples collected.

NOTE: The Be housecleaning surface contamination standard is 25 ug/ft^2 (2.7 $ug/100\ cm^2$).

Table A-2 Beryllium Smear Sample Log

NAME _____ LABORATORY _____
EMPLOYEE # _____ DATE OF ANALYSIS _____
DATE _____

Sample Number	Room	Description	Area Surveyed	ug/Sample	ug/Ft^2 or ug/100 cm^2	Alpha	Beta

SAMPLE

1.0 INTRODUCTION

This protocol establishes the framework for the identification of suspect areas and the characterization of lead and other RCRA metals such as chromium, cadmium and zinc in facilities to be decommissioned. The protocol was developed in accordance with ASTM Standard E-1729-95, *Standard Practice for Field Collection of Dry Paint Samples for Lead Determination by Atomic Spectrometry.*

2.0 PURPOSE

The purpose of this protocol is to provide guidelines for the sampling of solid materials for lead. Guidelines for the sampling of other metals is also provided herein. The practices identified herein are designed to provide occupational hazard assessment information in support of decommissioning activities within a facility and waste management information. In some cases, the results may be used as final status results or to support a final survey.

2.1 INSTRUCTION DEVELOPMENT

This protocol serves as a guide in the preparation of specific instructions for lead and metals characterization using the DQO information contained herein are referenced in Section 5.0 of this document. Additionally, the instructions should contain:

- Specific instructions, including sample location maps
- Bulk Sample Data Sheet(s)
- Sample Photo Data Cards
- Labels
- Chain of Custody
- Job Briefing sheet for sampling personnel

2.2 INITIAL CLASSIFICATION

Areas and components within a facility will be classified as suspect or non-suspect for characterization purposes by utilizing the following information:

- Review of historical records
- Interviewing building personnel
- Review operational records

Suspect Areas: These are areas and components where lead and/or other metals have been identified, through historical research of building records or by visual inspection techniques, to exist in paint, fragments or dust.

2.2.1 High Probability Locations for RCRA Lead and Metals

- Wall 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: These are areas and components where there is a high level of certainty that lead and/or metals do not exist due to their absence in paint chips, dust, fragments or other material forms. Process knowledge may also be used as a source for identification of non-suspect areas.

- Non-painted cement or cinder block surfaces
- Low Probability locations for RCRA Metals

3.0 SURVEY PROCEDURE

Sampling for lead and metals will be primarily performed utilizing a dust sampling technique and a paint scraping technique. The paint scraping technique is the preferred method for sampling when possible as the exact location of the lead or metal can be identified precisely. With dust sampling, the sample may include surface areas from many locations. Each sample will be acquired with the intent of assuring the quality, representativeness and safety of the process. When required, a RCT will be present to survey the area and location of the sample prior to proceeding. Controls and PPE will be specified in the AHA.

3.1 SAMPLING LOCATIONS

Sample locations are selected randomly according to how each represents a homogeneous material. Since homogeneous areas are located throughout the buildings, 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.

3.2 SETTLED DUST SAMPLING

Settled dust sampling is used as an aid to assessment of Industrial Hygiene issues such as work practices, engineering controls, and PPE during decommissioning. The supplies required for performing settled dust sampling are:

Supplies Required:

- One Micro-Vac Sampler pump calibrated at 2 lpm.
- One template that sequesters a 10 sq. inch pattern
- One 25 mm cassette attached to the Micro Vac Sampler
- A two inch section of tygon tubing
- Labels, sharpie and sampling logs
- Plastic baggies for the samples
- Chain of custody form
- Camera (Optional)
- Tables B-1, B-2 & B-3 of this protocol

Sampling Technique

Place template on area to be sampled. Slowly vacuum all surface areas inside template with tygon hose which is attached to the micro-pump (Change tubing and cassette for each sample). Label the cassette with an identification number and seal. Document the sample location and description on the Chain of Custody form. Photograph the sample identification area with photo identification card (Optional). Complete Tables B-1, B-2 and B-3 of this protocol.

3.2 Paint Chip Sampling

Paint chip sampling is used as an aid in Industrial Hygiene assessments regarding work practices, engineering controls, and PPE. Prior to sampling, ensure that the location of paint sampling is cleaned in order to minimize the prospect of cross-contamination. Paint chip sampling is a destructive method that may release a small quantity of dust containing lead. Therefore, appropriate safety precautions must be taken to ensure protection of the sampler and prevent the spread of suspect materials. It is also important to ensure that before any paint sampling occurs, the proper method of containment is identified and utilized. The general guidelines to perform paint chip sampling are:

Containment Methods When Procuring Paint Samples

Method One: Paint Chip Sampling Utilizing Plastic Sheeting

Place a clean sheet of plastic, large enough to capture all of the sample. Any visible paint chips falling onto the plastic shall be included in the sample. After each sample is collected, thoroughly clean the plastic, or dispose of it in a trash bag.

Method Two: Paint Chip Sampling Utilizing Glovebag Approach

If further containment is required, a "glovebag" approach may be used. A durable sleeve is loosely taped to the surface to be sampled. The glovebag should be large enough to house a paint scraper, collection device, and shipment container inside the plastic. There should be enough "play" in the plastic to permit a scraping motion without dislodging the tape holding the plastic glovebag to the surface. Large plastic baggies can be used in lieu of a glovebag if paint chips are to be shipped to the lab in plastic baggies. Properly conducted, the glovebag approach completely seals the sample area during the actual scraping operation. A sheet of plastic is recommended for use under the glove bag to capture any debris that falls to the ground during the glove bag removal. The tape should be slowly removed from the surface to avoid lifting any additional paint off of the surface.

Supplies Required for Paint Chip Sampling:

- Sharp stainless steel paint scraper.
- Disposable wipes for cleaning paint scraper.
- Non-sterilized, non-powdered, disposable gloves.
- Hard-shelled containers that can be rinsed if results are to be reported in ug/g or percent by weight.
- Plastic baggies for samples
- Labels to identify the sample, sharpie and sample log
- Collection device (clean creased piece of paper or cleanable tray).

- Field sampling and laboratory submittal forms.
- Tape measure or template (if results are reported in mg/cm^2).
- Ladder
- Sheet of plastic
- Plastic trash bags
- Flashlight
- Adhesive tape

Paint Sample Collection

- Template and measure the area to be sampled precisely. (Area must be four square inches in size and must have a minimum weight of 0.2 grams. The sample size maybe adjusted with IH&S approval).

Special Notes: Person collecting paint chips samples shall wear latex gloves for each sample.

If analysis results are reported in mg/cm^2 or mg/kg include a small amount of substrate in the sample is permitted.

Using a razor sharp chisel or scraper and hammer, scrape paint sample directly off the substrate surface and/ or sampling surface. (Remove all layers of the paint equally but none of the substrate).

- Place the sample in an approved container for shipment

- Record the exact location, sample area dimensions, description of paint color and substrate component on the field sampling form and the chain of custody form

Composite Paint Chip Sample Collection

When it is not possible to collect the required size sample at one location, a composite sample may be collected. Paint chip samples may be composited by collecting individual subsamples from different areas with similar surfaces and color. Each subsample should be the same size and weight. No more than five subsamples shall be included in the same sample container or ziplock baggie.

Cleanup and Repair

- All settled dust generated should be cleaned up using wet wipes.

- The surface from which the sample was obtained may be resealed with new paint if necessary. If desired, apply spackling and/or new paint to repair the area where paint was removed.

- Personnel conducting paint sampling shall avoid hand-to-mouth contact (specifically, smoking, eating, drinking, and applying cosmetics) and shall wash their hands with running water immediately after sampling.

Preparing Sample for Transfer to Lab

The samples shall be submitted to a laboratory recognized by the EPA National Lead Laboratory Accreditation Program (NLLAP). Appropriate sample submittal forms (Chain of Custody) 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.

Table B-1 Bulk Sample Data Sheet

Job # ____________ Name ______________________ Date _______

General Description of building/area: ______________________________

Sample Number	Sample Description and Location	Lab

SAMPLE

PREPARED BY ______________________ **DATE** ________

SIGNATURE ______________________

Table B-2 Sample Photo Data Card

BUILDING_____ROOM _____ DATE_____

SAMPLE NUMBER: _____

EXAMPLE

PREPARED BY _____ DATE _____

SIGNATURE _____

Table B-3 Labels

779-970108- MS-001	779-970108- MS-001	779-970108- MS-001
779-970108- MS-002	779-970108- MS-002	779-970108- MS-002
779-970108- MS-003	779-970108- MS-003	779-970108- MS-003
779-970108- MS-004	779-970108- MS-004	779-970108- MS-004
779-970108- MS-005	779-970108- MS-005	779-970108 -MS-005
779-970108- MS-006	779-970108- MS-006	779-970108- MS-006
779-970108- MS-007	779-970108- MS-007	779-970108- MS-007
779-970108- MS-008	779-970108- MS-008	779-970108- MS-008
779-970108- MS-009	779-970108- MS-009	779-970108- MS-009
779-970108- MS-0010	779-970108- MS-0010	779-970108- MS-0010
779-970108- MS-0011	779 -970108-MS -0011	779-970108- MS-0011
779-970108- MS-0012	779 -970108-MS-0012	779-970108- MS-0012
779-970108- MS-0013	779-970108-MS-0013	779-970108- MS-0013
779-970108- MS-0014	779-970108- MS-0014	779-970108- MS-0014
779-970108- MS-0015	779-970108- MS-0015	779-970108- MS-0015
779-970108- MS-0016	779-970108- MS-0016	779-970108- MS-0016
779-970108- MS-0017	779-970108- MS-0017	779-970108- MS-0017
779-97010-8- MS-0018	779-970108- MS-0018	779-970108- MS-0018
779-970108- MS-0019	779-970108- MS-0019	779-970108- MS-0019
779-970108- MS-0020	779-970108- MS-0020	779-970108- MS-0020
779-970108- MS-0021	779-970108- MS-0021	779-970108- MS-0021
779-970108- MS-0022	779-970108- MS-0022-	779-970108- MS-0022

1.0 INTRODUCTION

This protocol describes how to perform asbestos surveys. The criteria outlined are specifically designed to provide occupational hazard assessment information in support of decommissioning activities while performing asbestos activities and will aid in characterization of asbestos containing waste. However, in some cases, the results, particularly those from locations not affected by asbestos operations, may be used as final status results or to support a final survey. This protocol was developed in accordance with 40 CFR 763, *Asbestos* and applicable state regulations.

No activity that may cause asbestos to become airborne will be authorized, without the proper personal protective equipment and controls. Controls and PPE used, will be specified in the AHA.

2.0 PURPOSE

The purpose of this protocol is to provide guidelines for the sampling and analysis of asbestos. Although asbestos sampling instructions will be completed by a Colorado State Certified Inspector, the protocol can be used to help understand the sampling requirements.

This approach is consistent with the most conservative techniques available, and ensures compliance with applicable federal and state regulations.

2.1 INSTRUCTION DEVELOPMENT

This protocol serves as a guide in the preparation of specific instructions to obtain all of the answers to the questions referenced in Section 5.0 of this document. Additionally, the instructions should contain:

- Specific instructions, including sample location maps
- Asbestos Containing Material Inventory Worksheet (Table C-1)
- RFETS Inspection Checklist (Table C-2)
- Bulk Sample Data Sheet (Table B-1)
- Photo Data Card(Table B-2)
- Labels (Table B-3)
- Chain of Custody
- Job Briefing Sheet for Sampling Personnel

The survey practices outlined in this protocol are specifically designed to provide occupational hazard assessment information in support of decommissioning activities within buildings. However, the information may be used to provide support for a comprehensive operation and maintenance program during normal building activities.

2.2 INITIAL CLASSIFICATION AND SURVEY PROCEDURES

The first step in sampling for asbestos in a building is to research the building records such as blueprints and specifications for documentation relating to the use of asbestos. Dates of construction are considered in this process. In addition to building materials, certain process equipment may have used asbestos as an insulator or protective covering, and this use must be verified through research and sampling.

The second step in this process is to physically tour the building, entering every accessible area and room, looking for affected materials that may indicate, through historical data, or based on the inspector's experience, the presence of asbestos. A listing of suspect materials and areas is generated, along with estimated quantities. Non-suspect (or unaffected) materials are those traditionally made of wood, glass or metal. However, the inspector will suspect that 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. Data compilation will separate the materials into homogeneous areas within these three 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. Each building and/or construction date is sampled as a single entity.

The number of samples for each homogeneous area is determined initially by its physical condition such as friability, then by it's 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, require 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 must be sampled accordingly. Friable surfacing materials, such as fireproofing or ceiling texture, must have a nine section grid applied to a blueprint of the area and samples must be acquired from the randomly selected areas within the grids. If the homogeneous area of friable surfacing material is less than 1,000 square feet, three samples are needed; if between 1,000 and 5,000 square feet, five samples are needed; if the area is over 5,000 square feet, seven samples are needed. Miscellaneous materials, such as floor and ceiling tiles, are sampled according to the inspector's discretion. A minimum of one sample of each suspected material in this category will be acquired.

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 are the driving factors rather than exact location of the sample in each room. Exact locations are directly affected by the radiological concerns. An RCT will accompany the inspector, where necessary. If a selected location is determined to exceed acceptable parameters, a second location is selected. Should no radiologically acceptable location be found, a contaminated sample is acquired and treated accordingly.

2.3 SAMPLING METHODOLOGY

Each sample is acquired with the intent of assuring the quality of the sample, representation of the sample, and safety of the sampler. Note that an RCT will be present as necessary to survey the area and location of the sample prior to obtaining the sample. The following steps will be performed for each sample acquired:

- The location of the sample is visually verified against written descriptions.
- A polyethylene drop cloth or a baggie is secured below the sample area but above the floor.
- The immediate sample area is wetted with a mist of water and surfactant.
- A sampling tool, such as a hammer and chisel, razor knife, "Wondermaker" or hole saw is selected and the sample is acquired, making sure to take a complete sample from the substrate. Each sample must be a minimum of one cubic centimeter and no more than that necessary to be representative of the suspect material. During this process, the immediate surface is misted as needed to preclude drying.
- 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 form and the container is verified to be sealed.
- The sampling tool is thoroughly cleaned using the mister and wipes.
- The sample area is patched as needed.
- The description and location is documented on a form (Table B-1), a sample label is placed on the form, and the location is documented on a blueprint or other suitable drawing.
- 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 is 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 spent wipes, drop cloths, and PPE will be added to the appropriate waste stream.

Table C-1 Asbestos Containing Material Inventory Worksheet

Building Number _____ Room Number _____ Date _____

TSI INVENTORY:

Pipe: Type: _____ Linear/sq. ft. _____ Fitting count: _____
Type: _____ Linear/sq. ft. _____ Fitting count: _____
Type: _____ Linear/sq. ft. _____ Fitting count: _____
Type: _____ Linear/sq. ft. _____ Fitting count: _____
Type: _____ Linear/sq. ft. _____ Fitting count: _____

Duct: Type: _____ Duct Size/app. _____ Sq. ft. _____
Duct: Type: _____ Duct Size/app. _____ Sq. ft. _____

Other: _____

_____

SURFACE INVENTORY:

Location: _____ Description: _____ Sq. ft. _____
Location: _____ Description: _____ Sq. ft. _____
Location: _____ Description: _____ Sq. ft. _____
Location: _____ Description: _____ Sq. ft. _____

MISCELLANEOUS INVENTORY:

Location: _____ Description: _____ Sq./lin ft. _____
Location: _____ Description: _____ Sq./lin ft. _____
Location: _____ Description: _____ Sq./lin ft. _____
Location: _____ Description: _____ Sq./lin ft. _____
Location: _____ Description: _____ Sq./lin ft. _____
Location: _____ Description: _____ Sq./lin ft. _____

PREPARED BY _____ **DATE** _____

SIGNATURE _____

Table C-2 RFETS ACM Inspection Checklist

1. Inspector _____ Signature _____ Accreditation # _____ State _____
   Date _____

2. Building No.: _____
   Bldg. Area Code: _____

- ☐ 1. 1st Floor
- ☐ 2. 2nd Floor
- ☐ 3. 3rd Floor
- ☐ 4. 4th Floor
- ☐ 5. Basement
- ☐ 6. Crawl Space
- ☐ 7. Roof
- ☐ 8. Exterior of bldg.
- ☐ 9. Plenum
- ☐ 10. Other: _____

3. Room Number: _____
   Column Numbers: _____

4. Specific Location: _____

5. % Functional Space: _____

6. Functional Space I.D.: _____
   Homogeneous Area I.D.: _____

7. MATERIAL TYPE CATEGORY:

- ☐ T. Thermal System Insulation
- ☐ S. Surfacing Material
- ☐ M. Miscellaneous Material

8.1 TSI ACM:
Pipe Length (ft.) _____

8.2 TSI ACM:
Pipe Length (in.)

8.3 TSI ACM:
Pipe with Insulation Diameter (in.)

8.4 Surfacing Misc. ACM:

8.5 Total Surface Material (sq. ft.)

8.6 Surfacing Misc. ACM:
Depth of Surface Material (in.)

9.1 FUNCTION CODE:

- ☐ 1. Acoustic Insulation
- ☐ 2. Baseboard
- ☐ 3. Boiler/Furnace Insulation
- ☐ 4. Caulking Material
- ☐ 31. Vibration Damper
- ☐ 32. Wall Board

FUNCTION CODE (cont'd)

- ☐ 9. Cold Water Pipe Fitting
- ☐ 10. Condensate Pipe
- ☐ 11. Condensate Pipe Fitting
- ☐ 12. Cooling Tower Baffles
- ☐ 13. Debris/Settled Dust
- ☐ 14. Domestic Cold Water Pipe
- ☐ 15. Domestic Cold Water Fitting
- ☐ 16. Door
- ☐ 17. Drain Pipe
- ☐ 18. Drain Insulation
- ☐ 19. Exterior Construction
- ☐ 20. Floor Tile
- ☐ 21. Fire Stop
- ☐ 22. Fire Proofing Insulation
- ☐ 23. High Temperature Water Pipe
- ☐ 24. High Temperature Water Pipe Fitting
- ☐ 25. Mastic Adhesive
- ☐ 26. Roofing
- ☐ 27. Steam Pipe
- ☐ 28. Steam Pipe Fitting
- ☐ 29. Tank Insulation
- ☐ 30. Transite

9.2 ASBESTOS FORM CODE:

- ☐ 1. Air Cell
- ☐ 2. Blanket
- ☐ 3. Block
- ☐ 4. Cloth On
- ☐ 5. Loose Fill
- ☐ 6. Preformed
- ☐ 7. Sheet
- ☐ 8. Sprayed
- ☐ 9. Troweled On
- ☐ 10. Other:

9.3. COLOR CODE:

- ☐ 1. B Blue
- ☐ 2. BL Black
- ☐ 3. BR Brown
- ☐ 4. G Green
- ☐ 5. GR Gray
- ☐ 6. O Orange
- ☐ 7. W White
- ☐ 8. Y Yellow
- ☐ 9. Other:

9.1 FUNCTION CODE: (cont'd)

- ☐ 5. Ceiling Tile
- ☐ 6. Chilled Water Pipe
- ☐ 7. Chilled Water
- ☐ 8. Cold Water Piping
- ☐ 33. Wall Insulation
- ☐ 34. Wall Plaster/Spackle
- ☐ 35. Other : _____

10. CONSISTENCY:

- ☐ Brittle - hard
- ☐ Semi - Solid
- ☐ Fibrous - loose
- ☐ Granular -Pliable

11. CURRENTLY FRIABLE:

- ☐ Yes
- ☐ No

12. CAUSE OF DAMAGE:

- ☐ 1. Area Usage
- ☐ 2. Vibration
- ☐ 3. Air Flow
- ☐ 4. Water Damage
- ☐ 5. Service Activity
- ☐ 6. Usual Aging
- ☐ 7. Other:

13. CONTAMINANT PRESENT:

- ☐ 0. None
- ☐ 1. Spotty
- ☐ 2. Widely Scattered
- ☐ 3. Entire Area

14. DISPERSAL FACTOR:

- ☐ 1. Water
- ☐ 2. Air
- ☐ 3. Occupant
- ☐ 4. Machinery

15. AREA USED BY:

- ☐ Maintenance Workers
- ☐ Operations Workers
- ☐ Administrative Personnel
- ☐ Visiting Public

1.0 INTRODUCTION

This protocol describes how to perform chemical & liquid surveys. The criteria outlined are specifically designed to provide occupational hazard assessment information in support of decommissioning activities and to support waste management activities. If the systems are closed loop and no chance exists for foreign or new materials to enter the systems, then results may be used to support final survey results and reporting.

2.0 PURPOSE

The purpose of this protocol is to provide a consistent approach to the sampling and analysis of liquid materials.

The sampling practices outlined are designed to provide information to be used in support of decommissioning activities including occupational hazard assessment and waste management within a facility. However, in some cases the results, particularly those from locations not affected by chemical and liquid continuous operations (i.e., closed loop) may be used as final status results or to support a final survey.

2.1 INSTRUCTION DEVELOPMENT

This protocol serves as a guide in the preparation of specific instructions to obtain all of the answers to the questions referenced in Section 5.0 of this document. Additionally, the instructions should contain facility drawings, photographs and facility walk-downs to provide detailed information to assist the project engineer in making determinations of sampling locations.

2.2 INITIAL CLASSIFICATION

In an effort to provide an organized approach to the characterization activities, rooms are identified as being in one of two classifications, affected and unaffected. These classifications aid in focusing the sampling effort at the areas with a higher potential of contaminants.

Affected areas: For the purpose of liquids sampling, affected areas are defined as those rooms and equipment that have had a history of containing liquids and chemicals including the presence of equipment containing reservoirs (i.e., machining lathes, etc.), process lines, piping, tanks, containers, sinks, sumps and any other vessel likely to contain liquids or chemicals. Facility drawings, photographs and facility walk-downs provide detailed information to assist the project engineer in making determinations of sampling locations.

Unaffected areas: Unaffected areas are defined as areas, rooms or equipment where there is no history or process knowledge of liquids or chemicals being present, or which have been verified through visual inspection as being empty, and containing no chemical residues or liquids. Examples of such rooms include hallways, closets and office areas which have no visible reservoirs or piping systems associated with them, and have no container storage facilities. In some cases, rooms may be classified as unaffected based on visual inspections which confirm all liquid sources to be empty or absent.

2.3 DATA COLLECTION

Upon initial classification as an unaffected or affected area, a facility walk-down of the area or room is conducted in an effort to visually identify those items that require sampling. A sampling request is then completed and forwarded to the Analytical Projects Office (APO) for each room and equipment item to be sampled and the APO coordinates with the project engineer to arrange for the sampling event.

Data collected during the characterization activities will consist of two types:

(1) Field measurements using portable instruments or test kits (i.e., pH paper); and

(2) Sample analyses of media using fixed laboratory equipment or systems.

Radiological surveys will be performed by trained RCTs using field instrumentation in accordance with Radiological Operations Instructions during sampling activities, as necessary. Radiation protection associated with the sampling event and the sampling team will be addressed under a Radiological Work Permit (RWP). Controls and personal protective equipment for the sampling activity, if required, will be as specified in the AHA.

A trained sampling team is used to perform the sampling activities required for characterization purposes. Analysis for characterization purposes will be performed using Environmental Protection Agency (EPA) approved procedures, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, U.S. EPA SW-846, 1986, Third Edition using laboratory facilities located onsite.

During characterization activities, several direct, indirect and media samples will be obtained and analyzed for radiological and hazardous material contaminants. The results will be used to qualify and quantify contaminants and are the basis for estimating waste volumes identifying waste management and dispositioning and identifying decontamination options. Sample collection, analysis, and the associated documentation will be performed in accordance with relevant site procedures which meet the recommendations and requirements of applicable regulatory agencies. A "chain of custody" sample tracking form is used for each sample collected to account for the sample from collection to the point of analysis. Samples will be collected and documented in accordance with Laboratory Procedure No. L-6294-A, *Sampling Within an RBA/CA*, for the Protected Area (PA) work and L-6245-F, *Sampling Procedure For Waste Characterization On The "Cold Side"*, non-PA work.

1.0 INTRODUCTION

This protocol describes how to perform Polychlorinated Biphenyls (PCB) characterization surveys. The criteria outlined are specifically designed to provide PCB occupational hazard assessment and waste management information in support of decommissioning activities.

No activity that may cause the release of PCB materials will be authorized, unless the proper personal protective equipment and controls are in place. Controls and PPE to be used, will be specified on the AHA.

2.0 PURPOSE

The purpose of this protocol is to provide a consistent approach for the identification and analysis of materials potentially containing PCBs.

The PCB identification and sampling practices outlined are specifically designed to provide occupational hazard assessment and waste management information in support of decommissioning activities within a facility. However, in some cases the results, particularly those from locations not affected by new introductions of PCBs (i.e., closed loop) may be used as final status results or to support a final survey.

2.1 INSTRUCTION DEVELOPMENT

This protocol serves as a guide in the preparation of specific instructions to obtain all of the answers to the questions referenced in Section 5.0 of this document. Additionally, the instructions should contain:

- How to quantify the physical and chemical characteristics of PCB contamination and determine the extent of PCB contaminant distribution in an affected area.
- How to quantify and qualify environmental parameters that affect potential human exposure from existing and residual PCB material contamination.
- How to identify PCB containing materials based on historical and industrial data.
- How to identify the limiting conditions for sampling.
- How to perform representative sampling of a suspect area; and
- Facility drawings, photographs and facility walk-downs to provide detailed information to assist the project engineer in making determinations as to where sampling should be conducted.

2.2 INITIAL CLASSIFICATIONS

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. (Attachment 1.0)

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

Affected areas: These 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 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 ventilation gaskets in HVAC 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.

Unaffected areas: 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.

3.0 SAMPLING METHODOLOGY

NOTE: For actual sampling refer to Procedures L-6294-A and L-6245-F to perform sampling activities.

Data collected during the characterization activities will consist of two types:

(1) Collection of field swipes taken from PCB-suspect items; and

NOTE: A minimum of five grams of media is required to perform the PCB solids analysis.

(2) Sample analyses of media (paint chips, liquids, etc.) using laboratory equipment or systems.

Before performing sampling activities, the following must be evaluated:

- Method of collection and sampling equipment required
- Bottle/equipment decontamination and disposal

- Field and measuring equipment required
- Sampling parameters
- Sample collection, bottling & preservation
- Sample disposal
- Chain of custody requirements

Sampling Equipment (As Required):

- Watch
- Field sampling requests
- Pager and/or radio
- Hearing protection
- Coolers
- Ice packs
- Squeeze bottles
- Various tools, screwdriver, scissors, hammer, bung drum wrench
- Flashlight
- Sampling logbook
- Spray bottles
- Glass sampling bottles
- Sample labels
- TIDs

3.1 SAMPLING ACTIVITIES

Radiological surveys will be performed by trained RCTs using field instrumentation in accordance with Radiological Operations Instructions during sampling activities, as necessary.

A trained sampling team is used to perform the sampling activities. 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. Onsite 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. A table describing the differences in these methods is included in Appendix A. 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) APO office in B881. DQOs for off-site laboratories are established under individual QA/QC Programs which meet the intent of EPA SW-846 requirements.

During characterization activities, several direct, indirect and media samples will be obtained and analyzed for radiological (as needed) and PCB contaminants. The results will be used to determine contaminants and as the basis for estimating waste quantities and waste management and decontamination options. Sample collection, analysis, and the associated documentation will follow site procedures which meet the recommendations and requirements of applicable regulatory agencies. A "chain of custody" sample tracking form is used for each sample collected to account for the sample from collection to the point of analysis. Samples will be collected and documented in accordance with Laboratory Procedure No. L-6294-A, *Sampling Within an RBA/CA*.

3.2 ANALYSIS METHODOLOGY

Specialized procedures have been developed at RFETS to meet technical requirements for analyzing certain substances, such as those containing radionuclides or compounds which interfere with the accuracy and precision of the analysis. These test methods are entitled the "L-Procedures." "L- Procedures" are based on test methods found in 6 CCR, 1007-3, Part 261; *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, U.S. EPA SW-846, 1986, Third Edition, as amended by Updates I (July 1992), II (September 1994), and IIA (August 1993); *Methods for Chemical Analysis of Water and Wastes*, EPA Publication No. 600/4-79-020 (1979). Various other EPA approved protocols such as those from the American Society of Testing and Materials (ASTM) are also used.

Analysis for hazardous waste determination is conducted in accordance with Rocky Flats Site Procedure, 1-C75-HWRM-03, *Waste Identification and Analysis*.

This document outlines and references requirements of waste management for liquids which will be handled as waste material. This document contains the guidelines used at RFETS to determine if a waste is regulated as hazardous under RCRA, and to identify the waste characteristics/constituents for proper management of the waste.

3.3 QUALITY ASSURANCE

The Quality Assurance Program (QAP) for characterization activities follows the same program for management of hazardous wastes on-site and meets the minimum requirements established by *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, U.S. EPA SW-846, 1986, Third Edition. QA/QC procedures addressing waste characterization are maintained at the site.

3.4 DATA ANALYSIS AND REVIEW

As specified in TSCA and 40 CFR 761.60(4), disposal of solid PCBs is regulated at concentrations of 50 parts per million (ppm) or greater in the form of contaminated soil, rags or other debris. Processing or distribution in commerce of any PCB or PCB item, regardless of concentration, that is not specifically authorized is prohibited.

Results of all characterization activities will be documented in field notebooks and summarized in a characterization report. This characterization report will be distributed to appropriate project personnel to support decisions made for waste management, industrial hygiene, decontamination and other activities which may involve hazardous and radiological contaminants. The inventory of materials and the characterization results will be provided to the IH & S group for hazard review. IH&S will determine if engineering controls or personal protective equipment will be required during Decommissioning activities and provide recommendations during work package development.

Sample results for liquid wastes generated are submitted to the building Environmental Coordinator (EC) and/or the project Waste Specialists in order to prepare for waste disposal.

1.0 INTRODUCTION

This protocol describes how to perform radiological characterization surveys. The criteria outlined are specifically designed to provide radiological occupational hazard assessment information in support of decommissioning activities while performing radiological work activities.

No activity that may cause radioactive materials to become airborne will be authorized, without the proper personal protective equipment and engineering controls, until smear, fixed and scan sampling demonstrates that the area is below the permissible limits for working in radiologically controlled areas.

2.0 PURPOSE AND OBJECTIVES

The purpose of this protocol is to provide guidelines for the radiological sampling of buildings, structures and environs for characterization purposes.

This approach is consistent with the most conservative information available, and ensures compliance with applicable federal, state and site regulations and requirements.

2.1 INSTRUCTION DEVELOPMENT

This protocol serves as a guide in the preparation of specific instructions to obtain all of the answers to the questions referenced in Section 5.0 of this document. Additionally, the instructions should contain:

Before starting the actual characterization activities a historical profile must be developed to support the instruction development process. This process will include:

- A review of operating history of the facility or building with respect to use, spills, releases and any other significant radiological events.
- Review of radiological data from past scoping and characterization surveys.
- Identification of radionuclides of concern and determine guidelines.
- Classification of areas as "affected" or "unaffected".

2.2 INITIAL CLASSIFICATION

All areas of facilities or buildings do not have the same potential for residual contamination and therefore do not require the same level of characterization survey coverage to determine the initial classification. By combining historical data with surveillance and routine surveys, an effective and efficient characterization process will be conducted.

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

Affected areas: These are areas that have potential radioactive contamination (based on historical reviews) or known radioactive contamination (based on past or preliminary radiological surveillance). This would normally include areas where radioactive materials were used and stored, where records indicate spills or other unusual occurrences that could have resulted in spread of contamination and where radioactive materials were buried. Areas immediately surrounding or adjacent to locations where radioactive materials were used or stored, spilled, or buried are included in this classification because of the potential for inadvertent spread of contamination.

Unaffected areas: All areas not classified as affected will be labeled unaffected. These areas are not expected to contain residual radioactivity, based on a knowledge of site history and previous survey information.

3.0 SURVEY APPROACH

When performing radiological characterization surveys in affected and unaffected areas the surveys will be directed toward biased locations identified during the historical review phase. Additionally random points will also be selected in non biased areas to validate previous survey data.

Normally when performing characterization activities, the surveys will consist of surveying structures (which consist of equipment, ceilings, walls, floors, etc.), environs (surface and subsurface) and liquid pathways, if applicable. Sampling guidance from NUREG/CR-5849, *Manual for Conducting Radiation Surveys In Support of License Termination* and *Multi-Agency Radiological Survey and Site Investigation Manual* (MARSSIM) will be utilized as appropriate.

3.1 SURVEY TECHNIQUES AND PLANS

The characterization will be conducted in accordance with documented plans, instructions and procedures. The survey plan or instruction will define the general approach to performing measurements and sampling. Figure A-1 provides an example of a survey instruction. To determine the number of survey locations on the equipment that Radiological Engineering evaluates:

- Size of equipment or structure
- Radiological history
- Initial classification status

The quality assurance plan establishes the basis for assuring the adequacy and quality of the survey data. Specific survey techniques are detailed in procedures, which may be included in the instruction or plan or incorporated by reference. Personnel (RCTs) conducting the surveys will be trained and qualified in the Radiological Operating Instructions (ROIs) procedures they use. In addition to procedure training, the RCTs will be qualified in accordance with the site requirements (DOE and Site Radiological Control Manuals (RCM) Training User's Manual (TUM) and oral board examinations to ensure they are fully qualified RCTs. Changes in plans and procedures may be necessary, based on unanticipated findings or conditions encountered as the survey progresses. These changes will be reviewed and/or documented by the supervision in charge of the survey(s) and these changes will be made in accordance with the site procedure approval & revision process.

Surveys will address alpha, beta, gamma and neutron emitting materials as appropriate. Various types of instrumentation will be utilized. However, the instrumentation normally falls into three categories. These categories are: (1) Gas filled detectors, (2) Scintillation detectors, and (3) Solid state detectors.

The design and the conditions under which a specific detector is operated determines the types of radiation (alpha, beta and/or gamma) that can measured, the sensitivity level for measurements and the ability of the detector both to differentiate between different types of radiation and distinguish between the energies of the interacting radiation. The particular capabilities of a radiation detector will, in turn, establish its potential applications in conducting a survey for final site release. A listing of alpha, beta, and gamma radiation detector types along with their usual applications are listed in Tables F-1 and F-2.

Table F-1 Radiation Detectors with Application to Alpha Surveys

Detector Type	Detector Description	Application	Remarks
gas proportional	< 1 mg/cm^2 window; probe face area 50 to 100 cm^2.	surface scanning; surface activity measurement; field evaluation of smears	
	< 0.1 mg/cm^2 window; probe face area 10 to 20 cm^2.	laboratory measurement of water, air and smear samples	
	no window (internal proportional); Probe face area 10 to 20 cm^2.	laboratory measurement of water, air and smear samples	
scintillation	ZnS(Ag) scintillator; probe face area 50 to 100 cm^2.	surface scanning; surface activity measurement; field evaluation of smears	
	ZnS(Ag) scintillator; probe face area 10 to 20 cm^2.	laboratory measurement of water, air and smear samples	
	Lucas scintillation flask	laboratory measurement for low levels of radium	
solid state	silicon surface barrier detector	laboratory analysis by alpha spectroscopy	

Table F-2 Radiation Detectors with Application to Beta/Gamma Surveys

Detector Type	Detector Description.	Application	Remarks
gas proportional	< 0.1 mg/cm^2 window; probe face area 10 to 20 cm^2. < 1 mg/cm^2 window; probe face area 50 to 100 cm^2. no window (internal proportional); Probe face area 10 to 20 cm^2.	surface scanning; surface activity measurement; field evaluation of smears laboratory measurement of water, air and smear samples laboratory measurement of water, air and smear samples	better measurement sensitivity for low energy beta particles than detectors with windows
Geiger-Mueller	1.4 mg/cm^2 window; probe area 10 to 100 cm^2 various window thickness; few cm^2 probe face	surface scanning; surface activity measurement; laboratory measurement of samples special scanning applications laboratory	
scintillation	liquid scintillation cocktail containing sample	laboratory analysis; spectrum analysis capabilities	

Three techniques will be used for surveys. These techniques include:

Scan surveys: Scan surveys are conducted by holding the detector as close as possible to a surface and moving the detector across the surface at a slow speed, (about one detector width per second). Nominally the distance between the detector and the surface is maintained at less than 2 centimeters with the exception of alpha scanning for which the distance should be less than 1 centimeter.

Fixed point surveys or Direct measurements: Fixed point surveys are conducted by holding a detector as close as possible to a surface for a specified period of time. Normally this is a integrated count for one minute using a (100 cm^2) detector which has the required sensitivities to measure below the guideline values.

Removable contamination measurements: Smears for removable surface activity are obtained by wiping an area of approximately 100 cm^2 using a dry filter paper, such as a Whatman 50 or equivalent, while applying a moderate pressure. Normally a smear is taken at each direct measurement location, although for characterization purposes it is not always required. Large area wipes or "masslin smears" can be utilized during scoping and characterization surveys.

Sampling for soil, water or other liquids are outside the scope of this protocol.

3.2 LABORATORY SAMPLE ANALYSIS

Samples collected during characterization will be analyzed by trained individuals using the appropriate equipment and procedures. Samples may be analyzed on or off site, however, there must be written procedures that document the laboratory's analytical capabilities for the radionuclides of interest and a QA/QC program which assures validity of the analytical results. An example of equipment sensitivities for laboratory radiometric equipment/procedures to analyze characterization surveys are found in Table F-3.

Table F-3 Typical Measurement Sensitivities for Laboratory Radiometric Procedures Associated with Characterization Surveys

Sample Type	Radionuclides or Radiation Measured	Procedure	Approximate Measurement Sensitivity
Smears (filter paper)	Gross Alpha	Low-background gas proportional counter; 5-min. count	5 dpm
		Alpha scintillation detector with scaler; 5-min. count	20 dpm
	Gross Beta	Low background gas proportional counter; 5-min. count	10 dpm
		End window GM with scaler; 5-min. in count (unshielded detector)	80 dpm
	Low Energy Beta (H^3, C^{14}, Ni^{63})	Liquid scintillation B Counter; 5-min count	30 dpm
Soil Sediment	Cs^{137}, Co^{60}, Ra^{226}, Bi^{214}, TH^{232}, Ac^{228}, U^{235}	Gamma Spectrometry - Intrinsic germanium detector (25% relative efficiency); pulse height analyzer; 500-g sample; 15-min. analysis.	1-3 pCi/g
	U^{234}, 235, 238; Pu^{326}, 239/240; Th^{228}, 230, 232; other alpha emitters	Alpha spectrometry - pyrosulfate fusion and solvent extraction; surface barrier detector; pulse height analyzer; 1-g sample; 16-hour count	0.1-0.5 pCi/g
Water	Gross Alpha	Low-background gas proportional counter; 100-ml sample, 200-min. count	1 pCi/l
	Miscellaneous gamma emitter	Gamma spectrometry - 3.5-ml sample 16-hour count	10 pCi/l
	H^3	Liquid scintillation spectrometry; 5-ml sample; 30 min. count	300 pCi/l

3.3 SURVEY DOCUMENTATION

As surveys are completed they will be documented and forwarded to the Radiological Operations Foreman and Engineer for review and approval. Surveys generated will be controlled by the site record storage and retrieval program and they will be considered quality records.

1.0 FINAL SURVEY OVERVIEW

The purpose of the final decommissioning radiation survey will be to demonstrate the effectiveness of the decommissioning and to provide documentation that contaminated materials, structures, areas and components have been successfully removed/decontaminated to acceptable levels. Demonstrating that a facility meets established release criteria requires the systematic collection of data to assess surface activity levels, direct exposure rates and radionuclide concentrations in various remaining materials. If, as part of the overall facility disposition process additional environmental remediation actions are required, the final survey data collected as part of decommissioning will be used to document post decommissioning conditions and compliance with release criteria; as appropriate. During the course of decommissioning, materials and equipment surveyed and found to meet unconditional release criteria will be released on an on-going basis. Most decommissioning removal actions will not be the final action at a location. Remedial action will follow and final release of the site will occur after the remedial action.

All final radiological surveys will be conducted in accordance with approved procedures. Because the purpose of the final survey is to demonstrate that a facility meets the established release criteria, the survey will be performed in a manner that assures the results are accurate and that uncertainties have been adequately considered.

Surveys will be performed by trained individuals who are required to follow standard written procedures and will use properly calibrated instruments which are sensitive to the suspected contaminants. The custody of samples will be tracked from collection to analysis. Data will be recorded in an orderly and verifiable way and reviewed for accuracy and consistency. Every step of the final survey process, from training personnel to calculating and interpreting the data will be documented in a manner that lends itself to independent verification.

2.0 FINAL RELEASE CRITERIA

One of the ultimate goals of the decommissioning process is to assure that future uses of a facility will not result in individuals being exposed to unacceptable levels of radioactive materials. Another goal of the decommissioning process is to assure that future use of a facility will not result in individuals being exposed to unacceptable levels of hazardous or toxic materials (e.g., chemicals, asbestos, PCBs). Hazardous substances are addressed elsewhere in this document.

Currently the release criteria are based on the DOE Radiological Control Manual and DOE Order 5400.5.

Once this EPA Site Remediation Regulation is promulgated as final, necessary modifications to applicable plans and procedures will be made to comply with the requirements of the final regulation. These regulations will use the following dose based release criteria. The final release criteria for remaining building structures and materials will limit general population exposure to a total effective dose equivalent (TEDE) of 15/85 millirem (mrem) from the site in any single year above background. This means: (1) Conduct remediation so that, after completion of the remedial action, radioactive material in excess of background radiation levels shall not exceed concentrations that could cause any reasonably maximally exposed member of the public to receive, through all potential exposure pathways, an TEDE of 15 mrem from the site in any single year. The 15 mrem will be calculated using exposure scenarios that are consistent with the land uses contemplated in the Vision; and (2) Determine that the remediation provides a reasonable expectation that, for 1,000 years after completion of the remedial action in the event of failure of the active control measures, radioactive material in excess of background radiation levels shall not exceed concentrations that could cause any reasonably maximally exposed member of the public to receive, through all potential exposure pathways, an TEDE of 85 mrem from the site in any single year.

Residual levels of radioactive material that could be present and still assure that an individual would not exceed an acceptable radiation dose will be calculated by the analyses of various pathways and scenarios (e.g., direct radiation, inhalation, ingestion) through which exposure could reasonably occur. The derived levels, known as guideline values, release guidelines, or simply, guidelines, are presented in terms of direct radiation levels, surface activity levels, volume concentrations of radioactive material in soil and building materials, and site inventory limits. These guideline values refer to radiation and radioactivity above normal background levels. Guidelines for direct radiation are expressed in units of exposure rate, (i.e., microroentogens per hour (μR/hr). Surface activity guideline values, applicable to building or equipment surfaces, are expressed in units of activity per unit surface area [disintegration per minute per 100 cm^2 ($dpm/100\ cm^2$)]. Volume concentration guideline values, which are applied to soil, induced activity, and debris, are expressed in terms of activity per unit mass [typically, picocuries per gram (pCi/g)]. Site inventory limit refers to the total quantity of residual radioactive material permitted to remain onsite following completion of remedial action; this value is expressed in units of activity, [i.e., microcuries (μCi) or millicuries (mCi)].

The release of the site, facilities and materials remaining onsite will be based on proper application of surface contamination, volume concentration, soil/water concentrations and exposure rate release criteria. The objective of the decommissioning process is to remove a facility from service and reduce residual radioactivity to a level that permits either:

1. Release of Facility for unrestricted use; or
2. Release of Facility under restricted conditions.
3. Before the dose based guidelines are derived, the facilities will be released in an unrestricted manner only using the limits in DOE Order 5400.5.

The general decision flow for this process is shown in Figure G-1, Decision Chart for Choosing Unrestricted or Restricted Release of Facility.

The criterion for Unconditional Release of RFETS Facilities is:

- The TEDE to the reasonably maximally exposed member of the public, if no institutional controls exist or does not exceed 15 mrem/year.

- No institutional or active control measures will be required.

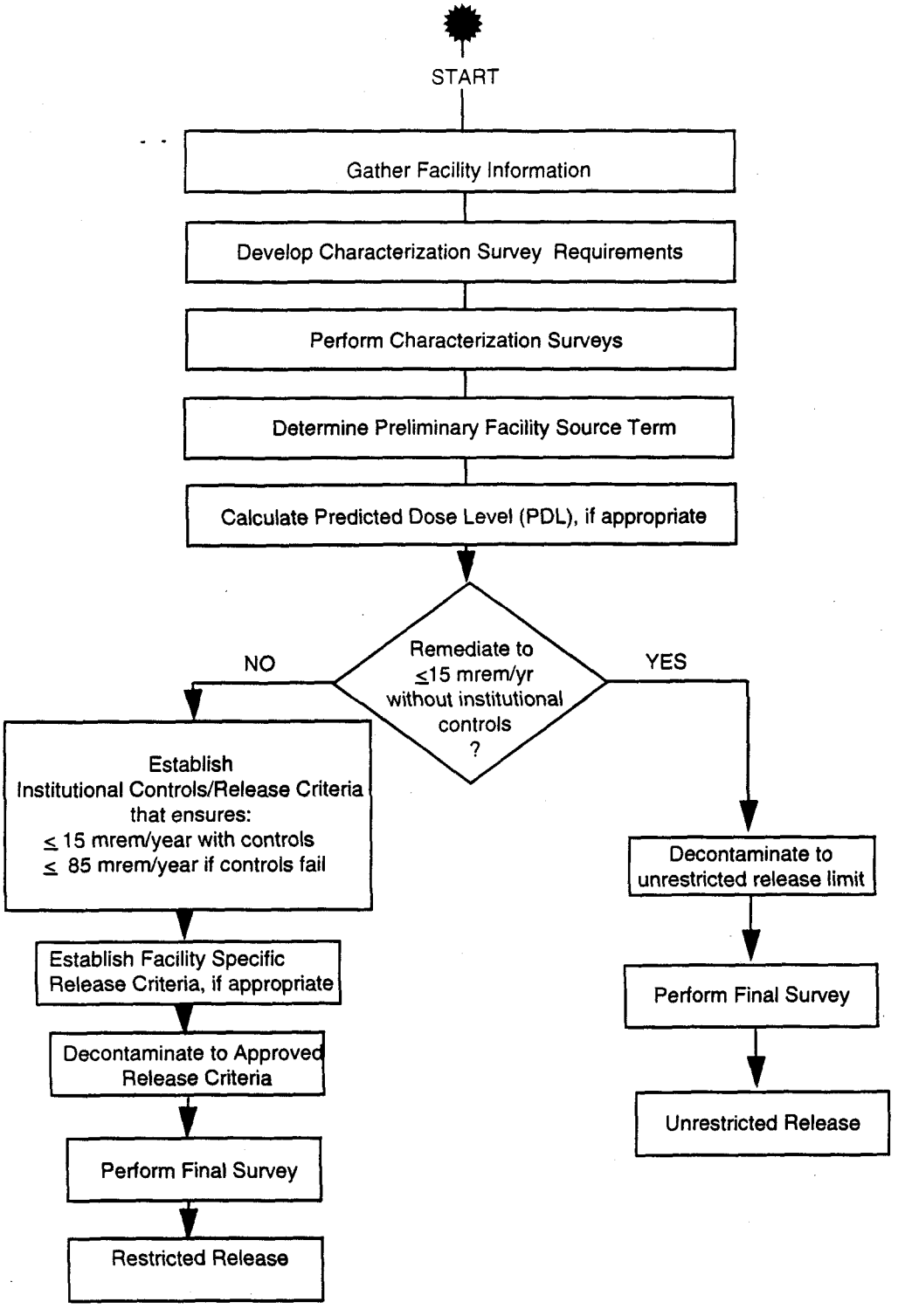


Figure G-1 Decision Chart for Choosing Unrestricted or Restricted Release of a Facility

The criterion for Restricted Release of RFETS Facilities is:

- Facilities/sites will be decontaminated until further reductions in residual radioactivity are not technically achievable, would be prohibitively expensive, or would result in net public or environmental harm. Building specific release criteria will be developed using an appropriate dose model (e.g., RESRAD - BUILD).

- The TEDE to the maximally exposed member of the public, if institutional controls failed, shall not exceed 85 mrem/year.

Two basic methods for demonstrating compliance with release criteria will be used:

1. Compare final survey results for equipment and surfaces directly to the values contained in Table G-1; or

2. Compare final volumetric survey results to limits derived using the generic dose conversion factions contained in NUREG/CR-5512, or limits derived using a site/facility (e.g., RESRAD).

3.0 BACKGROUND DETERMINATION

Background levels of radiation will be determined principally by taking radiological measurements of various construction materials (i.e., concrete, metal, tile, soil, etc.) within on-site, or off-site buildings of similar construction, but having no history of radioactive contamination. Background measurements will include both "instrument background" and naturally occurring background radioactive materials, including enhanced background radiation levels due to fallout.

Efforts will be made to find structures and materials with approximately the same physical characteristics as the facility undergoing decommissioning. The sampling scheme, sample locations, number, and statistical evaluation will be based on the guidance in NUREG/CR 5849 and/or MARSSIM.

Background response will be established for each type of instrument or measurement to be used. The objective of the background determination are to:

- Assure reliable instrument operation;

- Establish the reference background values for each type of instrument - detector to be used in the survey.

- Assess the variability in background responses for principal detectors under different applications and conditions of use; and

- Determine the need for correction factors or special measurements to establish the background of final survey measurements.

Table G-1 Summary of Contamination Values for Unrestricted Release

RADIONUCLIDE [1]	Average Total (Fixed + Removable) Contamination dpm/100 cm^2 [2], [3], [4]	Maximum Total (Fixed + Removable) dpm/100 cm^2 [2], [4], [5]	Removable dpm/100 cm^2 [2], [4], [6]
Transuranics, Ra^{226}, Ra^{228}, Th^{228}, Pa^{231}, Ac^{227}, I^{125}, I^{129}	100	300	20
Th-Natural, Th^{232}, Sr^{90}, Ra^{223}, Ra^{224}, U^{232}, I^{131}, I^{133}	1,000	3,000	200
U-Natural, U^{235}, U^{238}, and associated decay products, alpha emitters	5,000	15,000	1,000
Beta-gamma emitters (radionuclides with decay modes other than alpha emission or spontaneous fission) except Sr^{90} and others noted above [7]	5,000	15,000	1,000

NOTES:

(1)Where surface contamination by both alpha and beta-gamma emitting radionuclides exists, the limits established for alpha and beta-gamma emitting radionuclides should apply independently.

(2)As used in this table, disintegrations per minute (dpm) is defined as the rate of emission by radioactive material as determined by correcting the counts per minute measured by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

(3)Measurements of average contamination should not be averaged over an area of more than 1 $meter^2$. For objects with a total surface area of less than 1 $meter^2$, the average should be derived for each object.

(4)The average and maximum dose rates associated with surface contamination resulting from beta-gamma emitters should not exceed 0.2 mRad/hour and 1.0 mRad/hour, respectively at 1 cm.

(5)The maximum contamination level applies to an area of not more than 100 cm^2.

(6)The amount of removable material per 100 cm^2 of surface area should be determined by wiping an area of that size with a dry filter of soft absorbent paper, applying moderate pressure, and measuring the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of surface area less than 100 cm^2 is determined, the activity per unit area should be based on the actual area and the entire surface should be wiped. Except for transuranics and Ra^{228}, Ac^{227}, Th^{228}, Th^{230}, Pa^{231}, and alpha emitters, it is not necessary to use swiping techniques to measure removable contamination levels if direct scan surveys indicate the total residual surface contamination levels are within the limits for removable contamination.

(7)This category of radionuclides includes mixed fission products, including the Sr^{90} which is present in them. It does not apply to Sr^{90} which has been separated from the other fission products or mixtures where the Sr^{90} has been enriched.

3.8 CLASSIFICATION OF AREAS BY CONTAMINATION POTENTIAL

All areas of the RFETS (including structures, plant systems and outdoor areas) will not have the same potential for residual contamination and therefore will not require the same level of survey coverage to achieve an acceptable level of confidence that the facility satisfies the established release criteria. By designing the survey such that areas with higher potential for contamination receive a higher degree of survey effort, the process will be both effective and efficient. The classifications is based on NUREG/CR-5849 and MARSSIM.

Classification of areas will be based on results of radiological characterization data, history of operations and potential for radioactive contamination and operational radiological surveys performed during building disposition. Each survey area will be classified as follows:

- Class 1 Impacted (Affected) Areas are areas that have potential contamination (based on building operating history) or known contamination (based on past or preliminary characterization survey data). This would normally include areas where radioactive materials were used and stored and where records indicate spills or other unusual occurrences could have resulted in the spread of contamination. The survey frequency will be a minimum of one fixed survey measurement and one removable survey measurement per square meter. In addition, a scan survey for alpha and beta of 100% of the applicable surface areas, including fixed equipment, is required.

- Class 2 Impacted Areas are areas that have or had a potential for radioactive contamination or known contamination, but are not expected to exceed the applicable contamination limits. The survey frequency will be a minimum of one fixed survey measurement and one removable survey measurement at intervals as determined utilizing MARSSIM statistical calculations. In addition, a scan survey for alpha and beta of 10 to 100% of the applicable surface areas, including fixed equipment, will be performed as directed by Radiological Engineering Personnel.

- Class 3 Impacted (Unaffected) Areas are all areas not classified as Class 1 or Class 2 Impacted or Non-Impacted. These areas are not expected to contain residual contamination above the limits, based on knowledge of building history and previous survey information. However, insufficient documentation is present to exclude the area from survey requirements. The survey frequency will be a minimum of one fixed survey measurement and one removable survey measurement per 50 square meter or 30 points, whichever is greater. In addition, a scan survey for alpha and beta of 10% of the applicable surface areas, including fixed equipment, is required.

- Non-Impacted Areas are all areas not classified as Class 1, Class 2 or Class 3 Impacted. These areas have no reasonable potential for residual contamination, based on knowledge of building history and/or previous survey information. Sufficient information is present to be assured that no residual contamination is present above the acceptance criteria.

3.9 GRIDDING AND MARKING MEASUREMENT LOCATION

To assure that all affected area surfaces and structures are adequately surveyed during final survey, a square or other appropriate geometric grid will be superimposed on surfaces being surveyed. The grids may be physically marked on the surfaces or, as a minimum, the measurement location will be labeled if survey results show values above limits. Grids may be marked on a survey sheet as well and not marked in the building. The primary purpose of the grid is to facilitate systematic selection of measurement or sampling locations and provide a mechanism for referencing a measurement or sample back to a specific location.

Measurement locations will be clearly identified to provide a method of referencing survey results to survey area locations. Whenever it is appropriate and cost effective, gridding will be used. However, the physical grid layout may be substituted with surface makings or labels. Due to the large number of obstructions, non-uniform surfaces and complex geometry's remaining in some facilities, gridding will be used only for portions of impacted areas. Unimpacted survey areas will not generally be gridded.

3.9.1 Instrumentation

Radiation detection and measurement instrumentation for final surveys will be selected to provide reliable operation and adequate sensitivity to demonstrate that the measurements taken are sufficient to conclusively demonstrate that the release limits have been met. Commercially available portable and laboratory instruments and detections produced by several manufacturers will be selected based upon detection sensitivity, operating characteristics and expected performance in the field. Surveys will be performed using the most suitable equipment available and survey measurements shall not be limited to this listing. Data quality objectives (DQOs) for final survey measurements will be established and documented in accordance with Characterization and Survey Procedures.

Each instrument will be calibrated and maintained to enable the readout (usually in counts or counts per minute) to be converted to units in which the guideline levels are expressed. Instruments and detectors used to conduct final survey will be calibrated and maintained in accordance with applicable instrumentation procedures. Radioactive sources used for the purpose of calibration will be traceable to the National Institute of Standards and Technology (NIST).

Periodic checks of instrument response will be performed (normally daily or prior to use) to assure that calibration and background have not changed. Following calibration, instrument response will be determined and acceptable range of response established. Instrument response tests will be performed and documented typically prior to beginning the days measurements to assure continued acceptable operation. If the instrument response does not satisfy the established acceptable range, the instrument will be removed from service until the reason for the deviation can be determined and resolved and acceptable response again demonstrated. If repair and/or recalibration is necessary, acceptable response ranges will be reestablished and documented.

3.9.2 Final Survey Reporting

A summary of the measurement results and overall conclusions showing that the facility meets the release criteria will be provided. As applicable, a tabular data summary will present the results for each major category of survey unit such as: structures, components and facility systems. This tabulation will identify the number of survey units, the number and type of measurements such as: total surface beta-gamma, total surface alpha, removable surface beta-gamma and removable surface alpha activity concentration, and gamma exposure rate. For surface contamination, exposure rate and concentrations in soil and water, the average and maximum values, and upper the limit of the confidence interval about the mean will be reported for comparison to the release criteria, if appropriate. Typically, these results will also be illustrated in a graphical presentation to illustrate the individual data points and the statistical distribution of the results.

Within the release record for each survey unit (and/or subunit), the number of measurements and the applicable statistical distribution will typically be presented in graph form. These will be reported in units of dpm/100 cm^2 for each type of surface activity measurement; total surface beta-gamma, total surface alpha, removable surface beta-gamma and removable surface alpha activity concentration. Exposure rate measurements will be reported in units of m/hr, and soil and water activity in units of pCi/g or pCi/ml, respectively. The applicable results of special sampling measurements (e.g., sediment, paint, concrete and other debris will be reported in the release record for each survey unit).

3.9.3 Independent Verification

An independent verification is necessary in order to validate the accuracy and completeness of final survey measurements to ensure that the facility/site meets the established release criteria.

The level of verification required by the Independent Verification Contractor (IVC) may range from a simple review of the decommissioning plans and final survey results, to onsite visits involving direct measurements and sampling. The level of verification is determined by DOE with input from the IVC. Verification activities may be required throughout the decommissioning effort and are therefore integrated into overall project planning.

After acceptance of the final survey report, the DOE may perform (or arrange for its agent to perform) a confirmatory survey. As the name implies, a confirmatory survey is performed to confirm the adequacy and accuracy of the final survey. The confirmatory survey develops radiological data of the same type as that presented in the final survey, but is usually limited in scope to spot-checking conditions at selected site locations, comparing findings with those of the status survey, and performing independent statistical evaluations of the data developed by the confirmatory survey and the final survey. This survey is used in supporting a decision to release the facility.

CORRES. CONTROL
LTR. NO.
Originator Ltr Log #
GRK - 153-97
7 - RF -

DIST.	LTR	ENC
BENSON, C.A.		
CARMEAN, C.H.		
CRAWFORD, A. C.		
DAWSON, D.		
EDWARDS, J.D.		
ENDLEY, M.E.		
FITZ, R.C.		
FUINN, L.A.		
HUGHES, F.P.	X	
SPEED, A.B.		
TYSON, A.M.		
WAGNER, M.J.		
WHEELER, M		
Aguero, G.		
Gray, T.		
Johnson, L.		
Krokhmolnes, G.		
Dunn, R.		
Lobdell, D. R.	X	
Konwinski, G.R.	X	X
Engelmann, G.	X	X
RMRS RECORDS	X	
RF CORRES. CONTROL		
TRAFFIC		
PATS/T130G		

CLASSIFICATION:

UCNI		
UNCLASSIFIED		
CONFIDENTIAL		
SECRET		

AUTHORIZED CLASSIFIER SIGNATURE:

Date:

IN REPLY TO RF CC NO.

ACTION ITEM STATUS:
☐ PARTIAL/OPEN
☐ CLOSED

LTR APPROVALS:

ORIG. & TYPIST INITIALS:
GGE:mg

RF-46469(Rev.1/97)

RMRS Rocky Mountain Remediation Services, L.L.C.
... protecting the environment

Rocky Flats Environmental Technology Site
P.O. Box 464
Golden, Colorado 80402-0464
Phone: (303) 966-2678
Fax: (303) 966-8244

May 28, 1997

J. K. Wrapp
Environmental Management
Building T130C
Kaiser-Hill Company, L.L.C.
Rocky Flats Environmental Technology Site

CHARACTERIZATION GUIDANCE FOR PCBS CONTAMINATED MATERIALS - GRK-153-97

Over the past two months RMRS has gathered information on past uses of PCBs in commercial products such as paints to assist you with the characterization of waste debris from decommissioning. Additionally, this information will be helpful to characterize equipment scheduled for reuse/resale and recycling.

Please distribute this information within your company to the people that may encounter PCB during their work efforts. If you have additional characterization questions, please contact Gislinde Engelmann at extension 2731.

Gary R. Konwinski
Environmental Manager

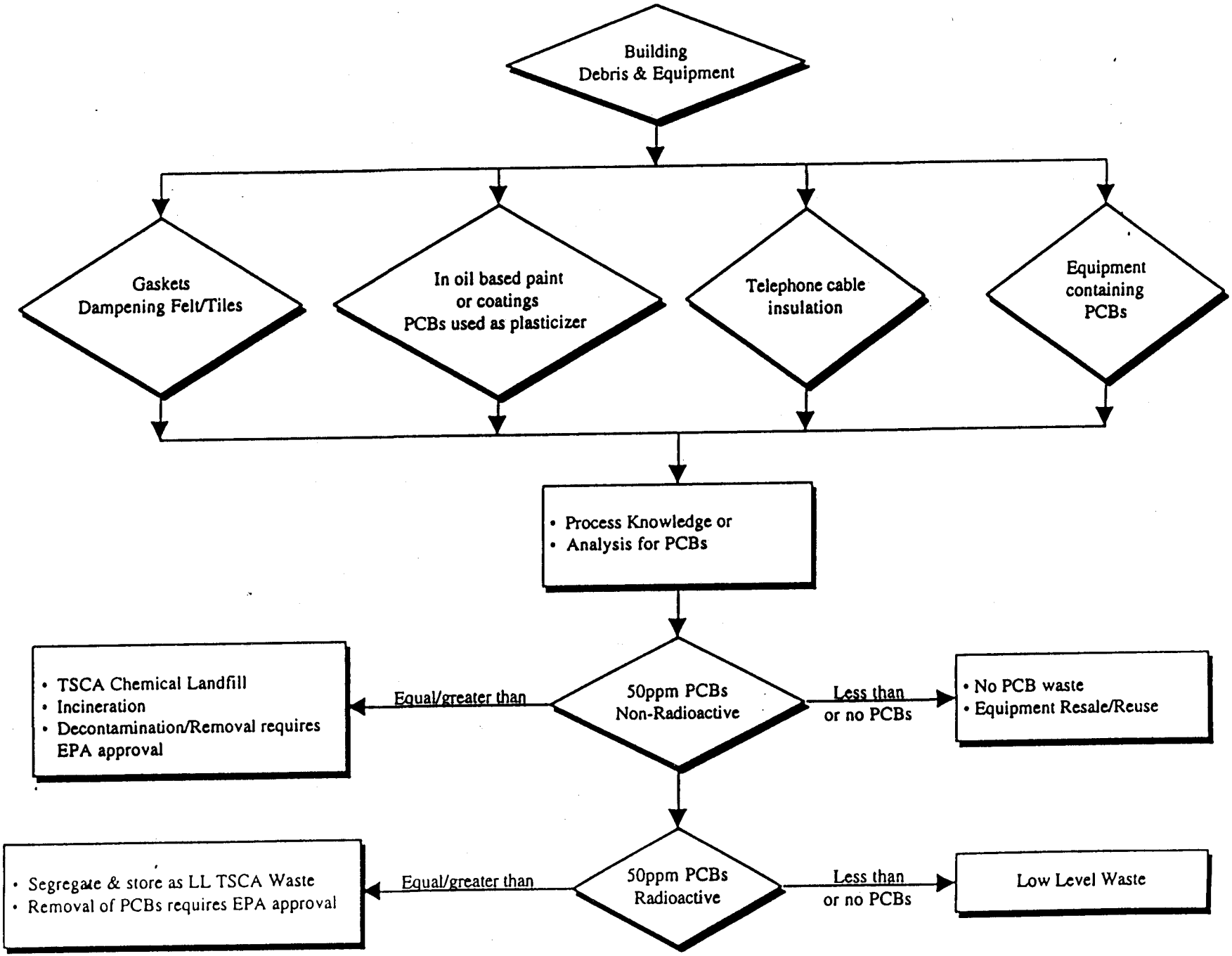
GGE:mg

Enclosure:
As Stated

cc:

DynCorp	Kaiser-Hill	SSOC	WSI
V. D. Sgrignoli	K. North	W. M. Wierzbicki	T. R. Benton

CHARACTERIZATION FOR PCBs



Information on PCB Containing Paints and Other Items

Over the past two months several major paint manufactures have been contacted, like Kelly Moore and Sherwin Williams who were unaware of the use of PCBs in paint, US West Communications provided information on insulation material in telephone cable, Monsanto who was the sole PCB manufacturer in the USA provided a copy of a PCB study which was prepared for the EPA in 1976, a literature search at the CU Library resulted in only one article on the use of chlorinated biphenyls as plasticizers, and the EPA Chemical Regulation Branch (CRB) and EPA Region V contributed information on past uses of PCBs. Hopefully the following information gathered from telephone calls, reports and letters, will be helpful in characterizing your waste for PCBs. As more information becomes available it will be distributed to you.

In the late 1960's it became apparent that, although PCBs exhibit little acute toxicity, they are accumulated in the tissue and do exhibit chronic toxicity even when exposed at low concentrations. The recognition of this problem resulted that Monsanto voluntarily terminated sales of PCBs for all but closed system (transformers, capacitors) uses in mid-1971. Monsanto supplied approximately 99% of the domestic market the remainder of the domestic usage depended on imported PCBs, most of which came from Italy and France. PCBs imported from Italy were used in investment casting wax, and the material from France was used in cooling systems of mining machinery. Monsanto stopped the production of PCBs in 1977. The commercial use of PCBs was discontinued in the USA in 1979.

PCBs are soluble in most organic solvents but almost insoluble in water. PCBs are very resistant to oxidation and heat stable. They have excellent chemical resistance, they are non-flammable and don't support combustion, and they decrease the flammability of mixtures in which they are used. Major use of PCBs was in capacitors, transformers, plasticizers, hydraulics and lubricants and carbonless copy paper. Because of its non-flammability PCBs were used extensively in submarines.

PCBs in Commercial Use

PCBs in Paints:

Information from manufactures and EPA on the commercial use of PCBs in paints and coatings was very limited, partly, because the usage in paints and coatings was spotty and by the time the impacts of PCBs on the environment was researched Monsanto voluntarily restricted the sale of PCBs. Documentation is available that PCBs were used commercially as plasticizers, however there was no information available on who manufactured paints and coatings with PCBs. Plasticizers are predominantly used in paints to increase flexibility and toughness. Furthermore, like other plasticizers, PCBs are organic compounds, and therefore were only used in oil based paints and coatings. As plasticizers, PCBs were added to a high polymer both to facilitate processing and to increase the flexibility and toughness of the final product by internal modification of the polymer molecule. The concentration of PCB added to paints could have been as much as 1% in the solid phase. However, analytical data pertaining to PCBs in dry paint is only available from Westinghouse Savannah River Company (WSRC). In addition, PCBs were used as pigments in paints (blue-green), but this use was very limited and the EPA CRB had no listings of paints containing PCB pigments.

However, PCB contamination of equipment, walls and wiring was possible, due to the fact, that transformers vented to the atmosphere and PCBs from transformer spills volitilized.

PCB in Electrical Wiring:

Liquid PCBs were used in high-voltage underground cables connecting substations and in large industrial plants. They are easy to identify because of their approximately 3" diameter lead casing and their ends with monitoring connections to check for liquids. A survey done by EG&G in the early 1990's determined that no PCB containing electrical cables were used onsite.

PCBs in Telephone Cable:

No data or information substantiating the 710 ppm PCB in a sample of telephone cable analyzed at WSRC was available. Telephone cable consist of a copper core insulated with rubber coating. The use of PCBs seems to be unlikely since there is no discrete containment inside the cable for liquid PCBs.

PCBs in Floor and Ceiling Tiles:

In a 1990 letter provided by the TSCA Hotline identified that PCBs were not used in floor tiles. However, one specific ceiling tile manufactured by Armstrong World Industries, Lancaster, PA contained PCBs.

Some other uses for PCBs included:

Fuel tank coatings construction materials, adhesive coating on ventilation gaskets in HVAC systems and some soft rubber gaskets.

PCBs in Specialty Products:

Besides using PCBs in commercial products, PCBs were also used in specialty products. For example, the Navy used PCBs in a variety of products. A comment made during the teleconference on May 14, 1997 with DOE Headquarters in regards to naval use was: " If it was not of metal it contained PCBs. "

These specialty products included:
Aluminized paint, ventilation gaskets and cooling coil insulation, cork insulation, chill waste insulation, piping insulation, grease, wool felt for sound dampening, and ventilation bedding components.

Analysis for PCBs:

Preparation and analysis of PCBs in solids is difficult and false positives readings may occur. A good QC program and data validation are a must. Two laboratories were contacted but they were not familiar with PCBs in paints nor telephone cables. The analysis for PCBs other than in oils is not very common. Three people contacted during the PCB investigations expressed their concern in regard to correct sample extraction and sample analysis. In order to analyze for PCBs the material has to be digested and cleaned up to remove interfering contaminants such as sulfur which can interfere with the following analytical methods 3550, 8080 and 8081.

For additional information or references and resources relative to the PCB characterization and management contact Gislinde Engelmann ant extension 2731.

DEC 20 1990

Mr. Greg Brendlinger
Technical Director
Stout Environmental, Inc.
101 Jessup Road
Thorofare, NJ 08086

Dear Mr. Brendlinger:

This responds to your letter of November 19, 1990 regarding the disposal requirements for paints collected during Household Hazardous Waste Collection Days conducted by Stout Environmental, Inc. that may contain PCBs. You also ask for listings of paint manufacturers that used PCBs in their paints as well as manufacturers that used PCBs in floor or ceiling tiles.

Your understanding of the disposal requirements for household paints containing PCBs consolidated by you is generally correct. PCBs at concentrations of less than 50 ppm contained in paints are unregulated for disposal under the Toxic Substances Control Act (TSCA). However, this only applies to disposal, if such paints were to be "used" for heat recovery by burning such paints would have to meet the definition of "waste oils" in 40 CFR 761.3. Waste oils are defined as: "...used products primarily derived from petroleum..." Paints collected from households for use not disposal in a landfill can be included in the definition of waste oils. Such paint containing PCBs between 2 and 49 ppm can be used for heat recovery. However, such "used oils" have restrictions on marketing, must be tested and can only be burned in certain types of combustion facilities (761.20(e)). Enclosed is a copy of the Federal Register outlining these requirements.

Paints containing PCBs at 50 ppm or greater <u>are</u> not authorized for use, such as heat recovery, under 40 CFR 761.30. Such paints, containing PCBs at 50 ppm or greater, <u>are</u> regulated for disposal under 40 CFR 761.60, generally in a TSCA approved incinerator or landfill.

OFFICIAL FILE C

RMRS Rocky Mountain
Remediation Services, L.L.C.
... protecting the environment

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May 28, 1997

S. M. Nesta
Environmental Compliance and Management
Kaiser-Hill Company, L.L.C.
T130C
Rocky Flats Environmental Technology Site

UPDATE OF TCSA GUIDANCE ON THE ENVIRONMENTAL CHECKLIST - GRK-161-97

To maintain the Environmental Checklist current and to enhance the awareness during D&D for the generation of TSCA regualted wastes, we would like to revise question #13 of the Environmental Checklist to include the following information:

13. Toxid Susbstance Control Act (TSCA):
    A. Does the project require an Asbestos Abatement Permit?
    B. Does the project generate PCB contaminated Waste?
    C. Does any potential PCB contaminated equipment involve commercial resale, reuse or recycle?

Gary R. Konwinski
Environmental Manager

GGE:mg

cc:
Kaiser-Hill
G. R. Sollner