RF/ER-95-0101

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FINAL SAMPLING AND ANALYSIS PLAN FOR THE REMOVAL OF POLYCHLORINATED BIPHENYLS

DOCUMENT CLASSIFICATION REVIEW WAIVER PER CLASSIFICATION OFFICE

• Rocky Flats Environmental Restoration Project •

August 1995

1/30

A-SW-002196

FINAL

SAMPLING AND ANALYSIS PLAN FOR THE REMOVAL OF PCBS

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Golden, Colorado

August 1995

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LIST OF ACRONYMS

ARA	Accelerated Response Action
ASME	American Society of Mechanical Engineers
CAR	Corrective Action Report
CDPHE	Colorado Department of Public Health and Environment
CERCLA	Comprehensive Environment Response Compensation and Liability Act
CHWA	Colorado Hazardous Waste Act
COC	Chain of Custody
DMP	Data Management Plan
DOE	Department of Energy
DQO	Data Quality Objectives
EMD	Environmental Management Division
EPA	Environmental Protection Agency
ER(M)	Environmental Restoration (Management)
FID	Flame Ionization Detector
FO	Field Order
GIS	Geographic Information System
GRRASP	General Radiochemistry and Routine Analytical Services Protocol
GT	Geotechnical
HRR	Historical Release Report
IAG	Interagency Agreement
MRI	Midwest Research Institute
NCR	Non-compliance Reports
NQA	National Quality Assurance
NRMMA	Non-Radiological Material Management Area
OSHA	Occupation Safety and Health Administration
OSWER	Office of Solid Waste and Emergency Response
OU	Operable Unit
OVA	Organic Vapor Analyzer
PAC	Potential Area of Concern
PAM	Proposed Action Memorandum
PARCC	Precision, Accuracy, Representativeness, Completeness, and Comparability
PCBs	Polychlorinated Biphenyls
PID	Photoionization Detectors
QAA	Quality Assurance Addendum
QAM	Quality Assurance Manual
QA/QC	Quality Assurance/Quality Control
QAPjP	Quality Assurance Project Plan
RFEDS	Rocky Flats Environmental Database System
RFETS	Rocky Flats Environmental Technology Site
RPD	Relative Percent Difference
SAP	Sampling and Analysis Plan
SNS	Scientific Notebook System
SOP	Standard Operating Procedure

TSCA	Toxic Substance Control Act
UTS	Universal Treatment Standards
USM	User System Manager
VOC	Volatile Organic Compound

LIST OF STANDARD OPERATING PROCEDURES (SOPs)

IDENTIFICATION NUMBER:	PROCEDURE TITLE:
5-21000-OPS-FO.03	*General Equipment Decontamination*
5-21000-OPS-FO.04	*Heavy Equipment Decontamination*
5-21000-OPS-FO.07	*Handling of Decontamination Water and Wash Water*
5-21000-OPS-FO.13	*Containerization, Preserving, Handling and Shipping of Soil and Water Samples*
5-21000-OPS-FO.14	*Field Data Management*
5-21000-OPS-GT.08	*Surface Soil Sampling*

General Radiochemistry and Routine Analytical Services Protocol, Part A and B (GRRASP, 1991).

FO = Environmental Management Division (EMD) Operating Procedures Volume I Field Operations
GT = EMD Operating Procedures Volume III Geotechnical

1.0 INTRODUCTION

This Sampling and Analysis Plan (SAP) describes the specific analytical needs, verification, confirmation, and waste characterization sampling requirements, sampling disposition, data handling requirements, data quality objectives (DQOs), site descriptions, and quality assurance/quality control (QA/QC) requirements for the removal of polychlorinated biphenyl (PCB) contamination at nine sites on the Rocky Flats Environmental Technology Site (RFETS). These removals are being conducted as an Accelerated Response Action (ARA) as described in the *Final Proposed Action Memorandum (PAM), Remediation of Polychlorinated Biphenyls,* (DOE, 1995). The purpose of this ARA is to significantly reduce risks from transformer sites where PCB concentrations exceed 25 parts per million (ppm). This SAP provides the methodology for implementing the sampling associated with the removal actions and is written to supplement the PAM.

1.1 Summary of the Proposed Action

Nine PCB sites have been selected (see Figure 1-1) for this ARA based on review of process knowledge, documents, and previous field sampling results which indicated PCB concentrations of greater than 25 ppm (see Table 1-1).

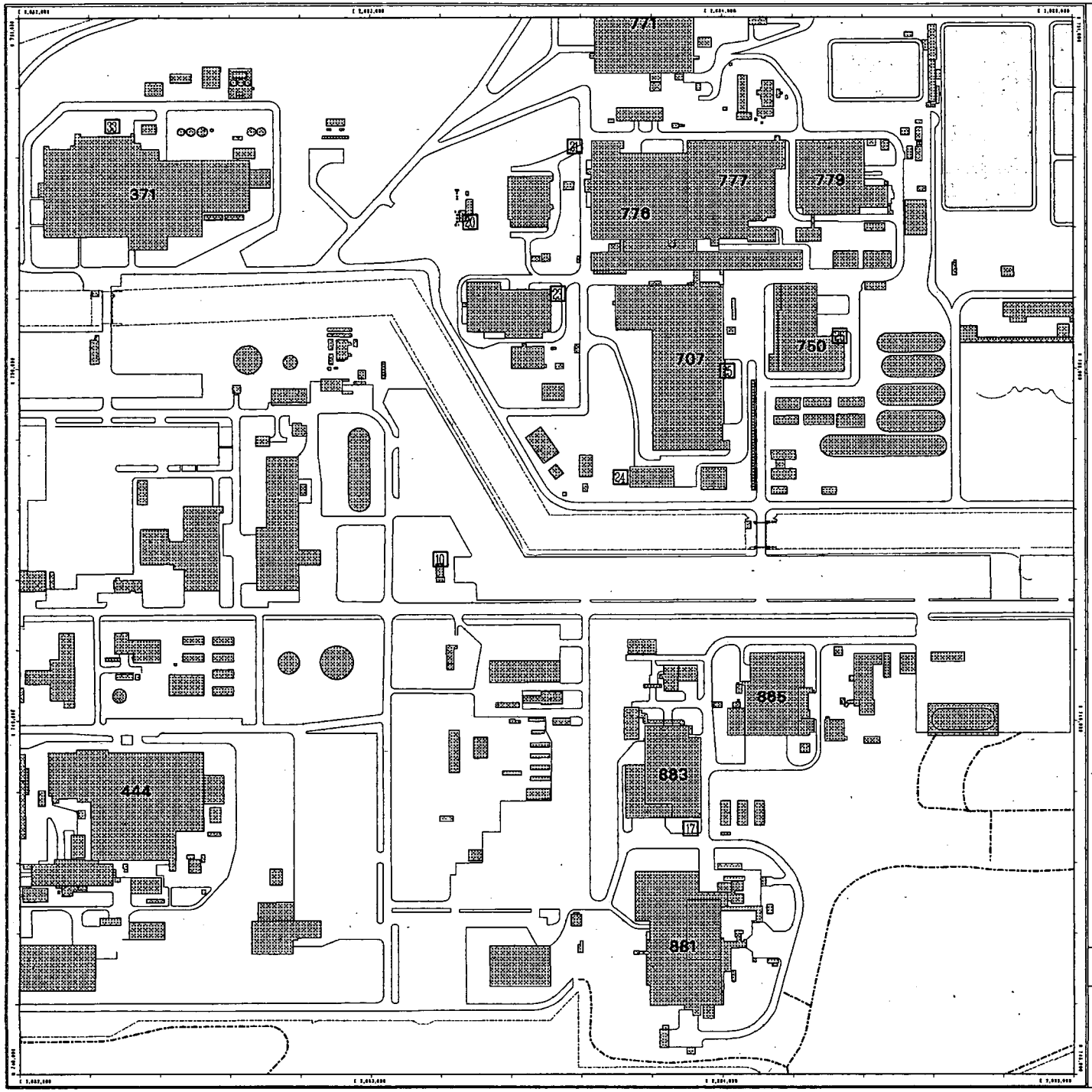
Sources of information describing potential PCB contamination include: the *Sitewide Evaluation of Known, Suspect, and Potential Environmental Releases of PCBs*, July 1991, the *Historical Release Report, HRR*, (DOE, 1992) and the preliminary sampling program conducted at most previously identified sites (EG&G, 1991). The sites consist of former or active transformers in the Industrial Area of RFETS, and have historically contained dielectric fluids containing PCBs.

The proposed removal actions include the following:

- excavating the PCB-contaminated soil and concrete slabs;
- containerizing and temporarily storing waste prior to disposal; and
- performing confirmation sampling using immunoassay and laboratory analyses on a statistically-based grid.

The sampling required to support these removal actions includes:

- verification sampling during excavation;
- confirmation sampling after removal; and
- waste characterization sampling.



Areas Potentially Contaminated with PCB's

Figure 1-1

PCB sites

Standard Map Features

- Buildings or other structures
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences
- Paved roads
- Dirt roads

DATA SOURCE:
Buildings, roads, and fences provided by Fluor/Rust Corp., EG&G Rocky Flats, Inc. - 1991.
Hydrology provided by USGS - (date unknown)

Scale = 1 : 5000
1 inch represents approximately 416.66 feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by:
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MAP ID: 'pcb11x17'

August 04, 1995

/home/518484/projects/ou1-6-11-15-16/peters/pcb-wayne-8x11.aml

TABLE 1-1
Description of PCB Removal Sites

Potential Area of Concern (PAC)#	Location Number*	HRR Description**
500-905	10	There is evidence of leakage on a valve on the northeast side of Transformer 558-1.
800-1207	17	Transformer 833-4 may have leaked prior to retro-fill, and a capacitor leak of one pint of non-PCB fluid.
500-900	20	Inspections in January & September 1986 discovered a leaking valve at the 515/516 substation.
700-1102	21	In January 1986, a leak was observed from Transformer 776-4.
500-902	23	Transformer 559-1 leaked oil containing PCBs from a faulty valve prior to relocating and retro-filling the transformer in 1987.
700-1104	24	In February 1987, concrete under the transformer 708-1 drain valve was found to be contaminated. Utilities reported that two of four transformers previously located at this site leaked PCB-contaminated oil prior to 1987.
700-1103	25	Concrete under the drain valves of Transformers 707-1 through 707-6 was found to be contaminated with PCBs in November 1986.
700-1111	26	Utilities personnel reported that Transformer 750-1 leaked dielectric fluid containing PCBs prior to retro-fill in 1987.
300-708	33	It was recorded that a stain was observed in 1991 on the pad beneath the drain valve of Transformer 371-1 (one of six active transformers).

* See Figure 1-1 for Locations
** DOE, 1992

1.2 Regulatory Framework

This ARA is being conducted under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), specifically under guidance, *A Guide on Remedial Actions at Superfund Sites with PCB Contamination*, Office of Solid Waste and Emergency Response (OSWER) Directive No. 9355.4-01 FS, August 1990. The guidance recommends the use of Toxic Substance Control Act (TSCA) PCB Spill Cleanup Policy in 40 CFR§761.120 to establish cleanup levels. For industrial and other restricted access areas, the TSCA Spill Cleanup Policy recommends a level of 25 ppm PCBs by weight (nearly equivalent to 25 mg/kg). At industrial areas and restricted access CERCLA sites, a range of 10 to 25 ppm PCBs in surface soil is recommended as a cleanup level to address threats posed by direct contact.

As stated in the *Final PAM, Remediation of Polychlorinated Biphenyls* (DOE, 1995), the soil cleanup standard for this action will be 25 ppm PCBs with a field target of 10 ppm PCBs by weight based on the TSCA PCB Spill Cleanup Policy and OSWER Directive No. 9355.4-01 FS, August 1990. This standard is supported by and is consistent with PCB contaminated soil cleanup requirements established for PCB remediation at other Department of Energy (DOE) facilities and at industrial facilities located within EPA's Region VIII.

2.0 SAMPLING APPROACH AND REQUIREMENTS

This section describes the approach for conducting removal actions, which includes: (1) verification sampling during excavation; (2) confirmation sampling after removal; and (3) waste characterization sampling. All health and safety monitoring will be fully documented by Health and Safety personnel and is further discussed in the Site Specific Health and Safety Plan for this removal action.

All soil sampling will be conducted using a spade, hand auger, or other appropriate hand tool, logged, and documented in accordance with *EMD Operating Procedures Volume III Geotechnical* 5-21000-OPS-GT.08, *Surface Soil Sampling, Section 4.3, Grab Sampling*. (*Section 4.3.3, Sampling Plot Layout*, will be modified as described in Sections 2.1 and 2.2 of this SAP). Waste container sampling will be done using a hand auger or other appropriate sampling tool. The sample handling will follow *EMD Operating Procedures Volume I Field Operations* 5-21000-OPS-FO.13, *Containerization, Preserving, Handling, and Shipping of Soil and Water Samples*.

Decontamination of all sampling and removal equipment will be conducted onsite between each sampling and removal activity. Decontamination of the equipment will consist of a triple wash with distilled water and liquinox, a triple rinse with distilled water, and a final wipe

down with Pipe X (a dilute cleaner used for the removal of PCBs). All decontamination water will be containerized at each location, transported to an onsite TSCA-compliant temporary waste storage facility, consolidated to minimize waste containers, and disposed of at an approved disposal facility.

The specific data management requirements for this SAP are defined and described in Appendix A, Data Management Plan (DMP). This DMP will be followed for all data collection, compilation, and dissemination activities for this project.

Standard QA/QC practices will be followed (i.e., collecting duplicate samples and equipment rinsate blanks). Field sampling for quality control will include the following;

- Collection of a duplicate sample at a minimum of one per 20 samples or one per day; and
- Collection of one equipment rinsate or swipe for every 20 samples collected (at a minimum of at least one equipment blank if fewer than 20 soil samples are collected) or one per day.

After every 20 samples (or at least once a day), an equipment rinsate blank or swipe sample will be collected and analyzed onsite using Draft Method 4020. A duplicate sample also will be collected and analyzed using the same method as the original sample (either Method 8080 or Draft Method 4020, depending upon where the duplicate sample is taken). The results of the Draft Method 4020 analysis will be compared to the Method 8080 analysis to confirm the analytical results.

Standard QA/QC practices are summarized in Appendix B, the Quality Assurance Addendum (QAA). This QAA will be followed for all QA/QC activities for this project.

2.1 Verification Sampling and Analysis

The approximate extent of PCB contamination has been established based on analytical results from previously-conducted investigations. Verification field samples will be taken during excavation after every 12 inches of soil are removed, using a simple random grid layout as directed by the Project Manager. All sampling locations will be statistically-derived, based on the size of the excavation and the estimated size of the spill site, and documented in the field using the Scientific Notebook System (SNS). The samples will be analyzed using the onsite immunoassay field test (EPA SW-846 Draft Method 4020). If samples taken during excavation exceed 10 ppm PCBs by weight, additional soil will be removed in 12 inch lifts at

the discretion of the Project Manager. The extent of soil removal will be based on the field sample results.

2.2 Confirmation Sampling and Analysis

After completion of the removal activities at each location, confirmation samples will be collected to verify that the cleanup level has been achieved. A grid of sampling locations will be developed for each site using the Midwest Research Institute (MRI) method (EPA, 1986). A hexagonal grid sampling design will be designed using the following 7-step process:

Step 1: Diagram the Cleanup Site

The site will be drawn to approximate scale, including all vertical surfaces, noting all different types of surfaces.

Step 2: Diagram All Cleanup Surfaces in the Same Plane

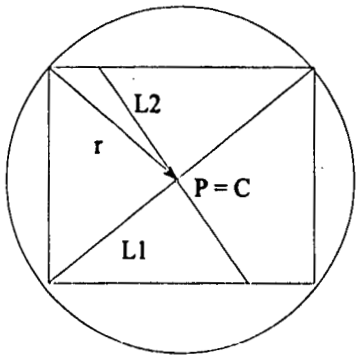
The purpose of this second diagram is to determine and show the dimensions of the total cleanup area, including any vertical surfaces (excavation walls, remaining concrete berms, etc.) on a horizontal plane, so the appropriate number of samples can be determined.

Step 3: Find the Center and Radius of the Sampling Circle

Although the excavations will be irregular in shape, the MRI process uses a circular area surrounding the contaminated area for a sampling circle. The dimensions of this circle are determined as follows (See Figure 2-1):

1. Draw the longest dimension, L_1, of the site diagram from Step 2.
2. Find the midpoint, P, of L_1.
3. Draw a second dimension, L_2, through P perpendicular to L_1. L_2 should extend to the boundaries of the cleanup area.
4. The midpoint, C, of L_2 is the center of the sampling circle.
5. The distance from C to either end of the longest dimension, L_1, is the sampling radius, r.

Figure 2-1
Locating the Center and Sampling Circle Radius



Step 4: Determine the Number of Grid Sample Points to Use
The number of grid samples to be taken at each site depends upon the radius of the sampling circle, as shown in Table 2-1.

Table 2-1 Required Number of Samples Based on the Radius of the Sampling Circle

Radius of Excavation Site, ft.	Number of Samples Required
≤ 4	7
> 4 - 11	19
> 11	37

Step 5: Lay Out the Sampling Points on the Diagram Constructed in Step 2
The grid layout is based on a hexagonal design centered in the sampling circle. The layout should be drawn on the site diagram prior to grid layout on the site.

Step 6: Lay Out the Sampling Points on the Site
The grids for each site will be laid out using string and stakes. The PCB spill site should be considered contaminated until analyses of the samples taken verify the site is clean. Caution

should be exercised when marking the sample points on the site to prevent possible cross-contamination.

Step 7: Consideration of Special Cases

Samples from grid points that fall outside the spill area should generally be collected. However, taking these samples will be at the discretion of the Project Manager. In cases where the contaminated area is very different from a circle (e.g., an elongated ellipse) the sampling circle may be a poor approximation of the contaminated area, and a moderate to large percentage of the sampling points may fall outside the contaminated area. Where the MRI approach appears inappropriate based on a large percentage of sampling points falling outside of the excavated area, a statistically-based simple random grid approach will be conducted in accordance with 40CFR§761.130, and fully documented in the SNS.

Surficial soil samples will be collected at each designated sample point on the sampling grid to verify that the PCB-contamination has been removed to below 25 ppm PCBs. These samples will be analyzed onsite using the immunoassay field technique (EPA SW-846 Draft Method 4020). In addition, twenty percent of the confirmation samples, chosen at random, will be sent to an offsite laboratory for analysis using EPA SW-846 Method 8080. For grid points that fall on concrete pads in the spill area, destructive samples will be collected and analyzed using EPA SW-846 Method 8080.

2.3 Waste Characterization Sampling and Analysis

Waste characterization samples will be collected from the containers of soil, and decontamination water. Samples will be analyzed for radionuclides, waste characterization using methods outlined in SW-846 Appendix IX (see Table 2-2), and/or all other applicable waste acceptance criteria from the TSCA-compliant incinerator or other disposal facility. This analytical data will be compared to the Universal Treatment Standards (UTS, 40 CFR Part 268) for waste characterization decisions. Ten percent of containers of each type of waste will be sampled at random for waste characterization purposes using a hand auger or other appropriate hand tool.

Historical analytical data for the concrete transformer pads will be used to determine the appropriate disposal facility. All concrete >500 ppm PCBs will be sampled as required for the TSCA-compliant incinerator or other approved disposal facility.

Table 2-2 Estimated Sample Types and Associated Analytical Methods

Analytical Method/Instruments	Analytes	Container	Preservative	Holding Time	Type of Sample
SW-846 Draft Method 4020	PCBs	250-ml wide mouth glass jar	None	14 days	Verification / Confirmation
SW-846 8240	VOAs	120-ml wide mouth glass jar	Cool, 4° C	14 days	Waste Characterization
SW-846 8270	SVOAs	250-ml wide mouth glass jar	Cool, 4° C	14 days	Waste Characterization
EPA-CLP TAL List	Metals	combine with 8270	Cool, 4° C	28 days	Waste Characterization
SW-846 8080/8150	PCB/PEST	250-ml wide mouth glass jar for characterization, combine with 8270	Cool, 4° C	14 days	Waste Characterization / Confirmation
SW-846 9030/9010	RCRA Reactivity	500-ml wide mouth glass jar	Cool, 4° C	14 days	Waste Characterization
SW-846 9045B	Soil pH	combine with 9030/9010	Cool, 4° C	14 days	Waste Characterization
SW-846 9020	TOX Analysis	combine with 9030/9010	Cool, 4° C	28 days	Waste Characterization
SW-846 1010/1020	Closed Cup Flash Point	combine with 9030/9010	Cool, 4° C		Waste Characterization
*ENCOTEC	RES Waste Acceptanace	Rollins Sample Kit	Per Rollins Sample Kit		Waste Characterization

* Requirement for Rollins Environmental Services waste acceptance criteria for incineration.

3.0 REFERENCES

Department of Energy (DOE), 1995. *Final Proposed Action Memorandum Remediation of Polychlorinated Biphenyls*. Golden, CO. July.

Department of Energy (DOE), 1992. *Final Historical Release Report for the Rocky Flats Plant*. Volume I - Text and Volume II - Appendices. Golden, CO. June.

EG&G Rocky Flats, 1994. *EMD Operating Procedures Volume I: Field Operations (Manual No. 5-21000 OPS-FO and Volume II (Groundwater Manual No. 5-21000 OPS-GW)*. EG&G Environmental Management, Rocky Flats Plant, Golden, CO. October.

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GRRASP, 1991. *General Radiochemistry and Routine Analytical Services Protocol.* EG&G Rocky Flats, Environmental Management Department, Golden, CO. July 2.

Rollins Environmental Services, *Customer Guide*, Deer Park, Texas Facility, 03/95

United States Environmental Protection Agency (EPA), 1986. Field Manual for Grid Sampling of PCB Spill Sites to Verify Cleanup. EPA-560/5-86-017. 55 pp.

FINAL

SAMPLING AND ANALYSIS PLAN FOR THE REMOVAL OF PCBS

APPENDIX A - DATA MANAGEMENT PLAN

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August 1995

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1.0 INTRODUCTION

The purpose of this DMP is to identify the mechanisms and procedures for the efficient and accurate transfer of data from collection/generation of the data through its end-use. This is achieved by identifying the sources of data, establishing systematic procedures for QA/QC, and creating a suitable database to allow end users the appropriate access to meet project requirements and to establish appropriate security and backup measures to ensure data integrity. The DMP identifies and defines sample documentation, sample tracking, data entry, data proofing, reporting, and management personnel responsibilities.

This project will involve the collection and analysis of data from several sources:

- Field generated data; and
- Analytical data generated from offsite laboratory testing.

This DMP has been developed to promote the proper and complete management of scientific and technical data that will be generated. The primary purpose of a DMP is to explain to personnel collecting, using, and managing information how data will be recorded, stored, accessed, and reviewed. Procedures are defined and implemented to ensure that data are collected, entered, and stored in a secure, controlled, and retrievable manner in order to accurately and efficiently transfer the data into useful information. This plan addresses the planning, implementation, and responsibilities to optimize data management and use of the Rocky Flats Environmental Data System (RFEDS) and the interim database, Datacap.

This DMP focuses principally on the data management and handling. Detailed discussion of peripheral activities (i.e., field data collection methods, etc.) are described in the main portion of the SAP. RFEDS will be the ultimate repository for controlled data generated during this project. Tracking and verification of data at each stage of the project is important. The data tracking procedures identified in this DMP vary according to the data collection method employed.

2.0 RESPONSIBILITIES AND QUALIFICATIONS

Support staff for the data management tasks includes all personnel involved in data acquisition, QC, and processing. The designated staff are responsible for implementing and carrying out data management activities according to this plan. All personnel shall be qualified to perform the tasks assigned to them.

The primary personnel responsible for data management are the Project Manager, Sample Crew Personnel, Sample Manager, Qualified Technical Reviewer, Field Data Manager,

RFEDS User System Manager (USM), Data Verifier, Sample Management GIS Group, and Project QA/QC Officer. The responsibilities for these positions are summarized in the following sections.

2.1 Project Manager

The Project Manager will be responsible for ensuring that all data are collected, processed, and stored in a manner consistent with this DMP and in compliance with *EMD Operating Procedures Volume I Field Operations*, 5-21000-OPS-FO.14, *Field Data Management*. Data management support personnel will report to the Project Manager with any problems that may impact the integrity of the data and/or the ARA.

Prior to sample collection, the Project Manger shall:

- Coordinate sample shipping with the analytical lab; and
- Obtain RFEDS assigned sample numbers and location codes from the RFEDS USM to use on the Chain-of-Custody (COC) forms.

After sample collection, the Project Manager shall:

- Manage any feedback from the contract laboratory;
- Ensure that any data from sample locations that have been surveyed are given to the RFEDS Geographic Information System (GIS) group; and
- Ensure that the appropriate authenticated quality-related records and Administrative Records are transmitted to the Central Records Center.

2.2 RFEDS User System Manager

The RFEDS User System Manager will, prior to sampling:

- Verify all locations of samples to be taken and assign any new location codes to sample locations; and
- Assign sample numbers, COC numbers and any applicable codes and abbreviations for the Project Manager.

After sampling, the RFEDS USM will:

- Verify any transmitted records for accuracy and completeness; and
- Ensure the data is preserved, retrievable, traceable, and available for response to regulatory agency requirements.

2.3 Sample Crew Personnel

The Sample Crew Personnel will be responsible for field data collection. Their tasks include:

- Completing all applicable entries on appropriate *EMD Operating Procedures,* 5-21000-OPS-FO.14, *Field Data Management* forms and all COCs;
- Documenting all field observations and data on field data forms;
- Recording field observations and data with black waterproof ink; and
- Delivering field data forms and corresponding COCs to the Sample Manager by the end of each day of field operations.

2.4 Sample Manager

The Sample Manager is responsible for:

- Receiving field data forms daily and reviewing for completeness and verifying that all forms have been received;
- Resolving any discrepancies with Sample Crew Personnel and clearly documenting any corrections, changes, or insertions made as a result of discrepancy resolution; and
- Verifying that the COCs are complete, accurate and error-free before samples are shipped to the contract laboratory, the Sample Manager will copy all COCs on a daily basis and place copies in the field files.

2.5 Qualified Technical Reviewer

The Qualified Technical Reviewer performs a technical verification of the data, including:

- Reviewing field data to ensure consistency with known chemical and physical properties of the media being sampled;
- Verifying all calculations, reported units and all data on all forms;
- Verifying that the correct number of QC samples were collected; and
- Ensuring that documentation of the verification of data in this record includes the date of verification and the initials of the verifier.

2.6 Field Data Manager

The Field Data Manager is responsible for:

- Entering any relevant field parameters into the appropriate Datacap module;
- Entering the COC/tracking information into the Tracking section of Datacap within two days of sample shipment to the analytical laboratory;
- Printing data from Datacap and giving to the Data Verifier for review;
- Verifying that all samples intended to be collected are in Datacap;
- Transmitting field information, sample collection data and COC tracking data to the RFEDS USM; and
- Backing up and ensuring the security of Datacap.

2.7 Data Verifier

The Data Verifier will:

- Compare the original field data forms and Datacap printout for consistency and accuracy;
- Report any transcription errors and return to data entry for correction; and
- Sign and date verified forms.

2.8 Sample Management GIS Group

The Sample Management GIS Group receives surveying and sample data information from the Project Manager and digitizes the data.

2.9 Project QA/QC Officer

The Project QA/QC Officer will ensure that procedures are carried out in accordance with this DMP. The QA/QC Officer will report to the Project Manager or designee.

3.0 DATA HANDLING SYSTEMS EQUIPMENT, DATA BACKUP, AND SECURITY PROCEDURES

3.1 Data Handling and Storage Systems

The data handling and storage system will handle and store data including field generated data and laboratory generated data. The raw data will be manually input into Datacap, an interim database in Microsoft Excel, by the Field Data Manager, or designee. Datacap is a temporary database used to store the field data in an easily-retrievable manner and in a manner easily recognizable by the RFEDS database, ORACLE, in order to ensure completeness and accuracy prior to data transfer to RFEDS. Datacap will also store waste characterization analysis data that will be downloaded from RFEDS.

3.2 Database Backup

3.2.1 Field Data Acquisition, Backup, and Security Procedures

Data manually acquired in the field will be directly entered onto the appropriate forms as raw data and will be subsequently entered into Datacap. Copies of all data collected, both disk and hard copy, will be sent to the Field Data Manager upon completion.

3.2.2 Backup and Security Procedures

Any modifications to the data must receive the authorization of the Field Data Manager. Changes to the data will be documented as described in Section 4.0 of this DMP, *Data Management, Data Tracking, Data Entry and Data Proofing*. The Field Data Manager is

responsible for backing up any data generated in the field by photocopying hard copies and backing up Datacap data daily to disk or tape.

4.0 DOCUMENTATION

4.1 Data Acquisition Documentation

It is necessary to record detailed information so that data acquisition can be reconstructed. The Scientific Notebook System (SNS) will be one of the primary mechanisms for data acquisition. Any data that are collected using non-standard procedures will be documented in the scientific notebook. At a minimum, the scientific notebook, electronically collected data records, field data, and sample collection forms should include the following information for each data or sample point (including verification and confirmation data):

- Field sample identification;
- Date and time of sampling/measurement;
- Sample measurement location;
- Sample measurement description;
- Sample number;
- Sample depth (if appropriate);
- Parameters or analyses being reported;
- Associated QA/QC samples (e.g., duplicates, matrix spikes, etc.); and

4.2 Transmittal of Field Data to Field Data Manager

All data generated in the field will be copied and transferred to the Field Data Manager or designee. This data will include COC forms, field notes, data generated by field instruments, and any other data generated in the field. Following shipment of data from the field to the Field Data Manager or designee, the Sample Manager will verbally confirm that the data have been received. The field data will be transferred to Datacap database by the Field Data Manager/Project Manager or designee. The data will then be transmitted to the RFEDS USM via diskette.

4.3 Data Receipt Confirmation

Upon receipt of the data, the Field Data Manager is responsible for checking, at a minimum that:

- All data were received and the receipt was noted on the Field Data Transmittal Form;

- The data received matches the data acquisition plans; and
- The appropriate field QC checks were performed (calibration of instruments etc.).

The Field Data Manager will have the responsibility of ensuring that discrepancies identified during the checking process are corrected and documented.

5.0 DATA MANAGEMENT, DATA TRACKING, DATA ENTRY, AND DATA PROOFING

5.1 Manually Collected Field Data

Data collected manually will consist of field data from the immunoassay analysis. Figure 5-1 summarizes the data flow for all data collected in the field, from collection through data reporting. The results and other pertinent information will be recorded on the appropriate data collection form (Figure 5-2), *ERM* 5-21000-OPS-FO14.C, *Soil Sample Collection Form.* The results from the forms will be entered into Datacap. The data entry will be QC reviewed by the Project Data Manager prior to entry of the data.

5.2 RFEDS Analytical Data

Analytical data will be obtained from RFEDS in electronic format. The data will be checked by the Data Verifier for format correctness and completeness. The RFEDS analytical data will be downloaded into Datacap to allow an end user to easily query the data from the database. Upon completion of downloading, the RFEDS USM will review the data for completeness in comparison to plan.

5.3 Data Entry

Data can be entered in two ways: (1) manual entry from data collection forms and analytical data sheets; and (2) data electronically downloaded from RFEDS.

5.3.1 Manual Data Entry

Manual data entry will be followed by a 100 percent data review by the Data Verifier. Errors will be researched and corrected. A hardcopy of the manually entered data will be initialed and dated by the person performing the review.

5.3.2 Corrections and Changes to Sample Data

Changes or corrections may be required in the data stored in Datacap. All changes must be accompanied by a Data Correction/Change Form (Figure 5-3). The form will detail the changes to be made and document that the changes were completed. Corrections to the

database will be reviewed by the Field Data Manager or designee for potential entry errors.

5.4 Data Verification/Technical Review

Problems encountered in data management are typically due to inconsistencies or errors in the data reporting. The field data in the database will be verified by the Data Verifier, comparing a printed hard copy from the database to field forms using the procedures in *ERM* 5-21000-OPS-FO.14, *Field Data Management,* Section 7.5. Data will be checked for transcription errors, accuracy and to ensure that all samples that were intended to be collected were collected, shipped and entered into Datacap. Any samples that were intended to be collected, but not collected were clearly noted, verified and entered into Datacap.

It is important that data inconsistencies and errors be identified as soon as possible to allow for correction prior to data use. To track the number of data points, samples, and analyses requested, it is important that all data (whether they are physical, chemical, or other parameters) be recorded and checked to verify that the data collected meet the project requirements.

5.5 Final QC Review

The following data final QC review procedures are applicable to all data acquisition for the project:

- Complete database QC review. A hard copy of the database, organized by location, will be verified by the Field Data Manager or designee.
- Clearly mark corrections to the hard copy database report in red ink.
- Using the data entry sheets and sample collection sheets, check that data identifications are correctly listed on the database hard copy, and the number of data points or number of samples for the response action are reported on the database hardcopy.
- Check that all the parameters requested for each analysis are reported on the database hard copy and that units reported on the database hard copy are correct.
- Check that data time sequences are correct.
- Check values for all manually collected parameters reported from the database against the field collection forms, at a frequency of approximately 10 percent of the data for each test. If errors are found, an additional 10 percent of results will be checked for similar errors. If errors are found in the second 10 percent, all results will be checked.
- Check the corrected copy of the database to determine that corrections have been completed (i.e., verify the final hard copy of the database).
- The data will then be reviewed by a scientist familiar with the project objectives and data collection activity (Qualified Technical Reviewer) for data that do not make scientific sense

(i.e., a concentration value of 2,000,000 mg/kg).

- Following completion of the QC procedure, the Project Manager, in consultation with the Project QA/QC Officer and Field Data Manager, will change the database reporting status to "FINAL."

Figure 5-1
Manual Data Collection System Flowchart

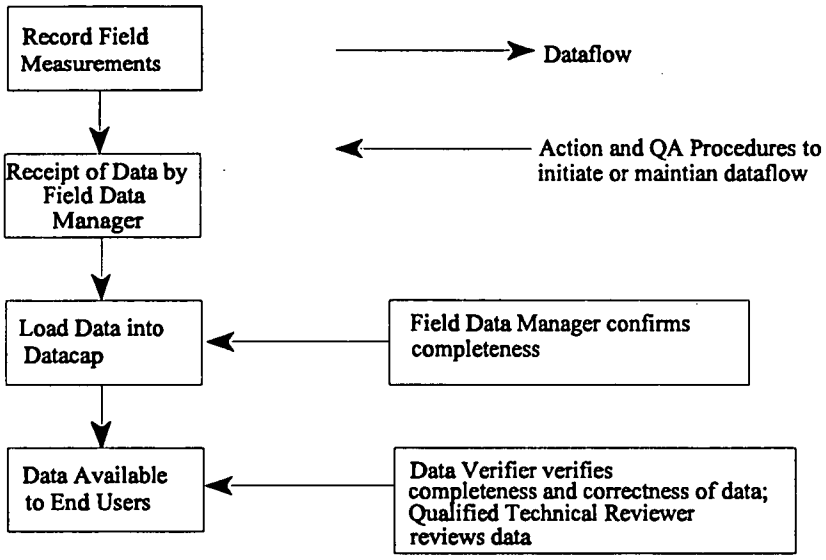

Figure 5-2
Sample Collection Form

Project Number	:		
Sample Number	:	Type: SS	
Contractor	:		
Station Code	:		
Collection Date	:	Quarter:	Disposition:
Collection Time	:	Purpose:	
Sample Location	:		
Composite (Y/N)	:		
Composite Desc	:		
QC Type	:	Partner:	
Collection Method	:		
Volume	:		
Depth of Take	:	Start (in.)	End (in.)
Headspace	:		
Comments	:		
Sample Team	:		
Member	:		
Member	:		
Prepared By	:	_____	
		Print Name	
		_____	
		Signature Date	

Figure 5-3
Data Correction/Change Form

The following changes and/or corrections to the database are required (check all that apply):

_____ Data qualifiers have been assigned to the attached sample data.

_____ The following sample analyses have been changed:

_____ Other changes

Changes Requested By: _____
(Print Name) (Signature) (Date)

Changes Made By: _____
(Print Name) (Signature) (Date)

Changes Checked By: _____
(Print Name) (Signature) (Date)

FINAL

SAMPLING AND ANALYSIS PLAN FOR THE REMOVAL OF PCBS

APPENDIX B - QUALITY ASSURANCE ADDENDUM

Prepared By:

Rocky Mountain Remediation Services
Rocky Flats Environmental Technology Site
Golden, Colorado

August 1995

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1.0 PURPOSE

The purpose of this QAA is to identify QA requirements that are applicable to this removal action and to identify specific measures for implementing these requirements.

This QAA is intended to supplement the *Rocky Flats Environmental Technology Site Site-Wide Quality Assurance Project Plan for CERCLA Remedial Investigation/ Feasibility Studies and RCRA Facility Investigations/Corrective Measures Studies Activities* (referred to as the RFETS Site-Wide QAPjP, or simply QAPjP). As a supplement to the QAPjP, this QAA establishes the site-specific measures and QA controls applicable to the actions described in this SAP.

2.0 SCOPE

This QAA addresses all quality-related activities as described in the SAP to be performed by the Contractor or designated subcontractor at RFETS.

The major actions within this SAP, to which this QAA applies, include:

- Definition of DQOs;
- Collection of field data;
- Decontamination procedures;
- Sample collection and analysis;
- Quality control samples;
- Sample handling and shipping; and
- Data analysis.

3.0 BASIS FOR TECHNICAL ACTIVITY

The work outlined in the preceding SAP identifies the specific analytical needs, sampling requirements, data handling requirements and associated QA/QC requirements. This includes the completion of three main activities, which are:

I. Verification soil sampling to ensure the complete removal of contaminated soils during excavation activities;

II. Confirmation soil sampling after excavation to ensure the complete removal of contaminated soils; and

III. Waste characterization sampling to ensure proper disposal.

4.0 BASIS OF QUALITY ASSURANCE REQUIREMENTS

EG&G Rocky Flats has prepared the *Rocky Flats Plant Environmental Management Site-wide QA Project Plan* (RFP-EMS QAPjP) for CERCLA Remedial Investigations/Feasibility Studies and RCRA Facility Investigations/Corrective Measures Studies activities. This QAA

supplements the information provided by the RFP-EMS QAPjP for this project. The RFP-EMS QAPjP was prepared to identify the QA requirements and methods applicable to the Environmental Restoration (ER) Program activities, as identified in the Attachment 2 of the Interagency Agreement (IAG) Statement of Work. Section IV.A of the IAG specifies the minimum quality elements that the QAPjP must include.

5.0 QUALITY REQUIREMENTS

5.1 Organization and Responsibilities

Rocky Mountain Remediation Services (RMRS) is responsible for the overall coordination of this sampling activity. Other organizations such as the internal sampling management group and the subcontracted external laboratory (IT St. Louis) will be involved with this work. Responsibilities of other organizations will be assigned by RMRS.

An organization chart for this project is shown in Figure 5-1. The organization has been structured to maintain a high level of quality in all areas of work to be performed. Conformance to established requirements shall be verified by individuals and groups not directly responsible for performing the work. RMRS is responsible for management and coordination of the resources dedicated to the project.

5.2 Quality Assurance Program

The RFP-EMS QAPjP was written to address QA controls and requirements for implementing environmental restoration activities, as required by the RFETS IAG. The content of the RFP-EMS QAPjP was driven by the DOE Order 5400.1, the RFP QA Manual (RFP QAM), and the IAG. Both, the DOE Order 5400.1 and the RFP QAM, require a QA program to be implemented based on the American Society of Mechanical Engineers (ASME) National Quality Assurance (NQA-1), *Quality Assurance Requirements for Nuclear Facilities*. The IAG specifies development of a QAPjP in accordance with the EPA QAMS-005/80, *Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans*. The 18-element format of NQA-1 was selected as the basis for both the QAPjP and subsequent QAAs with the applicable elements of QAMS-005/80 incorporated where appropriate.
Figure 2-1 of Section 2.0 of the RFP-EMS QAPjP illustrates where the 16 QA elements of QAMS-005/80 are integrated into the RFP-EMS QAPjP and also into this QAA. Section 2.0 of the RFP-EMS QAPjP also identifies other DOE Orders and QA requirement documents to which the QAPjP and this QAA are responsive.

This QAA addresses additional and site/project specific QA controls and requirements that are

applicable to the sampling activities outlined in this SAP that may not have been addressed on a site-wide basis in the RFP-EMS QAPjP.

5.2.1 Training

The minimum personnel qualification and training requirements that are applicable to Contractor and Subcontractor staff for ER Program activities are addressed in Section 2.0 of the RFP-EMS QAPjP. All Contractor and Subcontractor personnel that perform quality-related activities on this project shall have qualification records that document they arequalified to perform their assigned tasks. The Project Manager shall identify any RFETS area-specific and/or specialized training requirements that are applicable to project personnel.

Job-specific training for field personnel will include:

- Occupational Safety and Health Administration (OSHA) 40-hour Hazardous Waste Operations training;
- OSHA Field Experience Checklist;
- applicable Environmental Management Operating Procedures;
- applicable Field Operating Procedures;
- Laboratory Analytical Procedures that are applicable to their assigned tasks; and
- Designated Waste Generator will be RCRA Waste Generator Qualified.

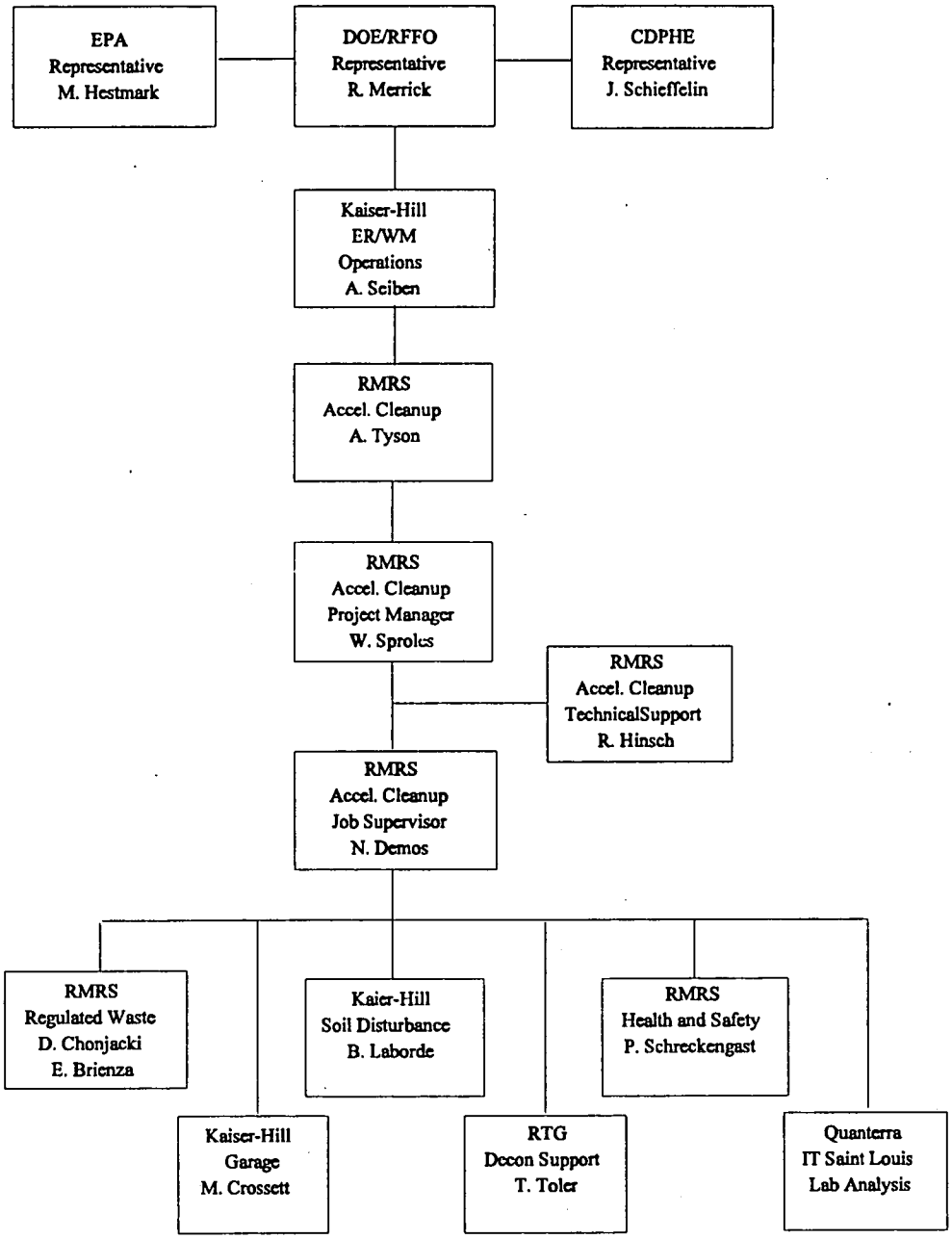
In addition to procedures training, Contractor and Subcontractor personnel shall receive training on the requirements of the RFP-EMS QAPjP and this SAP, including this QAA. This training must be recorded, with verifiable documentation of training submitted to the Project Manager prior to implementing the sampling and analysis activities described in the SAP.

Contractor and Subcontractor personnel shall also be qualified to perform the tasks they have been assigned. Personnel qualifications must be documented, with documentation of qualifications verified by the Project Manager in accordance with *ERM Administrative Procedure* 3-21000-ADM-02.02, *Personnel Qualifications.*

5.2.2 Quality Assurance Reports

A QA summary report will be prepared by the QA Program Manager at the conclusion of field activities. This report will include a summary of field operations and sampling oversight inspections, laboratory assessments, surveillances, and a report on data verification/validation results.

Figure 5-1
Project Organization Chart



5.3 Design Control and Control of Scientific Investigations

5.3.1 Design Control

This SAP describes the general design considerations for implementing work activities, outlining sampling and analysis techniques, describing analytical requirements, and summarizing data management processes.

The QAPjP considers activities that generate analytical data, which requires collection and analysis of environmental samples to be scientific investigations. Controls for scientific investigations include:

- Developing DQOs;
- Collecting and analyzing samples according to approved procedures;
- Establishing and implementing quality controls; and
- Reducing and reporting data in a controlled manner.

5.3.2 Data Quality Objectives

DQOs quantitatively and qualitatively describe the uncertainty that decision makers are willing to accept in results derived from environmental data. DQOs were established to make decisions on the number and types of samples required as specified in *Guidance for Planning for Data Collection in Support of Environmental Decision Making Using the Data Quality Objectives Process*, EPA QA/G-4. The seven steps in the DQOs process have been used as a planning tool and the results of the process are summarized below:

State the Problem:

(1) Identify members of the planning team: The planning team members include the Project Manager, the Accelerated Programs Technical Lead, and a Waste Programs Representative.

(2) Identify the primary decision maker: There will not be a primary decision maker; separate decisions will either be allocated to members of the planning team or made by consensus.

(3) Develop a concise description of the problem: The problem has been divided into the three activities that will be completed as part of the sampling activity. The waste characterization activity has been further divided into concrete sampling and other waste sampling. The problems are to:

I. determine PCB levels in the field above 10 ppm to guide excavation activities.

II. confirm that the PCB levels of the excavation sites after the contaminated soil and concrete have been removed are <25 ppm by Method 8080 analysis and immunoassay analysis.

IIIa. characterize waste streams for shipment offsite to determine if waste will be considered a RCRA hazardous waste, and to determine if the waste meets all appropriate waste acceptance criteria for an offsite incinerator, or another TSCA-approved disposal facility.

IIIb. characterize concrete waste to determine if the waste meets all appropriate waste acceptance criteria for a chemical waste landfill or other approved disposal facility.

(4) Specify available resources and relevant deadlines for the study: The removal actions must be completed as quickly as possible. Cost is a factor on this project, and sampling costs must be kept at a minimum, while maintaining the highest level of quality assurance/quality control.

Identify the Decision:

(1) State the decision(s):

(2) State the actions that could result from the decision:

Decisions made based on the sample results will be:

I. Has the excavation removed PCB contamination in accordance with Section 2.1 of the SAP, as analyzed on site using EPA SW-846 Draft Method 4020?

a) Confirmation sampling can begin at this site.
b) Excavation must continue.

II. Is the excavation site free of PCB contamination above 25 ppm as analyzed on site using EPA SW-846 Draft Method 4020 and confirmed offsite using EPA SW-846 Method 8080?

a) Include site in final project completion report and quarterly update to the Historical Release Report (HRR).
b) Return to site and excavate until the PCB levels on site are below 25 ppm.

IIIa. Is the waste (soil, PPE and waste water) a mixed RCRA/TSCA waste?

a) The waste will be disposed of at an approved RCRA/TSCA incinerator.
b) The waste will be disposed of at a TSCA incinerator or chemical waste landfill.

IIIb. Is the waste concrete with <10 ppm PCBs? Is the waste concrete with >10 ppm, but <500 ppm PCBs?

a) The waste will be disposed of at the onsite sanitary landfill.
b) The waste will be disposed of at an offsite chemical waste landfill.

Identify the Inputs to the Decision:

(1) Identify the information that will be required to make a decision:

I. To evaluate the problem, the planning team must collect samples of soil from the excavation site during removal activities following every 12" of soil removal, and subject them to an immunoassay test to analyze for PCBs. Either a semi-quantitative (> 10ppm or < 10ppm PCBs as compared to a 10ppm standard) or a quantitative analysis will be sufficient.

II. To evaluate the problem, the planning team must collect samples of soil from the final excavation site, using a MRI grid layout, subject all samples to an immunoassay test to analyze for PCBs, and 20% of the samples to Method 8080 analysis for PCBs. Either a semi-quantitative or quantitative analysis will be sufficient for the Method 4020 analysis.

IIIa. To evaluate the problem, the planning team must collect samples of soil from 10% of each type of waste container, and subject samples to all applicable waste acceptance criteria analyses as outlined in Table 2-2 of the SAP. For concrete, destructive samples must be collected and subjected to Method 8080 analysis for PCBs.

IIIb. To evaluate the problem, the planning team must collect destructive samples of concrete pads that have been removed from the sites, and subject all samples to Method 8080 for analysis of PCBs. Only pads that have initial PCB characterization levels > 10 ppm and require further waste characterization will be further sampled as part of this sampling support effort.

(2) Determine the sources for each item of information identified:

The additional PCB levels and waste characterization concentrations will be measured using methods referenced in 40 CFR § 260.11.

(3) Identify the information that is needed to establish the action level for the study:

I. The action level for guiding excavation, as agreed to in the *Final Proposed Action Memorandum, Remediation of Polychlorinated Biphenyls, July 1995*, is 10 ppm PCBs.

II. The action level, as agreed to in the *Final Proposed Action Memorandum, Remediation of Polychlorinated Biphenyls, July 1995*, is 25 ppm PCBs.

IIIa. The action levels will be all applicable UTS standards (40 CFR Part 268) and waste acceptance criteria for the disposal facility.

IIIb. The action levels will be:
a) the waste acceptance criteria level for the onsite sanitary landfill, and 10 ppm PCBs.
b) the waste acceptance criteria for the chemical waste landfill, and 500 ppm PCBs.

(4) Confirm that appropriate field sampling techniques and analytical methods exist to provide the necessary data:

The detection limit for all sampling techniques are below the applicable standards.

Define the Boundaries of the Study:

(1) Define the spatial boundary of the decision:

(a) Define the domain or geographic area within which all decisions must apply:

I. Decisions will apply to each site following each 12" of soil removal.

II. Decisions will apply to each completed excavation site.

IIIa. Decisions will apply to 10% of all waste containers, including waste water and soil.

IIIb. Decisions will apply to those concrete pads that have been removed, that have >10 ppm PCBs as determined by preliminary characterization sampling results.

(b) Specify the characteristics that define the population that will be studied:

I. Soil samples from the various sites will be analyzed. This soil is not expected to contain any hazardous or radioactive constituents -- only PCBs.

II. Soil samples from the excavation sites will be analyzed. This soil is not expected to contain any hazardous or radioactive constituents.

IIIa. Samples will be taken from drums of waste water that contain decon water and sample extract waste, from drums of soil that are not expected to contain any hazardous or radioactive constituents -- only PCBs.

IIIb. Samples will be taken from containerized concrete waste, with >10 ppm PCBs.

(d) Define the scale of decision making:

I. The scale of decision making will be based on a statistically-based simple random grid pattern around the excavation that is dependent upon the size of the excavation.

II. The scale of decision making will be based on a grid laid out following the MRI procedure or other statistically valid grid, that is also dependent upon the size of the excavation.

IIIa. The scale of decision making will be 10% of containers of each type of waste (i.e., 10% of waste water drums, 10% of soil containers, etc.)

IIIb. The scale of decision making will be 10% of concrete waste containers with levels of PCBs >10 ppm.

(2) Define the temporal boundary of the decision:

(a) Determine when to collect data:

I. The data will be collected after each 12" removal of soil at each site.

II. The data will be collected after the excavation is complete, based on the results of Step I of this sampling activity.

IIIa. The data will be collected after all waste containers are filled, in order to determine the total number of containers that will need to be sampled.

IIIb. The data will be collected after all concrete waste containers are filled.

(b) Determine the time frame to which the study data apply:

I. The sampling data will only represent the PCB concentration at the stage of excavation at which sampling occurred.

II. The sampling data will represent the PCB concentration at the end of excavation and that which will remain at the site.

IIIa. The sampling data will represent the current conditions of the waste, and may be used to characterize any future remediation waste from the site.

IIIb. The sampling data will represent only the concrete waste from this removal

action.

(3) Identify practical constraints on data collection:

I. The soil may be slightly rocky, and surficial samples may be difficult to obtain, but no additional practical constraints should be present.

II. The soil may be slightly rocky, and surficial samples may be difficult to obtain, but no additional practical constraints should be present.

IIIa. The soil may be rocky, and a hand auger may be refused from drum or waste container samples. If this happens, the sample will be taken from the depth obtainable.

IIIb. There may be some difficulty in retrieving a destructive sample from the concrete. It is expected that samples will be able to be obtained with either a sledge hammer and chisel, a hammer drill, or with a jackhammer.

Develop a Decision Rule:

(1) Specify the parameter that characterizes the population of interest:

(2) Specify the action level for the study:

I. The action level for this problem is 10 ppm PCBs.

II. The action level for this problem is 25 ppm PCBs.

IIIa. The action level for this problem is the applicable UTS and the waste acceptance criteria for the disposal facility.

IIIb. The action level for this problem is 10 ppm or 500 ppm PCBs, and the relevant waste acceptance criteria for the facility.

(3) Develop a decision rule:

I. If the PCB concentration in the soil is above 10 ppm, then the excavation will continue at the discretion of the Project Manager.

II. If the PCB concentration is below 25 ppm, then the site will be considered clean.

IIIa. If the waste fails any levels of UTS, then it will be coded as hazardous waste and disposed of at a RCRA/TSCA permitted facility.

IIIb. If the waste is concrete and below 10 ppm, then it will be disposed of at the onsite landfill. If the waste is concrete and below 500 ppm, but above 10 ppm, then it will be disposed of at a chemical waste landfill.

Specify Acceptable Limits on Decision Errors:

(1) Determine the possible range of the parameter of interest:

I. The range of PCB concentration is expected to be from 0 - 1600 ppm.

II. The range of remaining PCB concentration must be below 25 ppm.

IIIa. The range of all RCRA constituents is expected to be below UTS levels, and the range of PCBs is expected to be between 0 - 1600 ppm PCBs.

IIIb. The range of PCB levels in concrete is expected to be between 0 - 500 ppm.

(2) Define both types of decision errors and identify the potential consequences of each:

(a) Define both types of decision error and establish which decision errors have the more severe consequences:

(b) Establish the true state of nature for each decision error:

(c) Define the true state of nature for the more severe decision error as the baseline condition or the null hypothesis (H_o) and define the true state for the less severe decision error as the alternative hypothesis (H_a).

(d) Assign the terms "false positive" and "false negative" to the proper decision errors.

I. The two decision errors are:

(i) deciding that excavation is complete, when in fact it is not and

(ii) deciding that excavation must continue, when in fact it is complete.

The consequences of deciding that excavation is complete, when in fact it is not, would be that the site would have to be cleaned up again, after confirmation sampling indicates further contamination, at a significant cost for remobilization. (H_o= the excavation is complete. A false positive decision error would occur when H_o is erroneously rejected, and further excavation occurs. A false negative decision error would occur when H_o is erroneously accepted, and the excavation appears complete, although it is not.)

The consequences of deciding that excavation must continue, when in fact it is complete, would be over-excavation of the site, and would increase the amount of waste generated and the time spent on that site. (H_a = the excavation is not complete)

The first decision error has the more significant consequences.

II. The two decision errors are:

(i) deciding that the site is clean, when in fact PCB contamination over 25 ppm still exists, and

(ii) deciding that the site is not clean, when in fact it is.

The consequences of deciding that the site is clean, when in fact PCB contamination over 25 ppm still exists, would be leaving a continued source of risk to workers in the soil. (H_o = the site is clean. A false positive decision error occurs when the data would mislead the decision maker into erroneously rejecting H_o, and decides that the site is not clean, when in fact it is. A false negative decision error occurs when the decision maker erroneously accepts H_o, and decides that the site is clean, when in fact it is not.)

The consequences of deciding that the site is not clean, when in fact it is would be a remobilization of all field personnel to further excavate the site at tremendous cost. (H_a = the site is not clean.)

The first decision error has the more severe consequences, since cleanup of the PCB contamination would not have been achieved, and the risk to workers would remain.

IIIa. The decision errors are:

(i) deciding that the waste should not be a RCRA hazardous waste, when in fact it is;

(ii) deciding that the waste is a RCRA hazardous waste, when in fact it is not;

The consequences of deciding that the waste should not be a RCRA hazardous waste, when in fact it is, would be that the waste may be disposed of in a TSCA-approved incinerator, not a RCRA-approved incinerator. (H_o = the waste is hazardous. A false positive decision error occurs when the decision maker erroneously rejects H_o, and decides the waste is not hazardous, when in fact it is. A false negative occurs when the decision maker erroneously accepts H_o, and decides that the waste is hazardous when in fact it is not.)

The consequences of deciding that the waste is hazardous when it truly is not would be increased cost for the disposal. (H_a = the waste is not hazardous.)

The consequences of deciding that the waste is not hazardous when in fact it is hazardous is more severe.

IIIb. The decision errors are:

(i) deciding that the concrete waste can be disposed of in the onsite landfill, when in fact it should not be;

(ii) deciding that the concrete waste could not be disposed of in the onsite landfill, when in fact it could be;

(iii) deciding that the concrete waste can be disposed of in a chemical waste landfill, when in fact it should not be; and

(iv) deciding that the concrete waste can not be disposed of in a chemical waste landfill, when in fact it should be.

The consequences of deciding that the concrete waste can be disposed of in the onsite landfill, when in fact it should not be, would be that the waste would be disposed of in a non-TSCA approved sanitary landfill. (H_o = the waste has < 10 ppm PCBs. A false positive decision error would result in the decision maker erroneously rejecting H_o, and deciding that the waste cannot be disposed of onsite. A false negative decision error would result in the decision maker erroneously accepting H_o, and deciding that the waste can be disposed of onsite, when in fact it should not be.)

The consequences of deciding that the concrete waste could not be disposed of in the onsite landfill, when in fact it could be, would be further incurred costs for the disposal of the concrete at either a chemical waste landfill or incinerator. (H_a = the waste does not have < 10 ppm PCBs.)

The consequences of deciding that the concrete waste can be disposed of in a chemical landfill, when in fact it should be, are that the waste would be disposed of in an sanitary landfill. (H_o = the waste has > 10 ppm but < 500 ppm PCBs. A false positive decision error would result in the decision maker erroneously rejecting H_o, and deciding that the waste cannot be disposed of at a chemical waste landfill. A false negative decision error would result in the decision maker erroneously accepting H_o, and deciding that the waste can be disposed of at a chemical waste landfill, when in fact it should not be.)

The consequences of deciding that the concrete waste could not be disposed of in a chemical landfill, when in fact it could be would be further costs incurred for the disposal of the concrete an incinerator. (H_a = the waste does not have < 500 ppm PCBs.)

The most severe consequence would result from disposing of the concrete at the sanitary landfill, when in fact it should be disposed of at a chemical waste landfill or incinerator, or at the chemical landfill if the waste should be incinerated.

Optimize the Design:

There must be a high level of confidence, 95%, that the data quality is an accurate representation of the actual soil or waste condition. This confidence level will be maintained by taking duplicate samples and equipment rinsates, ensuring a proper grid size during excavation, and by following the PARCC parameters as defined in Table 5-1.

Table 5-1
PARCC PARAMETER SUMMARY

	ANALYTICAL
PRECISION	RPD ≤ 20% (Equipment Rinsate Blanks) RFP ≤ 30% (Soils)
ACCURACY	Comparison of LCS with true values
REPRESENTATIVENESS	Based on Use of SOPs and Work Plans
COMPARABILITY	Based on Use of SOPs and Work Plans
COMPLETENESS	≥ 90% Usable ≥ 25% Lab Validation

5.3.3 Equipment Decontamination

Sampling equipment shall be decontaminated between sampling locations by a triple washing with distilled water and liquinox, triple rinsing with distilled water and finally wiping the

equipment with Pipe X. Any heavy equipment used during excavation shall be decontaminated as specified in the following section of *Field Operations Procedure* 5-21000-OPS-FO.04, *Heavy Equipment Decontamination*: *Section 6.2, Contamination Reduction in the Field* (except for all references of ROI procedures, since all PCB areas under this SAP are Non-RMMA areas), *Section 6.4, Movement of Contaminated Heavy Equipment* (to portable decon pad), *Section 6.5, Main Decontamination Facility, Section 6.5.1, Predecontamination Procedure, Section 6.5.2, Decontamination Procedure, Section 6.5.3, Postdecontamination Procedure,* and *Section 7.0, Documentation.*

5.3.4 Quality Assurance/Quality Control

Field sampling QA/QC will consist of:

- Collection of duplicate samples will be at a minimum of 1 per 20 samples; and
- Collection of an equipment rinsate or swipe sample for every 20 samples collected or at least one per day.

Analytical laboratory QC for soil sample analyses shall be as specified in the GRRASP.

5.3.5 Quality Assurance Records

Field QA records will be controlled in accordance with 2G-18-ER-ADM-17.01. Project records that are considered ER QA records include, but are not necessarily limited to:

- Final report, (including all appendices);
- Inspection records;
- Logbooks;
- Analytical data packages;
- Noncompliance Reports (NCRs);
- Corrective Action Reports (CARs);
- Audit reports;
- Surveillance reports;
- Self-assessment reports;
- Personnel training and qualification records;
- Any administrative and operating procedures referenced herein; and
- Any other project records that are used to support observations and conclusions in the final report.

The remaining quality elements of the project will be consistent with a graded approach of DOE Order 5700.6C.