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RDGE, LARRY		
RDING, WYNN		
RD, BOB		
L, JOHN		
RTINEZ, LEN		
G, BOB		
RKER, ALAN		
LER, ROBERT		
OR, NANCY		
ORHEIS, GARY		
dahl, T. G.		
lerson, Scott		
d, Russ		
we, Steve		
amore, Drew		
r, Kent		
n, Steve		
kle, Gordon		
nedy, Colburn		
oud, Russ		
ers, Mike		
oen, Ann	X	X
and, Jennifer		
Brooks, L.	X	X
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MIN RECRD/080	X	X
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REPLY TO RFP CC NO.:

ACTION ITEM STATUS:
PARTIAL/OPEN
☐ CLOSED

LTR APPROVALS:

ORIG. & TYPIST INITIALS
AKS :bag

469 (Rev. 3/97)

KAISER-HILL COMPANY

August 1, 1997

97-RF-04192

Norma Castaneda
ES&H Program Assessment
DOE, RFFO

TRANSMITTAL OF THE SAMPLING ANALYSIS PLAN FOR THE PRE-REMEDIAL INVESTIGATION OF IHSSs 170, 174A, AND 174B, PROPERTY UTILIZATION & STORAGE YARD - AKS-034-97

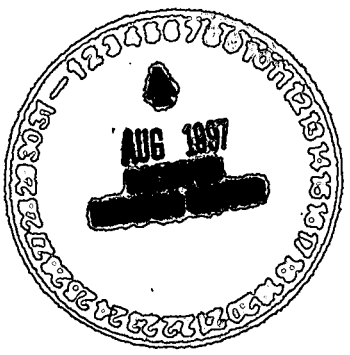
Please find enclosed for your review and comment the ***Sampling Analysis Plan for the Pre-Remedial Investigation of IHSSs 170, 174A, and 174B, Property Utilization & Storage.*** Field activities are scheduled to commence the week of August 11, 1997. Please respond with comments by August 6, 1997. Note that to expedite the review process, K-H and DOE are asked to review concurrently. Please call me at extension 9886 if you have any questions.

A. K. Sieben
Waste & Remediation Operations

bag

Orig. and 1 cc - N. Castaneda

Enclosure:
As Stated



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Mailing Address: P.O. Box 464, Golden, Colorado 80402-0464

ER/WM & IL DDT 7/95

RF/RMRS-97-036, Rev. 0

Sampling and Analysis Plan for the Pre-Remedial Investigation of IHSSs 170, 174A, and 174B, Property Utilization & Storage Yard

July 30, 1997

ADMINISTRATIVE INFORMATION

Site: Rocky Flats Environmental Technology Site (RFETS), Golden, Colorado

Project Name: Pre-Remedial Investigation of IHSSs 170, 174A, and 174B, Property Utilization & Storage Yard

Date Prepared: July 30, 1997

Approvals

I have read and approved this Sampling Analysis Plan with respect to project procedures and the planned implementation of this Pre-Remedial Investigation of IHSSs 170, 174A, and 174B, Property Utilization & Storage Yard.

Mark Wood RMRS - Project Manager	Date
Greg DiGregorio RMRS - Quality Assurance	Date
Scott Newsom SSOC - Radiological Engineering	Date

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2-G32-ER-ADM-08.02	Evaluation of ERM Data for Usability in Final Reports
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5-21000-ER-OPS-GT.08	Surface Soil Sampling
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5-21000-ER-OPS-GW.6	Groundwater Sampling
REP 14.01	Operation of the Nomad Portable Gamma Spectroscopy System
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1-C88-WP1027-NONRAD	Non-Radioactive Waste Packaging
1-C80-WO-1102-WRT	Waste/Residue Traveler Instructions
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1.0 INTRODUCTION

This pre-remedial investigation Sampling Analysis Plan (SAP) for Individual Hazardous Substance Sites (IHSSs) 170 and 174A and 174B, also known as the Property Utilization and Disposal Storage Yard (PU&D Yard), at the Rocky Flats Environmental Technology Site (RFETS) summarizes and assess the existing data, delineates data gaps, and describes the scope of work required to identify the source of volatile organic compounds (VOCs) impacting groundwater. Characterization of the PU&D Yard is required to confirm or disprove the potential presence of a VOC contaminant source for remedial activities. This investigation is being conducted by Rocky Mountain Remediation Services (RMRS) Environmental Restoration Projects Group on behalf of Kaiser-Hill Company, Inc. (K-H) for the U.S. Department of Energy/Rocky Flats Field Office (DOE/RFFO). Implementation of this project will be performed in accordance with the applicable Federal, State, and local regulations, as well as DOE Orders, RFETS policies and procedures, and Environmental Restoration Operating Procedures.

1.1 Background

The IHSSs are located in the northwest buffer zone and were former storage areas for empty drums, cargo boxes, and dumpsters from 1974 until 1994 (Figure 1-1). Empty drums contained unknown residual quantities and types of solvents and wastes. Two areas within IHSS 170 were specified for the storage of hazardous materials. Specifically, IHSS 174A stored empty drums and IHSS 174B was designated for a dumpster. The dumpster contained stainless steel metal chips and lathe turnings coated with freon-based or oil-based lathe coolant. Potential VOC contamination is a result of leaking drums containing oil-solvents or metal turnings coated with oil-solvents at the surface, or as surface spills.

The primary sources for information on IHSSs 170, 174A, and 174B (formerly part of Operable Unit 10 [OU 10]) are an internal letter (Rockwell, 1987), the Closure Plan for the Container Storage Area (Rockwell, 1988), the OU 10 Phase I Resource Conservation and Recovery Act (RCRA) Field Investigation/Remedial Investigation (RFI/RI) Work Plan (DOE 1992a), Draft Technical Memorandum No. 1 - Data Summary for OU 10 (EG&G, 1995a), the Final Historical Release Report (HRR) (DOE, 1992b) and the Hydrogeologic and Geologic Characterization Reports for RFETS (EG&G, 1995b and 1995c). The Draft Technical Memorandum No. 1 - Data Summary for OU 10 for the Phase I, Stage 1, RFI/RI was completed in October 1994. The soil gas survey performed per the Phase I RFI/RI consisted of 235 soil gas sample locations, some of which indicated the presence of volatile organic contaminants in subsurface soil (Figure 1-1). In addition, the Phase I RFI/RI Work Plan (DOE, 1992a) indicated the presence of chlorinated solvents in near-surface soil in 2 of 14 one foot deep soil samples in the northeast area of IHSS 174A (Figure 1-1). Specifically, tetrachloroethene at 94 µg/Kg and 1,1,1-trichloroethane at 160 µg/Kg. The primary volatile organic compounds (VOCs) detected are:

- acetone,
- benzene,
- trichloroethene (TCE),
- tetrachloroethene (PCE), and
- 1,1,1-trichloroethane (1,1,1-TCA)

Figure 1-1 shows the soil gas survey anomalies which indicate possible subsurface contamination in three areas, 1) the east-southeast side of IHSS 170, 2) the northeast corner of IHSS 170 and the north side of IHSS 174A, and 3) the oil stain area in IHSS 174B.

A total of 71 surface soil locations were sampled for the RFI/RI Work Plan (DOE, 1992a). Thirty seven soil samples from IHSS 170, 26 soil samples from IHSS 174A, and eight soil samples from IHSS 174B were analyzed for total metals, semivolatile organic compounds, pesticides, and polychlorinated biphenyl's (PCBs). Aroclor-1254 was observed in four samples from IHSS 174A at concentrations greater than the Rocky Flats Cleanup Agreement (RFCA) (DOE, 1996) Tier II but less than the Tier I surface soil action levels (EG&G, 1995a). Beryllium was observed in two samples from IHSS 174A at concentrations greater than the RFCA Tier II but less than the Tier I surface soil action levels (EG&G, 1995a).

High Purity Geranium and Sodium Iodide surveys of IHSSs 170, 174A, and 174B were also performed as part of the RFI/RI (EG&G, 1995a) with no anomalous results observed. However, according to an internal letter (Rockwell, 1987), a small spill of approximately 500-600 grams of green powder from a drum in December 1987 contained approximately 60 percent aluminum oxide, 32.5 percent chromium oxide, 3,000 pCi/g plutonium, 1,000 pCi/g americium, and 100 pCi/g uranium-235.

1.2 Hydrogeologic and Contaminant Setting

The PU&D Yard is located on an eastward sloping pediment surface where 30 to 40 feet of unconsolidated surficial materials of the Rocky Flats Alluvium overlie weathered claystone bedrock of the Laramie Formation (EG&G, 1995b). Depth to groundwater is approximately 10 to 20 feet with a hydraulic gradient of 0.01 ft/ft towards the east (EG&G, 1995c). The PU&D Yard is suspected as the source of groundwater contamination. Concentrations of VOCs greater than RFCA Tier II action levels protective of surface water (DOE, 1996) are observed in groundwater monitoring well 70393, upgradient of IHSS 114 at the Present Landfill, and in groundwater seep monitoring location 61495, above North Walnut Creek. Table 1-1 summarizes the analytical data from well 70393, located northeast of IHSS 170, and well point 61495 containing the highest contaminant concentrations in downgradient groundwater (Figure 1-1).

Table 1-1
Maximum Groundwater Contaminant Concentrations in Downgradient Wells

Compound	Well 70393 Concentration (µg/L)	Well point 61495 Concentration (µg/L)
1,1,1-Trichloroethane	84	54
1,1-Dichloroethene	20	15
Tetrachloroethene	9	2
Trichloroethene	36	7

1.3 Objectives

The objective of this investigation will be to evaluate a total of five areas. The three soil gas survey anomalies, and two areas of surficial oil staining in the east central portion of IHSS 170, which are not proximal to soil gas survey points will be investigated. The objectives of this investigation are as follows:

1. locate the source of the VOC groundwater plume; and
2. define the vertical and areal extent of residual VOC contamination equal to or greater than the RFCA Tier I subsurface soil action levels.

1.4 Methodology

The following methodology will be utilized.

- Initial soil borings will be located in the area of the three soil gas surveys with chlorinated VOC anomalies previously identified for a total of 11 borings (Figure 1-1).
- Each surface soil sample location with detectable chlorinated VOCs will have one soil boring and the two small oil stained areas will have a minimum of one soil boring for a total of four soil borings (Figure 1-1).
- Groundwater samples will be collected for VOC screening through the hollow-stem auger, geoprobe, or open borehole from each area.
- Additional boring locations will be modified in the field on the basis of the analytical results as obtained.
- Investigative findings will be summarized and documented in a final report.

This SAP describes the specific data needs, sampling and analysis procedures and requirements, data handling procedures, and associated Quality Assurance/ Quality Control (QA/QC) requirements for completion of soil and groundwater sampling. The SAP contains the following sections: Section 2 presents the sampling and data quality objectives; Section 3 presents the sample collection and analysis methodology; Section 4 presents the data management and documentation; Section 5 presents the project organization; and Section 6, references.

2.0 SAMPLING AND DATA QUALITY OBJECTIVES

This section of the SAP describes the sampling and data quality objectives for the pre-remedial investigation of IHSSs 170, 174a, and 174b. This investigation is driven by DOE Order 5400.1, RFETS protection of groundwater and the RFCA (DOE, 1996), to determine if VOC levels in subsurface soil are greater than or equal to RFCA Tier I Subsurface Soil Action Levels, and to provide additional data for an accelerated remedial action. Data requirements to support this project were developed using criteria established in *Guidance for the Data Quality Objective Process*, EPA QA/G-4 (EPA, 1994). The data gaps, study boundaries, and decisions are described below.

The primary data gap is the lack of subsurface VOC data in soil and groundwater. Soil samples will be collected for VOC analyses to evaluate subsurface soil for VOC contamination equal to or greater than the RFCA Tier I Subsurface Soil Action Levels (DOE, 1996). Groundwater samples will be collected to evaluate groundwater for VOC contamination to assist with source delineation. Four groundwater monitoring wells will be installed to the north, east, west, and south of IHSS 170 as shown on Figure 1-1, as part of the Groundwater Monitoring Program FY97 Well Abandonment and Replacement Program and agreed to by the regulators.

If hollow-stem auger drilling methodology is utilized, composite soil samples from drummed soil cuttings will be collected for analysis for TCLP-metals for RCRA waste characterization. Soil analytical results for VOCs will also be used for RCRA waste characterization.

2.1 Data Quality Objectives

The data quality objectives for this investigation are summarized in Tables 2-1 and 2-2. A minimum of 15 boreholes and a maximum of 30 boreholes will be drilled during this investigation. Borings will be drilled one to two feet into groundwater or to a sufficient depth to collect groundwater samples.

Table 2-1

Data Quality Objectives

Data Quality Objective	Assurance Method
Locate concentrations of VOCs in soil equal to or greater than the Tier I Subsurface Soil Action Levels listed in Table 2-2. Document concentrations of radionuclides in surface soil.	15 to 30 soil borings drilled to 20 feet or one to two feet into groundwater. A minimum of three soil samples per boring will be analyzed for VOCs. Two QC samples (one duplicate and one rinsate) will be collected per 20 real samples. Analysis will be by USEPA VOA by SW846/8240. Collect three surface soil samples based on the three highest FIDLER survey results and analyze for radioisotopes by HPGe.
Characterize groundwater for the presence of VOCs. Assist with delineation of residual VOC source area.	15 to 30 soil borings drilled to a sufficient depth to collect groundwater samples with a minimum of 30 percent of the soil borings will have a groundwater sample collected and analyzed for VOCs. One QC sample (1 duplicate and 1 rinsate) will be collected per 20 real groundwater samples. Analysis will be by VOC screening.
Characterize investigative derived materials (IDM) - soil cuttings from hollow-stem auger drilling for RCRA waste disposition.	Collect one composite sample per borehole from 15 to 30 soil borings and analyze for TCLP-metals. Results of VOC soil samples as described above, will also be utilized for this objective.

Table 2-2

RFCA Tier I Subsurface Soil Action Levels (DOE, 1996)

Compound	Concentration (mg/kg)
acetone	2,740.00
benzene	8.08
trichloroethene	9.27
tetrachloroethene	11.50
1,1,1-trichloroethane	378.00

3.0 SAMPLING AND ANALYSES

Samples will be collected as described below and submitted for the analyses listed in Tables 3-1 and 3-2. The initial soil borings will be located per the proposed boring location methodology described above and shown in Figure 1-1. If concentrations of VOCs in subsurface soil are equal to or greater than the Tier I Subsurface Soil Action Levels listed in Table 2-2, additional boreholes will be spaced approximately 20 feet apart to the north, east, south, and west in the area where the previous soil gas survey grid was on a 40 foot grid. Where the soil gas survey grid was on a 20 foot grid, additional borings will be spaced on a ten foot grid. If concentrations of VOCs are observed in groundwater from each investigative area equal to or greater than the Tier II Groundwater Action Levels per RFCA (DOE, 1996), additional boreholes may be located approximately 100 feet in an upgradient direction to the west to assist in delineating the upgradient source.

Table 3-1
Soil Analytical Parameters

Analysis, Method	Core Sample	QC Samples	Total Samples	Container, Preservative, Holding Time
VOA by EPA SW846/8240	60-120	3-6 duplicates (1 per 20 samples) 3-6 rinsates (1 per 20 samples)	63-126	125 ml wide mouth, Teflon lined glass jar or 2 in x 4 in brass sleeves with Teflon tape and capped,4°C, 14 days for soils Two 40 ml glass vials, Teflon lined, HCl to pH<2 and 4°C, 14 days for water
Rad Screen/per GRAASP	60-120	NA	60-120	250 or 500 ml glass jars, NA, 6 months
TCLP-metals	15-30	1-2 duplicates (1 per 20 samples) 1-2 rinsates (1 per 20 samples)	16-32	8 oz wide mouth glass jar, Teflon lined, 4°C, Extract and analyze within 180 days
radionuclides by HPGe, REP 14.01	3 Surface Soil Samples	1 duplicate (1 per 20 samples)	4	250 ml plastic or 250 ml glass wide mouth jars, NA, 6 months

Table 3-2
Water Analytical Parameters

Analysis, Method	Sample	QC Samples	Total Samples	Container, Preservative, Holding Time
VOA Screening	5-10	1-2 duplicates (1 per 20 samples) 1-2 rinsates (1 per 20 samples)	7-12	Two 40 ml glass vials, Teflon lined, HCl to pH<2 and 4°C, 14 days
Rad Screen, per GRAASP, if necessary	5-10	NA	5-10	250 ml or 4 oz. Glass jar, NA, 60 days

Eleven borings will be located on volatile chlorinated hydrocarbon soil gas survey anomalies delineated by the 1994 soil gas survey (EG&G, 1995a), (Figure 1-1). Two soil borings will be located over two additional areas of surface oil staining (Figure 1-1) and two soil borings will be located over the two anomalous surface soil analytical results in IHSS 174A. The fifteen initial soil borings will be radiologically surveyed using the Field Instrument for Detection of Low Energy Radiation (FIDLER) per FO.16, "Field Radiological Measurements". Additional borings will be installed to try to locate the source of groundwater contamination and to further investigate an area or areas of interest if conditions warrant. If locations must be changed to avoid obstructions, or for safety reasons, these changes will be noted in the field logbook.

Soil and groundwater samples will be handled in accordance with FO.13, "Containerization, Preserving, Handling and Shipping of Soil and Water Samples". If conditions are encountered in the field which make the use of a procedure unsafe or inappropriate for the task at hand, the specified procedures may be modified or replaced as long as the modification or replacement

procedure is justified and detailed in the field logbook per ADM-05.14, "Use of Field Logbooks and Forms" and the resulting data are adequate to meet the objectives of the project.

3.1 Field Preparation

Before data collection begins, each borehole location will be established with tape and compass as necessary, using the previous soil gas survey points as reference. Locations will be marked with reference stakes or flags with the unique number for that location. Borehole location numbers and sample numbers will be obtained from Rocky Flats Environmental Database System (RFEDS) and correlated with sample analyses for that location per FO.14, Field Data Management". On the basis of the FIDLER survey results per FO.16, "Field Radiological Measurements" from the 15 initial boring locations, the three highest FIDLER readings will be selected for surface soil samples for radionuclide analysis per GT.08, "Surface Soil Sampling", Section 4.3 - Grab Sampling. Surface soil sampling will be performed using disposable sampling equipment, such as plastic scoops.

3.2 Drilling and Soil Sampling Methodology

Boreholes will be advanced to a depth of one to two feet into groundwater or a sufficient depth to collect a groundwater sample. This depth is expected not to exceed 20 feet, however, no borehole will exceed a depth of 30 feet, the limit of expected groundwater. If refusal occurs prior to reaching groundwater, up to two offsets will be tried. If there is no success in penetrating below a given depth, the boring will be terminated at that location. Geoprobe drilling operations will be conducted per GT.39, "Push Subsurface Soil Sample", if utilized. Hollow-stem auger drilling is the preferred drilling methodology due to the thickness of the Rocky Flats Alluvium and will be conducted per GT.02, "Drilling and Sampling Using Hollow-Stem Auger Techniques". Subsurface soil samples will be collected at five foot intervals, or where visible staining or other indications of VOC contamination are present. Two to five foot core runs will be pushed using a hydraulic sampling tool (Geoprobe) or using a split-spoon sampler with a hollow-stem auger, logged in the field, and field screened for VOCs. A Photoionization Detector (PID) or Flame Ionization Detector (FID) will be used in the field to screen the collected core to assist in identifying the intervals where VOCs may be present per FO.15, "Photoionization Detectors and Flame Ionization Detectors". Core will be visually logged by the field geologist per GT.01, "Logging Alluvial and Bedrock Material". Soil cores recovered via hollow-stem auger will not be sieved per Section 5.1.2.1 or photographed per Section 6.2.4. Soil samples will be collected from the core for analyses as described above and in Table 3-1. Radiological screening samples will be composited from the 0.5 foot interval above the VOC sample interval to radiologically screen the samples per FO.18, "Environmental Sample Radioactivity Content Screening", for off site laboratory shipment and analysis.

Soil cuttings generated by hollow-stem auger drilling will be monitored and containerized per FO.8, "Monitoring and Containerizing Drilling Fluids and Cuttings" and managed per FO.10, "Receiving, Marking , and Labeling Environmental Materials Containers", FO.23, "Management of Soil and Sediment investigative Materials (IDM), and FO.29, "Disposition of Soil and Sediment Investigation-Derived Materials. The RMRS waste generators will be responsible for insuring that the waste containers are properly filled, labeled, and have the waste residue traveler documentation in accordance with plant procedures (1-C88-WP1027-NONRAD, "Non-Radioactive Waste Packaging", 1-C80-WO-1102-WRT, "Waste/Residue Traveler Instructions", and 1-I34-WO-1103-NRWOL, Non-Routine Waste Origination Log Instructions). Particulate dust will be monitored during drilling operations per Procedure FO.1, "Air Monitoring and Particulate Control".

Equipment will be decontaminated in the field per FO.3, "Field Decontamination Procedures" and FO.7, Handling of Decontaminated Water and Waste Water". Prior to release from RFETS, equipment will be decontaminated at the Main Decontamination Facility per FO.12, "Decontamination Facility Operations" and radiologically surveyed per HSP 18.10, "Radioactive Material Transfer and Unrestricted Release of Property and Waste" as necessary. Personal protective equipment (PPE) will be handled in accordance with FO.6, "Handling of Personal Protective Equipment".

3.3 Groundwater Sampling Methodology

Groundwater is expected to be encountered between 10 and 20 feet below ground surface in the investigation areas. Groundwater samples will be collected either through the hollow-stem auger or in the open borehole with a bailer from the first boring from each investigative area with sufficient groundwater. Groundwater samples will be collected for VOC analysis per GW.6, "Groundwater Sampling". Specifically, Section 5.8.1 - Sample Collection, for radiation screening (also per FO.18, "Environmental Sample Radioactivity Content Screening") and VOCs; Section 5.8.1.1 - Groundwater Sampling Using a Bailer; Section 5.8.4.1- Duplicates; Sections 5.8.4.4 - Equipment Rinses and 5.8.4.4.1 - Bailed Wells; Section 5.9 - Sample Handling And Control; and Section 6.0 - Documentation, using Form GW.6B - Groundwater Sample Collection Log. VOC analyses and radiological screens will be collected per the methods specified in Table 3-2 and procedure FO.18, "Environmental Sample Radioactivity Content Screening".

3.4 Abandonment of Borehole Locations

After completion of sampling at each location, boreholes will be abandoned in accordance with procedure GT.05, "Plugging and Abandonment of Boreholes", except that geoprobe boreholes will be backfilled with powdered or granular bentonite from ground surface and not tremmied. Each location will be identified with the unique location number assigned, with indelible ink either on a wooden lathe or pin flag.

Boring locations will be surveyed for location and elevation using GPS receivers operated in accordance with the equipment manuals (Ashtech 1993), or with equivalent equipment.

4.0 DATA MANAGEMENT AND DOCUMENTATION

The location and depth interval of all subsurface materials, either solid or liquid, recovered during the course of this investigation will be recorded in the field log book. RFEDS location codes will be cross indexed to appropriate sample location designations in the field logbook. Soil core and other material that is subject to only field screening will be identified by the sample location code and depth interval where the sample is obtained. Samples undergoing VOC or radioisotope analysis will have RFEDS sample numbers applied to the container labels in the field. The numbers will be applied sequentially as the samples are collected and the COC form is prepared. A block of sample numbers will be obtained from the RFEDS. A block of location codes and sample numbers will be of sufficient size to include the entire number of possible locations and samples scheduled for analysis and an additional twenty percent for potential additional locations and samples.

4.1 Project Completion

The results will be compiled into a brief report and map. The location and analytical data will be entered into and stored in the RFEDS. At the end of the project, all records and field documentation will be turned over to the records center.

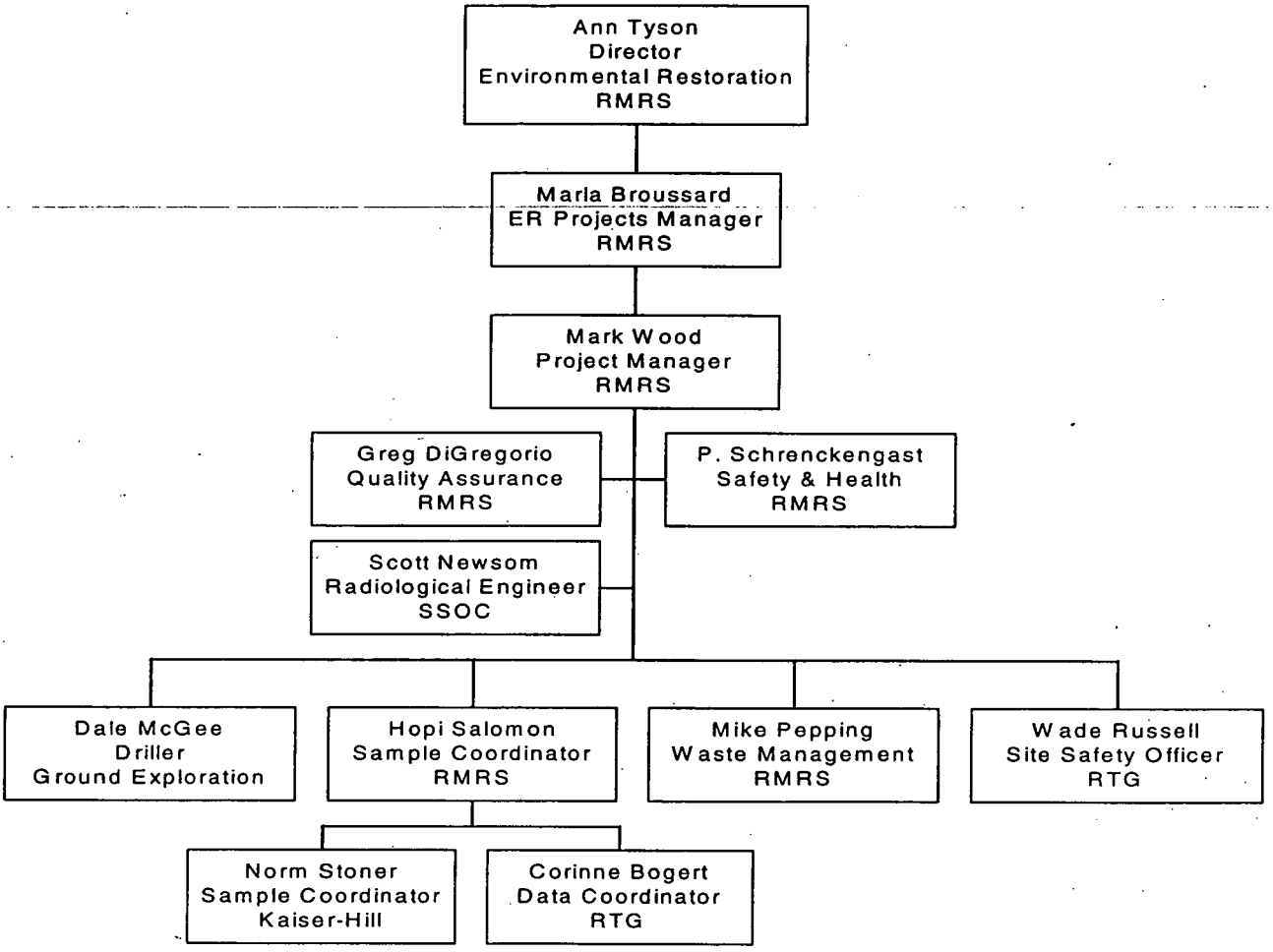
4.2 Quality Assurance

Analytical data collected in support of this investigation will be evaluated using the guidance established by 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. For precision, typically the relative percent difference between samples and duplicates is less than or equal to 40 percent for soil and 30 percent for groundwater. Accuracy of the laboratories will be obtained by using laboratories as directed by the APO. In addition, 25 percent of the soil analytical results will be validated by an independent third party. Comparability will be evaluated by using standardized methods for the collection and analysis of samples. Completeness will be evaluated by comparing the proposed sampling program to the field program as completed. A value of 90 percent will be used to assess completeness for the project. Sampling activities will be conducted in accordance with the RMRS Quality Assurance Program Plan (RMRS, 1995). Field decisions will be based on "Form 1s" received directly from the laboratory. This will allow for the timely use of analytical results. Analytical laboratories supporting this investigation have all passed regular laboratory audits by the Rocky Flats Analytical Projects Office.

5.0 PROJECT ORGANIZATION

The project organization chart is presented in Figure 5-1. The project team is responsible for management and coordination of resources dedicated to the project. The Project Manager is responsible for ensuring that all data are collected, verified, transmitted and stored in a manner consistent with relevant operating procedures. Other organizations assisting with the implementation of this project are: Analytical Services with Kaiser-Hill APO, RMRS Health and Safety, RMRS Quality Assurance, the drilling subcontractor, and health and safety specialist support.

Figure 5-1
Project Organization



6.0 REFERENCES

Ashtech, 1993 , Ashtech XII GPS Receiver Operating Manual, Version 7, March.

EG&G Rocky Flats, 1995a, *Draft Technical Memorandum 1, Operable Unit 10, Other Outside Closures,* Rocky Flats Environmental Technology Site, Golden, Colorado, January.

EG&G Rocky Flats, 1995b, *Geologic Characterization Report for the Rocky Flats Environmental Technology Site,* Rocky Flats Environmental Technology Site, Golden, Colorado, March.

EG&G Rocky Flats, 1995c, *Hydrogeologic Characterization Report for the Rocky Flats Environmental Technology Site,* Rocky Flats Environmental Technology Site, Golden, Colorado, April.

RMRS, 1995, *Quality Assurance Program Plan (QAPP).* 95-QAPP-001. Golden, Colorado.

Rockwell, 1987, *Letter to File from F. Blaha, dated December 17, 1987, Rocky Flats Plant, Golden, Colorado.*

Rockwell, 1988, *Closure Plan for the Container Storage Area,* Rocky Flats Plant, Golden, Colorado.

U.S. Department of Energy (DOE), 1992a, *Final Phase I RFI/RI Work Plan, Rocky Flats Plant, Other Outside Closures (Operable Unit 10),* Rocky Flats Plant, Golden, Colorado.

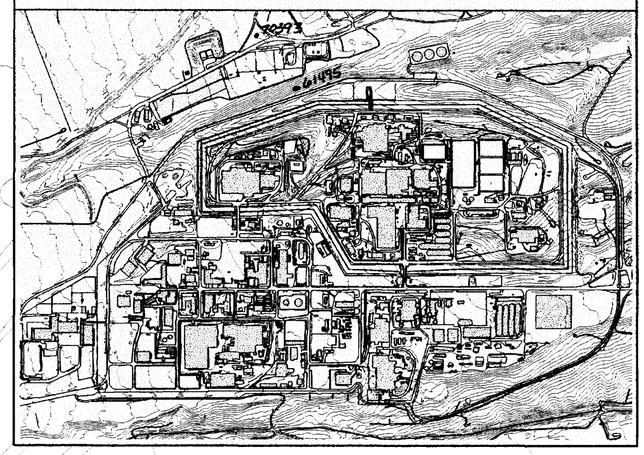
U.S. Department of Energy (DOE), 1992b, *Historical Release Report for the Rocky Flats Plant,* Rocky Flats Plant, Golden, Colorado, June.

U.S. Department of Energy (DOE), 1996, *Final Rocky Flats Cleanup Agreement,* Rocky Flats Environmental Technology Site, Golden, Colorado, September.

U.S. Environmental Protection Agency (EPA), 1994, *Guidance for the Data Quality Objectives Process*, EPA/G-4, September.

IHSS's 170, 174A & 174B
Property Utilization & Storage Yard
Location Map
Figure 1-1

Location of IHSS 170, Rocky Flats Environmental Technology Site



SG038294
TCA111=41.71
TCE=1.49
PCE=1.2
CH4=50
ACE=5.54
BZ=2.87

SG038194
TCA111=32.61
CH4=50

SG038394
PCE=1
CH4=20

SG043694
PCE=13
CH4=20

SG043994
PCE=1.5

174A

01297

SG036594
ACE=1.04

Soil Stain

01397

SG029894
TCA111=3.5
CH4=20

SG050294
TCA111=1.84

Soil Stain

Soil Stain

SG027494
TCA111=2.8
CH4=80

SG027394
TCA111=4.52
PCE=1.51

SG025094
TCA111=6.6
PCE=1.19

Revised Location of 174B

IHSS 170

01197

01097

EXPLANATION

- Contours (5 foot)
- OU10 IHSS
- Oil Stain Location
- New RFCA Groundwater Monitoring Wells under FY97 WARP
- Power Poles
- Soil-Gas Sampling Location
- Soil-Gas Sampling Location with concentrations of volatile organic compounds equal to or above the detection limit of 1.0 microgram per liter (*See note)
- Surface Soil Sample with Volatile Organic Compounds detected

Investigative Borings will be located on each soil gas and surface soil sample location with detectable volatile organic compounds and the two surface oil stain locations.

Standard Map Features

- Buildings & other structures
- Fences
- Rocky Flats boundary
- Paved roads
- Dirt roads

DATA SOURCE:
Buildings, roads, and fences provided by Facilities Dept. 2060 Rocky Flats, Inc. - 1991.
Hydrology provided by USGS - Date unknown

NOTE:
Concentrations are in ug/L

ACE = Acetone
BZ = Benzene
CH4 = Methane
PCE = Tetrachloroethene
TCA111 = 1,1,1-Trichlorethane
TCE = Trichlorethane

N

Scale = 1 : 960
1 inch represents 80 feet

0 40 80 120 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: 97-0128

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