



MANUAL

Sampling and Analysis Plan
For Concrete Pads at RCRA Units 21 and 48

RF/RMRS 99 319
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Page 1 of 12

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1 INTRODUCTION

This Sampling and Analysis Plan (SAP) supports the closure of the Resource, Conservation and Recovery Act (RCRA) Units 21 and 48 located at Rocky Flats Environmental Technology Site (RFETS). The RCRA units are associated with the former Operable Unit 4, Solar Evaporation Ponds. RCRA Units 21 and 48 are located within and surrounding Building 788 (B788). The B788 complex is located in the northeast area of the Protected Area (PA). B788 is located between Solar Ponds 207A and 207C. Unit 21 is a permitted storage unit located in Building 788 (B788). Unit 48 is an interim status unit which contains the pondcrete solidification process equipment including the clarifier and the pump transfer station at B308A. This SAP will provide guidance for collecting accurate and reproducible samples to support RCRA closure. Sampling activities will be conducted in accordance with the RMRS Quality Assurance Program Description, RMRS-QAPD-001.

B788 consists of four distinct areas: north pad, south pad, former Contamination Area (CA), and the Permacon area. The north pad is about 5 feet wider (east to west) than the south pad. The Permacon area is on the north pad along the west wall. The Permacon area covers 47 feet north to south and 10 feet east from the west wall. The former CA is located in the south pad area, 35 feet north of the south wall and 15 feet west of the east wall. The former CA is about 5 feet wide. Figure 1-1 shows a B788 Cluster site map.

This SAP addresses sampling of water generated during concrete pad washing and rinsing. Water samples will be collected to determine if RCRA closure requirements outlined in the *Closure Description Document for RCRA Units 21 and 48 (CDD)*, RF/RMRS-98-288, January 1999, are met. Wash water will also be sampled to evaluate on-site water treatment options in accordance with RMRS/OPS-PRO 097, Waste Management Plan for the Building 788 Cluster Decommissioning Project. Concrete core samples may be collected to provide an indication of the contaminants remaining in the concrete. If the core sampling is conducted, an addendum to this SAP and a new Activity Hazard Analysis (AHA) will be completed.

2 HISTORICAL RCRA CHARACTERIZATION

Historical data from the *Pond Sludge Waste Characterization Report and Clarifier Sludge Waste Characterization Report* prepared by Halliburton NUS Environmental Corporation in March of

ADMIN RECCRD
SW-SW-A-003006

K2

Figure 1-1
Building 788
Location Map

EXPLANATION

- Electrical pole
- Standard Map Features
 - Buildings and other structures
 - ▨ Solar evaporation ponds
 - - - Fences and other bar lines
 - Paved roads
 - Dirt roads

NOTES:
 1. This map was prepared from background maps and other information. It is not a survey map and does not show boundaries. It is not to be used for legal purposes. It is for informational purposes only. It is not to be used for any other purpose. It is not to be used for any other purpose. It is not to be used for any other purpose.

Scale: 1" = 640'
 1 inch represents approximately 640 feet



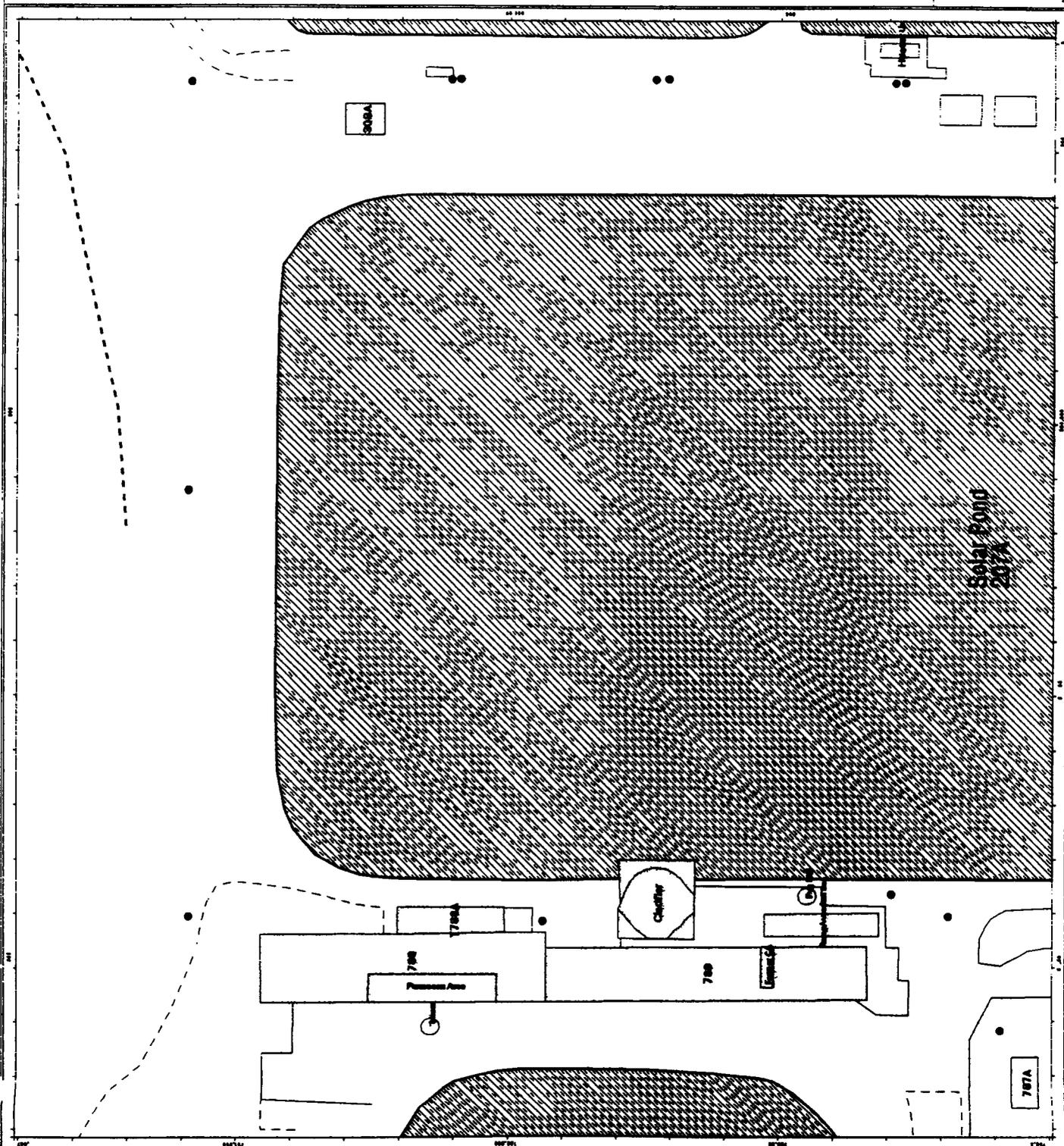
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U.S. Department of Energy
 Rocky Flats Environmental Technology Site



Rocky Mountain
 Remediation Services, L.L.C.
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MAP D-10-0110
 February 15, 1999



1992, lists the hazardous wastes detected in sludge and water from the Solar Ponds. The sampling was conducted to characterize the sludges for stabilization. The Halliburton data were compared with the contaminants of concern listed in Table 4-1 of the CDD. The data comparison indicated the only RCRA contaminants of concern historically present in the Solar Ponds water and sludge were Volatile Organic Compounds (VOCs), Metals and Cyanide. Table 2-1 lists the RCRA constituents listed in the CDD and found to be present. The constituents RCRA closure water samples will be analyzed for these constituents.

Table 2-1 RCRA Sample Water Analytes

VOCs	Inorganic
1,1,1 Trichloroethane	Arsenic
1,1,2 trichloro-1,2,2 trifluoroethane	Barium
1,2 Dichloroethane	Cadmium
Benzene	Chromium
Methyl ethyl ketone	Total Cyanide (includes Amenable Cyanide)
Tetrachloroethylene	Lead
Trichloroethylene	Mercury
Vinyl Chloride	Nickel
	Selenium
	Silver

Historical data do not exist for 1,2 Dichloroethane and Vinyl Chloride, so they are included on the list of analytes. Amenable Cyanide was listed in the CDD as a contaminant of concern and was detected in the Halliburton samples. Total cyanide will include amenable cyanide, so amenable cyanide will not be analyzed separately.

3 SAMPLING AND DATA QUALITY OBJECTIVES

Data needed to support the closure of RCRA Units 21 and 48 were developed using established criteria in EPA QA/G-4, Guidelines for the Data Quality Objective Process, EPA. The data gaps, study boundaries and decisions are described in this plan.

The primary objectives of this SAP are

- To determine if the required RCRA closure levels outlined in the CDD are met, and
- To support selection of on-site water treatment of wash and rinse water.

Variability of the data set as a whole will also be evaluated based on guidance provided in EPA QA/G-4, Guidance for the Data Quality Objectives Process. The EPA Guidance will be used to evaluate the data variance relative to the mean value of the sample results and compared to the RFCA Table 2-Groundwater Action Levels, Tier 2-MCLs. Using the sample results, EPA QA/G-4 provides guidance to compute the required minimum number of samples.

VOCs listed

necessary to make a statistically valid decision as outlined in Section 4.3

4 SAMPLE COLLECTION AND ANALYSIS

The sampling requirements for each sample type to be collected under this SAP are described in the following sections

Under certain circumstances, the field supervisor may determine that additional samples not specified in this SAP are required. In conjunction with the sample coordinator, project health and safety personnel, and project management additional samples may be collected based on best professional judgement. Rationale for collecting additional samples will be described in detail on sample logsheets. Additional sampling will not require changes to this SAP.

All activities will be conducted in accordance with the RCRA Units 21 and 48 Closure Sampling AHA and Generic Health and Safety Plan for Characterization Sampling, RF/RMRS-98-284

4.1 Concrete Pad RCRA Water Sampling

The concrete slabs below each RCRA unit will be washed with a machine capable of scrubbing and carrying cleaning solutions. The floor will then be rinsed with water. Foot traffic in the area to be sampled will be minimized to the extent practical. A tape measure will be used to measure and mark the 100 square foot area to be sampled. Two gallons of distilled water will be poured over the area. The water will be spread with a squeegee to cover at least 100 square feet. Rinse water may spread beyond the 100 square foot area, but efforts will be made to reduce spreading. The sample water will be allowed to contact the floor surface for at least 3 minutes but less than 10 minutes prior to initiating sampling. The sample will be collected using a squeegee to push water into a collection tray (dust pan/weigh boat). A long handle squeegee will be used to prevent samplers from walking in the sample water. The sample will then be poured into sample bottles. The sampler will wear plastic boot covers to prevent contaminating sample water. VOC samples will be minimally disturbed during sample collection to reduce sample volatilization. Some sample volatilization may occur during the sample contact time and spreading. However, the contact time with the concrete is required to allow contaminant absorption. Zero head space will be achieved in sample bottles for VOC analysis. If two gallons of water is not adequate to fill all the sample jars, an additional gallon of water will be spread on the concrete surface. Additional water requirements will be documented in the field logsheets. Additional water will be collected as outlined above. Table 3-1 lists the required analytical parameters necessary to evaluate the rinse water for RCRA closure.

Table 4-1 RCRA Water Sample Parameters

Analytical Method	ASD Line Item Code	Analytes	Number Of Samples	Container	Preservative	Holding Time
SW 846 Method 8240B/8260A	SS01B004	Volatiles Low Level	10	3 x 40 ml glass VOA	Zero Head Space 4C HCl to pH<2	14 days
6010 & 7000 Series	SS05B001*	Total Metals + Hg Low Level	10	1 L HDPE	4C HNO3 to pH<2	6 months Hg 28 days
335 Methods, 9010A/9012	SS06B015*	Cyanide Total	10	500 ml HDPE	4C NaOH to pH>14	14 days
DOT Rad Screen	OS01A002 Or PA04006	Gross Alpha/Gross Beta	10	40 ml Glass or 10 ml Glass	HNO3 to pH<2	30 days

* Confirm pH after sampling

NOTE Sample containers can be modified per Analytical Service Division (ASD) Customer Service Representative

4 2 RCRA Water Sampling Locations and Frequency

4 2 1 B788

Rinse water samples will be collected from at least seven locations on the B788 concrete pad. The concrete pad is approximately 220 feet long by 25 feet wide. A grid will be paced out on the floor creating grid cells as shown in Appendix 1. Each grid cell is assigned a number and a random number generator will be used to select five grids to sample. A map of random number sample locations is in Appendix 1. If the grids indicated by the random sampling contain floor paint, the grid will be shifted to exclude the painted area. The grid area will not include the former CA or the Permacon area. These two areas will be bias sampled. One sample will be collected from within the former CA and one sample will be collected within the Permacon area. The samples will be biased to the worst case scenario within these areas. The samples will be collected from stained areas or areas of historical spills. Historical spill locations will be based on facility personnel knowledge. If a biased location does not exist, the sample will be collected from the center of the area.

4 2 2 Clarifier

One real water sample will be collected from the clarifier pad. The clarifier pad is approximately 30 feet square. The clarifier sample will be collected from the most heavily stained 10 feet by 10 feet square on the pad. A duplicate sample will also be collected from the closest 10 foot by 10 feet square on the pad. If a biased location does not exist, the sample will be collected from the center of the area. The square will be measured out and the sample collected by the same methods outlined in Section 3 1.

4.2.3 B308A

The B308A pad is approximately 10 feet square. One rinse sample will be collected from the B308A pad, the whole pad surface will be used to collect sample. The sample will be collected by the same methods outlined in Section 3 1.

4 3 Decisions and Error Limits

The results from the random samples collected from the B788 pad will be compared to the Rocky Flats Clean Up Agreement (RFCA) Table 2-Groundwater Action Levels, Tier 2-Maximum Contaminant Levels (MCLs). Consistent with Environmental Protection Agency (EPA) protocol, the 90% upper confidence limit of the random samples will be compared to the RFCA Table 2-Groundwater Action Levels, Tier 2-MCLs. If the existing samples provide adequate variance and mean values (specifically EPA, 1994, Guidance for Data Quality Objectives Process, EPA QA/G-4, Final, September or Gilbert, R O , 1987, Statistical Methods for Environmental Pollution Monitoring, Van Norstrand Reinhold, New York, New York), sampling is complete. If the variance and mean values obtained are inadequate, then a new number of minimum samples specified in the calculation will be required. If the 90% upper confidence limit of the water samples exceeds the RFCA Table 2-Groundwater Action Levels, Tier 2-MCLs, then additional cleaning may be required. If the 90% upper confidence limit of the water samples is below the action levels, then the cleaning operation will be considered adequate.

The sample water results from the Permacon, former CA, Clarifier, and B308A will be compared directly to the RFCA Table 2-Groundwater Action Levels, Tier 2-MCLs. If the sample results exceed the levels, then all stained areas or areas of historical spills within the former CA and Permacon area would not meet RCRA closure. If the results are below the action levels, then the former areas are acceptable for closure.

If any contaminants are detected that do not have RFCA Table 2-Groundwater Action Levels, an alternative standard will be proposed to the Colorado Department of Public Health and Environment (CDPHE).

If the performance standard cannot be met, additional cleaning and sampling may be attempted. Any additional sampling would follow the procedures set forth in this SAP. If the performance measure cannot be met, the units will be deferred to Environmental Restoration (ER) after notifying CDPHE and employing necessary measures to prevent the release of waste constituents to the environment.

4 4 Wash Water and Rinse Water Sampling and Frequency

Wash water and rinse water used to clean the concrete pads will be collected from the cleaning machine or the pad surface. Pad surface water will be collected using a wet vacuum or a submersible pump placed in a B788 sump. The water will be transferred to drums, a tank or a tanker truck, and labeled as outlined in Hazardous Waste Requirements Manual, 1-10000-HWR, Transportation Manual, 1-T91-Traffic-100 and On-Site Transportation of Hazardous and Radioactive Materials Manual, 1-T93-Traffic-110. Water will be analyzed for VOCs, Metals, Cyanide and a Radiological Screen to determine the best location for on-site treatment. Treatment decisions will be based on the B374 Waste Acceptance Criteria (WAC). Samples will

be collected with a bailer/coliwasa from the drum(s) or tanks used. One grab sample will be used to characterize the water.

5 QUALITY CONTROL SAMPLES

The following Quality Control (QC) samples will be collected to support the closure of RCRA Units 21 and 48.

- **Duplicates** Duplicate (adjacent) samples will be collected in the same manner and analyzed by the same analytical methods by the same laboratory as the grab samples described in Section 3.1. Duplicates will be sampled from the nearest grid with similar staining. The samples will be collected at the ratio of at least one duplicate per twenty real samples. All duplicates will be collected using the same sampling equipment used for the collection of real samples. Sampling equipment will be decontaminated between collection of the real and duplicate sample. Duplicate samples will be evaluated to ensure an adequate Relative Percent Difference between the real and duplicate sample. Duplicates will only be collected for RCRA closure water samples.
- **Equipment Rinse Blanks** Rinse blanks will be prepared by collecting distilled water poured over decontaminated sampling equipment after collection of VOC samples. Rinse blanks will be collected at the ratio of at least one duplicate per twenty equipment decontaminations. Duplicates will only be collected for RCRA closure water samples.
- **Trip Blanks** Trip blanks will be shipped with VOC samples sent off site for analysis. The trip blank will be prepared prior to field activities. The trip blank will be preserved to pH < 2 and zero head space. Trip blanks will travel with samples from sample collection through sample receipt at the analytical laboratory. Trip Blanks will only be collected for RCRA closure water samples.

6 SAMPLE DESIGNATION AND DATA MANAGEMENT

Each sample will be assigned a unique sample number based on the assigned Analytical Service Division (ASD) Report Identification Number (RIN). Each sample number is made up of three components:

- **Report Identification Number**
- **Event Number**
- **Bottle Number**

The first part of the sample number will be the RIN. The RIN is used to track data. Unique RINs will be assigned to different types of sampling events. The RIN will have a seven digit alpha numeric code starting with 99 for fiscal year 1999. The RIN will be followed with a dash "-" and then the event number. The event number is a three digit code starting with "001". The following event numbers will be sequential. Each separate sampling event will usually have a unique event number with the RIN. QC samples will have unique event numbers to support blind submittal to the laboratory. The event number will be followed by a period "." and the sequential bottle number. The bottle number will be a three digit code starting with "001". Under each event, each additional bottle will have a sequential bottle number. The bottle number will be used to identify individual sample containers under the same event number.

Each sample will require the following sample QC description

<u>QC Code</u>	<u>QC Description</u>
REAL	Regular Sample
DUP	Duplicate Sample
RNS	Rinsate Sampled
TB	Trip Blank (VOCs only)

Table 6-1 lists examples of sample types and locations codes for the RCRA Units 21 and 48 Closure

Table 6-1 Sample Types and Location Codes

Sample Type	Sample Type Code	Sample QC Code	Location Code
RCRA Closure Sample Water	IW	REAL	Grid Number or Biased Location Coordinate
Wash & Rinse Water	IW	REAL	Tank Number/WEMS Drum Number
Trip Blank	IW	TB	Grid Number of Associated Sample
Rinsate Sample	IW	RNS	B788EQ
Duplicate	IW	DUP	Grid Number or Biased Location Coordinates

7 SAMPLING SUPPORT INFORMATION

This section details the sample handling, document and quality assurance requirements necessary to support the completion of this project. The Organizational Chart for this project is shown in Appendix 2.

7.1 Sample Handling

Samples collected for laboratory analysis will follow RMRS/OPS-PRO 069, Containing, Preserving, Handling, and Shipping of Soil and Water Samples. All water samples will be

collected without the use of filters. When reusable sampling equipment is used, the equipment will be decontaminated in accordance with 5-21000-OPS-FO 03, Field Decontamination Operations. If (CAS) Commodore Advanced Sciences conducts the sampling, they will use the following procedure for sample handling and decontamination: Sampling for Waste Characterization for General Sampling Activities at the Rocky Flats Environmental Technology Site, CAS SOP-003

7.2 Documentation

Field data shall be recorded on the Chain of Custody (COC) forms and log sheets from the Soil Water Database (SWD). COC forms will be completed as outlined in Field Data Management, 4-B29-ER-OPS-FO 14, Revision 3. SWD field logsheets will be printed prior to sampling activities. The logsheets will be completed by samplers during sampling. Any modifications to information will be lined through and initialed and dated. The information will then be entered into the SWD. The updated logsheet will then be reviewed by a peer reviewer. The reviewer will either indicate changes to be made on the logsheet or they will sign the QC Signature/Date line. The changes will be made (not by the reviewer) in the SWD and the new printed logsheet will be reviewed again. The process continues until the reviewer signs the logsheet. The SWD record is then marked as "QC'ed" in the database. The original logsheet and the final signed logsheet are considered QA records.

7.3 Quality Assurance

All of the RCRA rinse water data generated under this SAP will be validated. Data validation will be performed in accordance with the RFETS ASD, Data Assessment Guidelines (DAGR01), and will occur after the data are used for its intended purpose.

8.0 RECORDS

The following records generated during the performance of this procedure must be controlled as follows:

<u>Records</u>	<u>Record Type</u>	<u>Disposition</u>
Chain of Custody	QA, Permanent	Original is transferred to ASD Records
SWD Logsheets	QA, Permanent	Responsible Manager Transfers to RMRS Records Center

9.0 REFERENCES

1-10000-HWR, Hazardous Waste Requirements Manual

1-T91-Traffic-100, Transportation Manual

1-T93-Traffic-110, On-Site Transportation of Hazardous and Radioactive Materials Manual

4-B29-ER-OPS-FO 14, Field Data Management, Revision 3

4-S01-ENV-OPS-FO 03, Field Decontamination Operations, Rev 3

RCRA Units 21 and 48 Closure Sampling Activity Hazard Analysis

Data Assessment Guidelines (DAGR01)

DOE, 1996 Final Rocky Flats Cleanup Agreement, Rocky Flats Environmental Technology Site, Golden , CO

EPA, 1992 US EPA Test Methods for Evaluating Solid Waste, Solid Waste-846, third edition, Method 8260A, Rev 1

EPA, 1994, Guidance for Data Quality Objectives Process, EPA QA/G-4, Final
Gilbert, R O , 1987 Statistical Methods for Environmental Pollution Monitoring, Van Norstrand Reinhold, New York, New York

Pond Sludge Waste Characterization Report and Clarifier Sludge Waste Characterization Report for EG&G Rocky Flats Prepared by Halliburton NUS Environmental Corporation, March 1992

RF/RMRS-98-249, Building 788 Site Hazard Assessment Plan

RF/RMRS-98-284RF/RMRS-98-284, Generic Health and Safety Plan for Characterization Sampling

RF/RMRS-98-288, *Closure Description Document for RCRA Units 21 and 48*

RMRS/OPS-PRO 069, Containing, Preserving, Handling and Shipping of Soil and Water Samples

RMRS/OPS-PRO 097, Waste Management Plan for the Building 788 Cluster Decommissioning Project

RMRS-QAPD-001, RMRS, 1996a, Quality Assurance Program Description (QAPD) Rev 2

Sampling for Waste Characterization for General Sampling Activities at the Rocky Flats Environmental Technology Site, CAS SOP-003

U. S. J. L. 100

APPENDIX 1
B788 Random Number Sample Locations

B788 Concrete Pad Random Sample Grids
 Building Dimensions in Feet

North

	0-6	5-10	10-15	15-20	20-25
0-6	1		2		3
5-10					
10-15	4		5		
15-20					
20-25	6		7		8
25-30					
30-36	9				
35-40			10		
40-45	P				15
45-50	E		11		
50-55	R				
55-60	M	A	12		
60-65	A	R			16
65-70	C	E	13		
70-75	O	A			
75-80	N		14		
80-85					17
85-90	18		19		
90-95					
95-100	20		21		24
100-105					
105-110	22		23		
110-115					
115-120	25		26		
120-125					
125-130	27		28		
130-135					
135-140	29		30		
140-145					
145-150	31		32		
150-155					
155-160	33		34		
160-165					
165-170	35		36		
170-175					
175-180	37				
180-185	38 FORMER CA				
185-190	39				
190-195	40		41		
195-200					
200-205	42		43		
205-210					
210-215	OFFICE AREA				
215-220	TILE FLOOR				

Random Sample Grid Numbers

41 2, 4, 25, 12

East

Grid 24 shares one 8ft square with grid 17
 Grid 28 shares one 8 ft grid with grid 27 and two grids with grid 30

APPENDIX 2
Organizational Chart

Building 788 Organization Chart

