

**Data Summary Report  
IHSS Group 500-6**

**July 2003**

**Data Summary Report  
IHSS Group 400-10**

Approval received from the Colorado Department of Public Health and Environment.

July 15, 2003

Approval letter contained in the Administrative Record.

**July 2003**

Table of Contents

1.0 Introduction..... 1  
2.0 Site Characterization..... 1  
3.0 Data Quality Assessment ..... 5  
    3.1 Data Quality Assessment Process..... 5  
    3.2 Verification and Validation of Results ..... 6  
    3.3 Accuracy ..... 7  
    3.4 Precision..... 9  
    3.5 Sensitivity ..... 10  
    3.6 Summary of Data Quality ..... 10  
4.0 References..... 10

List of Tables

Table 1 IHSS Group 500-6 - Characterization Sampling Specifications ..... 3  
Table 2 IHSS Group 500-6 - Analytical Results Greater than Method Detection Limits .. 3  
Table 3 IHSS Group 500-6 - Summary of Analytical Results..... 3  
Table 4 Lab Control Sample Summary ..... 8  
Table 5 Surrogate Recovery Summary ..... 8  
Table 6 Method Blank Summary ..... 8  
Table 7 Matrix Spike Summary ..... 9  
Table 8 Matrix Spike Duplicate Summary ..... 9

**List of Figures**

Figure 1 Location Map IHSS Group 500-6/PAC 500-906 ..... 2  
Figure 2 IHSS Group 500-6 Results Greater than Method Detection Limits..... 4

**Appendix A**

Appendix A IHSS Group 500-6 Wildlife Refuge Worker/Ecological Receptor Action Level Comparison Table

**Enclosure**

Real and QC Data (compact disc)

## ACRONYMS AND ABBREVIATIONS

AL	action level
AR	Administrative Record
CDPHE	Colorado Department of Public Health and Environment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DOE	U.S. Department of Energy
DQA	Data Quality Assessment
DQO	Data Quality Objective
EPA	U.S. Environmental Protection Agency
ft	feet
FY	Fiscal Year
HRR	Historical Release Report
IA	Industrial Area
IASAP	Industrial Area Sampling and Analysis Plan
IHSS	Individual Hazardous Substance Site
K-H	Kaiser-Hill Company L.L.C.
MDL	method detection limit
NA	not applicable
ND	not detected
NFAA	No Further Accelerated Action
PAC	Potential Area of Concern
PARCCS	precision, accuracy, representativeness, completeness, comparability, and sensitivity
QC	quality control
RCRA	Resource Conservation and Recovery Act
RFCA	Rocky Flats Cleanup Agreement
RFETS	Rocky Flats Environmental Technology Site
RIN	report identification number
SAP	Sampling and Analysis Plan
SSRS	Subsurface Soil Risk Screen
□g/kg	microgram per kilogram
VOC	volatile organic compound
V&V	verification and validation
WRW	Wildlife Refuge Worker

## 1.0 INTRODUCTION

This Data Summary Report summarizes characterization activities conducted at Individual Hazardous Substance Site (IHSS) Group 500-6 at the Rocky Flats Environmental Technology Site (RFETS or Site) in Golden, Colorado. Characterization activities were planned and executed in accordance with the Industrial Area (IA) Sampling and Analysis Plan (SAP) (IASAP) (DOE 2001a) and IASAP Addendum #IA-02-01 (DOE 2001b).

IHSS Group 500-6 consists of one Potential Area of Concern (PAC) identified as PAC 500-906 – Asphalt Surface Near Building 559. The location of IHSS Group 500-6 (PAC 500-906) is shown on Figure 1.

## 2.0 SITE CHARACTERIZATION

Characterization of IHSS Group 500-6 consisted of historical knowledge (DOE 1993) and two surface soil sampling locations with specifications as described in IASAP Addendum #IA-02-01 (DOE 2001b). No existing characterization data was identified for this PAC. The sampling specifications for the characterization samples collected are listed in Table 1. The location of these samples and analytical results are shown on Figure 2. There were no sampling location deviations from the IASAP Addendum. Analytical results are presented in Tables 2 and 3. Results indicate that all contaminant concentrations are below Tier II action levels (ALs), Wildlife Refuge Worker (WRW) ALs and Ecological Receptor ALs. A comparison of the analytical results to the WRW and Ecological Receptor ALs is presented in Appendix A. Real and quality control (QC) data is enclosed on a compact disc.

Analytical results indicate that No Further Accelerated Action (NFAA) for IHSS Group 500-6 is warranted for the following reasons:

- All contaminant concentrations are less than WRW ALs.
- All contaminant concentrations are less than Ecological Receptor ALs.

Based on historical knowledge, subsurface soil sampling was deemed unnecessary and was not evaluated per IASAP Addendum IA#-02-01 (DOE 2001b). Consequently, a Subsurface Soil Risk Screen (SSRS) is not required based on the RFCA Modification (DOE, et. al, 2003).

Approval of this Data Summary Report constitutes regulatory agency concurrence of this IHSS Group as an NFAA. This information and NFAA determination will be documented in the FY03 Historical Release Report (HRR).

**Figure 1**  
**IA Groups Location Map**

**EXPLANATION**

**IHSS Groupings**

■ 500-6

**Standard Map Features**

- Buildings and other structures
- ▨ Demolished buildings
- ▩ Solar Evaporation Ponds (SEPs)
- ▤ Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Paved roads
- Dirt roads
- ⬮ Industrial Area Operable Unit Boundary

**DATA SOURCE BASE FEATURES:**  
 PACs  
 Historical Release Report (HRR)  
 2nd Annual Update  
 Sept. 30, 1997  
 Individual Hazardous Substance Sites (IHSS)  
 DOE, 1992, HRR Report and Subsequent Updates.  
 Buildings, fences, hydrography, roads and other  
 structures from 1994 aerial fly-over data  
 captured by EG&G RSL, Las Vegas.  
 Digitized from the orthophotographs, 1/95



Scale = 1 : 6330  
 1 inch represents approximately 528 feet



State Plane Coordinate Projection  
 Colorado Central Zone  
 Datum: NAD27

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

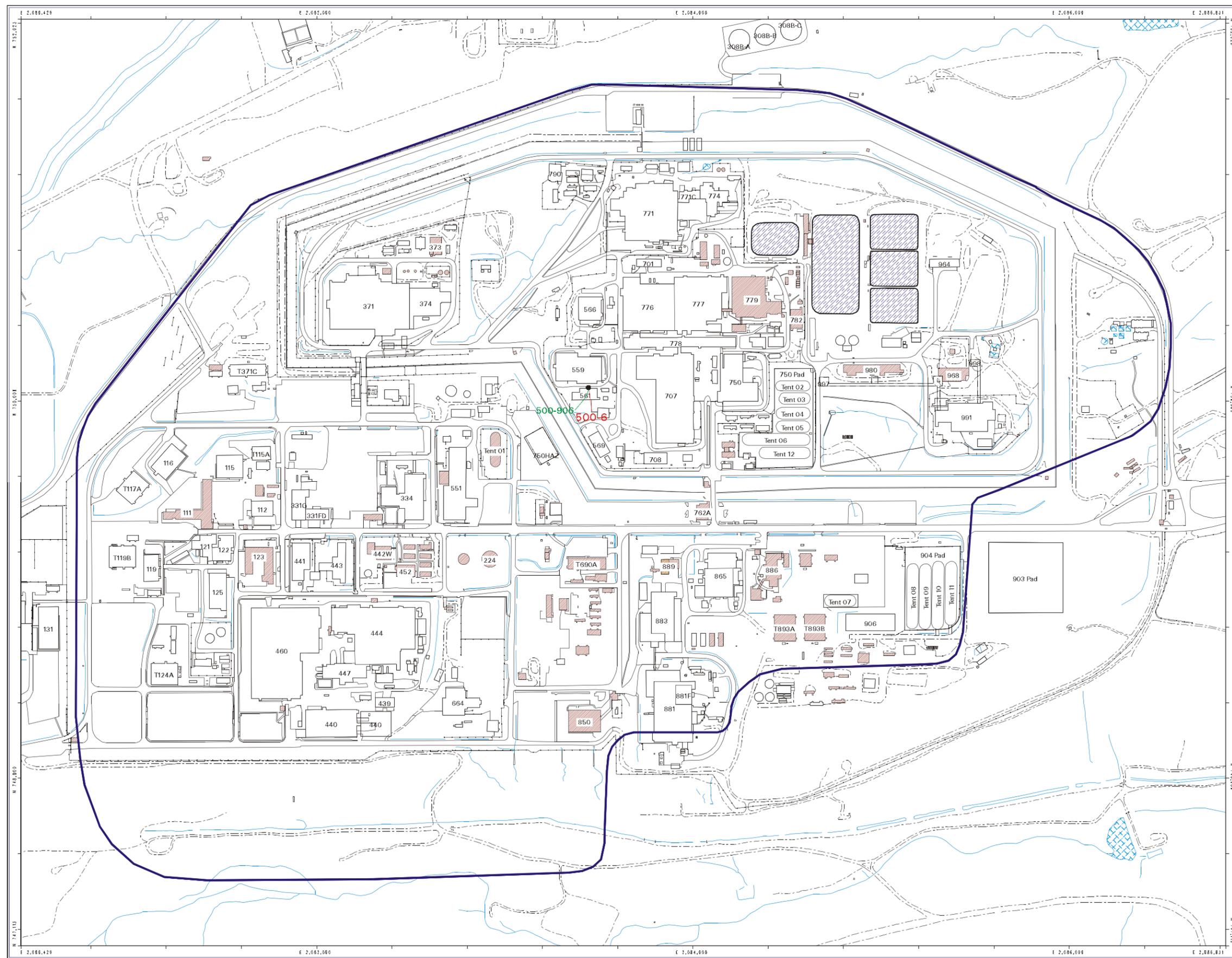
Prepared by:



Prepared for:



September 17, 2002



N:\\_Svr\projects\fly2002\02-0924\ia-500-6.aml

**Table 1**  
**IHSS Group 500-6 - Characterization Sampling Specifications**

IHSS/PAC/UBC Site	Location Code	Easting	Northing	Media	Depth Interval	Analyte	Lab Method
PAC 500-906 – Asphalt Surface Near Building 559	CD43-001	2083446.11	750070.71	surface Soil	A	VOCs	8260
	CD43-002	2083439.93	750075.86	surface Soil	A	VOCs	8260

**Table 2**  
**IHSS Group 500-6 - Analytical Results Greater than Method Detection Limits**

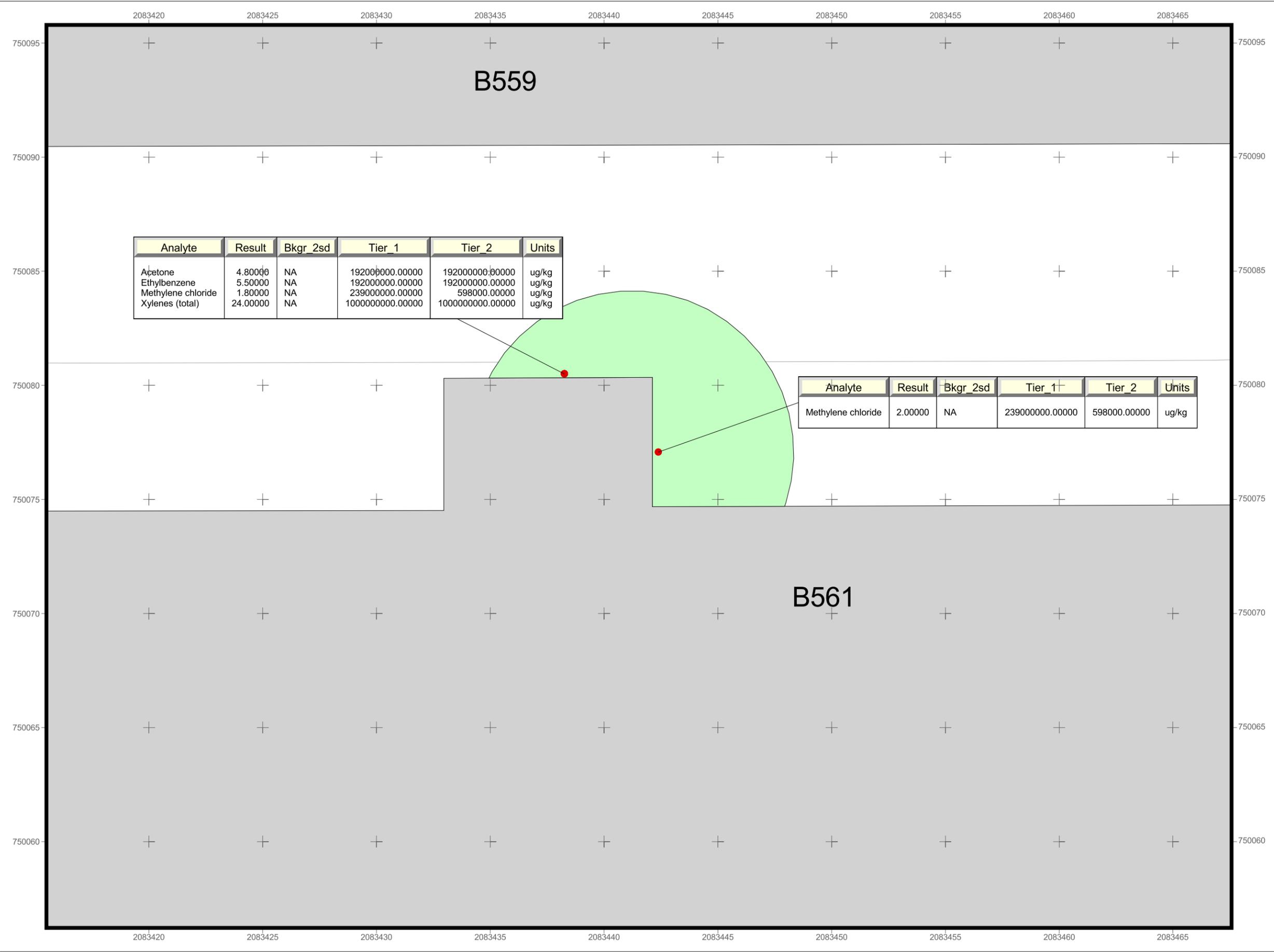
IHSS/PAC/UBC Site	Sampling Location	Easting	Northing	Media	Beginning Depth (ft)	Ending Depth (ft)	Analyte	Result	Background Mean + 2SD	Tier I	Tier II	Unit
PAC 500-906 – Asphalt Surface Near Building 559	CD43-001	2083446.11	750070.71	Surface Soil	0.00	0.50	Methylene chloride	2.00	NA	239,000,000	598,000	ug/kg
	CD43-002	2083439.93	750075.86	Surface Soil	0.00	0.50	Acetone	4.80	NA	192,000,000	192,000,000	ug/kg
	CD43-002	2083439.93	750075.86	Surface Soil	0.00	0.50	Ethylbenzene	5.50	NA	192,000,000	192,000,000	ug/kg
	CD43-002	2083439.93	750075.86	Surface Soil	0.00	0.50	Methylene chloride	1.80	NA	239,000,000	598,000	ug/kg
	CD43-002	2083439.93	750075.86	Surface Soil	0.00	0.50	Xylenes (total)	24.00	NA	1,000,000,000	1,000,000,000	ug/kg

**Table 3**  
**IHSS Group 500-6 - Summary of Analytical Results**

Analyte	Total Number Samples Collected	Number of Samples Above Detection Limit	Detection Frequency (%)	Maximum Concentration	Average Concentration	Tier I Action Level	Tier II Action Level	Background Mean +2SD	Unit
Acetone	2	1	50	4.80	4.80	192,000,000	192,000,000	NA	ug/kg
Ethylbenzene	2	1	50	5.50	5.50	192,000,000	192,000,000	NA	ug/kg
Methylene Chloride	2	2	100	2.00	1.90	239,000,000	598,000	NA	ug/kg
Xylenes (total)	2	1	50	24.00	24.00	1,000,000,000	1,000,000,000	NA	ug/kg

SD = standard deviation

NA = not applicable



Analyte	Result	Bkgr_2sd	Tier_1	Tier_2	Units
Acetone	4.80000	NA	192000000.00000	192000000.00000	ug/kg
Ethylbenzene	5.50000	NA	192000000.00000	192000000.00000	ug/kg
Methylene chloride	1.80000	NA	239000000.00000	598000.00000	ug/kg
Xylenes (total)	24.00000	NA	1000000000.00000	1000000000.00000	ug/kg

Analyte	Result	Bkgr_2sd	Tier_1	Tier_2	Units
Methylene chloride	2.00000	NA	239000000.00000	598000.00000	ug/kg

**Figure 2**  
**IHSS Group 500-6**  
**Results Greater Than**  
**Background Mean Plus Two**  
**Standard Deviations or**  
**Method Detection Limits**

**KEY**

-  PAC
-  Building
-  Stream, ditch, or other drainage
-  Paved area
-  Dirt road
-  Sampling Location

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N



2 0 2 4 Feet



Scale = 1:75  
State Plane Coordinate Projection  
Colorado Central Zone  
Datum: NAD 27

U.S. Department of Energy  
Rocky Flats Environmental Protection Agency

Prepared by: \_\_\_\_\_ Date: September 2002



Prepared by: \_\_\_\_\_



### **3.0 DATA QUALITY ASSESSMENT**

The Data Quality Objectives (DQOs) for this project are described in the IASAP (DOE 2001a). All DQOs for this project were achieved based on the following:

- Regulatory agency approved sampling program design (IASAP Addendum 02-01 [DOE 20021b]);
- Collection of samples in accordance with the sampling design;
- Results of the Data Quality Assessment as described in the following sections.

#### **3.1 Data Quality Assessment Process**

The DQA process ensures that the type, quantity and quality of environmental data used in decision making are defensible, and is based on the following guidance and requirements:

- EPA QA/G-4, 1994a, Guidance for the Data Quality Objective Process;
- EPA QA/G-9, 1998, Guidance for the Data Quality Assessment Process; Practical Methods for Data Analysis; and
- DOE Order 414.1A, 1999, Quality Assurance.

Verification and Validation (V&V) of the data are the primary components of the DQA. The final data are compared with original project DQOs and evaluated with respect to project decisions; uncertainty within the decisions; and quality criteria required for the data, specifically precision, accuracy, representativeness, completeness, comparability, and sensitivity (PARCCS). Validation criteria are consistent with the following RFETS-specific documents and industry guidelines:

- EPA 540/R-94/012, 1994b, USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review;
- EPA 540/R-94/013, 1994c, USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review; and
- Kaiser-Hill Company, L.L.C.(K-H) V&V Guidelines:
- General Guidelines for Data Verification and Validation, DA-GR01-v2, 2002a.
- V&V Guidelines for Isotopic Determinations by Alpha Spectrometry, DA-RC01-v2, 2002b.
- V&V Guidelines for Volatile Organics, DA-SS01-v3, 2002c.
- V&V Guidelines for Semivolatile Organics, DA-SS02-v3, 2002d.
- V&V Guidelines for Metals, DA-SS05-v3, 2002e.

- Lockheed-Martin, 1997, Evaluation of Radiochemical Data Usability, ES/ER/MS-5.

This report will be submitted to the Comprehensive Environmental, Response, Compensation and Liability Act (CERCLA) Administrative Record (AR) for permanent storage 30 days after being provided to CDPHE and/or U.S. EPA.

### **3.2 Verification and Validation of Results**

Verification ensures that data produced and used by the project are documented and traceable in accordance with quality requirements. Validation consists of a technical review of all data that directly support the project decisions so that any limitations of the data relative to project goals are delineated and the associated data are qualified accordingly. The V&V process defines the criteria that constitute data quality, namely PARCCS parameters. Data traceability and archival are also addressed. V&V criteria include the following:

- Chain-of-custody;
- Preservation and hold-times;
- Instrument calibrations;
- Preparation blanks;
- Interference check samples (metals);
- Matrix spikes/matrix spike duplicates (MS/MSD);-
- Laboratory control samples (LCS);
- Field duplicate measurements;
- Chemical yield (radiochemistry);
- Required quantitation limits/minimum detectable activities (sensitivity of chemical and radiochemical measurements, respectively); and
- Sample analysis and preparation methods.

Evaluation of V&V criteria ensures that PARCCS parameters are satisfactory (i.e., within tolerances acceptable to the project). Satisfactory V&V of laboratory quality controls are captured through application of validation “flags” or qualifiers to individual records.

Raw hardcopy data (e.g., individual analytical data packages) are currently filed by RIN and are maintained by Kaiser-Hill Analytical Services Division; older hardcopies may reside in the Federal Center in Lakewood, Colorado. Electronic data are stored in the RFETS Soil and Water Database (SWD).

Both quality control (QC) and real data for the project are included on the enclosed CD (Filename “500-5\_070703.mdb”; tables within, containing the raw data are “SWD&LIMS\_all\_qc\_data\_500-6\_070703” and “SWD&LIMS\_all\_real\_data\_500-6\_070703”).

### 3.3 Accuracy

The following measures of accuracy were evaluated:

- Laboratory Control Sample Evaluation;
- Surrogate Evaluation;
- Blanks; and
- Sample Matrix Spike Evaluation.

Results are compared to method requirements and project goals. The results of these comparisons are summarized for RFCA COCs where the result could impact project decisions. Particular attention is paid to those values near ALs when quality control (QC) results could indicate unacceptable levels of uncertainty for decision-making purposes.

#### Laboratory Control Sample Evaluation

The frequency of Laboratory Control Sample (LCS) measurements, relative to each laboratory batch, is given in Table 4. LCS frequency was adequate based on at least one LCS per batch; the short list of analytes represents the entire suite of VOCs captured by the SW8260 method. The minimum and maximum LCS results are also tabulated, by chemical, for the entire project; units of measure are in %Recovery. Any qualifications of results due to LCS performance exceeding upper or lower tolerance limits are captured in the V&V flags, described in the Completeness Section.

#### Surrogate Evaluation

The frequency of surrogate measurements, relative to each laboratory batch, is given in Table 5. Surrogate frequency was adequate based on at least one set per sample (Table 5). The minimum and maximum surrogate results are also tabulated, by chemical, for the entire project. Any qualifications of results due to surrogate results are captured in the V&V flags, described in the Completeness Section.

#### Blank Evaluation

Detectable amounts of contaminants within the blanks, which could indicate possible cross-contamination of samples, are evaluated if the same contaminant is detected in the associated real samples. Although no field blanks were collected for the 2 real samples taken for this project, because no contaminants exceeded action levels within the real samples, there was no cross-contamination of samples through the sampling process or transport. The method blank (Table 6) yielded no significant contamination.

**Table 4**  
**Lab Control Sample Summary**

Test Method Name	CAS Number	Analyte	Minimum of Result	Maximum of Result	Result Unit	Count of Analytes	Count of Batches
SW-846 8260	71-43-2	Benzene	109	120	%REC	2	2
SW-846 8260	108-90-7	Chlorobenzene	84	92	%REC	2	2
SW-846 8260	75-35-4	1,1-Dichloroethene	103	114	%REC	2	2
SW-846 8260	108-88-3	Toluene	92	102	%REC	2	2
SW-846 8260	79-01-6	Trichloroethene	94	103	%REC	2	2

**Table 5**  
**Surrogate Recovery Summary**

Number of Samples	Analyte	Minimum	Maximum	Result Unit
3	4-Bromofluorobenzene	88	101	%REC
3	Toluene-d8	92	105	%REC
3	1,2-Dichloroethane-d4	101	107	%REC

**Table 6**  
**Method Blank Summary**

Test Method Name	CAS Number	Analyte	Maximum	Result Unit	Number of Lab Samples	Number of Lab Batches
SW-846 8260	75-09-2	Methylene chloride	1.2	ug/kg	1	1

*Sample Matrix Spike Evaluation*

The frequency of MS measurements was adequate based on at least one MS per batch. The minimum and maximum MS results are summarized by chemical, for the entire project in Table 7; the short list of analytes represents the entire suite of VOCs captured by the SW8260 method. MS recoveries alone do not result in rejection of data; any qualifications due to matrix spike performance are included in the validation flags summarized in the Completeness section.

**Table 7**  
**Matrix Spike Summary**

Test Method Name	CAS Number	Analyte	Minimum of Result	Maximum of Result	Result Unit	Number of Samples	Number of Lab Batches
SW-846 8260	108-88-3	Toluene	82	82	%REC	1	1
SW-846 8260	108-90-7	Chlorobenzene	73	73	%REC	1	1
SW-846 8260	71-43-2	Benzene	101	101	%REC	1	1
SW-846 8260	75-35-4	1,1-Dichloroethene	93	93	%REC	1	1
SW-846 8260	79-01-6	Trichloroethene	78	78	%REC	1	1

### 3.4 Precision

#### Matrix Spike Duplicate Evaluation

Laboratory precision is measured through use of MSD. Adequate frequency of MSD measurements is indicated by at least one MSD in each laboratory batch. Table 8 indicates that MSD frequencies were adequate at greater. Ideally, RPDs of less than 35 percent (in soil) indicate satisfactory precision. Relative percent differences (RPDs) exceeding 35 percent might only affect project decisions if real sample results exhibited a range of values above and below applicable AL s; this project yielded no results exceeding AL s.

#### Field Duplicate Evaluation

Field duplicate results reflect sampling precision, or overall repeatability of the sampling process. The frequency of field duplicate collection should exceed 1 field duplicate per 20 real samples, or 5 percent. A field duplicate was not collected for this data set; however, the 2 real sample results were all repeatable at concentrations well below applicable action levels

**Table 8**  
**Matrix Spike Duplicate Summary**

Test Method Name	CAS Number	Analyte	Number of Sample Pairs	Number of Lab Batches	Max Of RPD (%)
SW-846 8260	71-43-2	Benzene	1	1	2
SW-846 8260	108-90-7	Chlorobenzene	1	1	0
SW-846 8260	75-35-4	1,1-Dichloroethene	1	1	2
SW-846 8260	108-88-3	Toluene	1	1	1
SW-846 8260	79-01-6	Trichloroethene	1	1	7

#### Completeness

Based on the project’s DQOs, a minimum of 25% of the Environmental Restoration (ER) Program’s analytical (and radiological) results are targeted for formal validation. Of that percentage, no more than 10 percent of the results may be rejected, which ensures that analytical laboratory practices are consistent with quality requirements. Table 9 shows

the number of validated records (codes without “1”), verified records (codes with “1”), and rejected records for each analytical group. All analytical results for this project were validated (100%) and no records were rejected.

**Table 9**  
**Validation and Verification Summary**

Validation Qualifier Code	Test Method SW8260
J	1
V	125
JB	2
UJ	1

Key: J = estimated  
V = valid without qualification  
JB = Estimated Value; analyte also detected in blank  
UJ = nondetect; detection limit estimated

### 3.5 Sensitivity

Reporting limits, in units of ug/kg were compared with RFCA WRW and Ecological Receptor ALs. Adequate sensitivities of analytical methods were attained for all COCs that affect project decisions. “Adequate” sensitivity is defined as a reporting limit less than an analyte’s associated AL, typically less than one-half the AL.

### 3.6 Summary of Data Quality

Data quality is acceptable for project decisions, based on the cited V&V criteria, with the qualifications given.

## 4.0 REFERENCES

- DOE, 1993, Historical Release Report, Fourth Quarterly Update, April 1 to July 1.
- DOE, 1999, DOE Order 414.1A, Quality Assurance.
- DOE, 2001a, Industrial Area Sampling and Analysis Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, June.
- DOE, 2001b, Industrial Area Sampling and Analysis Plan Addendum #IA-02-01, Rocky Flats Environmental Technology Site, Golden, Colorado, November.
- DOE, CDPHE and EPA, 2003, Rocky Flats Cleanup Agreement (RFCA) Modification, Rocky Flats Environmental Technology Site, Golden, Colorado, June.
- EPA, 1994a, Guidance for the Data Quality Objective Process, QA/G-4.
- EPA, 1994b, USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, 540/R-94/012.

EPA, 1994c, USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, 540/R-94/013.

EPA, 1998, Guidance for the Data Quality Assessment Process; Practical Methods for Data Analysis, QA/G-9.

K-H, 2002a, General Guidelines for Data Verification and Validation, DA-GR01-v2, October.

K-H, 2002b, V&V Guidelines for Isotopic Determinations by Alpha Spectrometry, DA-RC01-v2, October.

K-H, 2002c, V&V Guidelines for Volatile Organics, DA-SS01-v3, October.

K-H, 2002d, V&V Guidelines for Semivolatile Organics, DA-SS02-v3, October.

K-H, 2002e, V&V Guidelines for Metals, DA-SS05-v3, October.

Lockheed-Martin, 1997, Evaluation of Radiochemical Data Usability, ES/ER/MS-5.

## APPENDIX A

### IHSS Group 500-6 Wildlife Refuge Worker/Ecological Receptor Action Level Comparison Table

### Appendix A

#### IHSS Group 500-6 Wildlife Refuge Worker/Ecological Receptor Action Level Comparison Table

IHSS/PAC/UBC Site	Location	Analyte	Medium	Soil Begin Depth (feet)	Soil End Depth (feet)	Result	Wildlife Refuge Worker Action Level	Ecological Receptor Action Level	Background Mean +2SD	Unit
PAC 500-906 - Asphalt Surface Near Building 559	CD43-001	Methylene chloride	Surface Soil	0	0.5	2	2,530,000	39,500	NA	ug/kg
	CD43-002	Acetone	Surface Soil	0	0.5	4.8	102,000,000	211,000	NA	ug/kg
	CD43-002	Ethylbenzene	Surface Soil	0	0.5	5.5	4,250,000	—	NA	ug/kg
	CD43-002	Methylene chloride	Surface Soil	0	0.5	1.8	2,530,000	39,500	NA	ug/kg
	CD43-002	Xylenes (total)	Surface Soil	0	0.5	24	1,000,000,000	—	NA	ug/kg

SD = standard deviation