000007019

Benjamin P. Doty, P.E.
Geotechnical and Ground-Water Engineering

1240 Orchard Road
Golden, Colorado 80401
(303) 233-0577

MEMORANDUM

To: T.C. Greengard 1801-03
From: B.P. Doty
Date: July 28, 1988

Subject: Characterization of SWMU 130
881 Hillside

As requested, this memo reviews the data pertaining to SWMU 130 on the 881 Hillside and evaluates the adequacy of the characterization.

SITE HISTORY

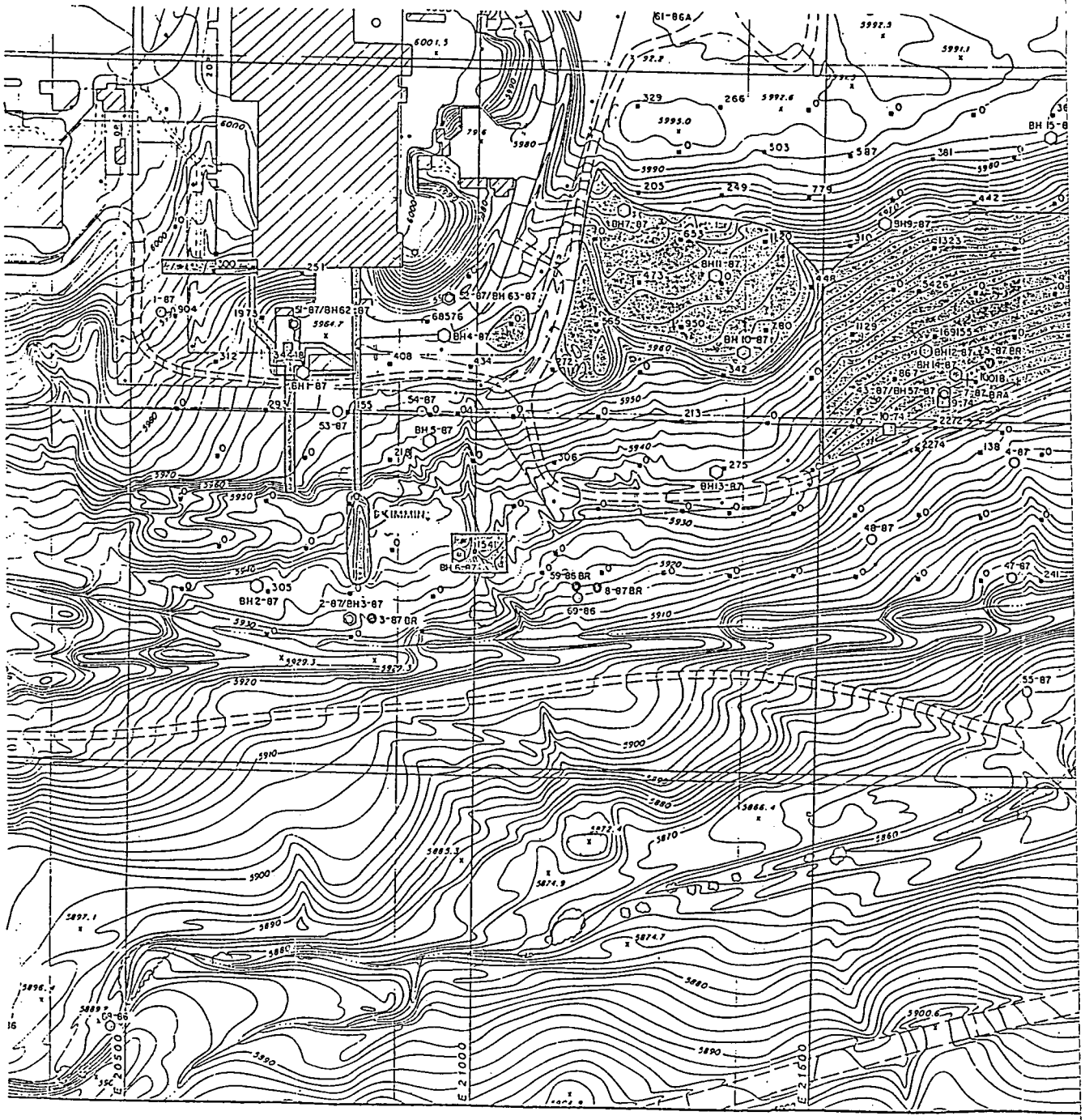
SWMU 130 was used for disposal of low-level plutonium contaminated soils. According to DOE (1986), the disposal history is as follows.

> 320 tons of soil were generated by the cleanup around Building 776 after the 1969 fire. The average plutonium activity of the material from the fire cleanup was estimated to be seven disintegrations per minute per gram (dpm/g).
>
> The area was also used for disposal of approximately 60 cubic yards of plutonium contaminated soil (about 250 dpm/g alpha activity) from the Building 774 waste storage tank area.
>
> After placement of these soils, the site was covered with approximately three feet of soil and fill material.

According to Rockwell (1988), the site was used between 1969 and 1972 (presumably based on review of air photos), and the soil cover is one to two feet thick (based on drilling data?).

The SWMU 130 location is shown on Figure 1. The location is clearly identifiable in the field as an earthen fill on the slope between the top of the Rocky Flats terrace and Woman Creek. The fill consists of approximately 15,000 cubic yards (yds), using the plan area as shown on Figure 1 (80,000 square feet) and an assumed average thickness of five feet (the fill is ten feet thick at its downhill edge based on the topographic map). This is so much larger than the 300 yds of

ADMIN RECORD


61-86A
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plutonium contaminated soil disposed of at the SWMU (assumed soil unit weight of 100 pounds per cubic foot), that it is obvious the area has been used for disposal of other soil.

REMEDIAL INVESTIGATION

The SWMU was investigated during the Phase I RI of the 881 Hillside using geophysics, soil gas, borings, and solids chemistry.

Geophysics

Not reviewed.

Soil Gas Survey

The soil gas survey found detectable ion counts of tetrachloroethene (PCE) in the area of the SWMU. Data are also reported in the RI (Rockwell International, 1988) for trichloroethene (TCE), 1,1,1-trichloroethane (TCA), dichloroethene (DCE) and carbon tetrachloride; but none of these compounds were detected in the soil gas in the vicinity of the SWMU. The PCE results are generally less than 1,000 counts (1,000 counts is a reasonable lower reliability limit, as discussed in my memo to you of July 25, 1988). However, because there is one sampling point with an ion count in excess of 1,000 (1,120) and two relatively near to 1,000 (780 and 950), the soil gas data appear to indicate the possibility of low level volatile organic contamination of soils or ground water.

Subsurface Borings

Three borings were made directly through the fill and a fourth was made downhill of the SWMU (Figure 1). The results of three of the borings are shown in cross section on Figure 2. The logs themselves (Appendix A) do not explicitly indicate the presence of the fill; however, the presence of the fill is obvious in the topography shown on Figure 2 and the base of the fill was projected from the toe of the Rocky Flats terrace to the toe of the fill. The logs were then inspected for supporting comments and it became apparent that the colluvium is a sandy clay and that the fill is generally a clayey sand. The fill was apparently fairly hard to sample; there are several intervals of no core recovery. In addition, there were two mentions of asphaltic debris in the uppermost 2.75 of boring BH11-87.

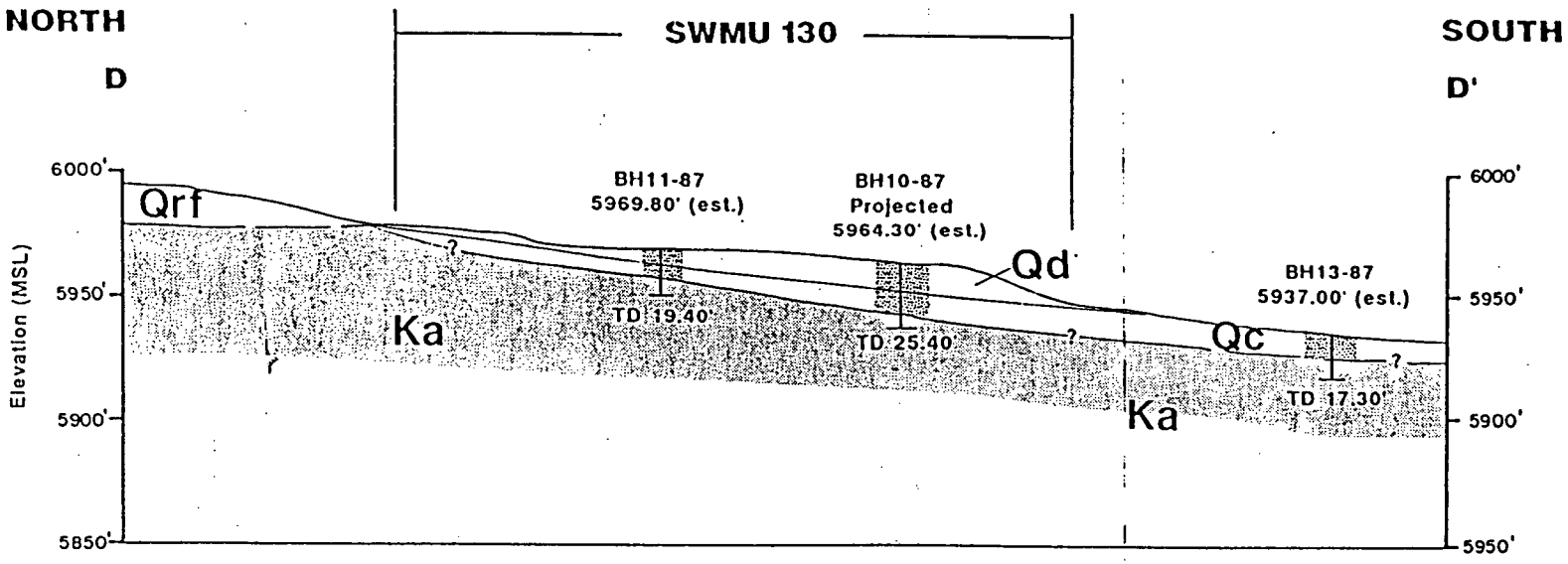


FIGURE 2. CROSS SECTION C
SWMU 130

Three other rather interesting pieces of data were developed in the drilling. First, there were no substantial HNu indications of volatile organics in the recovered samples. Second, none of the borings encountered ground water in either the fill or colluvium. BH11-87 apparently penetrated a saturated zone in the shallow bedrock. Third, bedrock immediately beneath the colluvium was claystone in all of the borings.

Solids Chemistry

Solid samples from each of the borings were analyzed for volatile organics, semivolatile organics, pesticides/PCBs, radionuclides, indicator inorganics, and metals. The following discussions are based on chemical data presented in Appendix B.

1. Volatile Organics -- Three volatile organic compounds were found in the solid samples.

   a. Methylene Chloride -- Methylene chloride was detected in every sample; however, it is believed that the detections result from laboratory rather than environmental contamination. The detections range from 26 B to 590 B micrograms per kilogram (ug/kg), i.e., all but one of the results is questionable because of lab contamination of the blank. Assuming that the detection in the blank was at least equal to the detection limit (10 ug/kg), then values of up to 100 ug/kg should have been reported as not detected, according to EPA (1985). Because most of the reported detections exceed 100 ug/kg, the blank data must be evaluated in order to determine whether the data should have been reported as not detected; however, lab contamination is likely.

      The single non-modified detection of 27.9 ug/kg in sample BH138711CT (10.1 to 11.6 feet below ground). The sampled material was a sandy clay immediately above the contact with claystone bedrock at 11.6 feet below ground.

   b. Acetone -- Detected acetone concentrations range from 15 JB to 280 B ug/kg with a single unmodified detection of 22 ug/kg in sample BH138711CT (10.1 to 11.6 feet below ground).

Assuming that the level detected in the blanks is equal to the apparent detection limit of 25 ug/kg, then all values of 250 ug/kg and less should have been reported as not detected when acetone was also found in the blank. This is close enough to the range of values that all B-modified results probably should have been reported as not detected, following EPA (1985).

c. 2-Butanone -- 2-Butanone (methyl ethyl ketone) was detected in all of the samples from BH7-87 at concentrations ranging from 21 J to 370 ug/kg. The compound was not detected in samples from the other borings.

Note that PCE (the only detected compound in the soil gas survey) was not detectable in the solid samples.

2. Semivolatile organics -- Bis(2-ethylhexyl)phthalate was detected in every sample from the area at concentrations ranging from 590 to 3,200 ug/kg. Although bis(2-ethylhexyl)phthalate was apparently not found in the lab blank, the ubiquity of the compound leads me to suspect some kind of procedural contamination. Because the lab blank does not appear contaminated, I suspect that field procedures (drilling, sampling or sample handling) may be the cause.

   In addition, sample BH138711CT contained diethylphthalate (26 ug/kg), di-n-butyl phthalate (2016 ug/kg) and di-n-octyl phthalate (265 ug/kg).

3. Pesticides/PCBs -- Pesticides and PCBs were not detected in the solid samples except for a single detection of 43 ug/kg Aroclor-1254 (detection limit of 40 ug/kg) in sample BH11870010. The sample is a composite from ground surface to a depth of 10 feet below ground and includes approximately 5.5 feet of fill material (2.75 feet have some asphaltic debris) and 4.5 feet of natural colluvium. Although it is possible that Aroclor is actually present in the sample, there is clearly not a large PCB problem at the SWMU.

4. Radionuclides -- Radionuclides appear insignificant components of the fill and underlying materials at

SWMU 130. Plutonium (the "waste") was not detectable in any of the samples, i.e. plutonium was found at negative concentrations or small positive concentrations with associated uncertainties larger than the determined value.

The non-detection of the waste is inconsistent with the volumetric estimates presented in this memo. If the 320 tons of 7 dpm/g material (776 fire) is added to the 60 yds of 250 dpm/g (774 waste storage tank), a total of about 15,830 yd-dpm/g were placed at SWMU 130. If this "mass" is diluted in 15,000 yds of fill material, there should be an average concentration of about 1 dpm/g, i.e., about 0.45 pCi/g. Because 0.45 pCi/g would be detectable, it is concluded that the reports over-estimated the amount of plutonium actually placed at the SWMU. This calculation is shown in Appendix C.

5. Indicator Inorganics -- Most of the indicator inorganics are not detectable (cyanide, sulfide, oil and grease, and ignitability), so the indicator inorganic data degenerate to pH and %solids. Presumably %solids is the dry weight divided by the moist weight of the sample. If so, moisture content can be found by subtracting the %solids from 100 and dividing the remainder by the %solids.

   Values of pH range from 5.65 to 8.84; all but one of the values are in the range of 7.72 to 8.84. If homogeneity is assumed, the 5.65 value can be rejected as an outlier using Dixon's Test (Appendix C). On the other hand, the lower pH value may be indicative of nonhomogeneous conditions (i.e., contamination). The low value was determined on the BH118711CT sample.

   Values of %solids range from 80.4 to 87.7; this corresponds to a moisture content range of 14.0 to 24.4 percent. Assuming a 35 percent porosity, a moisture content (weight of water to weight of solids) of about 20 percent is potentially saturated. This means that most of the samples from BH7-87 and the colluvial samples from BH10-87 (BH10871020), BH11-87 (BH118711CT), and BH13-87 (BH13870010) are probably near saturation. While this somewhat contradicts the boring log descriptions of moisture contents, it indicates that the fill itself is definitely not

saturated. In addition, because the analysis is based on several assumptions, it is by no means positive that the underlying natural soils are saturated.

6. Metals -- The metals data do not appear unusual.

SWMU CHARACTERISTICS

SWMU 130 is mostly an earthen fill (clayey sand with some construction demolition debris) with a volume of approximately 15,000 cubic yards. Although filling began in an effort to isolate plutonium contaminated soils generated elsewhere at the plant, it appears that the plutonium contamination of the soils was not as extensive as originally estimated. The fill is not saturated and it is founded on colluvium (sandy clay) that may be near saturation. The colluvium is underlain by claystone bedrock.

Although there were three potentially significant PCE ion counts in the soil gas survey and four volatile and semivolatile organic compounds were detected in the solid samples, there is not an organic problem associated with the SWMU. This conclusion is based on the following reasoning.

1. The PCE soil gas counts were less than or only slightly exceeded the reliability limit and PCE was not detected in the solid samples. Therefore, it is concluded that the PCE counts are procedural noise.

2. Two of the three volatile compounds found in the solid samples are common laboratory contaminants and the compounds were found in the blanks for all but one of the samples. Therefore, it is concluded that these compounds (methylene chloride and acetone) are probably laboratory contamination.

3. The third volatile compound, 2-butanone, was found in only one of the borings (but in all samples from that boring). It is concluded that there may be some 2-butanone in the soil in the vicinity of the boring due to an isolated incident; however, because BH7-87 is in an isolated lobe of the fill and 2-butanone was not found in the major part of the fill, the potential existence of 2-butanone is not considered environmentally significant. In addition, the proposed remedial action will be effective in

collecting any 2-butanone releases from the SWMU 130 area, should such occur.

4. Bis(2-ethylhexyl)phthalate, the detected semivolatile compound, is so ubiquitous that it cannot result from environmental contamination. I suspect that the drilling, sampling, or sample handling procedures produced the apparent bis(2-ethylhexyl)phthalate contamination.

In addition, it should be remembered that SWMU 130 was used for disposal of radioactively contaminated soils.

There do not appear to be any indications of pesticide, PCB or metallic contamination of either the SWMU or the surrounding soils.

ADEQUACY OF CHARACTERIZATION

Considerable investigative effort has been expended over this 1.8 acre SWMU. The most diagnostic of the investigative work is the three borings that penetrate the fill, from which samples were collected of the fill material and the underlying materials. Although the boring locations were not selected using a random sampling methodology, they appear satisfactory to characterize different areas of the main part of the fill (north, center and south). Please note on Figure 1 that none of the borings penetrate the small fill at the southwest corner of the SWMU.

On the whole, I consider the SWMU to be adequately investigated; however, because of the volumetric and radiometric discrepancies discussed in this document, I recommend that consideration be given to further characterization of the southwest fill. Could a surface investigation of radioactivity be used to determine if this fill is the disposal site for the plutonium contaminated soil and the other fill is construction demolition debris? If such a survey is impractical, I recommend that a test pit be dug in the middle of the small fill and that radiation monitoring produce a radiometric profile.

The recommended additional investigations will complete the characterization of the SWMU. However, it appears that there is no major environmental impact from the SWMU and the recommended additional investigation may not be warranted.

REFERENCES

DOE, 1986, Phase I: Installation Assessment, Draft, Comprehensive Environmental Assessment and Response Program, Albuquerque Operations Office, Environment, Safety, and Health Division, Environmental Programs Branch, April

EPA, 1985, Laboratory Data Validation, Functional Guidelines for Evaluating Organics Analyses, Technical Directive Document No. HQ-8410-01, Contract No. 68-01-6699, R-582-4-5-01, prepared for the Hazardous Site Control Division, U.S. Environmental Protection Agency, prepared by USEPA Data Validation Work Group, NUS Corporation, Superfund Division, April 11.

Rockwell International, 1988, Draft Final Remedial Investigation Report for High Priority Sites (881 Hillside Area), prepared for U.S. Department of Energy, Rocky Flats Plant, Golden, Colorado, March 1.

Appendix A

BORING LOGS

BH7-87, BH10-87, BH11-87 AND BH13-87

LOG OF BOREHOLE

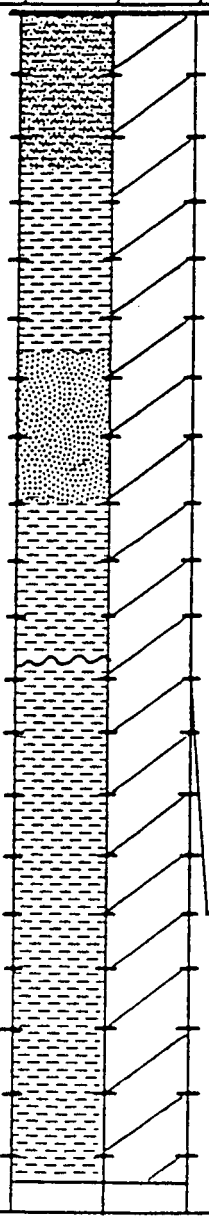
Location Rocky Flats Plant; 881 Hillside
Coordinates N35213.6 E21340.4
Total Depth 19.40'

Borehole/Well No. BH11-87
Ground Surface Elevation * 5969.8'
Water Level Encountered 13.90'
Static N/A

Drilling Company Boyles Bros.
Date Drilled June 2, 1987
Drilling Method Hollow Stem Auger
Logged By K. D. Holliway
Geologist

Driller R. Sharp
Helper A. Boday
Drilling Fluid None
Checked By [signature]
Site Manager
[signature]
CEARP Manager

Comments Borehole backfilled with Portland Type I cement.
* Estimated value from topographic map.

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			**ARTIFICIAL FILL** 0-2.5' - Sample. Recovered 2.0/2.5' = 80%. CLAYEY SAND: moderate yellowish brown (10Y 5/4); quartzite cobbles; subangular; some asphalt (20%); grasses & roots; moist. 2.5-5.5' - Sample. Recovered 3.0/3.0' = 100%. CLAY: light olive gray (5Y 6/1); occasional quartzite cobbles (<0.5"); subangular; trace asphalt to 2.75'; caliche in fractures; laminated; iron stains; damp to moist. **COLLUVIUM** 5.5-8.0' - Sample. Recovered 2.95/2.5' = 118%. SANDY CLAY: dark yellowish orange (10YR 6/6) with light olive gray (5Y 5/2); iron stains; quartzite cobbles; subangular to subrounded; damp to moist. 8.0-10.5' - Sample. Recovered 2.0/2.5' = 80%. CLAY: dark yellowish brown (10YR 4/2); to dusky yellowish brown (10YR 2/2); quartzite cobble; subrounded to angular; damp. 10.5-13.0' - Sample. Recovered 3.2/2.5' = 138%. 10.5-10.7: same as above. **ARAPHOE FORMATION** 10.7-13.0': CLAYSTONE: light olive gray (5Y 5/2) with dark yellowish orange (10YR 6/6) stains; weathered; damp to dry.	HNu background = 0.6. OVA background = 0.6. 0.0-10.0': Composite Sample: BH11870010. 5.0': Field Screening Sample: HNu=0.6; OVA=3.5. 8.7-10.7': Contact/Waste Sample: BH118711CT. 10.0': Field Screening Sample: HNu=0.6; OVA=10.0. 13.9-17.0': Water Table/ Bedrock Sample: BH118714WT.
5				
10				
15				
20				

LOG OF BOREHOLE

Location _____

Coordinates _____

Total Depth _____

Borehole/Well No. BH11-87 (cont'd.)

Ground Surface Elevation _____

Water Level Encountered _____

Static _____

Drilling Company _____

Date Drilled _____

Drilling Method _____

Logged By _____
Geologist

Driller _____

Helper _____

Drilling Fluid _____

Checked By _____
Site Manager

_____
CEARP Manager

Comments _____

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20			13.0-16.0' - Sample. Recovered 3.0/3.0 = 100%. CLAYSTONE: same as above; wet zone of iron modules; dark yellowish brown (10YR 2/2) at 13.9-14.25'.	15.0': Field Screening Sample: HNu=0.6; OVA-0.6.
			16.0-19.5' - Sample. Recovered 3.4/3.5' = 97%. CLAYSTONE: light olive gray (5Y 5/2) with dark yellowish orange (10YR 6/6) stains; caliche and iron stains; weathered; dry.	
25			TOTAL DEPTH: 19.40'	
30				
35				
40				

LOG OF BOREHOLE

Location Rocky Flats Plant; 881 Hillside
Coordinates N34940.3 E21342.1
Total Depth 17.3'

Borehole/Well No. BH13-87
Ground Surface Elevation * 5937.0'
Water Level Encountered None
Static N/A

Drilling Company Boyles Bros.
Date Drilled May 29, 1987
Drilling Method Hollow Stem Auger
Logged By K. D. Holliway
Geologist

Driller R. Sharp
Helper A. Boday
Drilling Fluid None
Checked By [illegible]
Site Manager
[illegible]
CEARP Manager

Comments No water encountered during drilling. Borehole backfilled with Portland Type I cement.
* Estimated value from topographic map.

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			**COLLUVIUM (DISTURBED)**	HNu background = 0.6-0.8. OVA background = 2.0-2.2.
			0.0-2.0' - Sample. Recovered 1.8/2.0 = 90%. SANDY CLAY: dark yellowish brown (10YR 4/2); trace sand fine-grained; occasional quartzite pebbles and cobbles up to 2 cm in diameter; subrounded; some roots; damp.	0.0-10.10': Composite Sample: BH13870010.
5			2.0-4.0' - Sample. Recovered 1.6/2.0 = 80%. 2.0-3.3': QUARTZITE COBBLE: with caliche deposits; subangular; 5 cm diameter. 3.3-3.6: SANDY CLAY: dark yellowish brown (10YR 4/2); quartzite pebbles up to 2.5 cm diameter; subangular to subrounded; damp.	
			4.0-7.0' - Sample. Recovered 3.0/3.0 = 100%. SANDY CLAY: moderate brown (5YR 4/4) with quartzite pebbles and gravel up to 4 cm diameter; subrounded to subangular; trace fine-grained sand; damp.	5.0': Field Screening Sample: HNu=0.6; OVA=0.2.
10			7.0-10.0' - Sample. Recovered 2.9/3.0 = 96%. SILTY CLAY: grayish orange (10YR 7/4) to very pale orange (10YR 8/2) with quartzite pebbles at 7.2-7.4' up to 2 cm diameter; subangular to subrounded; occasional quartzite pebbles; damp.	10.0': Field Screening Sample: HNu=1.0; OVA=1.8. 10.10-11.56': Contact Sample: BH138711CT.
15			10.0-~~12.0~~' - Sample. Recovered 2.0/~~2.0~~ = ~~100~~%. 2.0 = 100% ~~80%~~ 10.55-11.56': SANDY CLAY: moderate brown (5YR 4/4) to light brown (5YR 5/6) with quartzite gravel and pebbles up to 4cm diameter; subangular to subrounded; damp.	
20				

LOG OF BOREHOLE

Location _____

Coordinates _____

Total Depth _____

Borehole/Well No. BH13-87 (cont'd.)

Ground Surface Elevation _____

Water Level Encountered _____

Static _____

Drilling Company _____

Date Drilled _____

Drilling Method _____

Logged By _____ Geologist

Driller _____

Helper _____

Drilling Fluid _____

Checked By _____ Site Manager

_____ CEARF Manager

Comments _____

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20			ARAPHOE FORMATION	
			11.56-12.0': CLAYSTONE: light olive brown (5Y 5/6); weathered; caliche stringers (horizontal from 11.56-12.0'); damp.	
			12.0-14.0' - Sample. Recovered 2.0/2.0 = 100%. CLAYSTONE: light olive brown (5Y 5/6); weathered with caliche stringers; damp.	
25			14.0-17.5 - Sample. Recovered 3.3/3.5 = 94%. CLAYSTONE: dark yellowish orange (10YR 6/6); weathered; trace silt and iron staining; damp.	15.0': Field Screening Sample: HNu=0.6; OVA=2.2.
			TOTAL DEPTH: 17.3'	14.56-16.2': Bedrock Sample: BH138714BR.
30				
35				
40				

LOG OF BOREHOLE

Location Rocky Flats Plant; 881 Hillside
Coordinates N35304.9 E21214.4
Total Depth 13.0'

Borehole/Well No. BH7-87
Ground Surface Elevation * 5997.8'
Water Level Encountered None
Static N/A

Drilling Company Boyles Bros.
Date Drilled May 26, 1987
Drilling Method Hollow Stem Auger
Logged By K. D. Holliway
Geologist

Driller A. Shade
Helper T. Merritt
Drilling Fluid None
Checked By [signature]
Site Manager
[signature]
CEARP Manager

Comments No water encountered during drilling. Borehole backfilled with Portland Type I cement.
* Estimated value from topographic map.

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			ARTIFICIAL FILL 0.0-1.3 - Sample. Recovered 1.2/1.3 = 92%. CLAYEY SAND: dusky brown (5YR 2/2); quartzite gravel, quartzite cobble at @ 0.8'; grass & roots; damp. 2.0-5.0' - Sample. Recovered 1.78/3.0 = 59%. 2.0-3.1': Lost core; 3.10-4.80': CLAY: moderate brown (5YR 4/4); sandy to gravelly (quartzite) gravel; subangular; sand 2.5-2.0 Ø; damp to slightly moist.	HNu background = 1.0-1.2. No OVA readings. ~~0.0-10.0': VOA Composite Sample: BH078~~010. KDH 1/25/88 Not sent to 1 70 4.3-4.8': Contact Sample: BH078705CT. 5.0': Field Screening Sample: HNu=1.2.
5			ARAPAHOE FORMATION ~~4.8~~ 5.0 ADP-8.0' - Sample. Recovery 3.2/~~3.2~~ 3.0 ADP = 100%. 4.80-6.60': CLAYSTONE: light olive gray (5Y 5/2) with dark yellowish orange (10YR 6/6) iron staining in fractures; damp. 6.5-7.5' CLAYSTONE: light olive gray (5Y 7/2) weathered; slightly damp. 7.5-8.0' CLAYSTONE: moderate olive brown (5Y 4/4) with dark yellowish orange (10YR 6/6) iron staining; weathered; dry to slightly damp.	5.0-10.0': Composite Sample: BH07870510. 7.8-9.68': Bedrock Sample: BH078708BR.
10			8.0-13.0' - Sample. Recovery 5.0/5.0' = 100%. CLAYSTONE: olive gray (5Y 4/1) to olive black (5Y 2/1) with iron staining weathered; slight damp.	9.68-10.35': Waste Sample: BH078710WS 10.0': Field Screening Sample: HNu=1.3. 10.35-13.0': Composite Sample: BH07871013.
15			TOTAL DEPTH: 13.0'	
20				

LOG OF BOREHOLE

Location Rocky Flats Plant: 881 Hillside
Coordinates N35110.9 E21375.4
Total Depth ~~25.5'~~ 25.4' JJP

Borehole/Well No. BH10-87
Ground Surface Elevation * 5964.3'
Water Level Encountered None
Static N/A

Drilling Company Boyles Bros.
Date Drilled June 1, 1987
Drilling Method Hollow Stem Auger
Logged By K. D. Holliway
Geologist

Driller R. Sharp
Helper A. Boday
Drilling Fluid None
Checked By [signature]
Site Manager
[signature]
CEARP Manager

Comments No water encountered during drilling. Borehole backfilled with Portland Type I cement.
* Estimated value from topographic map.

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			**ARTIFICIAL FILL**	HNu background = ~~0.4~~ 0.8 JBB 11/1/8 OVA background = 0.0.
			0-2.0' · Sample. Recovered 0.4/2.0 = 20%. CLAYEY SAND: pale yellowish brown (10YR 6/2); quartzite cobbles; subanuglar; grasses & roots; trace caliche; dry.	0.0-10.0': Composite Sample: BH10870010.
			2-4.5' · Sample. Recovered 0/2.5 = 0%.	
5			4.5-6.5' · Sample. Recovered 0.95/2.0' = 48%. CLAYEY SAND: moderate yellowish brown (10YR 5/4); quartzite cobbles & pebbles (0.0 Ø to 2" diameter); trace caliche; dry to slightly damp.	5.0': Field Screening Sample: HNu=0.4; OVA=0.0.
			6.5-8.5': Sample: Recovered 0.95/2.0'=48%. CLAYEY SAND: Pale yellowish brown (5YR 6/2), dry to slightly damp. JJP	
			8.5-10.5' · Sample. Recovered 2.0/2.0 = 100%. CLAYEY SAND: dark yellowish brown (10YR 4/2) and moderate yellowish brown (10YR 5/4); trace light brown (5YR 5/6) stains; sand (3.5-40 Ø), dry to slightly damp.	10.0': Field Screening Sample: HNu=0.4; OVA=0.0. 10.0-18.95': Composite Sample: BH10871020 JJP
10			**COLLUVIUM**	
			10.5-12.5' · Sample. Recovered 0.5/2.0' = 25%. SANDY CLAY: light olive gray (5Y 5/2) with trace light brown (5YR 5/6) stains; weathered; quartzite cobbles; slightly damp.	
			12.5-14.5' · Sample. Recovered 0.45/2.0' = 23%. Same as above; trace caliche; dry.	15.0': Field Screening Sample: HNu=0.4; OVA=0.0.
15			14.5-16.5' · Sample. Recovered 2.1/2.0' = 105%. SANDY CLAY: pale yellowish brown (10YR 6/2) to dusky yellow (5Y 6/4); occasional quartzite cobbles; trace caliche and Fe stains; weathered; damp.	
20				

LOG OF BOREHOLE

Location _____ Borehole/Well No. BH10-87 (cont'd.)

Coordinates _____ Ground Surface Elevation _____

Total Depth _____ Water Level Encountered _____

Static _____

Drilling Company _____ Driller _____

Date Drilled _____ Helper _____

Drilling Method _____ Drilling Fluid _____

Logged By _____ Checked By _____

Geologist — Site Manager

CERRP Manager

Comments _____

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20			16.5-19.5' - Sample. Recovered 3.0/3.0' = 100%. CLAYEY SAND/SANDY CLAY: moderate yellowish brown (10YR 5/4) to dusky yellowish brown (10YR 2/2); occasional quartzite cobbles; sand 3.5-4.0 Ø; trace caliche; subrounded; sand/gravel lens at 17.3'; damp.	18.95-20.0': Contact Sample: BH108720CT.
25			19.5-22.0' - Sample. Recovered 2.6/2.5' = 104%. 19.5-20.0': same as above.	
			ARAPAHOE FORMATION	
			20.0-22.0': CLAYSTONE: light olive gray (5Y 5/2) with dark yellowish orange (10YR 6/6) stains; nodules dusky red (10YR 2/2); trace fine-grained sand; weathered; trace caliche; dry to slightly damp.	20.0': Field Screening ~~Sample~~: HNu=0.4; OVA=0.0.
30			22.0-25.5' - Sample. Recovered 3.4/3.5' = 97%. CLAYSTONE: light olive gray (5Y 5/2); with light brown (5YR 5/6) stains and dusky red (10YR 2/2) iron nodules; trace caliche; trace very fine-grained sand (3.5-4.0 Ø); weathered; dry.	23.0-25.4': Bedrock Sample: BH108723BR.
			TOTAL DEPTH: ~~25.5'~~ 25.4'	
35				
40				

881 HILLSIDE BOREHOLE SAMPLES
GC/MS DATA SUMMARY
Volatile HAZARDOUS SUBSTANCE LIST COMPOUNDS

RFW Batch Number: Client: ROCKWELL (ROCKY FLATS)

Sample Information

RFW Batch ID:	8705-051-012	8705-051-011	8705-057-0050	8705-057-0070
Customer ID:	8H068726CT	8H0687308R	8H07870510	8H078705CT
Matrix:	Soil	Soil	Soil	Soil
Units:	UG/KG	UG/KG	UG/KG	UG/KG
Dilution Factor:	1	1	1.0	1.0

Surrogate Recovery

Toluene-d8:	100 %	101 %	100 %	95 %
Bromofluorobenzene:	101 %	100 %	99 %	100 %
1,2-Dichloroethane-d4:	110 %	104 %	102 %	103 %

Analytes

Chloromethane	10 U	10 U	10.00 U	10.00 U
Bromomethane	10 U	10 U	10.00 U	10.00 U
Vinyl Chloride	10 U	10 U	10.00 U	10.00 U
Chloroethane	10 U	10 U	10.00 U	10.00 U
Methylene Chloride	83	23 J	210 B	200 B
Acetone	110 B	180 B	63 B	64 B
Carbon Disulfide	5 U	5 U	5.00 U	5.00 U
1,1-Dichloroethene	5 U	5 U	5.00 U	5.00 U
1,1-Dichloroethane	5 U	5 U	5.00 U	5.00 U
Trans-1,2-Dichloroethene	5 U	5 U	5.00 U	5.00 U
Chloroform	5 U	5 U	5.00 U	5.00 U
1,2-Dichloroethane	5 U	5 U	5.00 U	5.00 U
2-Butanone	10 U	10 U	79	370
1,1,1-Trichloroethane	5 U	5 U	5.00 U	5.00 U
Carbon Tetrachloride	5 U	5 U	5.00 U	5.00 U
Vinyl Acetate	10 U	10 U	10.00 U	10.00 U
Bromodichloromethane	5 U	5 U	5.00 U	5.00 U
1,2-Dichloropropane	5 U	5 U	5.00 U	5.00 U
Trans-1,3-Dichloropropene	5 U	5 U	5.00 U	5.00 U
Trichloroethene	5 U	5 U	5.00 U	5.00 U
Dibromochloromethane	5 U	5 U	5.00 U	5.00 U
1,1,2-Trichloroethane	5 U	5 U	5.00 U	5.00 U
Benzene	5 U	5 U	5.00 U	5.00 U
cis-1,3-Dichloropropene	5 U	5 U	5.00 U	5.00 U
2-Chloroethylvinylether	10 U	10 U	10.00 U	10.00 U
Bromoform	5 U	5 U	5.00 U	5.00 U
4-Methyl-2-pentanone	10 U	10 U	10.00 U	10.00 U
2-Hexanone	10 U	10 U	10.00 U	10.00 U
Tetrachloroethene	5 U	5 U	5.00 U	5.00 U
1,1,2,2-Tetrachloroethane	5 U	5 U	5.00 U	5.00 U
Toluene	5 U	5 U	5.00 U	5.00 U
Chlorobenzene	5 U	5 U	5.00 U	5.00 U
Ethylbenzene	5 U	5 U	5.00 U	5.00 U
Styrene	5 U	5 U	5.00 U	5.00 U
Total Xylenes	5 U	5 U	5.00 U	5.00 U

Modifiers: U=Analyzed, not detected. J=Present below detection limit. B=Present in blank. NS=Not spiked. %=Percent recovery.

881 HILLSIDE BOREHOLE SAMPLES
GC/MS DATA SUMMARY
Volatile HAZARDOUS SUBSTANCE LIST COMPOUNDS

RFW Batch Number: Client: ROCKWELL (ROCKY FLATS)

Sample Information

RFW Batch ID:	8705-057-0010	8705-057-0090	8705-057-0030	8706-014-0030
Customer ID:	BH0787088R	BH07871013	BH078710WS	BH08870007
Matrix:	Soil	Soil	Soil	Soil
Units:	UG/KG	UG/KG	UG/KG	UG/KG
Dilution Factor:	1.0	1.0	1.0	5.0

Surrogate Recovery

Toluene-d8:	99 %	101 %	101 %	102 %
Bromofluorobenzene:	99 %	100 %	100 %	100 %
1,2-Dichloroethane-d4:	102 %	101 %	100 %	109 %

Analytes

Chloromethane	10.00	U	10.00	U	10.00	U	50.00	U
Bromomethane	10.00	U	10.00	U	10.00	U	50.00	U
Vinyl Chloride	10.00	U	10.00	U	10.00	U	50.00	U
Chloroethane	10.00	U	10.00	U	10.00	U	50.00	U
Methylene Chloride	590	B	130	B	49	B	32	B
Acetone	100	B	270	B	38	JB	39	JB
Carbon Disulfide	5.00	U	5.00	U	5.00	U	25.00	U
1,1-Dichloroethene	5.00	U	5.00	U	5.00	U	25.00	U
1,1-Dichloroethane	5.00	U	5.00	U	5.00	U	25.00	U
Trans-1,2-Dichloroethene	5.00	U	5.00	U	5.00	U	25.00	U
Chloroform	5.00	U	5.00	U	5.00	U	25.00	U
1,2-Dichloroethane	5.00	U	5.00	U	5.00	U	25.00	U
2-Butanone	66		21	J	130		33	J
1,1,1-Trichloroethane	5.00	U	5.00	U	5.00	U	25.00	U
Carbon Tetrachloride	5.00	U	5.00	U	5.00	U	25.00	U
Vinyl Acetate	10.00	U	10.00	U	10.00	U	50.00	U
Bromodichloromethane	5.00	U	5.00	U	5.00	U	25.00	U
1,2-Dichloropropane	5.00	U	5.00	U	5.00	U	25.00	U
Trans-1,3-Dichloropropene	5.00	U	5.00	U	5.00	U	25.00	U
Trichloroethene	5.00	U	5.00	U	5.00	U	25.00	U
Dibromochloromethane	5.00	U	5.00	U	5.00	U	25.00	U
1,1,2-Trichloroethane	5.00	U	5.00	U	5.00	U	25.00	U
Benzene	5.00	U	5.00	U	5.00	U	25.00	U
cis-1,3-Dichloropropene	5.00	U	5.00	U	5.00	U	25.00	U
2-Chloroethylvinylether	10.00	U	10.00	U	10.00	U	50.00	U
Bromoform	5.00	U	5.00	U	5.00	U	25.00	U
4-Methyl-2-pentanone	10.00	U	10.00	U	10.00	U	50.00	U
2-Hexanone	10.00	U	10.00	U	10.00	U	50.00	U
Tetrachloroethene	5.00	U	5.00	U	5.00	U	25.00	U
1,1,2,2-Tetrachloroethane	5.00	U	5.00	U	5.00	U	25.00	U
Toluene	5.00	U	5.00	U	5.00	U	25.00	U
Chlorobenzene	5.00	U	5.00	U	5.00	U	25.00	U
Ethylbenzene	5.00	U	5.00	U	5.00	U	25.00	U
Styrene	5.00	U	5.00	U	5.00	U	25.00	U
Total Xylenes	5.00	U	5.00	U	5.00	U	25.00	U

Modifiers: U=Analyzed, not detected. J=Present below detection limit. B=Present in blank. NS=Not spiked. %=Percent recovery.

881 HILLSIDE BOREHOLE SAMPLES
GC/MS DATA SUMMARY
Volatile HAZARDOUS SUBSTANCE LIST COMPOUNDS

RFW Batch Number: Client: ROCKWELL (ROCKY FLATS) Page: 9

Sample Information

RFW Batch ID:	3122-471-009	8706-002-0010	8706-005-0050	8706-005-0030
Customer ID:	BH098711CT	BH098714BR	BH10870010	BH10871020
Matrix:	Soil	Soil	Soil	Soil
Units:	UG/KG	UG/KG	UG/KG	UG/KG
Dilution Factor:	1	1.0	1.0	1.0

Surrogate Recovery

Toluene-d8:	100 %	103 %	99 %	101 %
Bromofluorobenzene:	%	106 %	97 %	98 %
1,2-Dichloroethane-d4:	92 %	104 %	105 %	106 %

Analytes

Chloromethane	10 U	10.00 U	10.00 U	10.00 U
Bromomethane	10 U	10.00 U	10.00 U	10.00 U
Vinyl Chloride	10 U	10.00 U	10.00 U	10.00 U
Chloroethane	10 U	10.00 U	10.00 U	10.00 U
Methylene Chloride	11.9	39 B	29 B	46 B
Acetone	14.7	280 B	50 JB	100 B
Carbon Disulfide	5 U	5.00 U	5.00 U	5.00 U
1,1-Dichloroethene	5 U	5.00 U	5.00 U	5.00 U
1,1-Dichloroethane	5 U	5.00 U	5.00 U	5.00 U
Trans-1,2-Dichloroethene	5 U	5.00 U	5.00 U	5.00 U
Chloroform	5 U	5.00 U	5.00 U	5.00 U
1,2-Dichloroethane	5 U	5.00 U	5.00 U	5.00 U
2-Butanone	10 U	130	10.00 U	10.00 U
1,1,1-Trichloroethane	5 U	5.00 U	5.00 U	5.00 U
Carbon Tetrachloride	5 U	5.00 U	5.00 U	5.00 U
Vinyl Acetate	10 U	10.00 U	10.00 U	10.00 U
Bromodichloromethane	5 U	5.00 U	5.00 U	5.00 U
1,2-Dichloropropane	5 U	5.00 U	5.00 U	5.00 U
Trans-1,3-Dichloropropene	5 U	5.00 U	5.00 U	5.00 U
Trichloroethene	5 U	5.00 U	5.00 U	5.00 U
Dibromochloromethane	5 U	5.00 U	5.00 U	5.00 U
1,1,2-Trichloroethane	5 U	5.00 U	5.00 U	5.00 U
Benzene	5 U	5.00 U	5.00 U	5.00 U
cis-1,3-Dichloropropene	5 U	5.00 U	5.00 U	5.00 U
2-Chloroethylvinylether	10 U	10.00 U	10.00 U	10.00 U
Bromoform	5 U	5.00 U	5.00 U	5.00 U
4-Methyl-2-pentanone	10 U	10.00 U	10.00 U	10.00 U
2-Hexanone	10 U	10.00 U	10.00 U	10.00 U
Tetrachloroethene	5 U	5.00 U	5.00 U	5.00 U
1,1,2,2-Tetrachloroethane	NR	5.00 U	5.00 U	5.00 U
Toluene	5 U	5.00 U	5.00 U	5.00 U
Chlorobenzene	5 U	5.00 U	5.00 U	5.00 U
Ethylbenzene	5 U	5.00 U	5.00 U	5.00 U
Styrene	5 U	5.00 U	5.00 U	5.00 U
Total Xylenes	5 U	5.00 U	5.00 U	5.00 U

Modifiers: U=Analyzed, not detected. J=Present below detection limit. B=Present in blank. NS=Not spiked. %=Percent recovery.

881 HILLSIDE BOREHOLE SAMPLES
GC/MS DATA SUMMARY
Volatile HAZARDOUS SUBSTANCE LIST COMPOUNDS

RFW Batch Number: Client: ROCKWELL (ROCKY FLATS)

Sample Information

RFW Batch ID:	8706-005-0070	8706-005-0010	8706-010-0050	8706-010-0010
Customer ID:	BH108720CT	BH108723BR	BH11870010	BH118711CT
Matrix:	Soil	Soil	Soil	Soil
Units:	UG/KG	UG/KG	UG/KG	UG/KG
Dilution Factor:	1.0	1.0	5.0	5.0

Surrogate Recovery

Toluene-d8:	98 %	99 %	95 %	102 %
Bromofluorobenzene:	97 %	96 %	103 %	98 %
1,2-Dichloroethane-d4:	102 %	102 %	114 %	106 %

Analytes

Chloromethane	10.00 U	10.00 U	50.00 U	50.00 U
Bromomethane	10.00 U	10.00 U	50.00 U	50.00 U
Vinyl Chloride	10.00 U	10.00 U	50.00 U	50.00 U
Chloroethane	10.00 U	10.00 U	50.00 U	50.00 U
Methylene Chloride	36 B	26 B	59 B	35 B
Acetone	150 B	130 B	180 B	130 B
Carbon Disulfide	5.00 U	5.00 U	25.00 U	25.00 U
1,1-Dichloroethene	5.00 U	5.00 U	25.00 U	25.00 U
1,1-Dichloroethane	5.00 U	5.00 U	25.00 U	25.00 U
Trans-1,2-Dichloroethene	5.00 U	5.00 U	25.00 U	25.00 U
Chloroform	5.00 U	5.00 U	25.00 U	25.00 U
1,2-Dichloroethane	5.00 U	5.00 U	25.00 U	25.00 U
2-Butanone	10.00 U	10.00 U	50.00 U	50.00 U
1,1,1-Trichloroethane	5.00 U	5.00 U	25.00 U	25.00 U
Carbon Tetrachloride	5.00 U	5.00 U	25.00 U	25.00 U
Vinyl Acetate	10.00 U	10.00 U	50.00 U	50.00 U
Bromodichloromethane	5.00 U	5.00 U	25.00 U	25.00 U
1,2-Dichloropropane	5.00 U	5.00 U	25.00 U	25.00 U
Trans-1,3-Dichloropropene	5.00 U	5.00 U	25.00 U	25.00 U
Trichloroethene	5.00 U	5.00 U	25.00 U	25.00 U
Dibromochloromethane	5.00 U	5.00 U	25.00 U	25.00 U
1,1,2-Trichloroethane	5.00 U	5.00 U	25.00 U	25.00 U
Benzene	5.00 U	5.00 U	25.00 U	25.00 U
cis-1,3-Dichloropropene	5.00 U	5.00 U	25.00 U	25.00 U
2-Chloroethylvinylether	10.00 U	10.00 U	50.00 U	50.00 U
Bromoform	5.00 U	5.00 U	25.00 U	25.00 U
4-Methyl-2-pentanone	10.00 U	10.00 U	50.00 U	50.00 U
2-Hexanone	10.00 U	10.00 U	50.00 U	50.00 U
Tetrachloroethene	5.00 U	5.00 U	25.00 U	25.00 U
1,1,2,2-Tetrachloroethane	5.00 U	5.00 U	25.00 U	25.00 U
Toluene	5.00 U	5.00 U	25.00 U	25.00 U
Chlorobenzene	5.00 U	5.00 U	25.00 U	25.00 U
Ethylbenzene	5.00 U	5.00 U	25.00 U	25.00 U
Styrene	5.00 U	5.00 U	25.00 U	25.00 U
Total Xylenes	5.00 U	5.00 U	25.00 U	25.00 U

Modifiers: U=Analyzed, not detected. J=Present below detection limit. B=Present in blank. NS=Not spiked. %=Percent recovery.

881 HILLSIDE BOREHOLE SAMPLES
GC/MS DATA SUMMARY
Volatile HAZARDOUS SUBSTANCE LIST COMPOUNDS

RFW Batch Number: Client: ROCKWELL (ROCKY FLATS)

Sample Information

RFW Batch ID:	8706-010-0030	8705-059-0010	8705-059-0030	8706-004-0010
Customer ID:	BH118714WT	BH128702CT	BH128705BR	BH13870010
Matrix:	Soil	Soil	Soil	Soil
Units:	UG/KG	UG/KG	UG/KG	UG/KG
Dilution Factor:	5.0	1.0	1.0	1.0

Surrogate Recovery

Toluene-d8:	102 %	101 %	100 %	98 %
Bromofluorobenzene:	99 %	94 %	96 %	101 %
1,2-Dichloroethane-d4:	107 %	98 %	96 %	105 %

Analytes

Chloromethane	50.00 U	10.00 U	10.00 U	10.00 U
Bromomethane	50.00 U	10.00 U	10.00 U	10.00 U
Vinyl Chloride	50.00 U	10.00 U	10.00 U	10.00 U
Chloroethane	50.00 U	10.00 U	10.00 U	10.00 U
Methylene Chloride	66 B	130 B	130 B	27 B
Acetone	160 B	85 B	66 B	15 JB
Carbon Disulfide	25.00 U	5.00 U	5.00 U	5.00 U
1,1-Dichloroethene	25.00 U	5.00 U	5.00 U	5.00 U
1,1-Dichloroethane	25.00 U	5.00 U	5.00 U	5.00 U
Trans-1,2-Dichloroethene	25.00 U	5.00 U	5.00 U	5.00 U
Chloroform	25.00 U	5.00 U	5.00 U	5.00 U
1,2-Dichloroethane	25.00 U	5.00 U	5.00 U	5.00 U
2-Butanone	50.00 U	37 J	27 J	10.00 U
1,1,1-Trichloroethane	25.00 U	5.00 U	5.00 U	5.00 U
Carbon Tetrachloride	25.00 U	5.00 U	5.00 U	5.00 U
Vinyl Acetate	50.00 U	10.00 U	10.00 U	10.00 U
Bromodichloromethane	25.00 U	5.00 U	5.00 U	5.00 U
1,2-Dichloropropane	25.00 U	5.00 U	5.00 U	5.00 U
Trans-1,3-Dichloropropene	25.00 U	5.00 U	5.00 U	5.00 U
Trichloroethene	25.00 U	5.00 U	5.00 U	5.00 U
Dibromochloromethane	25.00 U	5.00 U	5.00 U	5.00 U
1,1,2-Trichloroethane	25.00 U	5.00 U	5.00 U	5.00 U
Benzene	25.00 U	5.00 U	5.00 U	5.00 U
cis-1,3-Dichloropropene	25.00 U	5.00 U	5.00 U	5.00 U
2-Chloroethylvinylether	50.00 U	10.00 U	10.00 U	10.00 U
Bromoform	25.00 U	5.00 U	5.00 U	5.00 U
4-Methyl-2-pentanone	50.00 U	10.00 U	10.00 U	10.00 U
2-Hexanone	50.00 U	10.00 U	10.00 U	10.00 U
Tetrachloroethene	25.00 U	19 J	5.00 U	5.00 U
1,1,2,2-Tetrachloroethane	25.00 U	5.00 U	5.00 U	5.00 U
Toluene	25.00 U	5.00 U	5.00 U	5.00 U
Chlorobenzene	25.00 U	5.00 U	5.00 U	5.00 U
Ethylbenzene	25.00 U	5.00 U	5.00 U	5.00 U
Styrene	25.00 U	5.00 U	5.00 U	5.00 U
Total Xylenes	25.00 U	5.00 U	5.00 U	5.00 U

Modifiers: U=Analyzed, not detected. J=Present below detection limit. B=Present in blank. NS=Not spiked. %=Percent recovery.

881 HILLSIDE BOREHOLE SAMPLES
GC/MS DATA SUMMARY
Volatile HAZARDOUS SUBSTANCE LIST COMPOUNDS

Sample Information

RFW Batch ID:	3122-471-004	8706-004-0030	3122-471-003	3122-471-007
Customer ID:	BH138711CT	BH138714BR	BH148206CT	BH148703W1
Matrix:	Soil	Soil	Soil	Soil
Units:	UG/KG	UG/KG	UG/KG	UG/KG
Dilution Factor:	1	1.0	1	1

Surrogate Recovery

Toluene-d8:	103 %	102 %	116 %	95 %
Bromofluorobenzene:	101 %	98 %	112 %	86 %
1,2-Dichloroethane-d4:	93 %	106 %	98 %	102 %

Analytes

Chloromethane	10 U	10.00 U	10 U	10 U
Bromomethane	10 U	10.00 U	10 U	10 U
Vinyl Chloride	10 U	10.00 U	10 U	10 U
Chloroethane	10 U	10.00 U	10 U	10 U
Methylene Chloride	27.9	46 B	27.1	46.9
Acetone	22	280 B	84.6	47.8
Carbon Disulfide	5 U	5.00 U	5 U	5 U
1,1-Dichloroethene	5 U	5.00 U	5 U	5 U
1,1-Dichloroethane	5 U	5.00 U	5 U	5 U
Trans-1,2-Dichloroethene	5 U	5.00 U	5 U	5 U
Chloroform	5 U	5.00 U	5 U	5 U
1,2-Dichloroethane	5 U	5.00 U	5 U	5 U
2-Butanone	10 U	10.00 U	10 U	10 U
1,1,1-Trichloroethane	5 U	5.00 U	5 U	5 U
Carbon Tetrachloride	5 U	5.00 U	5 U	5 U
Vinyl Acetate	10 U	10.00 U	10 U	10 U
Bromodichloromethane	5 U	5.00 U	5 U	5 U
1,2-Dichloropropane	5 U	5.00 U	5 U	5 U
Trans-1,3-Dichloropropene	5 U	5.00 U	5 U	5 U
Trichloroethene	5 U	5.00 U	5 U	5 U
Dibromochloromethane	5 U	5.00 U	5 U	5 U
1,1,2-Trichloroethane	5 U	5.00 U	5 U	5 U
Benzene	5 U	5.00 U	5 U	5 U
cis-1,3-Dichloropropene	5 U	5.00 U	5 U	5 U
2-Chloroethylvinylether	10 U	10.00 U	10 U	10 U
Bromoform	5 U	5.00 U	5 U	5 U
4-Methyl-2-pentanone	10 U	10.00 U	10 U	10 U
2-Hexanone	10 U	10.00 U	10 U	10 U
Tetrachloroethene	5 U	5.00 U	5 U	5 U
1,1,2,2-Tetrachloroethane	NR	5.00 U	NR	NR
Toluene	5 U	5.00 U	5 U	5 U
Chlorobenzene	5 U	5.00 U	5 U	5 U
Ethylbenzene	5 U	5.00 U	5 U	5 U
Styrene	5 U	5.00 U	5 U	5 U
Total Xylenes	5 U	5.00 U	5 U	5 U

Modifiers: U=Analyzed, not detected. J=Present below detection limit. B=Present in blank. NS=Not spiked. %=Percent recovery.

881 HILLSIDE BOREHOLE SAMPLES
GC/MS DATA SUMMARY
Semivolatile HAZARDOUS SUBSTANCE LIST COMPOUNDS

RFW Batch Number: Client: ROCKWELL (ROCKY FLATS)

Sample Information

RFW Batch ID:	8705-051-009	8705-051-011	8705-051-010	8705-057-0050
Customer ID:	8H06871020	8H068726CT	8H068730BR	8H07870510
Matrix:	Soil	Soil	Soil	Soil
Units:	UG/KG	UG/KG	UG/KG	UG/KG
Dilution Factor:	1	1	1	1.0

Surrogate Recovery

2-Fluorophenol:	101 %	96 %	97 %	84 %
Phenol-d5:	99 %	92 %	99 %	80 %
2,4,6-Br3-Phenol:	134 %	126 %	140 %	86 %
Nitrobenzene-d5:	90 %	78 %	84 %	73 %
2-Fluorobiphenyl:	109 %	98 %	106 %	74 %
p-Terphenyl-d14:	79 %	70 %	72 %	64 %

Analytes

Phenol	10 U	10 U	10 U	330.00 U
bis(2-Chloroethyl)Ether	10 U	10 U	10 U	330.00 U
2-Chlorophenol	10 U	10 U	10 U	330.00 U
1,3-Dichlorobenzene	10 U	10 U	10 U	330.00 U
1,4-Dichlorobenzene	10 U	10 U	10 U	330.00 U
Benzyl Alcohol	10 U	10 U	10 U	330.00 U
1,2-Dichlorobenzene	10 U	10 U	10 U	330.00 U
2-Methylphenol	10 U	10 U	10 U	330.00 U
bis(2-Chloroisopropyl)Ether	10 U	10 U	10 U	330.00 U
4-Methylphenol	10 U	10 U	10 U	330.00 U
N-Nitroso-di-n-propylamine	10 U	10 U	10 U	330.00 U
Hexachloroethane	10 U	10 U	10 U	330.00 U
Nitrobenzene	10 U	10 U	10 U	330.00 U
Isophorone	10 U	10 U	10 U	330.00 U
2-Nitrophenol	10 U	10 U	10 U	330.00 U
2,4-Dimethylphenol	10 U	10 U	10 U	330.00 U
Benzoic Acid	50 U	50 U	50 U	1600.00 U
bis(2-Chloroethoxy)Methane	10 U	10 U	10 U	330.00 U
2,4-Dichlorophenol	10 U	10 U	10 U	330.00 U
1,2,4-Trichlorobenzene	10 U	10 U	10 U	330.00 U
Naphthalene	10 U	10 U	10 U	330.00 U
4-Chloroaniline	10 U	10 U	10 U	330.00 U
Hexachlororbutadiene	10 U	10 U	10 U	330.00 U
4-Chloro-3-methylphenol	10 U	10 U	10 U	330.00 U
2-Methylnaphthalene	10 U	10 U	10 U	330.00 U
Hexachlorocyclopentadiene	10 U	10 U	10 U	330.00 U
2,4,6-Trichlorophenol	10 U	10 U	10 U	330.00 U
2,4,5-Trichlorophenol	50 U	50 U	50 U	1600.00 U
2-Chloronaphthalene	10 U	10 U	10 U	330.00 U
2-Nitroaniline	50 U	50 U	50 U	1600.00 U
Dimethyl Phthalate	10 U	10 U	10 U	330.00 U
Acenaphthylene	10 U	10 U	10 U	330.00 U
3-Nitroaniline	50 U	50 U	50 U	1600.00 U

Modifiers: U=Analyzed, not detected. J=Present below detection limit. B=Present in blank. NS=Not spiked. %=Percent recovery.

881 HILLSIDE BOREHOLE SAMPLES
GC/MS DATA SUMMARY
Semivolatile HAZARDOUS SUBSTANCE LIST COMPOUNDS

RFW Batch Number: Client: ROCKWELL (ROCKY FLATS)

Sample Information

RFW Batch ID:	8705-051-009	8705-051-011	8705-051-010	8705-057-0050
Customer ID:	BH06871020	BH068726CT	BH0687308R	BH07870510
Matrix:	Soil	Soil	Soil	Soil
Units:	UG/KG	UG/KG	UG/KG	UG/KG
Dilution Factor:	1	1	1	1.0

Analytes

Acenaphthene	10	U	10	U	10	U	330.00	U
2,4-Dinitrophenol	50	U	50	U	50	U	1600.00	U
4-Nitrophenol	50	U	50	U	50	U	1600.00	U
Dibenzofuran	10	U	10	U	10	U	330.00	U
2,4-Dinitrotoluene	10	U	10	U	10	U	330.00	U
2,6-Dinitrotoluene	10	U	10	U	10	U	330.00	U
Diethylphthalate	10	U	10	U	10	U	330.00	U
4-Chlorophenyl-phenylether	10	U	10	U	10	U	330.00	U
Fluorene	10	U	10	U	10	U	330.00	U
4-Nitroaniline	50	U	50	U	50	U	1600.00	U
4,6-Dinitro-2-methylphenol	50	U	50	U	50	U	1600.00	U
N-Nitrosodiphenylamine	10	U	10	U	10	U	1600.00	U
4-Bromophenyl-phenylether	10	U	10	U	10	U	330.00	U
Hexachlorobenzene	10	U	10	U	10	U	330.00	U
Pentachlorophenol	50	U	50	U	50	U	1600.00	U
Phenanthrene	10	U	10	U	10	U	330.00	U
Anthracene	10	U	10	U	10	U	330.00	U
di-n-Butyl Phthalate	10	U	10	U	10	U	330.00	U
Fluoranthene	10	U	10	U	10	U	330.00	U
Pyrene	10	U	10	U	10	U	330.00	U
Butyl Benzyl Phthalate	10	U	10	U	10	U	330.00	U
3,3'-Dichlorobenzidine	20	U	20	U	20	U	660.00	U
Benzo(a)Anthracene	10	U	10	U	10	U	330.00	U
bis(2-Ethylhexyl)Phthalate	1100	B	510	B	1200	B	3200.00	
Chrysene	10	U	10	U	10	U	330.00	U
di-n-Octyl Phthalate	10	U	10	U	10	U	330.00	U
Benzo(b)Fluoranthene	10	U	10	U	10	U	330.00	U
Benzo(k)Fluoranthene	10	U	10	U	10	U	330.00	U
Benzo(a)Pyrene	10	U	10	U	10	U	330.00	U
Indeno(1,2,3-cd)Pyrene	10	U	10	U	10	U	330.00	U
Dibenz(a,h)Anthracene	10	U	10	U	10	U	330.00	U
Benzo(g,h,i)Perylene	10	U	10	U	10	U	330.00	U

Modifiers: U=Analyzed, not detected. J=Present below detection limit. B=Present in blank. NS=Not spiked. %=Percent recovery.

881 HILLSIDE BOREHOLE SAMPLES
GC/MS DATA SUMMARY
Semivolatile HAZARDOUS SUBSTANCE LIST COMPOUNDS

Sample Information

RFW Batch ID:	8705-057-0070	8705-057-0010	8705-057-0090	8705-057-0030
Customer ID:	8H078705CT	8H0787088R	8H07871013	8H078710WS
Matrix:	Soil	Soil	Soil	Soil
Units:	UG/KG	UG/KG	UG/KG	UG/KG
Dilution Factor:	1.0	1.0	1.0	1.0

Surrogate Recovery

2-Fluorophenol:	89 %	77 %	81 %	84 %
Phenol-d5:	82 %	71 %	77 %	80 %
2,4,6-Br3-Phenol:	92 %	81 %	79 %	86 %
Nitrobenzene-d5:	81 %	77 %	72 %	78 %
2-Fluorobiphenyl:	78 %	67 %	71 %	75 %
p-Terphenyl-d14:	71 %	58 %	63 %	66 %

Analytes

Phenol	330.00 U	330.00 U	330.00 U	330.00 U
bis(2-Chloroethyl)Ether	330.00 U	330.00 U	330.00 U	330.00 U
2-Chlorophenol	330.00 U	330.00 U	330.00 U	330.00 U
1,3-Dichlorobenzene	330.00 U	330.00 U	330.00 U	330.00 U
1,4-Dichlorobenzene	330.00 U	330.00 U	330.00 U	330.00 U
Benzyl Alcohol	330.00 U	330.00 U	330.00 U	330.00 U
1,2-Dichlorobenzene	330.00 U	330.00 U	330.00 U	330.00 U
2-Methylphenol	330.00 U	330.00 U	330.00 U	330.00 U
bis(2-Chloroisopropyl)Ether	330.00 U	330.00 U	330.00 U	330.00 U
4-Methylphenol	330.00 U	330.00 U	330.00 U	330.00 U
N-Nitroso-di-n-propylamine	330.00 U	330.00 U	330.00 U	330.00 U
Hexachloroethane	330.00 U	330.00 U	330.00 U	330.00 U
Nitrobenzene	330.00 U	330.00 U	330.00 U	330.00 U
Isophorone	330.00 U	330.00 U	330.00 U	330.00 U
2-Nitrophenol	330.00 U	330.00 U	330.00 U	330.00 U
2,4-Dimethylphenol	330.00 U	330.00 U	330.00 U	330.00 U
Benzoic Acid	1600.00 U	1600.00 U	1600.00 U	1600.00 U
bis(2-Chloroethoxy)Methane	330.00 U	330.00 U	330.00 U	330.00 U
2,4-Dichlorophenol	330.00 U	330.00 U	330.00 U	330.00 U
1,2,4-Trichlorobenzene	330.00 U	330.00 U	330.00 U	330.00 U
Naphthalene	330.00 U	330.00 U	330.00 U	330.00 U
4-Chloroaniline	330.00 U	330.00 U	330.00 U	330.00 U
Hexachlororbutadiene	330.00 U	330.00 U	330.00 U	330.00 U
4-Chloro-3-methylphenol	330.00 U	330.00 U	330.00 U	330.00 U
2-Methylnaphthalene	330.00 U	330.00 U	330.00 U	330.00 U
Hexachlorocyclopentadiene	330.00 U	330.00 U	330.00 U	330.00 U
2,4,6-Trichlorophenol	330.00 U	330.00 U	330.00 U	330.00 U
2,4,5-Trichlorophenol	1600.00 U	1600.00 U	1600.00 U	1600.00 U
2-Chloronaphthalene	330.00 U	330.00 U	330.00 U	330.00 U
2-Nitroaniline	1600.00 U	1600.00 U	1600.00 U	1600.00 U
Dimethyl Phthalate	330.00 U	330.00 U	330.00 U	330.00 U
Acenaphthylene	330.00 U	330.00 U	330.00 U	330.00 U
3-Nitroaniline	1600.00 U	1600.00 U	1600.00 U	1600.00 U

Modifiers: U=Analyzed, not detected. J=Present below detection limit. B=Present in blank. NS=Not spiked. %=Percent recovery.

881 HILLSIDE BOREHOLE SAMPLES
GC/MS DATA SUMMARY
Semivolatile HAZARDOUS SUBSTANCE LIST COMPOUNDS

Sample Information

RFW Batch ID:	8705-057-0070	8705-057-0010	8705-057-0090	8705-057-0030
Customer ID:	8H078705CT	8H0787088R	8H07871013	8H078710WS
Matrix:	Soil	Soil	Soil	Soil
Units:	UG/KG	UG/KG	UG/KG	UG/KG
Dilution Factor:	1.0	1.0	1.0	1.0

Analytes

Acenaphthene	330.00	U	330.00	U	330.00	U	330.00	U
2,4-Dinitrophenol	1600.00	U	1600.00	U	1600.00	U	1600.00	U
4-Nitrophenol	1600.00	U	1600.00	U	1600.00	U	1600.00	U
Dibenzofuran	330.00	U	330.00	U	330.00	U	330.00	U
2,4-Dinitrotoluene	330.00	U	330.00	U	330.00	U	330.00	U
2,6-Dinitrotoluene	330.00	U	330.00	U	330.00	U	330.00	U
Diethylphthalate	330.00	U	330.00	U	330.00	U	330.00	U
4-Chlorophenyl-phenylether	330.00	U	330.00	U	330.00	U	330.00	U
Fluorene	330.00	U	330.00	U	330.00	U	330.00	U
4-Nitroaniline	1600.00	U	1600.00	U	1600.00	U	1600.00	U
4,6-Dinitro-2-methylphenol	1600.00	U	1600.00	U	1600.00	U	1600.00	U
N-Nitrosodiphenylamine	1600.00	U	1600.00	U	1600.00	U	1600.00	U
4-Bromophenyl-phenylether	330.00	U	330.00	U	330.00	U	330.00	U
Hexachlorobenzene	330.00	U	330.00	U	330.00	U	330.00	U
Pentachlorophenol	1600.00	U	1600.00	U	1600.00	U	1600.00	U
Phenanthrene	330.00	U	330.00	U	330.00	U	330.00	U
Anthracene	330.00	U	330.00	U	330.00	U	330.00	U
di-n-Butyl Phthalate	330.00	U	330.00	U	330.00	U	330.00	U
Fluoranthene	330.00	U	330.00	U	330.00	U	330.00	U
Pyrene	330.00	U	330.00	U	330.00	U	330.00	U
Butyl Benzyl Phthalate	330.00	U	330.00	U	330.00	U	330.00	U
3,3'-Dichlorobenzidine	660.00	U	660.00	U	660.00	U	660.00	U
Benzo(a)Anthracene	330.00	U	330.00	U	330.00	U	330.00	U
bis(2-Ethylhexyl)Phthalate	1300.00		1600.00		2500.00		1100.00	
Chrysene	330.00	U	330.00	U	330.00	U	330.00	U
di-n-Octyl Phthalate	330.00	U	330.00	U	330.00	U	330.00	U
Benzo(b)Fluoranthene	330.00	U	330.00	U	330.00	U	330.00	U
Benzo(k)Fluoranthene	330.00	U	330.00	U	330.00	U	330.00	U
Benzo(a)Pyrene	330.00	U	330.00	U	330.00	U	330.00	U
Indeno(1,2,3-cd)Pyrene	330.00	U	330.00	U	330.00	U	330.00	U
Dibenz(a,h)Anthracene	330.00	U	330.00	U	330.00	U	330.00	U
Benzo(g,h,i)Perylene	330.00	U	330.00	U	330.00	U	330.00	U

Modifiers: U=Analyzed, not detected. J=Present below detection limit. B=Present in blank. NS=Not spiked. %=Percent recovery.

881 HILLSIDE BOREHOLE SAMPLES
GC/MS DATA SUMMARY
Semivolatile HAZARDOUS SUBSTANCE LIST COMPOUNDS

RFW Batch Number: Client: ROCKWELL (ROCKY FLATS)

Sample Information

RFW Batch ID:	8706-002-0030	3122-471-009	8706-002-0020	8706-005-0060
Customer ID:	8H098706WT	8H098711CT	8H0987148R	8H10870010
Matrix:	Soil	Soil	Soil	Soil
Units:	UG/KG	UG/KG	UG/KG	UG/KG
Dilution Factor:	1.0	10	1.0	1.0

Surrogate Recovery

2-Fluorophenol:	124 %	40 %	123 %	108 %
Phenol-d5:	115 %	62 %	112 %	101 %
2,4,6-Br3-Phenol:	110 %	35 %	102 %	96 %
Nitrobenzene-d5:	109 %	70 %	106 %	90 %
2-Fluorobiphenyl:	98 %	56 %	91 %	85 %
p-Terphenyl-d14:	109 %	76 %	109 %	83 %

Analytes

Phenol	330.00 U	150 U	330.00 U	330.00 U
bis(2-Chloroethyl)Ether	330.00 U	150 U	330.00 U	330.00 U
2-Chlorophenol	330.00 U	200 U	330.00 U	330.00 U
1,3-Dichlorobenzene	330.00 U	200 U	330.00 U	330.00 U
1,4-Dichlorobenzene	330.00 U	200 U	330.00 U	330.00 U
Benzyl Alcohol	330.00 U	NR	330.00 U	330.00 U
1,2-Dichlorobenzene	330.00 U	200 U	330.00 U	330.00 U
2-Methylphenol	330.00 U	NR	330.00 U	330.00 U
bis(2-Chloroisopropyl)Ether	330.00 U	150 U	330.00 U	330.00 U
4-Methylphenol	330.00 U	NR	330.00 U	330.00 U
N-Nitroso-di-n-propylamine	330.00 U	200 U	330.00 U	330.00 U
Hexachloroethane	330.00 U	500 U	330.00 U	330.00 U
Nitrobenzene	330.00 U	200 U	330.00 U	330.00 U
Isophorone	330.00 U	100 U	330.00 U	330.00 U
2-Nitrophenol	330.00 U	400 U	330.00 U	330.00 U
2,4-Dimethylphenol	330.00 U	400 U	330.00 U	330.00 U
Benzoic Acid	1600.00 U	1600 U	1600.00 U	1600.00 U
bis(2-Chloroethoxy)Methane	330.00 U	200 U	330.00 U	330.00 U
2,4-Dichlorophenol	330.00 U	400 U	330.00 U	330.00 U
1,2,4-Trichlorobenzene	330.00 U	300 U	330.00 U	330.00 U
Naphthalene	330.00 U	100 U	330.00 U	330.00 U
4-Chloroaniline	330.00 U	NR	330.00 U	330.00 U
Hexachlororbutadiene	330.00 U	800 U	330.00 U	330.00 U
4-Chloro-3-methylphenol	330.00 U	330 U	330.00 U	330.00 U
2-Methylnaphthalene	330.00 U	NR	330.00 U	330.00 U
Hexachlorocyclopentadiene	330.00 U	800 U	330.00 U	330.00 U
2,4,6-Trichlorophenol	330.00 U	800 U	330.00 U	330.00 U
2,4,5-Trichlorophenol	1600.00 U	NR	1600.00 U	1600.00 U
2-Chloronaphthalene	330.00 U	200 U	330.00 U	330.00 U
2-Nitroaniline	1600.00 U	NR	1600.00 U	1600.00 U
Dimethyl Phthalate	330.00 U	200 U	330.00 U	330.00 U
Acenaphthylene	330.00 U	100 U	330.00 U	330.00 U
3-Nitroaniline	1600.00 U	NR	1600.00 U	1600.00 U

Modifiers: U=Analyzed, not detected. J=Present below detection limit. B=Present in blank. NS=Not spiked. %=Percent recovery.

881 HILLSIDE BOREHOLE SAMPLES
GC/MS DATA SUMMARY
Semivolatile HAZARDOUS SUBSTANCE LIST COMPOUNDS

RFW Batch Number: Client: ROCKWELL (ROCKY FLATS)

Sample Information

RFW Batch ID:	8706-002-0030	3122-471-009	8706-002-0020	8706-005-0060
Customer ID:	8H098706WT	8H098711CT	8H0987148R	8H10870010
Matrix:	Soil	Soil	Soil	Soil
Units:	UG/KG	UG/KG	UG/KG	UG/KG
Dilution Factor:	1.0	10	1.0	1.0

Analytes

Acenaphthene	330.00	U	150	U	330.00	U	330.00	U
2,4-Dinitrophenol	1600.00	U	700	U	1600.00	U	1600.00	U
4-Nitrophenol	1600.00	U	350	U	1600.00	U	1600.00	U
Dibenzofuran	330.00	U	NR	U	330.00	U	330.00	U
2,4-Dinitrotoluene	330.00	U	350	U	330.00	U	330.00	U
2,6-Dinitrotoluene	330.00	U	800	U	330.00	U	330.00	U
Diethylphthalate	330.00	U	28		330.00	U	330.00	U
4-Chlorophenyl-phenylether	330.00	U	150	U	330.00	U	330.00	U
Fluorene	330.00	U	150	U	330.00	U	330.00	U
4-Nitroaniline	1600.00	U	NR	U	1600.00	U	1600.00	U
4,6-Dinitro-2-methylphenol	1600.00	U	NR	U	1600.00	U	1600.00	U
N-Nitrosodiphenylamine	1600.00	U	350	U	1600.00	U	1600.00	U
4-Bromophenyl-phenylether	330.00	U	350	U	330.00	U	330.00	U
Hexachlorobenzene	330.00	U	350	U	330.00	U	330.00	U
Pentachlorophenol	1600.00	U	350	U	1600.00	U	1600.00	U
Phenanthrene	35	J	100	U	330.00	U	330.00	U
Anthracene	330.00	U	100	U	330.00	U	330.00	U
di-n-Butyl Phthalate	35	J	1493		330.00	U	330.00	U
Fluoranthene	330.00	U	100	U	330.00	U	330.00	U
Pyrene	330.00	U	100	U	330.00	U	330.00	U
Butyl Benzyl Phthalate	330.00	U	150	U	330.00	U	330.00	U
3,3'-Dichlorobenzidine	660.00	U	700	U	660.00	U	660.00	U
Benzo(a)Anthracene	330.00	U	100	U	330.00	U	330.00	U
bis(2-Ethylhexyl)Phthalate	1900		3591		1000		1000	
Chrysene	330.00	U	100	U	330.00	U	330.00	U
di-n-Octyl Phthalate	330.00	U	100	U	330.00	U	330.00	U
Benzo(b)Fluoranthene	330.00	U	200	U	330.00	U	330.00	U
Benzo(k)Fluoranthene	330.00	U	200	U	330.00	U	330.00	U
Benzo(a)Pyrene	330.00	U	600	U	330.00	U	330.00	U
Indeno(1,2,3-cd)Pyrene	330.00	U	300	U	330.00	U	330.00	U
Dibenz(a,h)Anthracene	330.00	U	350	U	330.00	U	330.00	U
Benzo(g,h,i)Perylene	330.00	U	300	U	330.00	U	330.00	U

Modifiers: U=Analyzed, not detected. J=Present below detection limit. B=Present in blank. NS=Not spiked. %=Percent recovery.

881 HILLSIDE BOREHOLE SAMPLES
GC/MS DATA SUMMARY
Semivolatile HAZARDOUS SUBSTANCE LIST COMPOUNDS

RFW Batch Number: Client: ROCKWELL (ROCKY FLATS)

Sample Information

RFW Batch ID:	8706-005-0040	8706-005-0080	8706-005-0020	8706-010-0060
Customer ID:	BH10871020	BH108720CT	BH1087238R	BH11870010
Matrix:	Soil	Soil	Soil	Soil
Units:	UG/KG	UG/KG	UG/KG	UG/KG
Dilution Factor:	1.0	1.0	1.0	1.0

Surrogate Recovery

2-Fluorophenol:	136 %	133 %	120 %	127 %
Phenol-d5:	128 %	120 %	113 %	108 %
2,4,6-Br3-Phenol:	122 %	113 %	104 %	90 %
Nitrobenzene-d5:	112 %	109 %	100 %	97 %
2-Fluorobiphenyl:	101 %	96 %	89 %	98 %
p-Terphenyl-d14:	99 %	93 %	82 %	88 %

Analytes

Phenol	330.00 U	330.00 U	330.00 U	330.00 U
bis(2-Chloroethyl)Ether	330.00 U	330.00 U	330.00 U	330.00 U
2-Chlorophenol	330.00 U	330.00 U	330.00 U	330.00 U
1,3-Dichlorobenzene	330.00 U	330.00 U	330.00 U	330.00 U
1,4-Dichlorobenzene	330.00 U	330.00 U	330.00 U	330.00 U
Benzyl Alcohol	330.00 U	330.00 U	330.00 U	330.00 U
1,2-Dichlorobenzene	330.00 U	330.00 U	330.00 U	330.00 U
2-Methylphenol	330.00 U	330.00 U	330.00 U	330.00 U
bis(2-Chloroisopropyl)Ether	330.00 U	330.00 U	330.00 U	330.00 U
4-Methylphenol	330.00 U	330.00 U	330.00 U	330.00 U
N-Nitroso-di-n-propylamine	330.00 U	330.00 U	330.00 U	330.00 U
Hexachloroethane	330.00 U	330.00 U	330.00 U	330.00 U
Nitrobenzene	330.00 U	330.00 U	330.00 U	330.00 U
Isophorone	330.00 U	330.00 U	330.00 U	330.00 U
2-Nitrophenol	330.00 U	330.00 U	330.00 U	330.00 U
2,4-Dimethylphenol	330.00 U	330.00 U	330.00 U	330.00 U
Benzoic Acid	1600.00 U	1600.00 U	1600.00 U	1600.00 U
bis(2-Chloroethoxy)Methane	330.00 U	330.00 U	330.00 U	330.00 U
2,4-Dichlorophenol	330.00 U	330.00 U	330.00 U	330.00 U
1,2,4-Trichlorobenzene	330.00 U	330.00 U	330.00 U	330.00 U
Naphthalene	330.00 U	330.00 U	330.00 U	330.00 U
4-Chloroaniline	330.00 U	330.00 U	330.00 U	330.00 U
Hexachlororbutadiene	330.00 U	330.00 U	330.00 U	330.00 U
4-Chloro-3-methylphenol	330.00 U	330.00 U	330.00 U	330.00 U
2-Methylnaphthalene	330.00 U	330.00 U	330.00 U	330.00 U
Hexachlorocyclopentadiene	330.00 U	330.00 U	330.00 U	330.00 U
2,4,6-Trichlorophenol	330.00 U	330.00 U	330.00 U	330.00 U
2,4,5-Trichlorophenol	1600.00 U	1600.00 U	1600.00 U	1600.00 U
2-Chloronaphthalene	330.00 U	330.00 U	330.00 U	330.00 U
2-Nitroaniline	1600.00 U	1600.00 U	1600.00 U	1600.00 U
Dimethyl Phthalate	330.00 U	330.00 U	330.00 U	330.00 U
Acenaphthylene	330.00 U	330.00 U	330.00 U	330.00 U
3-Nitroaniline	1600.00 U	1600.00 U	1600.00 U	1600.00 U

Modifiers: U=Analyzed, not detected. J=Present below detection limit. B=Present in blank. NS=Not spiked. %=Percent recovery.

881 HILLSIDE BOREHOLE SAMPLES
GC/MS DATA SUMMARY
Semivolatile HAZARDOUS SUBSTANCE LIST COMPOUNDS

Sample Information

RFW Batch ID:	8706-005-0040	8706-005-0080	8706-005-0020	8706-010-0060
Customer ID:	BH10871020	BH108720CT	BH108723BR	BH11870010
Matrix:	Soil	Soil	Soil	Soil
Units:	UG/KG	UG/KG	UG/KG	UG/KG
Dilution Factor:	1.0	1.0	1.0	1.0

Analytes

Acenaphthene	330.00	U	330.00	U	330.00	U	330.00	U
2,4-Dinitrophenol	1600.00	U	1600.00	U	1600.00	U	1600.00	U
4-Nitrophenol	1600.00	U	1600.00	U	1600.00	U	1600.00	U
Dibenzofuran	330.00	U	330.00	U	330.00	U	330.00	U
2,4-Dinitrotoluene	330.00	U	330.00	U	330.00	U	330.00	U
2,6-Dinitrotoluene	330.00	U	330.00	U	330.00	U	330.00	U
Diethylphthalate	330.00	U	330.00	U	330.00	U	330.00	U
4-Chlorophenyl-phenylether	330.00	U	330.00	U	330.00	U	330.00	U
Fluorene	330.00	U	330.00	U	330.00	U	330.00	U
4-Nitroaniline	1600.00	U	1600.00	U	1600.00	U	1600.00	U
4,6-Dinitro-2-methylphenol	1600.00	U	1600.00	U	1600.00	U	1600.00	U
N-Nitrosodiphenylamine	1600.00	U	1600.00	U	1600.00	U	1600.00	U
4-Bromophenyl-phenylether	330.00	U	330.00	U	330.00	U	330.00	U
Hexachlorobenzene	330.00	U	330.00	U	330.00	U	330.00	U
Pentachlorophenol	1600.00	U	1600.00	U	1600.00	U	1600.00	U
Phenanthrene	330.00	U	330.00	U	330.00	U	330.00	U
Anthracene	330.00	U	330.00	U	330.00	U	330.00	U
di-n-Butyl Phthalate	330.00	U	330.00	U	330.00	U	330.00	U
Fluoranthene	330.00	U	330.00	U	330.00	U	330.00	U
Pyrene	330.00	U	330.00	U	330.00	U	330.00	U
Butyl Benzyl Phthalate	330.00	U	330.00	U	330.00	U	330.00	U
3,3'-Dichlorobenzidine	660.00	U	660.00	U	660.00	U	660.00	U
Benzo(a)Anthracene	330.00	U	330.00	U	330.00	U	330.00	U
bis(2-Ethylhexyl)Phthalate	820		590		730		880	
Chrysene	330.00	U	330.00	U	330.00	U	330.00	U
di-n-Octyl Phthalate	330.00	U	330.00	U	330.00	U	330.00	U
Benzo(b)Fluoranthene	330.00	U	330.00	U	330.00	U	330.00	U
Benzo(k)Fluoranthene	330.00	U	330.00	U	330.00	U	330.00	U
Benzo(a)Pyrene	330.00	U	330.00	U	330.00	U	330.00	U
Indeno(1,2,3-cd)Pyrene	330.00	U	330.00	U	330.00	U	330.00	U
Dibenz(a,h)Anthracene	330.00	U	330.00	U	330.00	U	330.00	U
Benzo(g,h,i)Perylene	330.00	U	330.00	U	330.00	U	330.00	U

Modifiers: U=Analyzed, not detected. J=Present below detection limit. B=Present in blank. NS=Not spiked. %=Percent recovery.

881 HILLSIDE BOREHOLE SAMPLES
GC/MS DATA SUMMARY
Semivolatile HAZARDOUS SUBSTANCE LIST COMPOUNDS

RFW Batch Number: Client: ROCKWELL (ROCKY FLATS)

Sample Information

RFW Batch ID:	8706-010-0020	8706-010-0040	8705-059-0020	8705-059-0040
Customer ID:	BH118711CT	BH118714WT	BH128702CT	BH1287058R
Matrix:	Soil	Soil	Soil	Soil
Units:	UG/KG	UG/KG	UG/KG	UG/KG
Dilution Factor:	1.0	1.0	1.0	1.0

Surrogate Recovery

2-Fluorophenol:	132 %	118 %	78 %	66 %
Phenol-d5:	121 %	107 %	77 %	63 %
2,4,6-Br3-Phenol:	116 %	100 %	80 %	62 %
Nitrobenzene-d5:	110 %	99 %	72 %	59 %
2-Fluorobiphenyl:	96 %	90 %	73 %	56 %
p-Terphenyl-d14:	92 %	90 %	67 %	49 %

Analytes

Phenol	330.00 U	330.00 U	330.00 U	330.00 U
bis(2-Chloroethyl)Ether	330.00 U	330.00 U	330.00 U	330.00 U
2-Chlorophenol	330.00 U	330.00 U	330.00 U	330.00 U
1,3-Dichlorobenzene	330.00 U	330.00 U	330.00 U	330.00 U
1,4-Dichlorobenzene	330.00 U	330.00 U	330.00 U	330.00 U
Benzyl Alcohol	330.00 U	330.00 U	330.00 U	330.00 U
1,2-Dichlorobenzene	330.00 U	330.00 U	330.00 U	330.00 U
2-Methylphenol	330.00 U	330.00 U	330.00 U	330.00 U
bis(2-Chloroisopropyl)Ether	330.00 U	330.00 U	330.00 U	330.00 U
4-Methylphenol	330.00 U	330.00 U	330.00 U	330.00 U
N-Nitroso-di-n-propylamine	330.00 U	330.00 U	330.00 U	330.00 U
Hexachloroethane	330.00 U	330.00 U	330.00 U	330.00 U
Nitrobenzene	330.00 U	330.00 U	330.00 U	330.00 U
Isophorone	330.00 U	330.00 U	330.00 U	330.00 U
2-Nitrophenol	330.00 U	330.00 U	330.00 U	330.00 U
2,4-Dimethylphenol	330.00 U	330.00 U	330.00 U	330.00 U
Benzoic Acid	1600.00 U	1600.00 U	1600.00 U	1600.00 U
bis(2-Chloroethoxy)Methane	330.00 U	330.00 U	330.00 U	330.00 U
2,4-Dichlorophenol	330.00 U	330.00 U	330.00 U	330.00 U
1,2,4-Trichlorobenzene	330.00 U	330.00 U	330.00 U	330.00 U
Naphthalene	330.00 U	330.00 U	330.00 U	330.00 U
4-Chloroaniline	330.00 U	330.00 U	330.00 U	330.00 U
Hexachlororbutadiene	330.00 U	330.00 U	330.00 U	330.00 U
4-Chloro-3-methylphenol	330.00 U	330.00 U	330.00 U	330.00 U
2-Methylnaphthalene	330.00 U	330.00 U	330.00 U	330.00 U
Hexachlorocyclopentadiene	330.00 U	330.00 U	330.00 U	330.00 U
2,4,6-Trichlorophenol	330.00 U	330.00 U	330.00 U	330.00 U
2,4,5-Trichlorophenol	1600.00 U	1600.00 U	1600.00 U	1600.00 U
2-Chloronaphthalene	330.00 U	330.00 U	330.00 U	330.00 U
2-Nitroaniline	1600.00 U	1600.00 U	1600.00 U	1600.00 U
Dimethyl Phthalate	330.00 U	330.00 U	330.00 U	330.00 U
Acenaphthylene	330.00 U	330.00 U	330.00 U	330.00 U
3-Nitroaniline	1600.00 U	1600.00 U	1600.00 U	1600.00 U

Modifiers: U=Analyzed, not detected. J=Present below detection limit. B=Present in blank. NS=Not spiked. %=Percent recovery.

881 HILLSIDE BOREHOLE SAMPLES
GC/MS DATA SUMMARY
Semivolatile HAZARDOUS SUBSTANCE LIST COMPOUNDS

Sample Information

RFW Batch ID:	8706-010-0020	8706-010-0040	8705-059-0020	8705-059-0040
Customer ID:	BH118711CT	BH118714WT	BH128702CT	BH128705BR
Matrix:	Soil	Soil	Soil	Soil
Units:	UG/KG	UG/KG	UG/KG	UG/KG
Dilution Factor:	1.0	1.0	1.0	1.0

Analytes

Acenaphthene	330.00	U	330.00	U	330.00	U	330.00	U
2,4-Dinitrophenol	1600.00	U	1600.00	U	1600.00	U	1600.00	U
4-Nitrophenol	1600.00	U	1600.00	U	1600.00	U	1600.00	U
Dibenzofuran	330.00	U	330.00	U	330.00	U	330.00	U
2,4-Dinitrotoluene	330.00	U	330.00	U	330.00	U	330.00	U
2,6-Dinitrotoluene	330.00	U	330.00	U	330.00	U	330.00	U
Diethylphthalate	330.00	U	330.00	U	330.00	U	330.00	U
4-Chlorophenyl-phenylether	330.00	U	330.00	U	330.00	U	330.00	U
Fluorene	330.00	U	330.00	U	330.00	U	330.00	U
4-Nitroaniline	1600.00	U	1600.00	U	1600.00	U	1600.00	U
4,6-Dinitro-2-methylphenol	1600.00	U	1600.00	U	1600.00	U	1600.00	U
N-Nitrosodiphenylamine	1600.00	U	1600.00	U	1600.00	U	1600.00	U
4-Bromophenyl-phenylether	330.00	U	330.00	U	330.00	U	330.00	U
Hexachlorobenzene	330.00	U	330.00	U	330.00	U	330.00	U
Pentachlorophenol	1600.00	U	1600.00	U	1600.00	U	1600.00	U
Phenanthrene	330.00	U	330.00	U	92.00	J	330.00	U
Anthracene	330.00	U	330.00	U	330.00	U	330.00	U
di-n-Butyl Phthalate	330.00	U	330.00	U	330.00	U	330.00	U
Fluoranthene	330.00	U	330.00	U	110.00	J	330.00	U
Pyrene	330.00	U	330.00	U	110.00	J	330.00	U
Butyl Benzyl Phthalate	330.00	U	330.00	U	330.00	U	330.00	U
3,3'-Dichlorobenzidine	660.00	U	660.00	U	660.00	U	660.00	U
Benzo(a)Anthracene	330.00	U	330.00	U	36.00	J	330.00	U
bis(2-Ethylhexyl)Phthalate	760		1000		490.00		600.00	
Chrysene	330.00	U	330.00	U	42.00	J	330.00	U
di-n-Octyl Phthalate	330.00	U	330.00	U	330.00	U	330.00	U
Benzo(b)Fluoranthene	330.00	U	330.00	U	34.00	J	330.00	U
Benzo(k)Fluoranthene	330.00	U	330.00	U	35.00	J	330.00	U
Benzo(a)Pyrene	330.00	U	330.00	U	330.00	U	330.00	U
Indeno(1,2,3-cd)Pyrene	330.00	U	330.00	U	330.00	U	330.00	U
Dibenz(a,h)Anthracene	330.00	U	330.00	U	330.00	U	330.00	U
Benzo(g,h,i)Perylene	330.00	U	330.00	U	330.00	U	330.00	U

Modifiers: U=Analyzed, not detected. J=Present below detection limit. B=Present in blank. NS=Not spiked. %=Percent recovery.

881 HILLSIDE BOREHOLE SAMPLES
GC/MS DATA SUMMARY
Semivolatile HAZARDOUS SUBSTANCE LIST COMPOUNDS

Sample Information

RFW Batch ID:	8706-004-0020	3122-471-004	8706-004-0040	3122-471-007
Customer ID:	BH13870010	BH138711CT	BH1387148R	BH148703W1
Matrix:	Soil	Soil	Soil	Soil
Units:	UG/KG	UG/KG	UG/KG	UG/KG
Dilution Factor:	1.0	10	1.0	10

Surrogate Recovery

2-Fluorophenol:	127 %	19 %	128 %	44 %
Phenol-d5:	114 %	50 %	117 %	72 %
2,4,6-Br3-Phenol:	108 %	22 %	108 %	51 %
Nitrobenzene-d5:	105 %	62 %	102 %	62 %
2-Fluorobiphenyl:	97 %	51 %	96 %	51 %
p-Terphenyl-d14:	107 %	84 %	112 %	75 %

Analytes

Phenol	330.00	U	150	U	330.00	U	150	U
bis(2-Chloroethyl)Ether	330.00	U	150	U	330.00	U	150	U
2-Chlorophenol	330.00	U	200	U	330.00	U	200	U
1,3-Dichlorobenzene	330.00	U	200	U	330.00	U	200	U
1,4-Dichlorobenzene	330.00	U	200	U	330.00	U	200	U
Benzyl Alcohol	330.00	U	NR		330.00	U	NR	
1,2-Dichlorobenzene	330.00	U	200	U	330.00	U	200	U
2-Methylphenol	330.00	U	NR		330.00	U	NR	
bis(2-Chloroisopropyl)Ether	330.00	U	150	U	330.00	U	150	U
4-Methylphenol	330.00	U	NR		330.00	U	NR	
N-Nitroso-di-n-propylamine	330.00	U	200	U	330.00	U	200	U
Hexachloroethane	330.00	U	500	U	330.00	U	500	U
Nitrobenzene	330.00	U	200	U	330.00	U	200	U
Isophorone	330.00	U	100	U	330.00	U	100	U
2-Nitrophenol	330.00	U	400	U	330.00	U	400	U
2,4-Dimethylphenol	330.00	U	400	U	330.00	U	400	U
Benzoic Acid	1600.00	U	1600	U	1600.00	U	1600	U
bis(2-Chloroethoxy)Methane	330.00	U	200	U	330.00	U	200	U
2,4-Dichlorophenol	330.00	U	400	U	330.00	U	400	U
1,2,4-Trichlorobenzene	330.00	U	300	U	330.00	U	300	U
Naphthalene	330.00	U	100	U	330.00	U	100	U
4-Chloroaniline	330.00	U	NR		330.00	U	NR	
Hexachlororbutadiene	330.00	U	800	U	330.00	U	800	U
4-Chloro-3-methylphenol	330.00	U	330	U	330.00	U	330	U
2-Methylnaphthalene	330.00	U	NR		330.00	U	NR	
Hexachlorocyclopentadiene	330.00	U	800	U	330.00	U	800	U
2,4,6-Trichlorophenol	330.00	U	800	U	330.00	U	800	U
2,4,5-Trichlorophenol	1600.00	U	NR		1600.00	U	NR	
2-Chloronaphthalene	330.00	U	200	U	330.00	U	200	U
2-Nitroaniline	1600.00	U	NR		1600.00	U	NR	
Dimethyl Phthalate	330.00	U	200	U	330.00	U	200	U
Acenaphthylene	330.00	U	100	U	330.00	U	100	U
3-Nitroaniline	1600.00	U	NR		1600.00	U	NR	

Modifiers: U=Analyzed, not detected. J=Present below detection limit. B=Present in blank. NS=Not spiked. %=Percent recovery.

881 HILLSIDE BOREHOLE SAMPLES
GC/MS DATA SUMMARY
Semivolatile HAZARDOUS SUBSTANCE LIST COMPOUNDS

RFW Batch Number: Client: ROCKWELL (ROCKY FLATS)

Sample Information

RFW Batch ID:	8706-004-0020	3122-471-004	8706-004-0040	3122-471-007
Customer ID:	BH13870010	BH138711CT	BH138714BR	BH148703W1
Matrix:	Soil	Soil	Soil	Soil
Units:	UG/KG	UG/KG	UG/KG	UG/KG
Dilution Factor:	1.0	10	1.0	10

Analytes

Acenaphthene	330.00	U	150	U	330.00	U	150	U
2,4-Dinitrophenol	1600.00	U	700	U	1600.00	U	700	U
4-Nitrophenol	1600.00	U	350	U	1600.00	U	350	U
Dibenzofuran	330.00	U	NR	U	330.00	U	NR	U
2,4-Dinitrotoluene	330.00	U	350	U	330.00	U	350	U
2,6-Dinitrotoluene	330.00	U	800	U	330.00	U	800	U
Diethylphthalate	330.00	U	26		330.00	U	29	
4-Chlorophenyl-phenylether	330.00	U	150	U	330.00	U	150	U
Fluorene	330.00	U	150	U	330.00	U	150	U
4-Nitroaniline	1600.00	U	NR	U	1600.00	U	NR	U
4,6-Dinitro-2-methylphenol	1600.00	U	NR	U	1600.00	U	NR	U
N-Nitrosodiphenylamine	1600.00	U	350	U	1600.00	U	350	U
4-Bromophenyl-phenylether	330.00	U	350	U	330.00	U	350	U
Hexachlorobenzene	330.00	U	350	U	330.00	U	350	U
Pentachlorophenol	1600.00	U	350	U	1600.00	U	350	U
Phenanthrene	330.00	U	100	U	330.00	U	100	U
Anthracene	330.00	U	100	U	330.00	U	100	U
di-n-Butyl Phthalate	330.00	U	2016		41	J	1375	
Fluoranthene	330.00	U	100	U	330.00	U	100	U
Pyrene	330.00	U	100	U	330.00	U	100	U
Butyl Benzyl Phthalate	330.00	U	150	U	330.00	U	150	U
3,3'-Dichlorobenzidine	660.00	U	700	U	660.00	U	700	U
Benzo(a)Anthracene	330.00	U	100	U	330.00	U	100	U
bis(2-Ethylhexyl)Phthalate	1000		1185		3500		150	U
Chrysene	330.00	U	100	U	330.00	U	100	U
di-n-Octyl Phthalate	170	J	265		330.00	U	100	U
Benzo(b)Fluoranthene	330.00	U	200	U	330.00	U	200	U
Benzo(k)Fluoranthene	330.00	U	200	U	330.00	U	200	U
Benzo(a)Pyrene	330.00	U	600	U	330.00	U	600	U
Indeno(1,2,3-cd)Pyrene	330.00	U	300	U	330.00	U	300	U
Dibenz(a,h)Anthracene	330.00	U	350	U	330.00	U	350	U
Benzo(g,h,i)Perylene	330.00	U	300	U	330.00	U	300	U

Modifiers: U=Analyzed, not detected. J=Present below detection limit. B=Present in blank. NS=Not spiked. %=Percent recovery.

881 HILLSIDE BOREHOLE SAMPLES
PESTICIDES/PCB
CLP LIST

RFW Batch Number: Client: ROCKWELL (ROCKY FLATS) Page: 1

Sample Information

RFW Batch ID:	8706-005-0040	8706-005-0080	8706-005-0020	8706-010-0060
Customer ID:	BH10871020	BH108720CT	BH1087238R	BH11870010
Matrix:	Soil	Soil	Soil	Soil
Units:	UG/KG	UG/KG	UG/KG	UG/KG
Dilution Factor:	1.0	1.0	1.0	1.0

Surrogate Recovery

Di-n-butylchlorendate:	75 %	76 %	77 %	72 %

Analytes

Alpha-BHC	2.00 U	2.00 U	2.00 U	2.00 U
Beta-BHC	2.00 U	2.00 U	2.00 U	2.00 U
Delta-BHC	2.00 U	2.00 U	2.00 U	2.00 U
Gamma-BHC (Lindane)	2.00 U	2.00 U	2.00 U	2.00 U
Heptachlor	2.00 U	2.00 U	2.00 U	2.00 U
Aldrin	2.00 U	2.00 U	2.00 U	2.00 U
Heptachlor Epoxide	2.00 U	2.00 U	2.00 U	2.00 U
Endosulfan I	2.00 U	2.00 U	2.00 U	2.00 U
Dieldrin	4.00 U	4.00 U	4.00 U	4.00 U
4,4'-DDE	4.00 U	4.00 U	4.00 U	4.00 U
Endrin	4.00 U	4.00 U	4.00 U	4.00 U
Endosulfan II	4.00 U	4.00 U	4.00 U	4.00 U
4,4'-DDD	4.00 U	4.00 U	4.00 U	4.00 U
Endosulfan Sulfate	4.00 U	4.00 U	4.00 U	4.00 U
4,4'-DDT	4.00 U	4.00 U	4.00 U	4.00 U
Methoxychlor	20.00 U	20.00 U	20.00 U	20.00 U
Endrin Ketone	4.00 U	4.00 U	4.00 U	4.00 U
Chlordane	20.00 U	20.00 U	20.00 U	20.00 U
Toxaphene	40.00 U	40.00 U	40.00 U	40.00 U
Aroclor-1016	20.00 U	20.00 U	20.00 U	20.00 U
Aroclor-1221	20.00 U	20.00 U	20.00 U	20.00 U
Aroclor-1232	20.00 U	20.00 U	20.00 U	20.00 U
Aroclor-1242	20.00 U	20.00 U	20.00 U	20.00 U
Aroclor-1248	20.00 U	20.00 U	20.00 U	20.00 U
Aroclor-1254	40.00 U	40.00 U	40.00 U	43
Aroclor-1260	40.00 U	40.00 U	40.00 U	40.00 U

Modifiers: U=Analyzed, not detected. J=Present below detection limit. B=Present in blank. NS=Not spiked. %=Percent recovery.

881 HILLSIDE BOREHOLE SAMPLES
RADIOCHEMISTRY
DATA SUMMARY REPORT

RFW Batch Number: Client: ROCKWELL (ROCKY FLATS)

Sample Information

RFW Batch ID:	1000-000-019	1000-000-020	1000-000-021
Customer ID:	8H06870010	8H06871020	8H068726CT
Matrix:	Soil	Soil	Soil

Radio Chemistry

Gross Alpha	30 +/- 14	pci/g	22 +/- 13	pci/g	18 +/- 12	pci/g
Gross Beta	33 +/- 6	pci/g	38 +/- 6	pci/g	35 +/- 6	pci/g
Uranium 233, 234	1.0 +/- 0.2	pci/g	1.1 +/- 0.3	pci/g	0.55 +/- 0.18	pci/g
Uranium 235	NR		NR		NR	
Uranium 238	0.86 +/- 0.28	pci/g	0.63 +/- 0.27	pci/g	1.0 +/- 0.3	pci/g
Strontium 89, 90	-0.2 +/- 0.8	pci/g	1.3 +/- 1.1	pci/g	0.7 +/- 0.7	pci/g
Plutonium 239, 240	-0.04 +/- 0.16	pci/g	-0.06 +/- 0.15	pci/g	-0.01 +/- 0.19	pci/g
Americium 241	0.02 +/- 0.07	pci/g	-0.06 +/- 0.08	pci/g	-0.03 +/- 0.05	pci/g
Cesium 137	0.6 +/- 0.7	pci/g	0.4 +/- 0.7	pci/g	0.5 +/- 0.6	pci/g
Tritium	0.12 +/- 0.20	pci/ml	0.09 +/- 0.20	pci/ml	0.23 +/- 0.20	pci/ml

RFW Batch Number: Client: ROCKWELL (ROCKY FLATS)

Sample Information

RFW Batch ID:	1000-000-022	1000-000-023	1000-000-024
Customer ID:	8H0687308R	8H078708BR	8H07871013
Matrix:	Soil	Soil	Soil

Radio Chemistry

Gross Alpha	14 +/- 11	pci/g	28 +/- 13	pci/g	35 +/- 14	pci/g
Gross Beta	30 +/- 6	pci/g	32 +/- 6	pci/g	18 +/- 5	pci/g
Uranium 233, 234	0.96 +/- 0.35	pci/g	0.56 +/- 0.22	pci/g	0.77 +/- 0.41	pci/g
Uranium 235	NR		NR		NR	
Uranium 238	1.4 +/- 0.5	pci/g	0.49 +/- 0.28	pci/g	0.62 +/- 0.44	pci/g
Strontium 89, 90	0.0 +/- 0.8	pci/g	0.6 +/- 0.8	pci/g	1.2 +/- 1.3	pci/g
Plutonium 239, 240	0.01 +/- 0.15	pci/g	-0.12 +/- 0.14	pci/g	-0.08 +/- 0.15	pci/g
Americium 241	0.01 +/- 0.07	pci/g	0.07 +/- 0.10	pci/g	-0.01 +/- 0.06	pci/g
Cesium 137	0.4 +/- 0.6	pci/g	0.5 +/- 0.8	pci/g	2.6 +/- 0.9	pci/g
Tritium	0.11 +/- 0.20	pci/ml	0.46 +/- 0.23	pci/ml	0.01 +/- 0.22	pci/ml

881 HILLSIDE BOREHOLE SAMPLES
RADIOCHEMISTRY
DATA SUMMARY REPORT

RFW Batch Number: Client: ROCKWELL (ROCKY FLATS)

Sample Information

RFW Batch ID:	1000-000-031	1000-000-032	1000-000-033
Customer ID:	BH098714BR	BH10870010	BH10871020
Matrix:	Soil	Soil	Soil

Radio Chemistry

Gross Alpha	23 +/- 10	pci/g	20 +/- 10	pci/g	18 +/- 10	pci/g
Gross Beta	28 +/- 6	pci/g	21 +/- 6	pci/g	28 +/- 6	pci/g
Uranium 233, 234	0.71 +/- 0.17	pci/g	0.73 +/- 0.14	pci/g	0.99 +/- 0.34	pci/g
Uranium 235	NR		NR		NR	
Uranium 238	0.72 +/- 0.18	pci/g	0.62 +/- 0.14	pci/g	0.79 +/- 0.32	pci/g
Strontium 89, 90	0.8 +/- 1.2	pci/g	-0.1 +/- 0.7	pci/g	0.0 +/- 0.8	pci/g
Plutonium 239, 240	-0.04 +/- 0.12	pci/g	-0.06 +/- 0.11	pci/g	-0.09 +/- 0.10	pci/g
Americium 241	0.03 +/- 0.09	pci/g	-0.03 +/- 0.11	pci/g	0.01 +/- 0.08	pci/g
Cesium 137	0.1 +/- 0.8	pci/g	0.2 +/- 0.8	pci/g	0.4 +/- 0.7	pci/g
Tritium	0.08 +/- 0.21	pci/ml	0.25 +/- 0.21	pci/ml	0.12 +/- 0.21	pci/ml

RFW Batch Number: Client: ROCKWELL (ROCKY FLATS)

Sample Information

RFW Batch ID:	1000-000-034	1000-000-035	1000-000-036
Customer ID:	BH108720CT	BH108723BR	BH11870010
Matrix:	Soil	Soil	Soil

Radio Chemistry

Gross Alpha	17 +/- 10	pci/g	29 +/- 11	pci/g	22 +/- 10	pci/g
Gross Beta	21 +/- 6	pci/g	33 +/- 6	pci/g	27 +/- 6	pci/g
Uranium 233, 234	0.81 +/- 0.19	pci/g	0.86 +/- 0.19	pci/g	1.2 +/- 0.2	pci/g
Uranium 235	NR		NR		NR	
Uranium 238	0.68 +/- 0.18	pci/g	0.76 +/- 0.19	pci/g	0.78 +/- 0.18	pci/g
Strontium 89, 90	-0.2 +/- 0.6	pci/g	0.1 +/- 0.6	pci/g	0.3 +/- 0.5	pci/g
Plutonium 239, 240	-0.05 +/- 0.11	pci/g	-0.06 +/- 0.11	pci/g	-0.02 +/- 0.11	pci/g
Americium 241	0.04 +/- 0.09	pci/g	0.03 +/- 0.08	pci/g	0.09 +/- 0.10	pci/g
Cesium 137	0.9 +/- 0.9	pci/g	0.1 +/- 0.6	pci/g	0.1 +/- 0.7	pci/g
Tritium	-0.08 +/- 0.20	pci/ml	0.08 +/- 0.21	pci/ml	0.12 +/- 0.21	pci/ml

881 HILLSIDE BOREHOLE SAMPLES
RADIOCHEMISTRY
DATA SUMMARY REPORT

RFW Batch Number: Client: ROCKWELL (ROCKY FLATS)

Sample Information

RFW Batch ID:	1000-000-037	1000-000-038	1000-000-039
Customer ID:	8H118711CT	8H118714WT	8H128702CT
Matrix:	Soil	Soil	Soil

Radio Chemistry

Gross Alpha	18 +/- 10	pci/g	17 +/- 9	pci/g	32 +/- 13	pci/g
Gross Beta	28 +/- 6	pci/g	32 +/- 6	pci/g	27 +/- 6	pci/g
Uranium 233, 234	0.44 +/- 0.11	pci/g	1.2 +/- 0.2	pci/g	0.98 +/- 0.18	pci/g
Uranium 235	NR		NR		NR	
Uranium 238	0.51 +/- 0.14	pci/g	1.0 +/- 0.2	pci/g	0.89 +/- 0.18	pci/g
Strontium 89, 90	0.6 +/- 1.1	pci/g	0.7 +/- 0.8	pci/g	-0.2 +/- 0.7	pci/g
Plutonium 239, 240	-0.02 +/- 0.11	pci/g	-0.08 +/- 0.11	pci/g	0.12 +/- 0.14	pci/g
Americium 241	0.06 +/- 0.11	pci/g	0.06 +/- 0.12	pci/g	0.15 +/- 0.13	pci/g
Cesium 137	-0.2 +/- 0.8	pci/g	-0.1 +/- 0.9	pci/g	0.8 +/- 0.9	pci/g
Tritium	0.12 +/- 0.21	pci/ml	-0.04 +/- 0.20	pci/ml	0.17 +/- 0.22	pci/ml

RFW Batch Number: Client: ROCKWELL (ROCKY FLATS)

Sample Information

RFW Batch ID:	1000-000-040	1000-000-041	1000-000-042
Customer ID:	8H128705BR	8H13870010	8H138711CT
Matrix:	Soil	Soil	Soil

Radio Chemistry

Gross Alpha	31 +/- 13	pci/g	18 +/- 10	pci/g	17 +/- 10	pci/g
Gross Beta	21 +/- 6	pci/g	27 +/- 6	pci/g	17 +/- 6	pci/g
Uranium 233, 234	0.96 +/- 0.18	pci/g	0.58 +/- 0.13	pci/g	0.67 +/- 0.17	pci/g
Uranium 235	NR		NR		NR	
Uranium 238	0.85 +/- 0.18	pci/g	0.60 +/- 0.14	pci/g	0.87 +/- 0.20	pci/g
Strontium 89, 90	0.1 +/- 0.7	pci/g	1.9 +/- 1.5	pci/g	1.2 +/- 1.2	pci/g
Plutonium 239, 240	0.03 +/- 0.13	pci/g	0.04 +/- 0.12	pci/g	0.00 +/- 0.12	pci/g
Americium 241	-0.01 +/- 0.07	pci/g	0.03 +/- 0.08	pci/g	0.03 +/- 0.08	pci/g
Cesium 137	1.7 +/- 0.9	pci/g	0.1 +/- 0.8	pci/g	-0.2 +/- 0.8	pci/g
Tritium	0.14 +/- 0.22	pci/ml	0.00 +/- 0.20	pci/ml	0.08 +/- 0.21	pci/ml

881 HILLSIDE BOREHOLE SAMPLES
RADIOCHEMISTRY
DATA SUMMARY REPORT

RFW Batch Number: Client: ROCKWELL (ROCKY FLATS)

Sample Information

RFW Batch ID:	1000-000-043	1000-000-044	1000-000-046
Customer ID:	8H138714BR	8H148703W1	8H148703W2
Matrix:	Soil	Soil	Soil

Radio Chemistry

Gross Alpha	34 +/- 11	pci/g	28 +/- 13	pci/g	22 +/- 12	pci/g
Gross Beta	26 +/- 6	pci/g	25 +/- 6	pci/g	29 +/- 6	pci/g
Uranium 233, 234	1.4 +/- 0.2	pci/g	0.69 +/- 0.20	pci/g	1.1 +/- 0.2	pci/g
Uranium 235	NR		NR		NR	
Uranium 238	1.2 +/- 0.2	pci/g	0.67 +/- 0.18	pci/g	0.96 +/- 0.21	pci/g
Strontium 89, 90	1.1 +/- 1.3	pci/g	-0.2 +/- 0.7	pci/g	-0.2 +/- 0.7	pci/g
Plutonium 239, 240	-0.04 +/- 0.11	pci/g	-0.03 +/- 0.12	pci/g	-0.09 +/- 0.10	pci/g
Americium 241	0.03 +/- 0.08	pci/g	0.10 +/- 0.11	pci/g	-0.01 +/- 0.08	pci/g
Cesium 137	-0.2 +/- 0.7	pci/g	0.6 +/- 1.0	pci/g	0.1 +/- 0.9	pci/g
Tritium	-0.11 +/- 0.20	pci/ml	-0.07 +/- 0.22	pci/ml	0.01 +/- 0.22	pci/ml

RFW Batch Number: Client: ROCKWELL (ROCKY FLATS)

Sample Information

RFW Batch ID:	1000-000-045	1000-000-047	1000-000-048
Customer ID:	8H148706CT	8H148709BR	8H15870005
Matrix:	Soil	Soil	Soil

Radio Chemistry

Gross Alpha	31 +/- 13	pci/g	30 +/- 13	pci/g	25 +/- 10	pci/g
Gross Beta	30 +/- 6	pci/g	26 +/- 6	pci/g	22 +/- 6	pci/g
Uranium 233, 234	1.2 +/- 0.2	pci/g	0.52 +/- 0.12	pci/g	0.75 +/- 0.17	pci/g
Uranium 235	NR		NR		NR	
Uranium 238	0.80 +/- 0.16	pci/g	0.36 +/- 0.12	pci/g	0.71 +/- 0.16	pci/g
Strontium 89, 90	-0.3 +/- 0.6	pci/g	-0.4 +/- 0.7	pci/g	0.0 +/- 0.6	pci/g
Plutonium 239, 240	0.06 +/- 0.07	pci/g	-0.01 +/- 0.13	pci/g	0.09 +/- 0.13	pci/g
Americium 241	0.02 +/- 0.08	pci/g	0.01 +/- 0.08	pci/g	0.10 +/- 0.12	pci/g
Cesium 137	0.1 +/- 0.9	pci/g	0.4 +/- 1.6	pci/g	0.1 +/- 0.8	pci/g
Tritium	-0.01 +/- 0.22	pci/ml	0.11 +/- 0.22	pci/ml	0.34 +/- 0.21	pci/ml

881 HILSIDE BOREHOLE SAMPLES
INORGANIC
DATA SUMMARY REPORT

Sample Information

RFW Batch ID:	8705-051-014			8705-051-013			8705-057-006		
Customer ID:	BH068726CT			BH0687308R			BH07850510		
Matrix:	Soil			Soil			Soil		
Inorganics									
Chloride									
Cyanide, Total	1.1	U	mg/kg	1.3		mg/kg	1.2	U	mg/kg
Fluoride									
Nitrate-Nitrite-Nitrogen									
Total Organic Carbon									
pH	6.63		phunit	7.52		phunit	8.49		phunit
Sulfate									
Specific Conductance									
Turbidity									
Sulfide	200	U	mg/kg	200	U	mg/kg	198	U	mg/kg
Oil and Grease	1.7	U	mg/kg	1.7	U	mg/kg	1.7	U	mg/kg
Ignitability (Degrees)	230	U	f	230	U	f			
% Solids	84.3		%	83.4		%	82.8		%
Total Dissolved Solids									
HCO3-									
CO3=									
Suspended Solids									
Hexavalent Chromium (Cr+6)									

881 HILSIDE BOREHOLE SAMPLES
INORGANIC
DATA SUMMARY REPORT

Sample Information

RFW Batch ID:	8705-057-008	8705-057-002	8705-057-009
Customer ID:	8H078705CT	8H078708BR	8H07871013
Matrix:	Soil	Soil	Soil

Inorganics

Chloride									
Cyanide, Total	1.2	U	mg/kg	1.3	U	mg/kg	1.3	U	mg/kg
Fluoride									
Nitrate-Nitrite-Nitrogen									
Total Organic Carbon									
pH	8.23		phunit	8.35		phunit	8.84		phunit
Sulfate									
Specific Conductance									
Turbidity									
Sulfide	196	U	mg/kg	187	U	mg/kg	192	U	mg/kg
Oil and Grease	1.7	U	mg/kg	1.7	U	mg/kg	1.7	U	mg/kg
Ignitability (Degrees)									
% Solids	83.5		%	83.3		%	84.8		%
Total Dissolved Solids									
HCO3-									
CO3=									
Suspended Solids									
Hexavalent Chromium (Cr+6)									

881 HILSIDE BOREHOLE SAMPLES
INORGANIC
DATA SUMMARY REPORT

RFW Batch Number: Client: ROCKWELL (ROCKY FLATS)

Sample Information

RFW Batch ID:	8705-057-004	8706-014-004	8706-014-008
Customer ID:	8H078710WS	8H08870007	8H088707CT
Matrix:	Soil	Soil	Soil

Inorganics

Chloride									
Cyanide, Total	1.1	U	mg/kg	1.2	U	mg/kg	1.2	U	mg/kg
Fluoride									
Nitrate-Nitrite-Nitrogen									
Total Organic Carbon									
pH	8.30		phunit	8.10		phunit	9.10		phunit
Sulfate									
Specific Conductance									
Turbidity									
Sulfide	200	U	mg/kg	200	U	mg/kg	200	U	mg/kg
Oil and Grease	1.7	U	mg/kg	1.7	U	mg/kg	1.7	U	mg/kg
Ignitability (Degrees)				>230		f	>230		f
% Solids	83.5		%	87.1		%	84.7		%
Total Dissolved Solids									
HCO3-									
CO3=									
Suspended Solids									
Hexavalent Chromium (Cr+6)									

881 HILSIDE BOREHOLE SAMPLES
INORGANIC
DATA SUMMARY REPORT

Sample Information

RFW Batch ID:	3122-471-009	8706-002-002	8706-005-006
Customer ID:	8H098711CT	8H0987148R	8H10870010
Matrix:	Soil	Soil	Soil

Inorganics

Chloride	NR								
Cyanide, Total	2.5	U	mg/kg	1.3	U	mg/kg	1.2	U	mg/kg
Fluoride	NR								
Nitrate-Nitrite-Nitrogen	NR								
Total Organic Carbon	NR								
pH	8.1		phunit	6.55		phunit	8.39		phunit
Sulfate	NR								
Specific Conductance	NR								
Turbidity	NR								
Sulfide	NEG		mg/kg	213	U	mg/kg	187	U	mg/kg
Oil and Grease	263		mg/kg	1.7	U	mg/kg	1.7	U	mg/kg
Ignitability (Degrees)	NR			>230		f	>230		f
% Solids	NR			85.2		%	87.7		%
Total Dissolved Solids									
HCO3-									
CO3=									
Suspended Solids									
Hexavalent Chromium (Cr+6)									

881 HILSIDE BOREHOLE SAMPLES
INORGANIC
DATA SUMMARY REPORT

Sample Information

RFW Batch ID:	8706-005-004	8706-005-008	8706-005-002
Customer ID:	BH10871020	BH108720CT	BH108723BR
Matrix:	Soil	Soil	Soil

Inorganics

Chloride									
Cyanide, Total	1.2	U	mg/kg	1.2	U	mg/kg	1.2	U	mg/kg
Fluoride									
Nitrate-Nitrite-Nitrogen									
Total Organic Carbon									
pH	8.46		phunit	7.72		phunit	8.3		phunit
Sulfate									
Specific Conductance									
Turbidity									
Sulfide	194	U	mg/kg	189	U	mg/kg	190	U	mg/kg
Oil and Grease	1.7	U	mg/kg	1.7	U	mg/kg	1.7	U	mg/kg
Ignitability (Degrees)	>230		f	>230		f	>230		f
% Solids	80.4		%	83.2		%	84.5		%
Total Dissolved Solids									
HCO3-									
CO3=									
Suspended Solids									
Hexavalent Chromium (Cr+6)									

881 HILSIDE BOREHOLE SAMPLES
INORGANIC
DATA SUMMARY REPORT

Sample Information

RFW Batch ID:	8706-010-006	8706-010-002	8706-010-004
Customer ID:	BH11870010	BH118711CT	BH118714WT
Matrix:	Soil	Soil	Soil

Inorganics

Chloride									
Cyanide, Total	1.1	U	mg/kg	1.2	U	mg/kg	1.3	U	mg/kg
Fluoride									
Nitrate-Nitrite-Nitrogen									
Total Organic Carbon									
pH	8.65		phunit	5.65		phunit	8.16		phunit
Sulfate									
Specific Conductance									
Turbidity									
Sulfide	202	U	mg/kg	204	U	mg/kg	190	U	mg/kg
Oil and Grease	1.7	U	mg/kg	1.7	U	mg/kg	1.7	U	mg/kg
Ignitability (Degrees)	>230		f	>230		f	>230		f
% Solids	86.1		%	82.6		%	86.1		%
Total Dissolved Solids									
HCO3-									
CO3=									
Suspended Solids									
Hexavalent Chromium (Cr+6)									

881 HILSIDE BOREHOLE SAMPLES
INORGANIC
DATA SUMMARY REPORT

RFW Batch Number: Client: ROCKWELL (ROCKY FLATS)

Sample Information

RFW Batch ID:	8705-059-002	8705-059-004	8706-004-002
Customer ID:	8H128702CT	8H128705BR	8H13870010
Matrix:	Soil	Soil	Soil

Inorganics

Chloride								
Cyanide, Total	2.0	U	mg/kg	1.1	U	mg/kg	1.3	mg/kg
Fluoride								
Nitrate-Nitrite-Nitrogen								
Total Organic Carbon								
pH	7.08		phunit	8.68		phunit	8.65	phunit
Sulfate								
Specific Conductance								
Turbidity								
Sulfide	187	U	mg/kg	194	U	mg/kg	192	U mg/kg
Oil and Grease	1.7	U	mg/kg	1.7	U	mg/kg	1.7	U mg/kg
Ignitability (Degrees)							>230	f
% Solids	86.6		%	86.0		%	81.1	%
Total Dissolved Solids								
HCO3-								
CO3=								
Suspended Solids								
Hexavalent Chromium (Cr+6)								

881 HILSIDE BOREHOLE SAMPLES
INORGANIC
DATA SUMMARY REPORT

Sample Information

RFW Batch ID:	3122-471-004	8706-004-004	3122-471-007
Customer ID:	BH138711CT	BH138714BR	BH148703WI
Matrix:	Soil	Soil	Soil

Inorganics

Chloride	NR						NR		
Cyanide, Total	2.5	U	mg/kg	1.1	U	mg/kg	2.5	U	mg/kg
Fluoride	NR						NR		
Nitrate-Nitrite-Nitrogen	NR						NR		
Total Organic Carbon	NR						NR		
pH	8.6		phunit	8.01		phunit	8.1		phunit
Sulfate	NR						NR		
Specific Conductance	NR						NR		
Turbidity	NR						NR		
Sulfide	NEG		mg/kg	200	U	mg/kg	NEG		mg/kg
Oil and Grease	316		mg/kg	1.7	U	mg/kg	265		mg/kg
Ignitability (Degrees)	NR			>230		f	NR		
% Solids	NR			85.8		%	NR		
Total Dissolved Solids									
HCO3-									
CO3=									
Suspended Solids									
Hexavalent Chromium (Cr+6)									

881 HILLSIDE BOREHOLES
METALS
INORGANICS DATA SUMMARY REPORT

RFW Batch Number: Client: ROCKWELL (ROCKY FLATS)

Sample Information

RFW Batch ID:	8705-051-011	8705-051-013	8705-051-012	8705-057-0060
Customer ID:	BH06871020	BH068726CT	BH068730BR	BH07870510
Matrix:	Soil	Soil	Soil	Soil
Units:	MG/KG	MG/KG	MG/KG	MG/KG

Metals

Silver (Ag), total.....	1.5 U	1.6 U	1.6 U	2.00 U
Aluminum (Al), total.....	15200	15300	6720	8750
Arsenic (As), total.....	8.6	12	5.8	9.1
Barium (Ba), total.....	165	59	56	124
Beryllium (Be), total.....	0.9	0.8	0.6	0.6 J
Calcium (Ca), total.....	8270	3000	4440	4920
Cadmium (Cd), total.....	4.8	3.5	3.4	1.00 U
Cobalt (Co), total.....	12	9.8	11	10.00 U
Chromium (Cr), total.....	20	12	9.0	8.5
Cesium (Cs), total.....				NR
Copper (Cu), total.....	20	5.8	23	14
Iron (Fe), total.....	20000	13800	20600	6720
Mercury (Hg), total.....	2.07	0.10 U	0.33	0.1 U
Potassium (K), total.....	2170	1300	643	765 J
Lithium (Li), total.....	39 U	40 U	42 U	
Magnesuim (Mg), total.....	5290	2880	2080	2020
Manganese (Mn), total.....	563	128	163	291
Molybdenum(Mo), total.....				NR
Sodium (Na), total.....	900	666	918	556 J
Nickel (Ni), total.....	18	15	24	8.00 U
Lead (Pb), total.....	6.7	6.6	10	14
Antimony (Sb), total.....	9.4 U	9.4 U	9.8 U	12.00 U
Selenium (Se), total.....	0.9 U	0.9 U	1.0 U	1.00 U
Strontium (Sr), total.....	49	28	59	56
Thallium (Tl), total.....	0.9 U	0.9 U	1.0 U	2.00 U
Vanadium (V), total.....	38	25	25	15
Zinc (Zn), total.....	49	27	93	36

881 HILLSIDE BOREHOLES
METALS
INORGANICS DATA SUMMARY REPORT

Sample Information

RFW Batch ID:	8705-057-0080		8705-057-0020		8705-057-0090		8705-057-0040	
Customer ID:	BH078705CT		BH078708BR		BH07871013		BH078710WS	
Matrix:	Soil		Soil		Soil		Soil	
Units:	MG/KG		MG/KG		MG/KG		MG/KG	
Metals								
Silver (Ag), total	2.00	U	2.00	U	2.00	U	2.00	U
Aluminum (Al), total	13800		9280		6360		8650	
Arsenic (As), total	7.9		9.1		6.1		4.3	
Barium (Ba), total	69		56		70		73	
Beryllium (Be), total	0.9	J	0.5	J	0.9	J	0.5	J
Calcium (Ca), total	2280		4600		3990		5000	
Cadmium (Cd), total	1.00	U	1.9		1.00	U	1.00	U
Cobalt (Co), total	10.00	U	10.00	U	10.00	U	10.00	U
Chromium (Cr), total	16		8.2		4.6		6.2	
Cesium (Cs), total	NR		NR		NR		NR	
Copper (Cu), total	6.8		9.2		12		16	
Iron (Fe), total	14800		8560		2460		3560	
Mercury (Hg), total	0.1	U	0.09	U	0.09	U	0.1	U
Potassium (K), total	605	J	873	J	402	J	692	J
Lithium (Li), total								
Magnesuim (Mg), total	1810		2330		1160		1840	
Manganese (Mn), total	372		219		250		142	
Molybdenum(Mo), total	NR		NR		NR		NR	
Sodium (Na), total	574	J	579	J	367	J	456	J
Nickel (Ni), total	8.00	U	4.5	J	8.00	U	8.00	U
Lead (Pb), total	3.4		16		8.0		7.7	
Antimony (Sb), total	12.00	U	12.00	U	12.00	U	12.00	U
Selenium (Se), total	1.00	U	1.00	U	1.00	U	1.00	U
Strontium (Sr), total	21		42		51		70	
Thallium (Tl), total	2.00	U	2.00	U	2.00	U	2.00	U
Vanadium (V), total	22		13		11		10	
Zinc (Zn), total	8.4		59		12		23	

881 HILLSIDE BOREHOLES
METALS
INORGANICS DATA SUMMARY REPORT

RFW Batch Number: Client: ROCKWELL (ROCKY FLATS)

Sample Information

RFW Batch ID:	8706-002-0040	3122-471-009	8706-002-0020	8706-005-0060
Customer ID:	BH098706WT	BH098711CT	BH0987148R	BH10870010
Matrix:	Soil	Soil	Soil	Soil
Units:	MG/KG	MG/KG	MG/KG	MG/KG

Metals

Silver	(Ag), total.....	2.00	U	0.4	U	2.00	U	2.00	U
Aluminum	(Al), total.....	18600		6880		8860		11900	
Arsenic	(As), total.....	15		2.2		11		11	
Barium	(Ba), total.....	128		213.0		66		97	
Beryllium	(Be), total.....	0.9	J	1.00		0.7	J	0.6	J
Calcium	(Ca), total.....	3980		5180		4280		70800	
Cadmium	(Cd), total.....	1.00	U	1.0	U	1.00	U	1.7	
Cobalt	(Co), total.....	10.00	U	4.0	U	3.8	J	10.00	U
Chromium	(Cr), total.....	16		3.20		9.0		10	
Cesium	(Cs), total.....	NR				NR		NR	
Copper	(Cu), total.....	7.7		23.2		13		7.4	
Iron	(Fe), total.....	17500		2220		8370		11200	
Mercury	(Hg), total.....	0.1	U	0.1	U	0.13		0.22	
Potassium	(K), total.....	1520		796		900	J	1510	
Lithium	(Li), total.....			10.0	U				
Magnesuim	(Mg), total.....	2440		1550		2020		2660	
Manganese	(Mn), total.....	169		12.0		105		160	
Molybdenum	(Mo), total.....	NR		NR		NR		NR	
Sodium	(Na), total.....	709	J	484.0		405	J	466	J
Nickel	(Ni), total.....	8.00	U	4.0	U	8.00	U	3.5	J
Lead	(Pb), total.....	7.9		17.6		14		11	
Antimony	(Sb), total.....	12.00	U	4.0	U	12.00	U	12.00	U
Selenium	(Se), total.....	1.00	U	1	U	1.00	U	1.00	U
Strontium	(Sr), total.....	34		60.0		70		86	
Thallium	(Tl), total.....	2.00	U	2	U	2.00	U	2.00	U
Vanadium	(V), total.....	35		5.00		17		26	
Zinc	(Zn), total.....	38		27.0		62		30	

881 HILLSIDE BOREHOLES
METALS
INORGANICS DATA SUMMARY REPORT

Sample Information

RFW Batch ID:	8706-005-0040	8706-005-0080	8706-005-0020	8706-010-0060
Customer ID:	8H10871020	8H108720CT	8H1087238R	8H11870010
Matrix:	Soil	Soil	Soil	Soil
Units:	MG/KG	MG/KG	MG/KG	MG/KG

Metals

Silver (Ag), total.....	2.00 U	2.00 U	2.00 U	2.00 U
Aluminum (Al), total.....	14400	9050	8310	9900
Arsenic (As), total.....	19	9.4	9.4	8.2
Barium (Ba), total.....	192	120	186	77
Beryllium (Be), total.....	1.0	0.7 J	0.8 J	0.7 J
Calcium (Ca), total.....	21600	26200	7710	5790
Cadmium (Cd), total.....	3.0	2.9	3.1	1.9
Cobalt (Co), total.....	9.4 J	5.6 J	12	6.6 J
Chromium (Cr), total.....	14	9.7	10	10
Cesium (Cs), total.....	NR	NR	NR	NR
Copper (Cu), total.....	13	12	17	9.3
Iron (Fe), total.....	12800	16100	23700	11200
Mercury (Hg), total.....	0.08	0.16	0.19	0.09 U
Potassium (K), total.....	917 J	813 J	1060	1270
Lithium (Li), total.....				
Magnesuim (Mg), total.....	3350	2630	2470	2090
Manganese (Mn), total.....	124	113	536	135
Molybdenum(Mo), total.....	NR	NR	NR	NR
Sodium (Na), total.....	603 J	760 J	1130	534 J
Nickel (Ni), total.....	21	18	25	7.4 J
Lead (Pb), total.....	10	10	10	24
Antimony (Sb), total.....	12.00 U	12.00 U	12.00 U	12.00 U
Selenium (Se), total.....	1.00 U	1.00 U	1.00 U	1.00 U
Strontium (Sr), total.....	82	78	73	34
Thallium (Tl), total.....	2.00 U	2.00 U	2.00 U	2.00 U
Vanadium (V), total.....	38	28	30	28
Zinc (Zn), total.....	52	51	100	38

881 HILLSIDE BOREHOLES
METALS
INORGANICS DATA SUMMARY REPORT

Sample Information

RFW Batch ID:	8706-010-0020	8706-010-0040	8705-059-0020	8705-059-0040
Customer ID:	8H118711CT	8H118714WT	8H128702CT	8H1287058R
Matrix:	Soil	Soil	Soil	Soil
Units:	MG/KG	MG/KG	MG/KG	MG/KG

Metals

Silver (Ag), total.....	2.00 U	2.00 U	2.00 U	2.00 U
Aluminum (Al), total.....	15000	9750	17400	9230
Arsenic (As), total.....	13	9.4	14	3.9
Barium (Ba), total.....	127	76	134	258
Beryllium (Be), total.....	0.8 J	1.9	1.00	0.6 J
Calcium (Ca), total.....	2770	6920	24800	3880
Cadmium (Cd), total.....	3.4	6.6	1.00 U	1.00 U
Cobalt (Co), total.....	6.2 J	36	10.00 U	10.00 U
Chromium (Cr), total.....	16	12	14	8.2
Cesium (Cs), total.....	NR	NR	NR	NR
Copper (Cu), total.....	9.1	9.9	12	17
Iron (Fe), total.....	15400	67200	13000	13600
Mercury (Hg), total.....	0.12	0.18	0.09 U	1.63
Potassium (K), total.....	1760	944 J	1110	708 J
Lithium (Li), total.....				
Magnesuim (Mg), total.....	2460	2600	2730	1560
Manganese (Mn), total.....	318	522	149	113
Molybdenum(Mo), total.....	NR	NR	NR	NR
Sodium (Na), total.....	617 J	2230	357 J	487 J
Nickel (Ni), total.....	11	71	8.00 U	8.00 U
Lead (Pb), total.....	9.4	12	17	14
Antimony (Sb), total.....	12.00 U	12.00 U	12.00 U	12.00 U
Selenium (Se), total.....	1.1 U	1.00 U	1.00 U	1.00 U
Strontium (Sr), total.....	34	72	63	50
Thallium (Tl), total.....	2.00 U	2.00 U	2.00 U	2.00 U
Vanadium (V), total.....	38	41	34	20
Zinc (Zn), total.....	39	159	32	39

881 HILLSIDE BOREHOLES
METALS
INORGANICS DATA SUMMARY REPORT

Sample Information

RFW Batch ID:	8706-004-0020	3122-471-004	8706-004-0040	3122-471-007
Customer ID:	8H13870010	8H138711CT	8H138714BR	8H148703W1
Matrix:	Soil	Soil	Soil	Soil
Units:	MG/KG	MG/KG	MG/KG	MG/KG

Metals

Silver (Ag), total.....	2.00 U	0.4 U	2.00 U	0.4 U
Aluminum (Al), total.....	10900 U	13400	7850	21000
Arsenic (As), total.....	12	7.79	6.5	6.61
Barium (Ba), total.....	124	811.0	231	294.0
Beryllium (Be), total.....	0.7 J	1.00 U	0.5 J	1.20
Calcium (Ca), total.....	56400	104000.0	4540	7870
Cadmium (Cd), total.....	2.7	1.0 U	4.1	6.40
Cobalt (Co), total.....	8.3 J	4.0 U	5.7 J	10.6
Chromium (Cr), total.....	7.4	15.6	9.8	27.8
Cesium (Cs), total.....	NR		NR	
Copper (Cu), total.....	5.6	12.2	8.9	19.6
Iron (Fe), total.....	10200	12300	33600	23100
Mercury (Hg), total.....	0.18	0.1 U	0.1 U	0.1 U
Potassium (K), total.....	459 J	1052	784 J	2174
Lithium (Li), total.....		10.8		18.4
Magnesuim (Mg), total.....	3680	5000	2170	6090
Manganese (Mn), total.....	116	159.0	533	459.0
Molybdenum(Mo), total.....	NR	NR	NR	NR
Sodium (Na), total.....	547 J	598.0	1100	308.0
Nickel (Ni), total.....	12	14.4	12	24.8
Lead (Pb), total.....	9.5	17.1	11	17.6
Antimony (Sb), total.....	12.00 U	4.0 U	12.00 U	4.0 U
Selenium (Se), total.....	1.00 U	1 U	1.00 U	1 U
Strontium (Sr), total.....	135	178.0	138	52.2
Thallium (Tl), total.....	2.00 U	2 U	2.00 U	2 U
Vanadium (V), total.....	25	41.6	21	42.0
Zinc (Zn), total.....	34	60.2	43	63.2

07/29/88
1801-03
BPD

SOURCE DILUTION CALCULATION

SOURCES:

1969 FIRE @ BLDG 776.

320 TONS OF 7 dpm/g

$$\text{MASS} = \frac{7\ \text{dpm}}{g} \times 320\ \text{tons} \times \frac{1000\ \#}{\text{tons}} \times \frac{ft^3}{100\ \#} \times \frac{yd}{27\ ft^3}$$

$$= 830\ \text{dpm-yd/g}$$

774 WASTE STORAGE TANK.

$$\text{MASS} = \frac{250\ \text{dpm}}{g} \times 60\ \text{yds}$$

$$= 15{,}000\ \text{dpm-yd/g}.$$

$$\text{SUM} = 15{,}830\ \text{dpm-yd/g}$$

DILUTED CONCENTRATION.

TOTAL FILL VOLUME = 15,000 yd.

$$\text{CONCENTRATION} = \frac{15{,}830\ \text{dpm-yd}}{g} \times \frac{1}{15{,}000\ \text{yd}}$$

$$= 1\ \text{dpm/g}.$$

$$1\ \text{dpm/g} = 4.5 \times 10^{-1}\ \text{pCi/g}$$

$$= 0.45\ \text{pCi/g}$$

→ VALUES FOUND @ SUMU 130 ARE AT LEAST AN ORDER OF MAGNITUDE <u>LOWER</u>.

07/29/83
1801-03
BPD.

DIXON'S TEST ON pH

pH VALUES
5.65
7.72
8.01
8.16
8.23
8.30
8.30
8.35
8.39
8.46
8.49
8.6
8.65
8.65
8.84

$n = 15$

$$\frac{7.72 - 5.65}{8.84 - 5.65} = 0.65 = r; \quad n = 15$$

if $r > 0.52$ @ 5% level, or
$r > 0.62$ @ 1% level

then reject.

∴ REJECT 5.65.

$$\frac{8.01 - 7.72}{8.84 - 7.72} = 0.26 = r; \quad n = 14$$

if $r > 0.55$ @ 5% level, or
$r > 0.64$ @ 1% level

Then reject

∴ do <u>not</u> reject 7.72.