



**ROCKWELL INTERNATIONAL**  
NORTH AMERICAN SPACE OPERATIONS  
ROCKY FLATS PLANT

# Remedial Investigation Report For 903 Pad, Mound, and East Trenches Areas

## Volume VIII

*U.S. DEPARTMENT OF ENERGY*

*Rocky Flats Plant  
Golden Colorado*

*31 December 1987*

**DRAFT**

JW/UMH

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D 4-1-91 \_\_\_\_\_

UNITED STATES DEPARTMENT OF ENERGY  
ADMINISTRATION CONTRACT DE AC04 76DPO 2533

ADMIN RECORD

INDEX OF DATA

Boring No 29-87

Completed as well? Yes

Data in File

- Log of Borehole
- Well Construction Summaries
- Well Development Summaries
- Hydraulic Conductivity Test Data  
and Results
- Packer Test Data and Results
- Water Level Data

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No 29-87  
 Coordinates N 35094 87 E 24249 82 Ground Surface Elevation 5812 42  
 Total Depth 25 6' Water Level Encountered 17 0  
 Static 5800 08' (12/01/87)

Drilling Company Boyles Bros Driller T High  
 Date Drilled September 29-30 1987 Helper B Keeney  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By J L Bannon Checked By J J Pasick  
 Geologist Site Manager  
Brent Jones  
 CAMP Manager

Comments \_\_\_\_\_

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<b>TOPSOIL</b>	HNu Background=02 OVA Background=10 No Ludlum readings taken  No readings over background on core
			<b>0.0 2.0 SAMPLE.</b> Recovered 19/20 = 95% 00 01 TOPSOIL dry clay with rocks	
			<b>COLLUVIUM</b>	
5			<b>01 19 CLAYEY SAND AND GRAVEL</b> moderate yellowish brown (10 YR 5/4) moderately sorted fine grained clayey sand with subangular to round quartz pebbles and caliche consolidated strong HCl reaction especially at bottom damp	
			<b>2.0 4.0 SAMPLE.</b> Recovered 20/20 = 100% SAND moderate yellowish brown (10 YR 5/4) well sorted fine grained clayey caliche sand with rare subrounded peb- bles consolidated very strong HCl reac- tion damp	
10			<b>4.0 7.0 SAMPLE.</b> No recovery  NOTE Recovered 665 over following 40 Recored clay cuttings	
15			<b>4.65 8.4 SAMPLE.</b> Recovered 375/375 = 100% CLAY light olive gray (5 Y 6/1) with dark yellowish orange (10 YR 6/6) oxida- tion highly mottled clay caliche stained slightly sandy near bottom well consoli- dated very strong HCl reaction damp	
20				

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 Logged By J L Bannon Checked By J L Bannon  
 Geologist Site Manager  
 CEARP Manager

Comments \_\_\_\_\_

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20			<u>8.4 11.3 SAMPLE.</u> Recovered 29/29 = 100% CLAY light olive gray (5 Y 6/1) highly mottled dark yellowish orange (10 YR 6/6) clay caliche stained with sub rounded to rounded quartzite pebbles consolidated damp	
25			<u>11.3 14.3 SAMPLE.</u> Recovered 37/30 = 123% CLAY same as above with less oxidation and more caliche still contains few sub rounded to rounded quartzite and quartz pebbles consolidated very strong HCl reaction damp	
30			<u>14.3 17.3 SAMPLE.</u> Recovered 49/30 = 163% 143 172 CLAY same as above 172 173 CLAYEY SAND moderate yellowish brown (10 YR 5/4) dense well sorted very fine grained clayey sand with pebbles and one large subrounded quartzite cobble in shoe no visible caliche consolidated strong HCl reaction above grades to weak down core wet at 170	
—			<u>17.3 19.8 SAMPLE.</u> Recovered 07/25 = 28% SAND moderate yellowish brown (10 YR 5/4) poorly sorted fine to medium grained clayey sand with abundant sub rounded to rounded quartz and quartzite pebbles unconsolidated flowing	

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 Logged By J L Bannon Checked By J Pasche  
 Geologist Site Manager  
 CEARP Manager

Comments \_\_\_\_\_

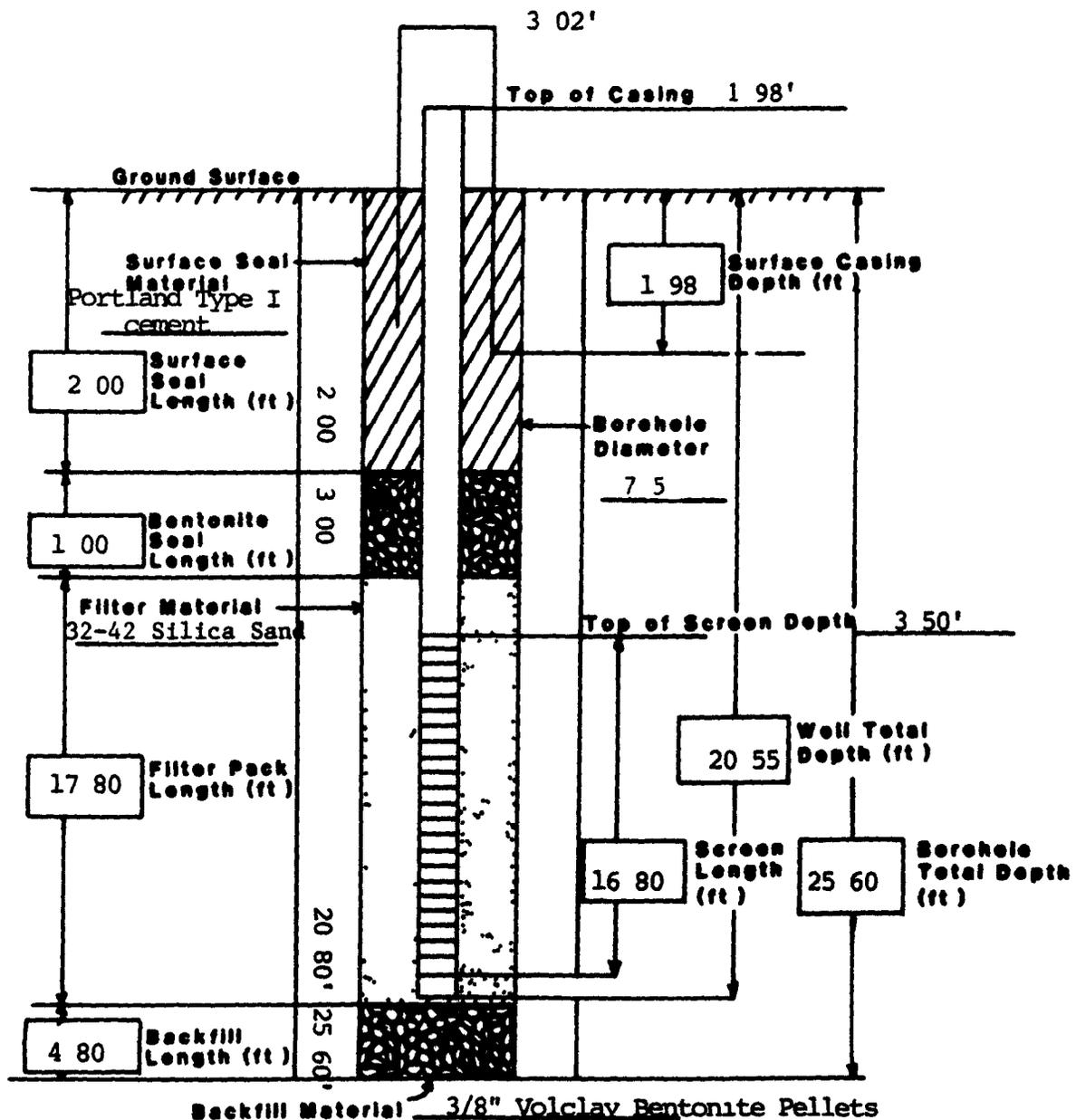
Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			<p><u>19.8 22.3 SAMPLE.</u>            Recovered 5 0/25 = 200%            Top 25 slough SANDY CLAY as above            flowing sandy clay with few quartzite            pebbles wet consolidated very weak HCl            reaction</p> <p style="text-align: center;"><b><u>ARAPAHOE FORMATION</u></b></p> <p>198 223 CLAYSTONE light olive gray            (5 Y 5/2) no pebbles consolidated minor            oxidation damp</p> <p><u>22.3 24.3 SAMPLE.</u>            Recovered 5 1/20 = 255%            CLAYSTONE light olive gray (5 Y 5/2)            with abundant dark yellowish orange (10            YR 6/6) mottling contains small black            organic fragments no pebbles damp con            solidated</p> <p>TOTAL DEPTH WITH PLOPPER 240            READJUST DEPTH</p> <p><u>24.0 25.5 SAMPLE.</u>            Recovered 5 1/15 = 340%            CLAYSTONE light olive gray (5 Y 5/2)            grading to dark yellowish orange (10 YR            6/6) sandy clay upper clay probably            slough</p> <p>TOTAL DEPTH WITH PLOPPER 2560            READJUST DEPTH</p> <p>TOTAL DEPTH 2560</p>	

# WELL COMPLETION INFORMATION

Location Rocky Flats Plant, East Trenches Area Well No 29-87  
 Coordinates N 35094.87 E 24249.82 Elevation Ground Surface 5812.42'  
 Total Depth Well 20.55' Top of Casing 5814.40'  
 Borehole 25.60'

Formation of Completion Rocky Flats Alluvium  
 Casing Material Sch 5, type 316 TFJ stainless steel Casing Diameter 2" ID  
 Screen Material 0.010' wire wrap, type 316 TFJ stainless steel Surface Casing Diameter 5" ID  
 Date Installed Sept 30, 1987 Approved By J L Bannon  
 Installed By J L Bannon Geologist Brent Lewis  
 Site Manager  
 CAMP Manager

Comments \_\_\_\_\_



12 11/87

Water Level Data  
for  
Rockwell (Rocky Flats)

<u>Date Measured</u>	<u>Depth to Water from TOC</u>	<u>Elevation TOC (ft)</u>	<u>Water Level Elev (ft)</u>
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\*\* Well Number 2987

12 01/87

14 32

5814 40

5800 08

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Completed as well? Yes

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LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No 30-87BR  
 Coordinates N 35095 15 E 24312 43 Ground Surface Elevation 5811 87  
 Total Depth 110.20' Water Level Encountered 10.5'

Static

Drilling Company Boyles Bros Driller S Bradfield, P Bushkovski  
 Date Drilled Sept 29 - Oct 1, 1987, Oct 5-6 1987 Helper P Mesa, K Parker  
 Drilling Method Hollow Stem Auger, Rotary Core Drilling Fluid 0-45 0' None  
45 0' - 110 2' Water  
 Logged By R T Treat, L A Gregory-Frost Checked By Brent Lewis  
Geologist Site Manager  
 CEARP Manager

Comments Surface casing set to 45 0' by R Treat October 1, 1987

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<b>COLLUVIUM</b>	
			<p><b>0.0 2.0 SAMPLE.</b>            Recovered 17/20 = 85%            00 16 CLAY AND GRAVEL grayish brown (5 YR 3/2) to dusky brown (5 YR 2/2) sandy poorly sorted subrounded gravels moderately cemented slightly moist</p>	HNu Background=03 OVA Background=00 No alpha readings taken No readings over background on the core
5		<p>16 20 SAND AND GRAVEL moderate brown (5 YR 4/4) fine to medium grained sands subrounded to rounded gravel poorly sorted weakly cemented slightly moist</p>		
10		<p><b>2.0 4.0 SAMPLE.</b>            Recovered 08/20 = 40%            20 38 SAND AND GRAVEL same as above slightly moist            38 40 CLAY dusky brown (5 YR 2/2) fine grained sand scattered gravel moderately cemented moist</p>		
15			<p><b>4.0 6.0 SAMPLE.</b>            Recovered 075/20 = 38%            SANDY CLAY considerable mica particles with fine grained sand moderately cemented calcareous streaks small scattered gravels moist</p>	
20				

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 Geologist Site Manager *ADP*  
 \_\_\_\_\_  
 CEARP Manager

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20			<u>6.0 8.0 SAMPLE.</u> Recovered 20/20 = 100% SANDY CLAY moderate brown (5 YR 4/4) to moderate yellowish brown (10 YR 5/4) sandy to sand lenses scattered gravels poorly sorted moderately cemented subrounded to subangular granular deposits moist	
25			<u>8.0 10.0 SAMPLE.</u> Recovered 20/20 = 100% 80 98 SANDY CLAY pale yellowish brown (10 YR 6/2) to moderate yellowish brown (10 YR 5/4) very fine grained sand to lenses of sand subangular and angular scattered gravels moderately cemented moderately calcareous moist	
30			98 100 SILTY SAND light brown (5 YR 6/4 to 5 YR 5/6) fine grained calcareous sand poorly sorted weakly cemented moist	
35			<u>10.0-12.0 SAMPLE.</u> Recovered 18/20 = 90% SILTY SAND same as above with scattered gravels moist to wet at 10 50	
40				

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45 0' - 110 2' Water  
 Logged By R T Treat, L A Gregory-Frost Checked By \_\_\_\_\_  
 Geologist Site Manager *[Signature]*

CEARP Manager

Comments Surface casing set to 45 0' by R Treat October 1, 1987

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
40			<p><u>12.0 14.0 SAMPLE.</u>            Recovered 17/20 = 85%</p> <p>120 123 SILTY SAND same as above            moist to wet</p> <p>123 131 CLAY dark yellowish brown            (10 YR 4/2) slightly calcareous fine            grained sand moderately cemented moist</p> <p>131 140 SAND AND GRAVEL grayish            orange (10 YR 7/4) clayey scattered            gravels weakly cemented poorly sorted            moist to wet</p>	
45			<p><u>14.0 16.0 SAMPLE.</u> No recovery            SAND AND GRAVEL same as above</p> <p style="text-align: center;"><b><u>ARAPAHOE FORMATION</u></b></p>	
50			<p><u>16.0 17.0 SAMPLE.</u>            Recovered 08/10 = 80%</p> <p>162' CLAYSTONE medium light gray (N            6/0) to grayish brown (5 YR 3/2) blocky            trace very fine grained sand massive            weathered moist</p>	
55			<p><u>17.0 18.0 SAMPLE.</u>            Recovered 10/10 = 100%</p> <p>CLAYSTONE same as above moist</p>	
			<p><u>18.0-19.0 SAMPLE.</u>            Recovered 10/10 = 100%</p> <p>CLAYSTONE same as above with Fe            staining moist</p>	
60			<p><u>19.0 20.0 SAMPLE.</u>            Recovered 04/10 = 40%</p> <p>CLAYSTONE same as above moist</p>	

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 Geologist Site Manager *[Signature]*  
 CEARP Manager \_\_\_\_\_

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Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
60			<p><u>20.0 21.0 SAMPLE.</u>            Recovered 10/10 = 100%            CLAYSTONE medium gray (N 5/0) massive blocky slightly Fe stained weathered moist</p>	
65			<p><u>21.0 22.0 SAMPLE.</u>            Recovered 10/10 = 100%            CLAYSTONE medium gray (N 5/0) trace fine grained sands more Fe staining massive blocky weathered slightly moist</p>	
			<p><u>22.0 23.0 SAMPLE.</u>            Recovered 10/10 = 100%            CLAYSTONE same as above moist</p>	
70			<p><u>23.0 24.0 SAMPLE.</u>            Recovered 10/10 = 100%            CLAYSTONE light olive gray (5 Y 5/2) trace poorly sorted fine grained sands moderately Fe stained massive blocky weathered moist</p>	
75			<p><u>24.0 25.0 SAMPLE.</u>            Recovered 10/10 = 100%            CLAYSTONE dark yellowish orange (10 YR 6/6) to pale yellowish brown (10 YR 6/2) severely FeO stained massive blocky poorly sorted fine grained sands at bottom weathered moist</p>	
80			<p><u>25.0 26.0 SAMPLE.</u>            Recovered 10/10 = 100%            CLAYSTONE same as above moist</p>	

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 Geologist Site Manager *[Signature]*

CEARP Manager

Comments Surface casing set to 45 0' by R Treat October 1, 1987

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
80			<p><u>26.0 27.0 SAMPLE.</u>            Recovered 10/10 = 100%            CLAYSTONE same as above but more fine grained sand moist</p>	
85			<p><u>27.0 28.0 SAMPLE.</u>            Recovered 10/10 = 100%            CLAYSTONE light gray (N 7/0) massive blocky slightly Fe stained weathered moist</p>	
			<p><u>28.0 29.0 SAMPLE.</u>            Recovered 10/10 = 100%            CLAYSTONE same as above moist</p>	
90			<p><u>29.0 30.0 SAMPLE.</u>            Recovered 10/10 = 100%            CLAYSTONE same as above moist</p>	
			<p><u>30.0 31.0 SAMPLE.</u>            Recovered 10/10 = 100%            CLAYSTONE medium gray (N 5/0) to medium dark gray (N 4/0) severely FeO stained massive blocky weathered moist</p>	
95			<p><u>31.0 32.0 SAMPLE.</u>            Recovered 10/10 = 100%            CLAYSTONE same as above with less FeO staining moist</p>	
			<p><u>32.0 33.0 SAMPLE.</u>            Recovered 10/10 = 100%            CLAYSTONE same as above moist</p>	
100				

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 Geologist Site Manager

**CEARP Manager**

Comments Surface casing set to 45 0' by R Treat October 1, 1987.

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
100			<u>33.0 34.0 SAMPLE.</u> Recovered 10/10 = 100% CLAYSTONE same as above with some fine grained sands moist	
105			<u>34.0 35.0 SAMPLE.</u> Recovered 10/10 = 100% 340 348 CLAYSTONE same as above moist 348 350 CLAYEY SANDSTONE light gray (N 7/0) to moderate yellowish brown (10 YR 5/4) to light brown (5 YR 5/6) very fine grained sand rounded to sub rounded poorly sorted weathered moist	
110			<u>35.0 36.0 SAMPLE.</u> Recovered 10/10 = 100% CLAYSTONE same as above with lenses of sandstone moist	
			<u>36.0 37.0 SAMPLE.</u> Recovered 10/10 = 100% CLAYSTONE medium light gray (N 6/0) to medium gray (N 5/0) fine grained lenses of sand massive blocky some FeO staining weathered moist	
			<u>37.0 38.0 SAMPLE.</u> Recovered 10/10 = 100% CLAYSTONE same as above more sand in lenses more FeO staining moist	
		<u>38.0 39.0 SAMPLE.</u> Recovered 10/10 = 100% CLAYSTONE same as above moist		

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CEARP Manager

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Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			<u>39.0 40.0 SAMPLE.</u> Recovered 10/10 = 100% CLAYSTONE same as above moist	
			<u>40.0 41.0 SAMPLE.</u> Recovered 10/10 = 100% CLAYSTONE medium gray (N 5/0) to medium dark gray (N 4/0) shaley some fine grained sand trace FeO staining massive blocky weathered moist	
			<u>41.0 42.0 SAMPLE.</u> Recovered 10/10 = 100% CLAYSTONE same as above less FeO staining moist	
			<u>42.0 43.0 SAMPLE.</u> Recovered 10/10 = 100% CLAYSTONE same as above no weather ing apparent moist	
			<u>43.0 44.0 SAMPLE.</u> Recovered 10/10 = 100% CLAYSTONE same as above moist	
			<u>44.0 45.0 SAMPLE.</u> Recovered 10/10 = 100% CLAYSTONE dark gray (N 3/0) to gray ish black (N 2/0) shaley trace fine grained sand massive blocky no wea thering moist	

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			<u>45.5 48.0 SAMPLE.</u> Recovered 2 4/2 5 = 96% RQD = 1 65/2 4 = 69% CLAYSTONE medium gray (N 5/0) to dark gray (N 3/0) slightly to moderately silty occasional fissile zones rare carbonaceous debris consolidated moist	
			<u>48.0 52.0 SAMPLE.</u> Recovered 2 9/4 0 = 72% RQD = 0% CLAYSTONE medium gray (N 5/0) to dark gray (N 3/0) occasional fissile zones rare carbonaceous debris slightly silty moderate brown (5 YR 4/4) iron staining on abundant vertical and horizontal fractures and joints moist	
			<u>52.0 56.0 SAMPLE.</u> Recovered 0 95/4 0 = 24% RQD = 0 38/0 95 = 40% CLAYSTONE same as 45 5 48 0 slightly silty moist	
			<u>56.0 58.0 SAMPLE.</u> Recovered 2 3/2 0 = 115% RQD = 1 15/2 3 = 50% CLAYSTONE medium dark gray (N 4/0) to grayish black (N 2/0) at base very carbonaceous at base slightly to moderately silty abundant carbonaceous debris abundant carbonized plant fragments rare resin at base consolidated dry to moist	

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 Geologist \_\_\_\_\_ Site Manager \_\_\_\_\_

CEARP Manager

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Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
58.0		60.0	<u>58.0 60.0 SAMPLE.</u> Recovered 13/20 = 65% RQD = 0% CLAYSTONE grayish black (N 2/0) to black (N 1/0) carbonaceous fissile to blocky rare 005 cubes resinous coal moist	
60.0		62.0	<u>60.0 62.0 SAMPLE.</u> Recovered 17/20 = 85% RQD = 0% CLAYSTONE grayish black (N 2/0) to medium dark gray (N 4/0) near base very silty carbonaceous carbonized and coalified plant fragments hard consolidated moist	
62.0		64.0	<u>62.0 64.0 SAMPLE.</u> Recovered 19/20 = 95% RQD = 17/19 = 89% 62 0 63 5 SILTSTONE brownish black (5 YR 2/1) to olive black (5 Y 2/1) carbonaceous abundant carbonized and coalified plant fragments consolidated moist 63 5 64 0 CLAYSTONE medium dark gray (N 4/0) to olive gray (5 Y 3/2) slightly silty abundant carbonaceous debris consolidated moist to dry	
64.0		66.0	<u>64.0 66.0 SAMPLE.</u> Recovered 05/20 = 25% RQD = 0% SILTSTONE olive gray (5 Y 3/2) very clayey rare carbonaceous debris consolidated dry	

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—			<u>66.0 68.0 SAMPLE.</u> Recovered 175/20 = 87% RQD = 058/175 = 33% 66 0 66 45 SILTSTONE same as above dry to moist 66 45 67 15 CLAYSTONE medium gray (N 5/0) to olive gray (5 Y 3/2) silty car bonaceous debris rare coalified plant fragments consolidated moist 67 15 67 75 SILTSTONE same as 64 0 66 0 trace very fine grained sand dry to moist	
—			<u>68.0 70.0 SAMPLE.</u> Recovered 23/20 = 115% RQD = 07/23 = 30% SILTSTONE same as 64 0 66 0 occasional medium gray (N 5/0) claystone lenses very to slightly clayey dry to moist	
—			<u>70.0 74.0 SAMPLE.</u> Recovered 36/40 = 90% RQD = 0% CLAYSTONE medium gray (N 5/0) to olive gray (5 Y 3/2) slightly silty 005 008 spaced horizontal fractures moist	

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 Date Drilled Sept 29 - Oct 1, 1987, Oct 5-6 1987 Helper P Mesa, K Parker  
 Drilling Method Hollow Stem Auger, Rotary Core Drilling Fluid 0-45 0' None  
 Logged By R T Treat, L A Gregory-Frost Checked By 45 0' - 110 2' Water *JJP*  
 Geologist Site Manager

CEARP Manager

Comments Surface casing set to 45 0' by R Treat October 1, 1987

Depth Foot	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			<p><u>74.0 78.0 SAMPLE.</u>            Recovered 38/40 = 95%            RQD = 228/38 = 60%            740 75 72 CLAYSTONE dark gray (N 3/0) abundant carbonized plant material carbonaceous easily broken into thin layers fissile dry to moist            75 72 78 0 SILTSTONE medium dark gray (N 4/0) very sandy very fine grained slightly clayey massive dry to moist</p>	
			<p><u>78.0 82.0 SAMPLE.</u>            Recovered 42/40 = 105%            RQD = 097/42 = 23%            780 81 05 SILTSTONE same as above dry to moist            81 05 82 0 SANDSTONE greenish gray (5 G 6/1) very fine to fine grained well sorted rounded slightly clayey dry to moist</p>	
			<p><u>82.0 86.0 SAMPLE.</u>            Recovered 375/40 = 94%            RQD = 220/375 = 59%            820 85 28 CLAYSTONE medium dark gray (N 4/0) to greenish gray (5 G 6/1) slightly to very silty trace very fine grained sand friable dry to moist            85 28 86 0 SANDSTONE greenish gray (5 GY 6/1 to 5 G 6/1) very fine to fine grained well sorted rounded silty slightly clayey moist</p>	

**LOG  
OF  
BOREHOLE**

Location Rocky Flats Plant, East Trenches Area Borehole/Well No 30-87BR  
 Coordinates N 35095 15 E 24312 43 Ground Surface Elevation 5811 87  
 Total Depth 110.20 Water Level Encountered 10.5  
 Drilling Company Boyles Bros Driller S Bradfield, P Bushkovski  
 Date Drilled Sept 29 - Oct 1, 1987, Oct 5-6 1987 Helper P Mesa, K Parker  
 Drilling Method Hollow Stem Auger, Rotary Core Drilling Fluid 0-45 0' None  
 Logged By R T Treat, L.A Gregory-Frost Checked By 45 0' - 110 2' Water  
 Geologist Site Manager *JJP*

CEARP Manager

Comments Surface casing set to 45 0' by R Treat October 1, 1987

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
—			<p><u>86.0 90.0 SAMPLE.</u>            Recovered 4 08/40 = 102%            RQD = 3 84/408 = 94%            86.0 86.68 SANDSTONE greenish gray (5 G 6/1) very fine to fine grained well sorted rounded slightly clayey consolidated moist to saturated            86.68 87.18 CLAYSTONE olive gray (5 Y 3/2) silty at base fining upward dry to moist            87.18 90.0 SANDSTONE light olive gray (5 Y 5/2) silty very fine grained grading into fine grained well rounded well sorted slightly clayey occasional carbonized and coalified plant debris rippled low angle cross beds occasional burrows infilled with sand occasional rooting moist to saturated</p>	
—			<p><u>90.0 94.0 SAMPLE.</u>            Recovered 3 7/40 = 92%            RQD = 3 65/37 = 99%            SANDSTONE same as above fine grained well sorted well rounded moist to saturated</p>	



LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No 30-87BR  
 Coordinates N 35095 15 E 24312 43 Ground Surface Elevation 5811 87  
 Total Depth 110.20 Water Level Encountered 10.5  
 Static \_\_\_\_\_  
 Drilling Company Boyles Bros Driller S Bradfield, P Bushkovski  
 Date Drilled Sept 29 - Oct 1, 1987, Oct 5-6 1987 Helper P Mesa, K Parker  
 Drilling Method Hollow Stem Auger, Rotary Core Drilling Fluid 0-45 0' None  
45 0' - 110 2' Water  
 Logged By R T Treat, L A Gregory-Frost Checked By \_\_\_\_\_  
 Geologist Site Manager  
 \_\_\_\_\_  
 CEARP Manager

Comments Surface casing set to 45 0' by R Treat October 1, 1987

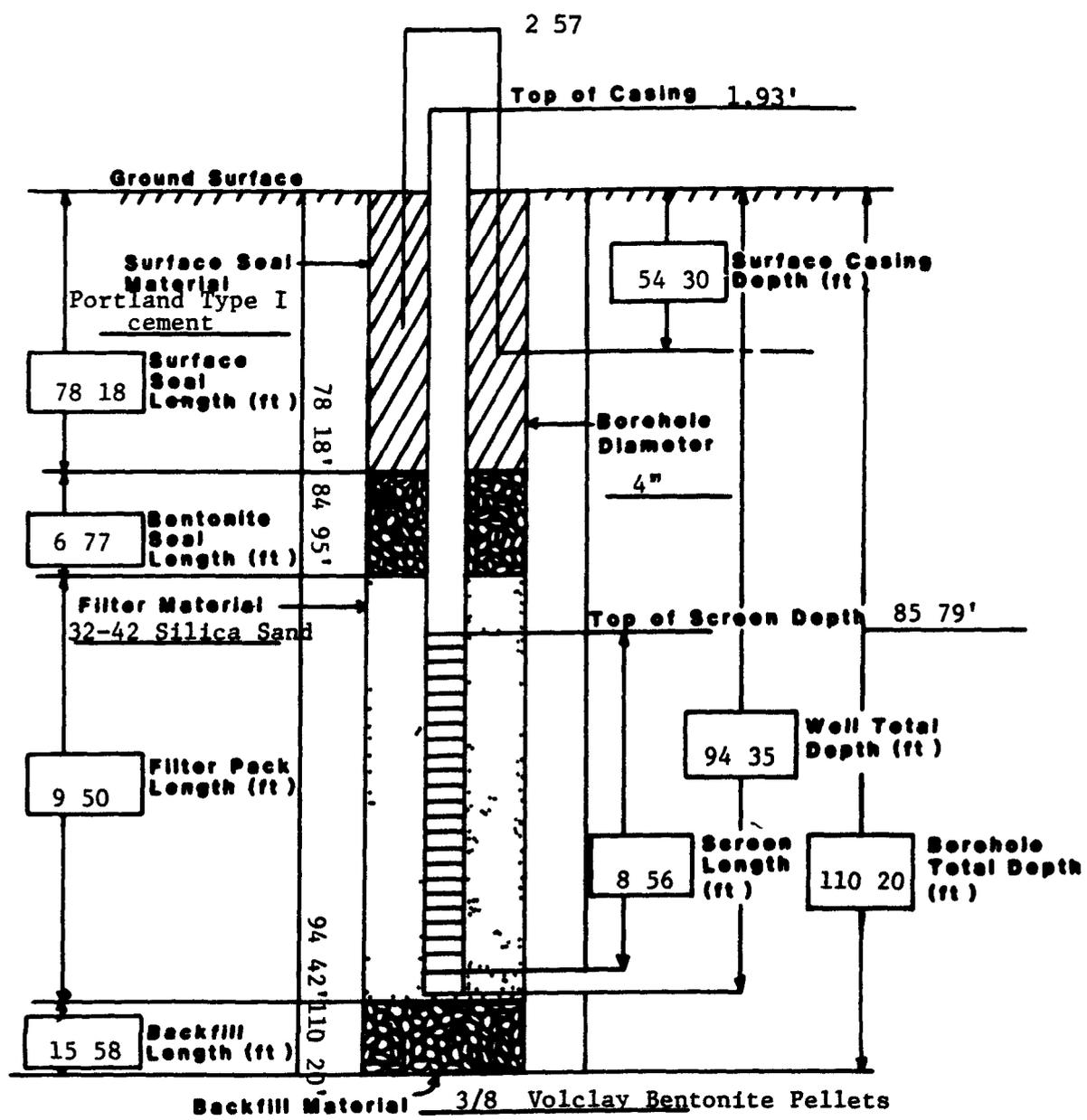
Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			<u>102.0 106.0 SAMPLE.</u> Recovered 42/40 = 105% RQD = 328/42 = 78% 102 0 102 45 CLAYSTONE medium dark gray (N 4/0) abundant carbonized plant fragments friable moist 102 45 103 1 CARBONACEOUS SHALE grayish black (N 2/0) to black (N 1/0) coal streaks 103 1 106 0 SILTSTONE medium dark gray (N 4/0) to dark gray (N 3/0) clayey to very clayey trace very fine grained sand rounded moist	
			<u>106.0 110.0 SAMPLE.</u> Recovered 42/40 = 105% RQD = 368/42 = 88% SILTSTONE medium dark gray (N 4/0) occasional carbonaceous debris occasional dark yellowish brown (10 YR 4/2) sandy silt filled burrows hard moist	
			TOTAL DEPTH 1100	

# WELL COMPLETION INFORMATION

Location Rocky Flats Plant, East Trenches Area Well No 30-87BR  
 Coordinates N 35095 15 E 24312 43 Elevation Ground Surface 5811.87'  
 Total Depth Well 94 35' Top of Casing 5813.80'  
 Borehole 110 20

Formation of Completion Arapahoe Formation  
 Casing Material Sch 5, type 316 TFJ stainless steel Casing Diameter 2 ID  
 Screen Material 0 010 wire wrap, type 316 TFJ stainless steel Surface Casing Diameter 5 ID  
 Date Installed October 8, 1987 Approved By *J. Pasche*  
 Installed By L A Gregory-Frost Geologist *Brent Sears*  
 CEAP Manager

Comments Surface casing set to 54 30' by R T Treat on October 1, 1987



Packer test data for well 30 87BR are presented on the following table  
However the well was still in development on December 1 1987 and static water  
levels could not be measured Hydraulic conductivity values were thus not calculated

# PACKER TEST DATA SHEET

Job No 2029-17-02 Static Water Level \_\_\_\_\_  
 Location Rocky Flats Plant, East Trenches Area Date of Water Level \_\_\_\_\_  
 Well No 30-87BR Page 1 of 2  
 Borehole Diameter 0 333' Comments \_\_\_\_\_  
 Acrylic Tube Diameter 0 1663'

Test Interval No.	Top of Test Interval	Bottom of Test Interval	Test Length (minutes)	Gage Pressure	Gage Height	Avg. H <sub>2</sub> O Height	Gage Height + Avg. H <sub>2</sub> O Height	Δh	Date of Test	Lithology	Geologist
1	98 14	107 79	15	0	5 35	4 66	10 01	-0 122	10/06/87	Kass/KCL	LAG
			15	21 5	5 35	N/A	5 35	0 262	10/06/87	Kass/KCL	LAG
			15	0	5 35	4 20	9 55	0 000	10/06/87	Kass/KCL	LAG
2	89 12	98 77	15	0	5 35	3 85	9 20	0 040	10/07/87	Kass	LAG
			15	19	5 35	N/A	5 35	0 370	10/07/87	Kass	LAG
			15	0	5 35	4 05	9 40	-0 005	10/07/87	Kass	LAG
3	76.70	86.35	15	0	5 35	3 72	9 07	0 030	10/07/87	Kass/SILT	LAG
			15	16	5 35	N/A	5 35	0 040	10/07/87	Kass/SILT	LAG
			15	0	5 35	3 745	9 095	-0 030	10/07/87	Kass/SILT	LAG
4	79 10	88 75	15	0	5 35	3 72	9 07	0 010	10/07/87	Kass/SILT	LAG
			15	16 5	5 35	N/A	5 35	0 172	10/07/87	Kass/SILT	LAG
			15	0	5 35	3 75	9 10	0 010	10/07/87	Kass/SILT	LAG
5	67 05	76 70	15	0	5 35	3 61	8 96	0 040	10/07/87	Kass/SILT	LAG
			15	13 5	5 35	N/A	5 35	0 030	10/07/87	Kass/SILT	LAG
			15	0	5 35	3 59	8 94	-0 037	10/07/87	Kass/SILT	LAG
6	57 40	67 05	15	0	5 35	3 64	8 99	0 063	10/07/87	KCL	LAG
			15	11 5	5 35	N/A	5 35	0 288	10/07/87	KCL	LAG
			15	0	5 35	3 27	8 62	0 100	10/07/87	KCL	LAG



12 11/87

Water Level Data  
for  
Rockwell (Rocky Flats)

Date Measured

Depth to Water  
from TOC

Elevation  
TOC (ft)

Water Level  
Elev (ft)

\*\* Well Number 30878R

12 01/87

24 95

## INDEX OF DATA

Boring No 31-87BR

Completed as well? Yes

### Data in File

- Log of Borehole
- Well Construction Summaries
- Well Development Summaries
- Hydraulic Conductivity Test Data  
and Results
- Packer Test Data and Results
- Water Level Data

**LOG  
OF  
BOREHOLE**

Location <u>Rocky Flats Plant East Trenches Area</u>	Borehole/Well No <u>31-87B</u>
Coordinates <u>N 36502.97 E 25201.86</u>	Ground Surface Elevation <u>5945 02'</u>
Total Depth <u>140 00'</u>	Water Level Encountered _____
	Static <u>5852.81' (12/01/87)</u>
Drilling Company <u>Boyles Bros</u>	Driller <u>T High, P Bushkovski</u>
Date Drilled <u>September 23-29, 1987</u>	Helper <u>R Keeney K Parker</u>
Drilling Method <u>Hollow Stem Auger, Rotary Core</u>	Drilling Fluid <u>0 - 57 6 None</u>
Logged By <u>L A Gregory-Frost, J B Bergman</u>	Checked By <u>_____</u>
<b>Geologist</b>	Site Manager <i>Brent...</i> CEARP Manager

Comments Surface casing set to 57 60' by L A Gregory-Frost

Depth Foot	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<b>TOPSOIL</b>	
			<b>0.0 2.0 SAMPLE.</b> Recovered 18/20 = 90% 00 085 TOPSOIL grayish brown (5 YR 3/2) sandy caliche deposits quartzite and granite pebbles and cobbles rooted grasses unconsolidated dry	HNu Background=00 OVA Background=02
5			<b>ROCKY FLATS ALLUVIUM</b>	
			085 115 CALICHE grayish brown (5 YR 3/2) and very pale orange (10 YR 8/2) clay interbedded (003) dry 115 180 SAND grayish orange (10 YR 7/4) to moderate yellowish brown (10 YR 5/4) very fine to fine grained well rounded well sorted slightly clayey abundant caliche calcareous abundant granite and quartzite pebbles and cobbles subangular to angular unconsolidated dry	<b>7.0 12.0</b> Readings on core HNu = 08 OVA = 02
10				
			<b>2.0 4.0 SAMPLE.</b> Recovered 20/20 = 100% 20 24 CLAYEY SAND same as above (115 180) abundant caliche layers consolidated dry 24 38 SAND same as above (115 180) dry	<b>14.5 17.0</b> Readings on core HNu = 04 OVA = 02
15				
20				

# LOG OF BOREHOLE

Location Rocky Flats Plant East Trenches Area Borehole/Well No 31-87BP  
 Coordinates N 36502.97 E 25201.86 Ground Surface Elevation 5945.02'  
 Total Depth 140.00' Water Level Encountered \_\_\_\_\_  
 Static 5852.81' (12/01/87)  
 Drilling Company Boyles Bros Driller T High, P Bushkovski  
 Date Drilled September 23-29, 1987 Helper R Keeney, K Parker  
 Drilling Method Hollow Stem Auger, Rotary Core Drilling Fluid 0 - 57.6' None  
 Logged By L A Gregory-Frost, J B Bergman Checked By 57.6' - 140.0' Water  
 Geologist Site Manager *[Signature]*

CEARP Manager

Comments Surface casing set to 57.60' by L A Gregory-Frost

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20			38.40 CLAY moderate yellowish brown (10 YR 5/4) very sandy fine to coarse grained poorly sorted angular to rounded feldspar and quartz grains from a granite cobble weathering in place quartzite and granite pebbles and cobbles subangular consolidated dry	
25	[Hatched pattern]		<u>4.0 7.0 SAMPLE</u> Recovered 23/30 = 77% SAND moderate yellowish brown (10 YR 5/4) very fine to coarse grained predominantly medium grained poorly sorted rounded to subangular slightly clayey quartzite pebbles and cobbles subangular to angular fining upward caliche deposits calcareous unconsolidated dry	
30	[Hatched pattern]		<u>7.0 12.0 SAMPLE</u> Recovered 25/50 = 50% SAND same as above occasional clayey zones at base not fining upward dry	
35			<u>12.0 14.5 SAMPLE</u> Recovered 33/25 = 132% 11.2 14.5 SAND moderate yellowish brown (10 YR 5/4) with occasional light brown (5 YR 5/6) zones same as 4.0 7.0 calcareous abundant feldspar and muscovite grains unconsolidated dry to moist	
40				





**LOG  
OF  
BOREHOLE**

Location Rocky Flats Plant East Trenches Area Borehole/Well No 31-87BR  
 Coordinates N 36502.97 E 25201.86 Ground Surface Elevation 5945 02  
 Total Depth 140 00' Water Level Encountered \_\_\_\_\_  
 Static 5852.81 (12/01/87)  
 Drilling Company Boyles Bros Driller T High, P Bushkovski  
 Date Drilled September 23-29, 1987 Helper R Keeney, K Parker  
 Drilling Method Hollow Stem Auger, Rotary Core Drilling Fluid 0 - 57 6' None  
 Logged By L A Gregory-Frost, J B Bergman Checked By \_\_\_\_\_  
 Geologist Site Manager *[Signature]*  
 \_\_\_\_\_  
 CEARP Manager

Comments Surface casing set to 57 60' by L A Gregory-Frost

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
80			34 25 34 5 SAND dark yellowish orange (10 YR 6/6) medium grained moderately sorted rounded to subangular slightly sorted rounded to subangular slightly to very clayey consolidated moist 34 5 34 7 SAND same as 32 5 34 25 very clayey moist	
85			<u>35.0 37.5 SAMPLE.</u> Recovered 2 3/2 5 = 92% SAND moderate yellowish brown (10 YR 5/4) fine to very coarse grained poorly sorted rounded to angular abundant quartzite and granite pebbles slightly to very clayey unconsolidated moist to sat urated	
90			<u>37.5 40.0 SAMPLE.</u> Recovered 1 3/2 5 = 52% SAND same as above saturated at top moist at base	
95			<u>40.0 42.5 SAMPLE.</u> No recovery Cuttings indicate SAND same as 35 0 37 5 gravel and cobbles saturated	
100			<u>42.5 45.0 SAMPLE.</u> Recovered 1 0/2 5 = 40% GRAVEL moderate yellowish brown (10 YR 5/4) coarse grained to upper very coarse grained sand matrix quartzite granite quartz hematite cemented sand stone pebbles rounded to subangular oc casional quartzite and granite cobbles saturated	

**LOG  
OF  
BOREHOLE**

Location <u>Rocky Flats Plant East Trenches Area</u>	Borehole/Well No <u>31-87BP</u>
Coordinates <u>N 36502.97 E 25201.86</u>	Ground Surface Elevation <u>5945.02</u>
Total Depth <u>140.00'</u>	Water Level Encountered _____
	Static <u>5852.81 (12/01/87)</u>
Drilling Company <u>Boyles Bros</u>	Driller <u>T High, P Bushkovski</u>
Date Drilled <u>September 23-29, 1987</u>	Helper <u>R Keeney, K Parker</u>
Drilling Method <u>Hollow Stem Auger, Rotary Core</u>	Drilling Fluid <u>0 - 57.6' None</u>
Logged By <u>L A Gregory-Frost, J B Bergman</u>	Checked By <u>_____</u>
Geologist	Site Manager
	CEARP Manager

Comments Surface casing set to 57.60' by L A Gregory-Frost

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
100			<b><u>ARAPAHOE FORMATION</u></b>	
			<p><b><u>45.0 47.5 SAMPLE</u></b>            Recovered 39/25 = 156%            CLAYSTONE moderate yellowish brown (10 YR 5/4) to light olive gray (5 Y 6/1) with dark yellowish orange (10 YR 6/6) mottles and bands very fine grained sand silty soft consolidated carbonaceous debris weathered saturated</p>	
105			<p><b><u>47.5 50.0 SAMPLE</u></b>            Recovered 40/25 = 160%            CLAYSTONE light olive gray (5 Y 6/1) with moderate yellowish brown (10 YR 5/4) mottling and banding slightly sandy very fine grained slightly silty soft to firm carbonaceous debris weathered saturated</p>	
110			<p><b><u>50.0 52.5 SAMPLE</u></b>            Recovered 29/25 = 116%            50.0 50.85 CLAYSTONE moderate yellowish brown (10 YR 5/4) and light olive gray (5 Y 6/1) silty very fine grained sand soft consolidated saturated            50.85 51.20 CLAYSTONE dark gray (N 3/0) occasional moderate yellowish or orange (10 YR 6/6) streaks and bands very fine grained sand silty slightly weathered soft consolidated saturated</p>	
115				
120				

**LOG  
OF  
BOREHOLE**

Location Rocky Flats Plant East Trenches Area Borehole/Well No 31-87BR  
 Coordinates N 36502.97 E 25201.86 Ground Surface Elevation 5945 02  
 Total Depth 140 00' Water Level Encountered \_\_\_\_\_  
 Static 5852.81 (12/01/87)  
 Drilling Company Bovles Bros Driller T High, P Bushkovski  
 Date Drilled September 23-29, 1987 Helper R Keeney, K Parker  
 Drilling Method Hollow Stem Auger, Rotary Core Drilling Fluid 0 - 57 6' None  
 Logged By L.A. Gregory-Frost, J B Bergman Checked By \_\_\_\_\_  
 Geologist Site Manager *JAF*  
 CEARP Manager

Comments Surface casing set to 57 60' by L A Gregory-Frost

Depth Foot	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
120			51 20 52 5 CLAYSTONE dark gray (N 3/0) to grayish black (N 2/0) very rare moderate yellowish brown (10 YR 5/4) to dark yellowish orange (10 YR 6/6) staining on vertical fracture planes horizontal fractures approximately 0 04 apart abundant carbonaceous debris silty very fine grained sand at top coarsening upward consolidated moist	
125			52.5 55.0 SAMPLE. Recovered 2 5/2 5 = 100% CLAYSTONE dark gray (N 3/0) silty soft consolidated moist to saturated	
130	130		55.0 57.5 SAMPLE. Recovered 3 5/2 5 = 140% CLAYSTONE same as above moist to saturated	
135			53.0 58.0 SAMPLE. Recovered 0 35/5 0 = 7% RQD = 0 3/0 35 = 85% 53 0 57 65 CEMENT PLUG 57 65 58 0 CLAYSTONE olive gray (5 Y 3/2) to olive black (5 Y 2/1) slightly silty occasional carbonaceous debris slickensides consolidated moist	
140			58.0 62.0 SAMPLE. Recovered 4 25/4 0 = 106% RQD = 3 85/4 25 = 90% CLAYSTONE olive gray (5 Y 3/2) to medium dark gray (N 4/0) rare dark yellowish brown (10 YR 4/2) mottling carbonaceous debris slightly silty consolidated moist to dry	

# LOG OF BOREHOLE

Location Rocky Flats Plant East Trenches Area Borehole/Well No 31-87BR  
 Coordinates N 36502.97 E 25201.86 Ground Surface Elevation 5945.02'  
 Total Depth 140.00' Water Level Encountered \_\_\_\_\_  
 Static 5852.81 (12/01/87)  
 Drilling Company Boyles Bros Driller T High, P Bushkovski  
 Date Drilled September 23-29, 1987 Helper R Keeney, K Parker  
 Drilling Method Hollow Stem Auger, Rotary Core Drilling Fluid 0 - 57.6' None  
57.6' - 140.0' Water  
 Logged By L.A. Gregory-Frost, J B Bergman Checked By \_\_\_\_\_  
 Geologist Site Manager  
 \_\_\_\_\_  
 GEARP Manager

Comments Surface casing set to 57.60' by L A Gregory-Frost

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
—			<u>62.0-66.0 SAMPLE.</u> Recovered 3 9/40 = 97% RQD = 3 45/39 = 88% CLAYSTONE olive gray (5 Y 3/2) to medium dark gray (N 4/0) mottling carbonaceous debris occasional to rare very pale orange (10 YR 8/2) silt to very fine grained sandstone infilled burrows slightly silty consolidated moist to dry	
—			<u>66.0-70.0 SAMPLE.</u> Recovered 4 3/40 = 107% RQD = 3 96/43 = 92% CLAYSTONE olive gray (5 Y 3/2) to medium gray (N 5/0) silty carbonaceous debris consolidated moist to dry	
—			<u>70.0-74.0 SAMPLE.</u> Recovered 4 2/40 = 105% RQD = 3 85/42 = 92% 70.0-71.05 CLAYSTONE same as 62.0-66.0 moist to dry 71.05-74.0 SILTSTONE medium dark gray (N 4/0) very fine grained sand sub-rounded well sorted consolidated fining upward moist	
—			<u>74.0-78.0 SAMPLE.</u> Recovered 3 85/40 = 96% RQD = 3 60/385 = 93% SILTSTONE medium dark gray (N 4/0) slightly sandy very fine grained sub rounded well sorted abundant carbonaceous debris and coal spars massive consolidated dry	

**LOG  
OF  
BOREHOLE**

Location Rocky Flats Plant East Trenches Area Borehole/Well No 31-87BR  
 Coordinates N 36502.97 E 25201.86 Ground Surface Elevation 5945.02'  
 Total Depth 140.00' Water Level Encountered \_\_\_\_\_  
 Static 5852.81' (12/01/87)  
 Drilling Company Boyles Bros Driller T High, P Bushkovski  
 Date Drilled September 23-29, 1987 Helper R Keeney, K Parker  
 Drilling Method Hollow Stem Auger, Rotary Core Drilling Fluid 0 - 57.6' None  
57.6' - 140.0' Water  
 Logged By L A Gregory-Frost, J B Bergman Checked By \_\_\_\_\_  
 Geologist Site Manager

CEARP Manager

Comments Surface casing set to 57.60' by L A Gregory-Frost

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
—			<p><b>78.0-82.0 SAMPLE.</b>            Recovered 45/40 = 112%            RQD = 420/45 = 93%            78.0 79.2' SILTSTONE medium dark gray (N 4/0) with rare dark yellowish brown (10 YR 4/2) mottling clayey carbonaceous debris massive hard consolidated dry</p>	
—			<p>79.2 81.60 CLAYSTONE olive gray (5 Y 3/2) to medium dark gray (N 4/0) abundant carbonaceous debris silty slicken sides consolidated dry</p> <p>81.60 81.85 CARBONACEOUS SHALE grayish black (N 2/0) abundant coal streaks fissile friable consolidated dry</p>	
—			<p><b>82.0 86.0 SAMPLE.</b>            Recovered 28/40 = 70%            RQD = 23/28 = 82%            CLAYSTONE olive black (5 Y 2/1) to brownish black (5 YR 2/1) carbonaceous coal spars silty to very silty carbonaceous plant debris and leaves massive consolidated dry</p>	
—			<p><b>86.0 90.0 SAMPLE.</b>            Recovered 29/40 = 72%            RQD = 13/29 = 45%            86.0 88.9 SILTSTONE medium dark gray (N 4/0) clayey to slightly clayey hard abundant carbonaceous debris vertical fractures from 86.15 to 87.20 abundant coal spars from 87.20 to 87.35 consolidated massive dry</p>	





**LOG  
OF  
BOREHOLE**

Location Rocky Flats Plant East Trenches Area Borehole/Well No 31-87BR  
 Coordinates N 36502.97 E 25201.86 Ground Surface Elevation 5945.02'  
 Total Depth 140.00' Water Level Encountered \_\_\_\_\_  
 State 5852.81' (12/01/87)  
 Drilling Company Boyles Bros Driller T High, P Bushkovski  
 Date Drilled September 23-29, 1987 Helper R Keeney, K Parker  
 Drilling Method Hollow Stem Auger, Rotary Core Drilling Fluid 0 - 57.6' None  
 Logged By L.A. Gregory-Frost, J B Bergman Checked By \_\_\_\_\_  
 Geologist Site Manager  
 \_\_\_\_\_  
 CEARP Manager

Comments Surface casing set to 57.60' by L A Gregory-Frost

Depth Foot	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
116.0		120.0	<p><u>116.0 120.0 SAMPLE.</u>            Recovered 40/40 = 100%            RQD = 2.55/40 = 64%            SANDSTONE medium gray (N 5/0) fine to medium grained rounded well sorted dense homogeneous very little clay some silt no organics wet</p>	
120.0		124.0	<p><u>120.0 124.0 SAMPLE.</u>            Recovered 36/40 = 90%            RQD = 2.5/36 = 69%            SANDSTONE same as above with quartzose sand some organics and some coaly material moist to wet</p>	
124.0		128.0	<p><u>124.0 128.0 SAMPLE.</u>            Recovered 40/40 = 100%            RQD = 37/40 = 92%            SANDSTONE same as above coarsening downward at 127.7 128.0 very coarse grained sand quartzose with clay fragments rounded well sorted abundant coal material abundant light brownish gray clay fragments in patches through out core some lignite stringers some clay laminae dense moist</p>	
128.0		132.0	<p><u>128.0 132.0 SAMPLE.</u>            Recovered 33/40' = 82%            RQD = 0.8/33 = 24%            128.0 129.0 SANDSTONE same as above with more clay</p>	

**LOG  
OF  
BOREHOLE**

Location Rocky Flats Plant East Trenches Area Borehole/Well No 31-87BR  
 Coordinates N 36502.97 E 25201.86 Ground Surface Elevation 5945 02  
 Total Depth 140 00' Water Level Encountered \_\_\_\_\_  
 State 5852.81 (12/01/87)  
 Drilling Company Boyles Bros Driller T High, P Bushkovski  
 Date Drilled September 23-29, 1987 Helper R Keeney, K Parker  
 Drilling Method Hollow Stem Auger, Rotary Core Drilling Fluid 0 - 57 6' None  
 Logged By L.A. Gregory-Frost, J B Bergman Checked By \_\_\_\_\_  
 Geologist Site Manager

**CEARP Manager**

Comments Surface casing set to 57 60' by L A Gregory-Frost

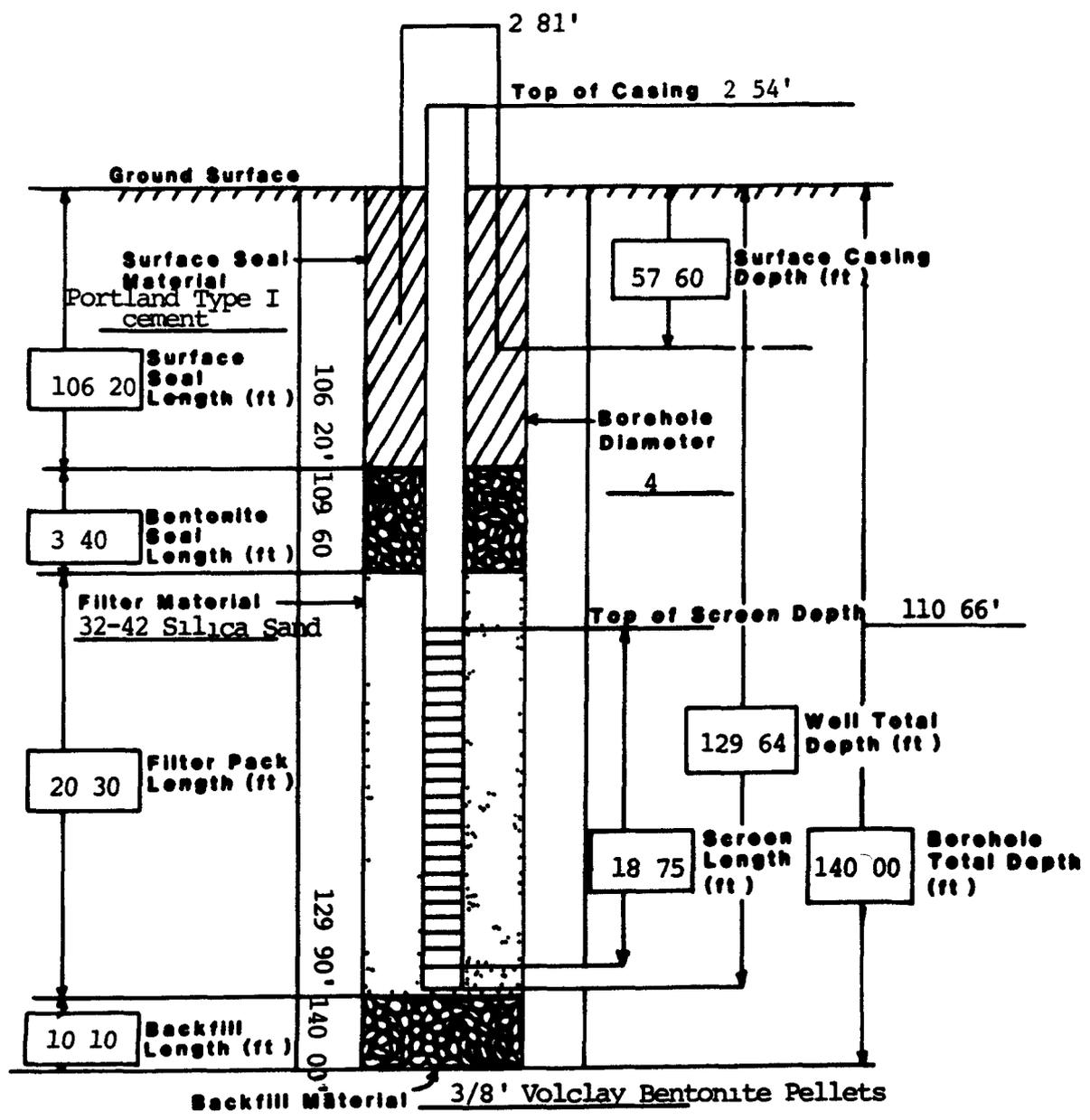
Depth feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
—			1290 1292 CONGLOMERATE medium gray (N 5/0) with abundant light brown ish gray (5 YR 6/1) clay clasts ranging in size from 0.02 to <0.005 rectangular to rounded shapes abundant organics calcareous cementation abundant very fine grained sand no sorting very dense Fe common dry	
—			1292 1310 CLAYSTONE medium dark gray (N 4/0) abundant organics dense moist	
—			1310 1320 CLAYSTONE black (N 1/0) more organics coal friable some very fine grained sand layers <0.01 moist	
—			<u>132.0 136.0 SAMPLE.</u> Recovered 40/40 = 100% RQD = 36/40 = 90% CLAYSTONE medium dark gray (N 4/0) gradational change to siltstone then clay stone/siltstone interbeds very fine grained sand rounded very well sorted dry to moist	
—			<u>136.0 140.0 SAMPLE.</u> Recovered 40/40 = 100% RQD = 40/40 = 100% CLAYSTONE same as above except no siltstone few organics trace very fine grained sand moist	
			TOTAL DEPTH 140 00	

# WELL COMPLETION INFORMATION

Location Rocky Flats Plant, East Trenches Area Well No 31-87BR  
 Coordinates N 36502 97 E 25201 86 Elevation Ground Surface 5945 02  
 Total Depth Well 129 64 Top of Casing 5947 56'  
 Borehole 140 0

Formation of Completion Arapahoe Formation  
 Casing Material Sch 5, type 316 TFJ stainless steel Casing Diameter 2 ID  
 Screen Material 0 010 wire wrap, type 316 TFJ stainless steel Surface Casing Diameter 5 ID  
 Date Installed Oct 1, 1987 Approved By [Signature]  
 Installed By J. B. Bergman Site Manager  
 Geologist [Signature] CEAPP Manager

Comments Surface casing set to 57 60' by L. A. Gregory-Frost on September 25, 1987



PACKER TEST ANALYSIS

WELL NO 31-87BR

ROCKY FLATS PLANT EAST TRENCHES JOB NO 2029-17-02

DATE TESTED 09/29/87 BY J B BERGMAN

TEST INTERVAL (FEET BELOW G S ) 119 55 - 129 20

MATERIAL TESTED ARAPAHOE SANDSTONE

DEPTH TO WATER (FEET BELOW G S ) 92 21

$$K = \frac{Q}{2(\pi)(L)(H)} \ln\left(\frac{L}{R}\right)$$

1ST P1/3 TEST

Q = INJECTION RATE = 00172318 (FEET<sup>3</sup>/MIN)  
 L = LENGTH OF TEST INTERVAL = 9 65 FEET  
 TEST INTERVAL IS BELOW WATER TABLE  
 HEAD = DEPTH TO WATER + GAGE HEIGHT  
           + GAGE PRESSURE (IN FEET)  
           = 92 21 + 8 60 + 00 \* 2 31 = 100 81  
 R = BOREHOLE RADIUS = 17 FEET  
  
 K = HYDRAULIC CONDUCTIVITY = 00000114 FT/MIN  
                                   K = 00000058 CM/SEC

P2/3 TEST

Q = INJECTION RATE = 00514057 (FEET<sup>3</sup>/MIN)  
 L = LENGTH OF TEST INTERVAL = 9 65 FEET  
 TEST INTERVAL IS BELOW WATER TABLE  
 HEAD = DEPTH TO WATER + GAGE HEIGHT  
           + GAGE PRESSURE (IN FEET)  
           = 92 21 + 5 60 + 26 00 \* 2 31 = 157 87  
 R = BOREHOLE RADIUS = 17 FEET  
  
 K = HYDRAULIC CONDUCTIVITY = 00000218 FT/MIN  
                                   K = 00000111 CM/SEC

2ND P1/3 TEST

Q = INJECTION RATE = 00173766 (FEET<sup>3</sup>/MIN)  
 L = LENGTH OF TEST INTERVAL = 9 65 FEET  
 TEST INTERVAL IS BELOW WATER TABLE  
 HEAD = DEPTH TO WATER + GAGE HEIGHT  
           + GAGE PRESSURE (IN FEET)  
           = 92 21 + 8 85 + 00 \* 2 31 = 101 06  
 R = BOREHOLE RADIUS = 17 FEET  
  
 K = HYDRAULIC CONDUCTIVITY = 00000115 FT/MIN  
                                   K = 00000058 CM/SEC

PACKER TEST ANALYSIS

WELL NO 31-87BR

ROCKY FLATS PLANT EAST TRENCHES JOB NO 2029-17-02

DATE TESTED 09/29/87 BY J B BERGMAN

TEST INTERVAL (FEET BELOW G S ) 110 70 - 120 35

MATERIAL TESTED ARAPAHOE SANDSTONE

DEPTH TO WATER (FEET BELOW G S ) 92 21

$$K = \frac{Q}{2(\pi)(L)(H)} \ln\left(\frac{L}{R}\right)$$

1ST P1/3 TEST

Q = INJECTION RATE = 00152045 (FEET<sup>3</sup>/MIN)  
 L = LENGTH OF TEST INTERVAL = 9 65 FEET  
 TEST INTERVAL IS BELOW WATER TABLE  
 HEAD = DEPTH TO WATER + GAGE HEIGHT  
       + GAGE PRESSURE (IN FEET)  
       = 92 21 + 8 63 + 00 \* 2 31 = 100 84  
 R = BOREHOLE RADIUS = 17 FEET  
  
 K = HYDRAULIC CONDUCTIVITY = 00000101 FT/MIN  
                                   K = 00000051 CM/SEC

P2/3 TEST

Q = INJECTION RATE = 00388077 (FEET<sup>3</sup>/MIN)  
 L = LENGTH OF TEST INTERVAL = 9 65 FEET  
 TEST INTERVAL IS BELOW WATER TABLE  
 HEAD = DEPTH TO WATER + GAGE HEIGHT  
       + GAGE PRESSURE (IN FEET)  
       = 92 21 + 5 60 + 24 00 \* 2 31 = 153 25  
 R = BOREHOLE RADIUS = 17 FEET  
  
 K = HYDRAULIC CONDUCTIVITY = 00000170 FT/MIN  
                                   K = 00000086 CM/SEC

2ND P1/3 TEST

Q = INJECTION RATE = 00101363 (FEET<sup>3</sup>/MIN)  
 L = LENGTH OF TEST INTERVAL = 9 65 FEET  
 TEST INTERVAL IS BELOW WATER TABLE  
 HEAD = DEPTH TO WATER + GAGE HEIGHT  
       + GAGE PRESSURE (IN FEET)  
       = 92 21 + 8 42 + 00 \* 2 31 = 100 63  
 R = BOREHOLE RADIUS = 17 FEET  
  
 K = HYDRAULIC CONDUCTIVITY = 00000067 FT/MIN  
                                   K = 00000034 CM/SEC

PACKER TEST ANALYSIS

WELL NO 31-87BR

ROCKY FLATS PLANT EAST TRENCH JOB NO 2029-17-02

DATE TESTED 9/30/87 BY J B BERGMAN

TEST INTERVAL (FEET BELOW G S ) 101 05 - 110 70

MATERIAL TESTED ARAPAHOE CLAYSTONE

DEPTH TO WATER (FEET BELOW G S ) 92 21

$$K = \frac{Q}{2(\pi)(L)(H)} \ln\left(\frac{L}{R}\right)$$

1ST P1/3 TEST

Q = INJECTION RATE = 00014480 (FEET3/MIN)  
 L = LENGTH OF TEST INTERVAL = 9 65 FEET  
 TEST INTERVAL IS BELOW WATER TABLE  
 HEAD = DEPTH TO WATER + GAGE HEIGHT  
           + GAGE PRESSURE (IN FEET)  
           = 92 21 + 9 20 + 00 \* 2 31 = 101 41  
 R = BOREHOLE RADIUS = 17 FEET  
 K = HYDRAULIC CONDUCTIVITY = 0000000956 FT/MIN  
                                   K = 00000005 CM/SEC

P2/3 TEST

Q = INJECTION RATE = 00154941 (FEET3/MIN)  
 L = LENGTH OF TEST INTERVAL = 9 65 FEET  
 TEST INTERVAL IS BELOW WATER TABLE  
 HEAD = DEPTH TO WATER + GAGE HEIGHT  
           + GAGE PRESSURE (IN FEET)  
           = 92 21 + 5 60 + 21 50 \* 2 31 = 147 47  
 R = BOREHOLE RADIUS = 17 FEET  
 K = HYDRAULIC CONDUCTIVITY = 0000007035 FT/MIN  
                                   K = 00000036 CM/SEC

2ND P1/3 TEST

PACKER TEST ANALYSIS

WELL NO 31-87BR

ROCK FLATS PLANT EAST TRENCHES JOB NO 2029-17-02

DATE TESTED 09/30/87 BY J B BERGMAN

TEST INTERVAL (FEET BELOW G S ) 91 40 - 101 05

MATERIAL TESTED ARAPAHOE CLAYSTONE

DEPTH TO WATER (FEET BELOW G S ) 92 21

$$K = \frac{Q}{2(\pi)(L)(H)} \ln\left(\frac{L}{R}\right)$$

1ST P1/3 TEST

Q = INJECTION RATE = 00286714 (FEET<sup>3</sup>/MIN)

L = LENGTH OF TEST INTERVAL = 9 65 FEET

TEST INTERVAL IS ABOVE WATER TABLE

HEAD = DEPTH OF CENTER OF INTERVAL + GAGE HEIGHT

+ GAGE PRESSURE (IN FEET)

= 96 23 + 8 50 + 00 \* 2 31 = 104 73

R = BOREHOLE RADIUS = 17 FEET

K = HYDRAULIC CONDUCTIVITY = 00000183 FT/MIN

K = 00000093 CM/SEC

P2/3 TEST

Q = INJECTION RATE = 00638589 (FEET<sup>3</sup>/MIN)

L = LENGTH OF TEST INTERVAL = 9 65 FEET

TEST INTERVAL IS ABOVE WATER TABLE

HEAD = DEPTH OF CENTER OF INTERVAL + GAGE HEIGHT

+ GAGE PRESSURE (IN FEET)

= 96 23 + 5 60 + 19 00 \* 2 31 = 145 72

R = BOREHOLE RADIUS = 17 FEET

K = HYDRAULIC CONDUCTIVITY = 00000293 FT/MIN

K = 00000149 CM/SEC

2ND P1/3 TEST

Q = INJECTION RATE = 00176662 (FEET<sup>3</sup>/MIN)

L = LENGTH OF TEST INTERVAL = 9 65 FEET

TEST INTERVAL IS ABOVE WATER TABLE

HEAD = DEPTH OF CENTER OF INTERVAL + GAGE HEIGHT

+ GAGE PRESSURE (IN FEET)

= 96 23 + 7 07 + 00 \* 2 31 = 103 30

R = BOREHOLE RADIUS = 17 FEET

K = HYDRAULIC CONDUCTIVITY = 00000115 FT/MIN

K = 00000058 CM/SEC

PACKER TEST ANALYSIS

WELL NO 31-87BR

ROCK: FLATS PLANT EAST TRENCHES JOB NO 2029-17-02

DATE TESTED 09/30/87 BY J B BERGMAN

TEST INTERVAL (FEET BELOW G S ) 81 75 - 91 40

MATERIAL TESTED ARAPAHOE CLAYSTONE

DEPTH TO WATER (FEET BELOW G S ) 92 21

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$$K = \frac{Q}{2(\pi)(L)(H)} \ln\left(\frac{L}{R}\right)$$

1ST P1/3 TEST

P2/3 TEST

Q = INJECTION RATE = 00023169 (FEET<sup>3</sup>/MIN)

L = LENGTH OF TEST INTERVAL = 9 65 FEET

TEST INTERVAL IS ABOVE WATER TABLE

HEAD = DEPTH OF CENTER OF INTERVAL + GAGE HEIGHT  
+ GAGE PRESSURE (IN FEET)

= 86 57 + 5 60 + 17 00 \* 2 31 = 131 44

R = BOREHOLE RADIUS = 17 FEET

K = HYDRAULIC CONDUCTIVITY = 00000012 FT/MIN

K = 00000006 CM/SEC

2 D P1/3 TEST

PACKER TEST ANALYSIS

WELL NO 31-87BR

ROCKY FLATS PLANT EAST TRENCH JOB NO 2029-17-02

DATE TESTED 9/30/87 BY J B BERGMAN

TEST INTERVAL (FEET BELOW G S ) 62 45 - 72 10

MATERIAL TESTED ARAPAHOE CLAYSTONE

DEPTH TO WATER (FEET BELOW G S ) 92 21

$$K = \frac{Q}{2(\pi)(L)(H)} \ln\left(\frac{L}{R}\right)$$

1ST P1/3 TEST

Q = INJECTION RATE = 00065162 (FEET3/MIN)

L = LENGTH OF TEST INTERVAL = 9 65 FEET

TEST INTERVAL IS ABOVE WATER TABLE

HEAD = DEPTH OF CENTER OF INTERVAL + GAGE HEIGHT

+ GAGE PRESSURE (IN FEET)

= 67 28 + 9 15 + 00 \* 2 31 = 76 43

R = BOREHOLE RADIUS = 17 FEET

K = HYDRAULIC CONDUCTIVITY = 0000005709 FT/MIN

K = 00000029 CM/SEC

P2/3 TEST

Q = INJECTION RATE = 00147701 (FEET3/MIN)

L = LENGTH OF TEST INTERVAL = 9 65 FEET

TEST INTERVAL IS ABOVE WATER TABLE

HEAD = DEPTH OF CENTER OF INTERVAL + GAGE HEIGHT

+ GAGE PRESSURE (IN FEET)

= 67 28 + 5 60 + 12 50 \* 2 31 = 101 75

R = BOREHOLE RADIUS = 17 FEET

K = HYDRAULIC CONDUCTIVITY = 0000009719 FT/MIN

K = 00000049 CM/SEC

2ND P1/3 TEST

Q = INJECTION RATE = 00018825 (FEET3/MIN)

L = LENGTH OF TEST INTERVAL = 9 65 FEET

TEST INTERVAL IS ABOVE WATER TABLE

HEAD = DEPTH OF CENTER OF INTERVAL + GAGE HEIGHT

+ GAGE PRESSURE (IN FEET)

= 67 28 + 10 38 + 00 \* 2 31 = 77 65

R = BOREHOLE RADIUS = 17 FEET

K = HYDRAULIC CONDUCTIVITY = 0000001623 FT/MIN

K = 00000008 CM/SEC

# PACKER TEST DATA SHEET

Job No 2029-17-02

Location Rocky Flats Plant, East Trenches Area

Well No 31-87BR

Borehole Diameter 0.333'

Acrylic Tube Diameter 0.1663'

Static Water Level 92.21

Date of Water Level 12/1/87

Page 1 of 2

Comments: Tests 5 and 6 are invalid due to no water gain in tube on first 1/3 pressure test

Test Interval No.	Top of Test Interval	Bottom of Test Interval	Test Length (minutes)	Gage Pressure	Gage Height	Avg. H <sub>2</sub> O Height	Gage Height + Avg. H <sub>2</sub> O Height	Δh	Date of Test	Lithology	Geologist
1	119.55	129.20	15	0	5.60	3.0	8.60	1.19	9/29/87	Kass	JBB
			15	26	5.60	N/A	5.60	3.55	9/29/87	Kass	JBB
			15	0	5.60	3.25	8.85	1.20	9/29/87	Kass	JBB
2	110.70	120.35	15	0	5.60	3.03	8.63	1.05	9/29/87	Kass	JBB
			15	24	5.60	N/A	5.60	2.68	9/29/87	Kass	JBB
			15	0	5.60	2.82	8.42	0.70	9/29/87	Kass	JBB
3	101.05	110.70	15	0	5.60	3.60	9.20	0.10	9/30/87	KCL	JBB
			15	21.5	5.60	N/A	5.60	1.07	9/30/87	KCL	JBB
			15	0	5.60	3.92	9.52	0.0	9/30/87	KCL	JBB
4	91.40	101.05	15	0	5.60	2.90	8.50	1.98	9/30/87	KCL	JBB
			15	19	5.60	N/A	5.60	4.41	9/30/87	KCL	JBB
			15	0	5.60	1.47	7.07	1.22	9/30/87	KCL	JBB
5	81.75	91.40	15	0	5.60	3.96	9.56	0	9/30/87	KCL	JBB
			15	17	5.60	N/A	5.60	0.16	9/30/87	KCL	JBB
			15	0	5.60	3.67	9.27	0	9/30/87	KCL	JBB
6	72.10	81.75	15	0	5.60	3.37	8.97	0	9/30/87	KCL	JBB
			15	15	5.60	N/A	5.60	0	9/30/87	KCL	JBB
			15	0	5.60	2.77	8.37	0	9/30/87	KCL	JBB
							5.60				



12 11/87

Water Level Data  
for  
Rockwell (Rocky Flats)

Date  
Measured

Depth to Water  
from TOC

Elevation  
TOC (ft)

Water Level  
Elev (ft)

\*\* Well Number 31878R

12/01/87

94 75

5947 56

5852 81

## INDEX OF DATA

Boring No 32-87

Completed as well? Yes

### Data in File

- Log of Borehole
- Well Construction Summaries
- Well Development Summaries
- Hydraulic Conductivity Test Data  
and Results
- Packer Test Data and Results
- Water Level Data

LOG  
OF  
BOREHOLE

Location <u>Rocky Flats Plant, East Trenches Area</u>	Borehole/Well No <u>32-87</u>
Coordinates <u>N 36513 70 E 25256 21</u>	Ground Surface Elevation <u>5946 12</u>
Total Depth <u>51 70</u>	Water Level Encountered <u>37.30'</u>
	Static <u>5906.68 (12/01/87)</u>
Drilling Company <u>Boyles Bros</u>	Driller <u>R Sharp</u>
Date Drilled <u>September 21-24, 1987</u>	Helper <u>T Merritt, K. Parker</u>
Drilling Method <u>Hollow Stem Auger</u>	Drilling Fluid <u>None</u>
Logged By <u>J L Bannon</u> Geologist	Checked By <u>J. Pascello</u> Site Manager <u>Brent Lewis</u> GEARP Manager

Comments \_\_\_\_\_

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			<b>TOPSOIL</b>	
			<u>0.0 2.0 SAMPLE.</u> Recovered 157/20 = 78% 00 042 TOPSOIL pale yellowish brown (10 YR 6/2) clay with grass and roots	HNu Background=02 OVA Background=00 No Ludlum readings taken
			<b>ROCKY FLATS ALLUVIUM</b>	
5			042 157 SAND dark yellowish orange (10 YR 6/6) very fine grained clayey sand moderately consolidated slight HCl reaction dry	2.0 No readings over background at cuttings and breathing zone At well head OVA = 10 No readings over background at core
			<u>2.0 4.0 SAMPLE.</u> Recovered 13/20 = 65% 20 315 CLAY grayish brown (5 YR 3/2) organic rich clay unconsolidated very dry	4.0 6.0 Readings on core HNu = 02 OVA = 00
10			315 33 SAND AND GRAVEL dark yellowish orange (10 YR 6/6) fine grained moderately sorted caliche sand with subangular to subrounded quartzite pebbles moderately consolidated strong HCl reaction very dry	6.0 Reading at well head OVA = 12 No readings over background on cuttings and breathing zone
			<u>4.0 6.0 SAMPLE.</u> Recovered 17/20 = 85% 40 51 SAND AND SILT dark yellowish orange (10 YR 6/6) very fine grained very well sorted sand and silt unconsoli dated powdery strong HCl reaction dry	6.0 8.0 Readings on core HNu = 02 OVA = 09
15				12.5 Readings at well head HNu = 200 OVA = 1000 Readings on cuttings HNu = 10 OVA = 20
20				

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No 32-87  
 Coordinates N 36513 70 E 25256 21 Ground Surface Elevation 5946 12  
 Total Depth 51 70 Water Level Encountered 37.30  
 Static 5906.68 (12/01/87)  
 Drilling Company Boyles Bros Driller R Sharp  
 Date Drilled September 21-24, 1987 Helper T Merritt, K Parker  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By J L Bannon Checked By J Pasche  
 Geologist Site Manager  
 CEARP Manager

Comments \_\_\_\_\_

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20			51 57 SAND AND GRAVEL dark yel lowish orange (10 YR 6/6) with very pale orange (10 YR 8/2) caliche rind very fine grained well sorted sand with minor caliche coated quartzite pebbles uncon solidated very strong HCl reaction dry	14.0. No readings over background on cuttings  17.2 Reading on cutting OVA = 15(00)
25			<u>6.0 8.0 SAMPLE.</u> Recovered 14/20 = 70% SAND AND GRAVEL pale yellowish brown (10 YR 6/2) to dark yellowish orange (10 YR 6/6) with very pale orange (10 YR 8/2) caliche poorly sorted sand and gravel consolidated very strong HCl reaction dry to damp	33.2 No readings over background on cuttings well head and breathing zone
30			<u>8.0 9.0 SAMPLE.</u> Recovered 118/10 = 118% SAND AND GRAVEL dark yellowish orange (10 YR 6/6) matrix with very pale orange (10 YR 8/2) caliche poorly sorted very fine to fine grained clayey sand with abundant quartzite pebbles very strong HCl reaction	
35			<u>9.0 10.5 SAMPLE.</u> Recovered 15/15 = 100% SAND AND GRAVEL moderate orange pink (5 YR 8/4) very fine to fine grained moderately sorted clayey sand with some quartzite pebbles heavy caliche moderately consolidated dry	
40				

LOG  
OF  
BOREHOLE

Location <u>Rocky Flats Plant, East Trenches Area</u>	Borehole/Well No <u>32-87</u>
Coordinates <u>N 36513 70 E 25256 21</u>	Ground Surface Elevation <u>5946 12</u>
Total Depth <u>51 70</u>	Water Level Encountered <u>37.30</u>
	Static <u>5906.68 (12/01/87)</u>
Drilling Company <u>Boyles Bros</u>	Driller <u>R Sharp</u>
Date Drilled <u>September 21-24, 1987</u>	Helper <u>T Merritt, K. Parker</u>
Drilling Method <u>Hollow Stem Auger</u>	Drilling Fluid <u>None</u>
Logged By <u>J L Bannon</u> Geologist	Checked By <u>J. Pasalle</u> Site Manager
	<u>CEARP Manager</u>

Comments \_\_\_\_\_

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
40			<p><u>10.5 11.5 SAMPLE.</u> Recovered 133/10 = 133% SAND AND GRAVEL light brown (5 YR 5/6) fine to medium grained moderately sorted clayey sand with abundant small quartzite pebbles consolidated moderate HCl reaction dry to damp</p>	
45			<p><u>11.5 12.5 SAMPLE.</u> Recovered 12/10 = 120% 115 1225 SAND light brown (5 YR 5/6) fine to medium grained well sorted minor clay and rare small pebbles unconsolidated no HCl reaction damp 1225 127 SAND AND GRAVEL light brown (5 YR 5/6) poorly sorted quartzite pebbles moderately consolidated very weak HCl reaction</p>	
50			<p><u>12.5 14.0 SAMPLE.</u> Recovered 115/15 = 77% SAND AND GRAVEL moderate reddish brown (10 R 4/6) poorly sorted clayey sand dry to damp moderately consolidated very weak HCl reaction</p>	
55			<p><u>14.0 16.0 SAMPLE.</u> Recovered 141/20 = 71% SAND AND GRAVEL moderate reddish orange (10 R 6/6) poorly sorted fine to coarse grained clayey sand with abundant caliche coated quartzite pebbles top 55 unconsolidated well consolidated down core strong HCl reaction on pebbles damp</p>	

**LOG  
OF  
BOREHOLE**

Location <u>Rocky Flats Plant, East Trenches Area</u>	Borehole/Well No <u>32-87</u>
Coordinates <u>N 36513 70 E 25256 21</u>	Ground Surface Elevation <u>5946 12</u>
Total Depth <u>51 70</u>	Water Level Encountered <u>37.30</u>
	Static <u>5906.68 (12/01/87)</u>
Drilling Company <u>Boyles Bros</u>	Driller <u>R Sharp</u>
Date Drilled <u>September 21-24, 1987</u>	Helper <u>T Merritt, K Parker</u>
Drilling Method <u>Hollow Stem Auger</u>	Drilling Fluid <u>None</u>
Logged By <u>J L Bannon</u> Geologist	Checked By <u>J Paselle</u> Site Manager
	<u>CEARP Manager</u>

Comments \_\_\_\_\_

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
—			<p><u>16.0 16.5 SAMPLE.</u> Recovered 107/05 = 214% SAND AND GRAVEL moderate reddish orange (10 R 6/6) poorly sorted clayey sand with abundant angular to subangular quartzites unconsolidated no HCl reaction damp</p>	
—			<p><u>16.5 17.2 SAMPLE.</u> No recovery Drilled with center bit</p>	
—			<p><u>17.2 19.0 SAMPLE.</u> Recovered 17/18 = 94% SAND AND GRAVEL moderate reddish orange (10 R 6/6) poorly sorted very fine to fine grained clayey sand with abundant large quartzite and granite cobbles moderately consolidated no HCl reaction dry</p>	
—			<p><u>19.0 19.2 SAMPLE.</u> Recovered 09/02 = 450% Top 63 very fine grained slough dry SAND AND GRAVEL light brown (5 YR 5/6) poorly sorted clayey sand with abundant quartzite pebbles unconsolidated damp</p>	
—			<p><u>19.2 21.2 SAMPLE.</u> Recovered 21/20 = 105% 19.2 20.4 SAND AND GRAVEL dark yellowish orange (10 YR 6/6) moderately sorted cuttings with few small pebbles unconsolidated minor HCl reaction dry</p>	

**LOG  
OF  
BOREHOLE**

Location Rocky Flats Plant, East Trenches Area Borehole/Well No 32-87  
 Coordinates N 36513 70 E 25256 21 Ground Surface Elevation 5946 12  
 Total Depth 51 70' Water Level Encountered 37.30'  
 Static 5906.68 (12/01/87)  
 Drilling Company Boyles Bros Driller R Sharp  
 Date Drilled September 21-24, 1987 Helper T. Merritt, K. Parker  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By J L Bannon Checked By J. Passolunghi  
 Geologist Site Manager  
 CEARP Manager

Comments \_\_\_\_\_  
 \_\_\_\_\_

Depth Foot	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			204 212 SAND AND GRAVEL moder- ate reddish orange (10 R 6/6) poorly sorted fine grained clayey sand with abundant large quartz and quartzite peb- bles consolidated moderate HCl reaction damp	
			<u>21.2 23.2 SAMPLE.</u> Recovered 1 64/20 = 82% SAND moderate reddish brown (10 R 4/6) moderately sorted fine to medium grained clayey quartz sand unconsoli- dated no HCl reaction dry to damp	
			<u>23.2 25.2 SAMPLE.</u> Recovered 1 7/20 = 85% 232 2425 SAND dark yellowish orange (10 YR 6/6) well sorted fine grained clayey sand unconsolidated damp 2425 249 SAND AND GRAVEL very pale orange (10 YR 8/2) moderately sorted sand with very large quartzite pebbles well consolidated dry	
			<u>25.2 27.2 SAMPLE.</u> Recovered 1 15/20 = 57% SAND AND GRAVEL very pale orange (10 YR 8/2) to light brown (5 YR 5/6) poorly sorted clayey sand with abundant gravel well consolidated damp	

**LOG  
OF  
BOREHOLE**

Location <u>Rocky Flats Plant, East Trenches Area</u>	Borehole/Well No <u>32-87</u>
Coordinates <u>N 36513 70 E 25256 21</u>	Ground Surface Elevation <u>5946 12</u>
Total Depth <u>51 70</u>	Water Level Encountered <u>37.30</u> Static <u>5906.68' (12/01/87)</u>
Drilling Company <u>Boyles Bros</u>	Driller <u>R Sharp</u>
Date Drilled <u>September 21-24, 1987</u>	Helper <u>T Merritt, K. Parker</u>
Drilling Method <u>Hollow Stem Auger</u>	Drilling Fluid <u>None</u>
Logged By <u>J L Bannon</u> Geologist	Checked By <u>[Signature]</u> Site Manager
	_____ CEARP Manager

Comments \_\_\_\_\_

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
—			<p><b>27.2 29.2 SAMPLE.</b> Recovered 21/20 = 105% SAND light brown (5 YR 5/6) grading down to dark yellowish orange (10 YR 6/6) very well sorted very fine grained clayey sand with rare subangular to sub rounded pebbles well consolidated moist</p>	
—			<p><b>29.2 31.2 SAMPLE.</b> Recovered 20/20 = 100% SAND moderate yellowish brown (10 YR 5/4) very well sorted very fine grained clayey sand dense well consolidated moist</p>	
—			<p><b>31.2 32.2 SAMPLE.</b> Recovered 16/10 = 160% SAND same as above with more sand and less clay moderately consolidated damp</p>	
—			<p><b>32.2 33.2 SAMPLE.</b> Recovered 16/10 = 160% SAND moderate yellowish brown (10 YR 5/4) well sorted very slightly mottled very fine to fine grained clayey sand un consolidated damp</p>	
—			<p><b>34.2 35.2 SAMPLE.</b> Recovered 14/10 = 140% 342 34 65 SAND same as above yellowish gray (5 Y 7/2) 34 65 35 2 SAND light brown (5 YR 5/6) well sorted clean sand with thin zone of subangular to subrounded quartz and quartzite pebbles unconsolidated damp</p>	

LOG  
OF  
BOREHOLE

Location <u>Rocky Flats Plant, East Trenches Area</u>	Borehole/Well No <u>32-87</u>
Coordinates <u>N 36513 70 E 25256 21</u>	Ground Surface Elevation <u>5946 12</u>
Total Depth <u>51 70</u>	Water Level Encountered <u>37.30</u> Static <u>5906 68 (12/01/87)</u>
Drilling Company <u>Boyles Bros</u>	Driller <u>R Sharp</u>
Date Drilled <u>September 21-24, 1987</u>	Helper <u>T. Merritt, K. Parker</u>
Drilling Method <u>Hollow Stem Auger</u>	Drilling Fluid <u>None</u>
Logged By <u>J L Bannon</u> Geologist	Checked By <u><i>J. J. Donella</i></u> Site Manager
	<u>CEARP Manager</u>

Comments \_\_\_\_\_

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
—			<p><u>35.2 36.2 SAMPLE.</u> Recovered 09/10 = 90% SAND same as above damp</p>	
—			<p><u>36.2 37.2 SAMPLE.</u> Recovered 10/10 = 100% SAND dark yellowish orange (10 YR 6/6) very well sorted clean sand with a couple of subrounded quartzite cobbles unconsolidated damp</p>	
—			<p><u>37.2 38.2 SAMPLE.</u> Recovered 13/10 = 130% SAND dark yellowish orange (10 YR 6/6) very well sorted fine grained clean sand with zones of medium to coarse grained quartz sand some clay toward bottom flowing unconsolidated WATER TABLE at 37 3</p>	
—			<p><u>38.2 39.2 SAMPLE.</u> Recovered 10/10 = 100% SAND moderately sorted medium to coarse grained sand with a large sub rounded quartzite and large pink granite cobble saturated drier downcore</p>	
—			<p><u>39.2 40.2 SAMPLE.</u> Recovered 10/10 = 100% SAND very well sorted flowing sand Lower 0 15 dark yellowish orange (10 YR 6/6) poorly sorted sand and gravel un consolidated</p>	

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No 32-87  
 Coordinates N 36513 70 E 25256 21 Ground Surface Elevation 5946 12  
 Total Depth 51 70 Water Level Encountered 37.30'  
 Static 5906 68 (12/01/87)  
 Drilling Company Boyles Bros Driller R Sharp  
 Date Drilled September 21-24, 1987 Helper T Merritt, K. Parker  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By J L Bannon Checked By J. Pasche  
 Geologist Site Manager  
 CEARP Manager

Comments \_\_\_\_\_

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			<p><u>40.2 41.2 SAMPLE.</u>            Recovered 10/10 = 100%            SAND AND GRAVEL moderately sorted            medium to coarse grained quartz sand            with large quartz and quartzite cobbles            subangular to subrounded flowing            unconsolidated</p>	
			<p><u>41.2 42.2 SAMPLE.</u>            Recovered 14/10 = 140%            41 2 41 5 SAND AND GRAVEL same as            above moderately sorted coarse flowing            sand            41 5 42 2 SANDY CLAY yellowish gray            (5 Y 7/2) very homogenous sandy clay            moderately consolidated saturated</p>	
			<p><u>42.2 43.2 SAMPLE.</u>            Recovered 125/10 = 125%            42 2 43 0 CLAYEY SAND yellowish            gray (5 Y 7/2) flowing moderately            consolidated            43 0 43 2 SAND AND GRAVEL mod            erate yellowish brown (10 YR 5/4)            poorly sorted flowing unconsolidated</p>	
			<p><u>43.2 44.2 SAMPLE.</u>            Recovered 14/10 = 140%            SAND AND GRAVEL moderate yellow            ish brown (10 YR 5/4) poorly sorted mi            nor clay unconsolidated saturated</p>	
			<p>TOTAL DEPTH WITH PLOPPER 44 00            READJUST DEPTH</p>	

**LOG  
OF  
BOREHOLE**

Location Rocky Flats Plant, East Trenches Area Borehole/Well No 32-87  
 Coordinates N 36513 70 E 25256 21 Ground Surface Elevation 5946 12  
 Total Depth 51 70 Water Level Encountered 37.30  
 State 5906.68 (12/01/87)  
 Drilling Company Boyles Bros Driller R Sharp  
 Date Drilled September 21-24, 1987 Helper T Merritt, K Parker  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By J L Bannon Checked By J L Bannon  
 Geologist Site Manager  
 CEARP Manager

Comments \_\_\_\_\_

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			<p><u>44.0 45.0 SAMPLE.</u>            Recovered 10/10 = 100%            SAND AND GRAVEL same as above            flowing unconsolidated</p>	
			<p><u>45.0 46.0 SAMPLE.</u>            Recovered 145/10 = 145%            SAND AND GRAVEL same as above            flowing unconsolidated</p>	
			<p><u>46.0 47.0 SAMPLE.</u>            Recovered 15/10 = 150%            46.0 46.3 SAND moderate brown (5 YR            4/4) moderately sorted fine to coarse            grained flowing unconsolidated</p>	
			<p><b><u>ARAPAHOE FORMATION</u></b></p>	
			<p>46.3 47.0 SILTY CLAY light olive gray            (5 Y 5/2) homogenous silty consolidated            damp</p>	
			<p><u>47.0 48.0 SAMPLE.</u>            Recovered 045/10 = 45%            CLAYSTONE light olive gray (5 Y 7/2)            dense clay very wet outside consolidated            moist</p>	
			<p><u>48.0 49.0 SAMPLE.</u>            Recovered 22/10 = 220%            CLAYSTONE light olive gray (5 Y 5/2)            with moderate yellowish brown (10 YR            5/4) mottling thin laminations visible            consolidated wet</p>	
			<p>TOTAL DEPTH WITH PLOPPER 49.3            READJUST DEPTH</p>	



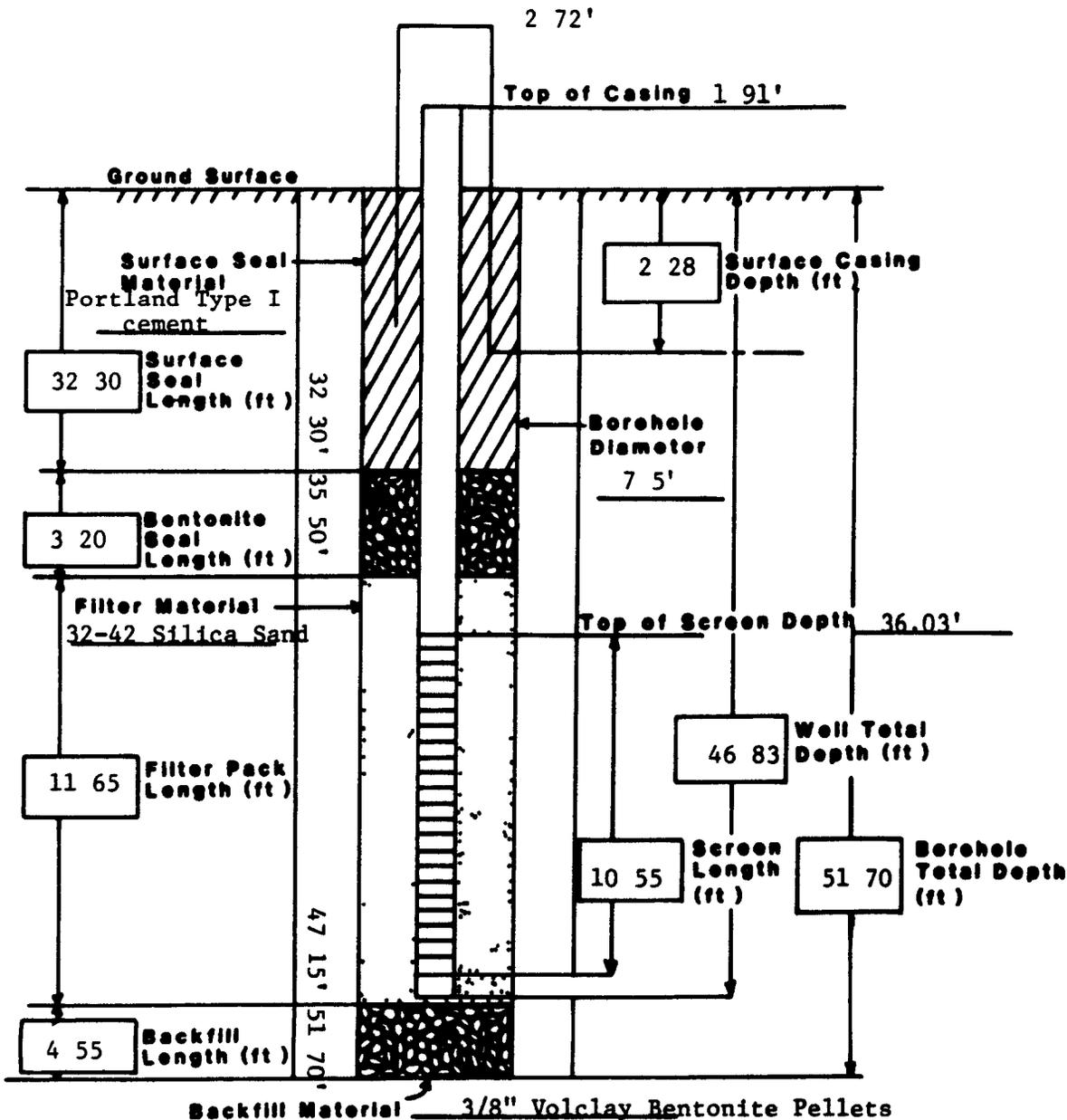
# WELL COMPLETION INFORMATION

Location Rocky Flats Plant, East Trenches Area Well No 32-87  
 Coordinates N 36513.70 E 25256.21 Elevation Ground Surface 5946.12'  
 Total Depth Well 46 83 Top of Casing 5948.03  
 Borehole 51.70

Formation of Completion Rocky Flats Alluvium

Casing Material Sch 5, type 316 TFJ stainless steel Casing Diameter 2 ID  
 Screen Material 0.010 wire wrap, type 316 TFJ stainless steel Surface Casing Diameter 5 ID  
 Date Installed Sept. 23, 1987 Approved By J. Pasolha  
 Installed By J L Bannon Site Manager  
 Geologist Brent Lewis CEARP Manager

Comments \_\_\_\_\_



PROGRAM SLUGT VERSION 4 OCT 198J

SGPMM CALCULATES MEAN TRANSMISSIVITIES FROM SLUG TEST DATA BASED ON TWO ANALYTICAL APPROACHES

- (1) METHOD OF COOPER BRIDGEWATER AND PAPADOPULOS 1967 (ARTICLE IN VOL NO 1 OF WRR ENTITLED  
RESPONSE OF A FINITE DIAMETER WELL TO AN INSTANTANEOUS CHARGE OF WATER )
- (2) METHOD OF BOWMER AND RICE 1975 (ARTICLE IN VOL 12 NO 3 OF WRR ENTITLED  
A SLUG TEST FOR DETERMINING HYDRAULIC CONDUCTIVITY OF UNCONFINED AQUIFERS  
WITH COMPLETELY OR PARTIALLY PENETRATING WELLS )

NO 6 0118 87

CLIENT Rockwell International

LOCATION Rocky Flats Plant

DATE OF SLUG TEST 10-23 87

FIELD INVESTIGATOR Kevin McNeill

WELL NO 52 87

INPUT DATA ARE

INNER CASING DIAMETER 2 00 INCHES

LENGTH OF SCREEN OR INTAKE PORTION 7 73 FEET

INNER SCREEN OR OPEN-HOLE DIAMETER 2 00 INCHES

DEPTH FROM STATIC LEVEL TO BOTTOM OF SCREEN 7 73 FEET

DIAMETER OF DRILLED HOLE 7 25 INCHES

THICKNESS OF SATURATED AQUIFER ZONE 7 73 FEET

ESTIMATED POROSITY OF GRAVEL PACK 25

FALLING HEAD INDEX 0 ( 1 IF FALLING 0 IF RISING)

NUMBER OF HEAD TIME DATA POINTS 49

TIME (sec )	HEAD (FEET)
1 00	1 100
2 00	1 070
3 00	1 050
4 00	1 030
5 00	1 010
6 00	990
7 00	980
8 00	970
9 00	950
10 00	940
12 00	910
15 00	880
17 00	860
20 00	830
22 00	820
25 00	790
27 00	770
30 00	750
32 00	730
35 00	710
37 00	690
40 00	670
42 00	660
45 00	640
50 00	610
55 00	580
60 00	550
65 00	530
70 00	500
75 00	480
80 00	460
85 00	440
91 00	410
101 0	30
111 00	40
121 00	510
131 00	280
141 00	60
151 00	240
171 00	200
191 00	160
211 00	140
231 00	120
296 00	070
336 00	050
416 00	030
536 00	020
656 00	010
806 00	010

HO WAS COMPUTED FROM INTERCEPT OF PLOT OF LOG(H) VS TIME

SUCCESSIVE COMPUTED  
VALUES FOR HO  
(FEET)

8540  
9093  
7415

METHOD OF BOWER AND RICE

COMPUTED RESULTS USING DIAMETER OF DRILLED HOLE

PERMEABILITY 5.88E-05 FT/sec 1.18E-03 CM/sec

TRANSMISSIVITY 3.00E-04 FT+2/sec

COMPUTED RESULTS USING DIAMETER OF CASING AND SCREEN

PERMEABILITY 1.39E-05 FT/sec 4.23E-04 CM/sec

TRANSMISSIVITY 1.07E-04 FT+2/sec

12 11/87

Water Level Data  
for  
Rockwell (Rocky Flats)

<u>Date Measured</u>	<u>Depth to Water from TOC</u>	<u>Elevation TOC (ft)</u>	<u>Water Level Elev (ft)</u>
** Well Number 3287			
12 01/87	41 35	5948 03	5906 68

**INDEX OF DATA**

Boring No 33-87/BH56-87

Completed as well? Yes

Data in File

- Log of Borehole
- Well Construction Summaries
- Well Development Summaries
- Hydraulic Conductivity Test Data  
and Results
- Packer Test Data and Results
- Water Level Data

**LOG  
OF  
BOREHOLE**

Location Rocky Flats Plant, East Trenches Area Borehole/Well No 33-87/BH56-87  
 Coordinates N 36859 07 E 24815 13 Ground Surface Elevation 5945 27  
 Total Depth 24 50 Water Level Encountered 17 0  
 Static 5926 25 (12/01/87)

Drilling Company Boyles Bros Driller T High  
 Date Drilled September 10-11 1987 Helper B Keeney  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By K D Holliday Checked By J Passello  
 Geologist Site Manager  
Brent Davis  
 CAMP Manager

Comments \_\_\_\_\_

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<b><u>ROCKY FLATS ALLUVIUM</u></b>	
			<b><u>0.0 2.0 SAMPLE.</u></b> Recovered 19/20 = 95% CLAYEY SAND pale yellowish brown (10 YR 6/2) to dark yellowish brown (10 YR 4/2) some quartzite gravel some grasses and roots dry	<b><u>HNu Background=02</u></b> <b><u>OVA Background=10</u></b> No readings over background
			<b><u>2.0 3.5 SAMPLE.</u></b> Recovered 15/20 = 75% CLAYEY SAND very pale orange (10 YR 8/2) to pale yellowish brown (10 YR 6/2) some quartzite gravel unconsolidated dry	<b><u>2.0 3.5 Direct hit</u></b> sample BH568702DH
5			<b><u>2.0 4.0 SAMPLE.</u></b> Recovered 15/20 = 75% CLAYEY SAND very pale orange (10 YR 8/2) to pale yellowish brown (10 YR 6/2) some quartzite gravel unconsolidated dry	<b><u>3.0 Readings on</u></b> core OVA = 20 25
			<b><u>4.0 7.0 SAMPLE.</u></b> Recovered 13/30 = 43% CLAYEY SAND same as above	<b><u>4.0 5.3 Field screen</u></b> sample BH568704FS
			<b><u>7.0 9.5 SAMPLE.</u></b> Recovered 13/25 = 52% CLAYEY SAND grayish orange (10 YR 7/4) some quartzite gravel very fine grained sand unconsolidated dry	<b><u>9.5 10.4 Direct hit</u></b> sample BH568709DH
10			<b><u>9.5 12.0 SAMPLE.</u></b> Recovered 09/25 = 36% CLAYEY SAND moderate yellowish brown (10 YR 5/4) some quartzite gravel dry	<b><u>9.5 10.4 Readings on</u></b> core HNu = Back ground OVA = 36
				<b><u>12.0-14.0 Readings</u></b> on core OVA = 60
				<b><u>12.0 14.0 Direct hit</u></b> sample BH568712DH
15				<b><u>14.5 16.6 No</u></b> readings over background
20				

**LOG  
OF  
BOREHOLE**

<p>Location <u>Rocky Flats Plant, East Trenches Area</u></p> <p>Coordinates <u>N 36859 07 E 24815 13</u></p> <p>Total Depth <u>24 50'</u></p> <p>Drilling Company <u>Boyles Bros</u></p> <p>Date Drilled <u>September 10-11 1987</u></p> <p>Drilling Method <u>Hollow Stem Auger</u></p> <p>Logged By <u>K D Holliday</u> Geologist</p>	<p>Borehole/Well No <u>33-87/BH56-87</u></p> <p>Ground Surface Elevation <u>5945 27'</u></p> <p>Water Level Encountered <u>17 0</u> Static <u>5926 25' (12/01/87)</u></p> <p>Driller <u>T High</u></p> <p>Helper <u>B Keeney</u></p> <p>Drilling Fluid <u>None</u></p> <p>Checked By <u>J.P. Proulx</u> Site Manager</p> <p style="text-align: center;">CEARP Manager</p>
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Comments \_\_\_\_\_

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20			<p><u>12.0 14.5 SAMPLE.</u> Recovered 20/25 = 80%</p> <p>120 1345 CLAYEY SAND moderate yellowish brown (10 YR 5/4) to light brown (5 YR 5/6) some quartzite gravel fine grained to coarse grained sand un consolidated dry</p> <p>1345 140 SANDY CLAY moderate yellowish brown (10 YR 5/4) to light olive gray (5 Y 5/2) some quartzite gravel some caliche in small stringers consolidated dry</p>	<p>HNu Background=03 OVA Background=10</p> <p><u>17.0 18.9.</u> Water table sample BH568717WT</p> <p><u>19.5 22.0</u> Contact sample BH568720CT</p> <p><u>22.0 24.3</u> Bedrock sample BH568722BR</p>
25			<p><u>14.5 17.0 SAMPLE.</u> Recovered 21/25 = 84%</p> <p>CLAYEY SAND moderate yellowish brown (10 YR 5/4) some quartzite gravel fine grained sand poorly consolidated slightly damp</p>	
			<p><u>17.0 19.5 SAMPLE.</u> Recovered 19/25 = 76%</p> <p>170 178 CLAYEY SAND light brown (5 YR 5/6) to moderate yellowish brown (10 YR 5/4) some quartzite cobbles fine grained sand moist to wet</p> <p>178 189 CLAYEY SAND moderate yellowish brown (10 YR 5/4) some quartzite cobbles very fine to fine grained (35 40 phi to 25 15 phi) sand poorly sorted dry</p>	

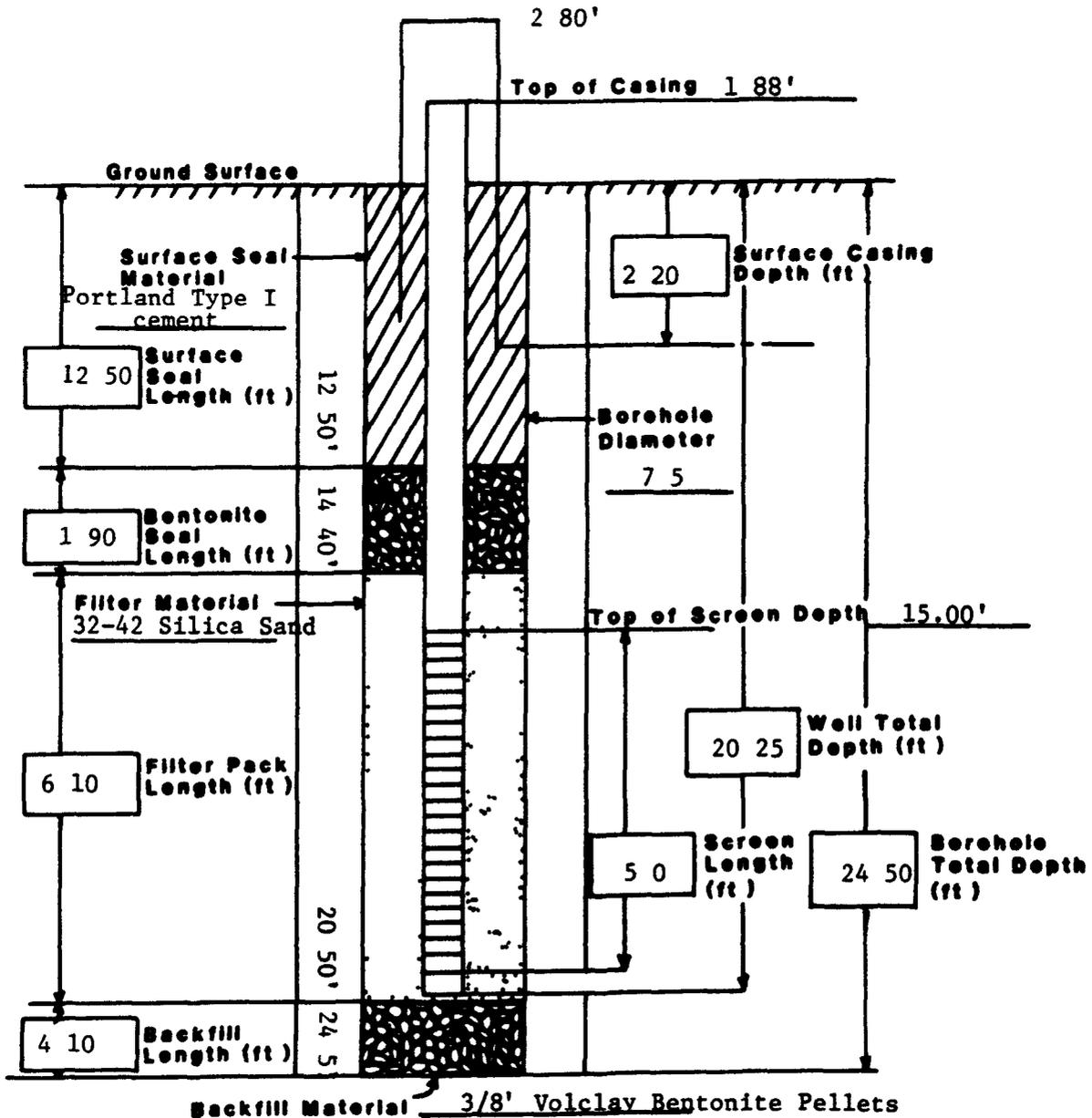


# WELL COMPLETION INFORMATION

Location Rocky Flats Plant, East Trenches Area Well No 33-87/BH56-87  
 Coordinates N 36859.07 E 24815.13 Elevation Ground Surface 5945.27  
 Total Depth Well 20.25' Top of Casing 5947.15'  
 Borehole 24.50'

Formation of Completion Rocky Flats Alluvium  
 Casing Material Sch 5, type 316 TFJ stainless steel Casing Diameter 2 ID  
 Screen Material 0.010 wire wrap, type 316 TFJ stainless steel Surface Casing Diameter 5' ID  
 Date installed Sept. 11, 1987 Approved By [Signature]  
 Installed By K D Holliway Geologist [Signature] Site Manager  
 CRAP Manager

Comments \_\_\_\_\_



12/11/87

Water Level Data  
for  
Rockwell (Rocky Flats)

Date  
Measured

Depth to Water  
from TOC

Elevation  
TOC (ft)

Water Level  
Elev (ft)

\*\* Well Number 3387

12/01/87

20 90

5947 15

5926 25

INDEX OF DATA

Boring No 34-87BR

Completed as well? Yes

Data in File

- Log of Borehole
- Well Construction Summaries
- Well Development Summaries
- Hydraulic Conductivity Test Data  
and Results
- Packer Test Data and Results
- Water Level Data

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant East Trenches Area Borehole/Well No 34-87BR  
 Coordinates N 36840 38 E 24825 73 Ground Surface Elevation 5945 21  
 Total Depth 124.00 Water Level Encountered 19 0  
 Static 5888 47 (12/01/87)  
 Drilling Company Boyles Bros Driller R Sharp, P Bushkovski  
 Date Drilled Aug 25-27, 1987, Aug 31-Sept 4 1987 Helper S Bradfield, K Parker  
 Drilling Method Hollow Stem Auger, Rotary Core Drilling Fluid 0-55 0 None  
 Logged By B.O. Hyde, K.D. Holliday Checked By 55 0'-124 0' Water  
 Geologist Brent Lewis Site Manager  
 CRAMP Manager

Comments Surface casing set to 55 3' August 27 1987 by B Q Hyde

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<b>TOPSOIL</b>	
			<u>0.0 1.5 SAMPLE.</u> Recovered 0 42/15 = 28% SOIL grayish brown (5 YR 3/2) very fine to coarse grained poorly sorted angular quartzite gravel subrounded sand organic rich dry to damp	HNu Background = 0 05 OVA Background = 0 45 No alpha readings taken No readings over background on core
5			<b>ROCKY FLATS ALLUVIUM</b>	
			<u>3.5 5.0 SAMPLE.</u> Recovered 0 75/15 = 50% SAND AND GRAVEL light brown (5 YR 6/4) fine to coarse grained sand sub rounded quartzitic pebble size angular quartzite gravels and cobbles poorly sorted dry	<u>0.0 1.5</u> Standard penetration test 6 /6 6 /7 6 /8  <u>3.5 5.0</u> Standard penetration test 6 /35 3 /100
10			<u>8.5 10.0 SAMPLE.</u> Recovered 1 33/15 = 89% GRAVEL AND SAND same as above with 70% gravel dry	<u>8.5 10.0</u> Standard penetration test 6 /90 6 /100 4 /100
			<u>13.5 15.0 SAMPLE.</u> Recovered 1 25/15 = 83% SAND AND GRAVEL same as above with 50 50 ratio dry	<u>13.5 15.0</u> Standard penetration test 6 /61 6 /60 3 /100
15			<u>15.0 18.5 CUTTINGS.</u> SAND AND GRAVEL light brown (5 YR 6/4) fine to coarse sand subrounded to subangular quartzitic pebble size gravel angular quartzitic poorly sorted dry	<u>18.5 20.0.</u> Standard penetration test 4"/100
20				

# LOG OF BOREHOLE

Location Rocky Flats Plant East Trenches Area Borehole/Well No 34-87BR  
 Coordinates N 36840 38 E 24825 73 Ground Surface Elevation 5945 21  
 Total Depth 124.00 Water Level Encountered 19 0  
 Static 5888 47' (12/01/87)  
 Drilling Company Bovles Bros Driller R Sharp, P Bushkovski  
 Date Drilled Aug 25-27, 1987, Aug 31-Sept 4 1987 Helper S Bradfield, K Parker  
 Drilling Method Hollow Stem Auger, Rotary Core Drilling Fluid 0-55 0' None  
 Logged By B.O. Hyde, K.D. Holliday Checked By 55 0'-124 0' Water *[Signature]*  
 Geologist Site Manager

CEARP Manager

Comments Surface casing set to 55 3' August 27 1987 by B Q Hyde

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20			<u>18.5 20.0 SAMPLE.</u> No core recovered Described from cuttings SAND dark yellowish brown (10 YR 4/2) fine to coarse grained sand subangular to subrounded poorly sorted 20% silt and clay poorly indurated wet	
	X		<b>ARAPAHOE FORMATION</b>	
			<u>20.0 23.0 SAMPLE.</u> SANDSTONE same as above	
			<u>23.5 25.0 SAMPLE.</u> Recovered 15/15 = 100% CLAYSTONE light olive gray (5 Y 5/2) sparse carbonized organics streaks of FeO moderately well indurated well sorted dry	<u>23.5 25.0</u> Standard penetration test 6 / 8 6 / 61 6 / 18
25				
			<u>28.5 30.0 SAMPLE.</u> Recovered 15/15 = 100% CLAYSTONE same as above dry	<u>28.5 30.0</u> Standard penetration test 6 / 18 6 / 41 6 / 80
30				
			<u>33.5 35.0' SAMPLE.</u> Recovered 15/15 = 100% CLAYSTONE same as above dry	<u>33.5 35.0</u> Standard penetration test 6 / 20 6 / 44 6 / 70
			<u>38.5 40.0 SAMPLE.</u> Recovered 075/15 = 50% CLAYSTONE same as above dry	
35				
			<u>43.5 45.0 SAMPLE.</u> Recovered 083/15 = 55% CLAYSTONE light olive gray (5 Y 5/2) to grayish olive (10 Y 4/2) no FeO staining less organics homogenous slightly moist	<u>38.5 40.0</u> Standard penetration test 6 / 85 3 / 100
40				

**LOG  
OF  
BOREHOLE**

Location Rocky Flats Plant East Trenches Area Borehole/Well No 34-87BR  
 Coordinates N 36840 38 E 24825 73 Ground Surface Elevation 5945 21'  
 Total Depth 124.00 Water Level Encountered 19 0  
 Static 5888.47' (12/01/87)  
 Drilling Company Boyles Bros Driller R Sharp, P Bushkovski  
 Date Drilled Aug 25-27, 1987, Aug 31-Sept 4 1987 Helper S Bradfield, K Parker  
 Drilling Method Hollow Stem Auger, Rotary Core Drilling Fluid 0-55 0' None  
 Logged By B.O. Hyde, K.D. Holliday Checked By 55 0'-124 0' Water  
 Geologist Site Manager  
 CEARP Manager

Comments Surface casing set to 55 3 August 27 1987 by B Q Hyde

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
40			<u>48.5 50.0 SAMPLE.</u> Recovered 1 17/15 = 78% CLAYSTONE grayish olive (10 Y 4/2) to dark greenish gray (5 G 4/1) to greenish black (5 G 2/1) structureless homogenous moderately well indurated unweathered bedrock at 49 0 dry	<u>43.5 45.0</u> Standard penetration test 6 / 44 4 / 100
45	X		<u>53.5 55.0 SAMPLE.</u> Recovered 0 92/15 = 61% CLAYSTONE same as above with greenish black (5 G 2/1) to grayish black (N 2/0) dry	
50	X		<u>53.0 56.0 SAMPLE.</u> Recovered 0 48/30 = 16% RQD = 0 48/0 48 = 100% 53 0 55 0 PLUG AND CEMENT 55 0 56 0 CLAYSTONE olive black (5 Y 2/1) trace silt unweathered dry	<u>48.5 50.0</u> Standard penetration test 6 / 45 6 / 100 4 / 100
55	X		<u>56.0 59.0 SAMPLE.</u> Recovered 1 0/30 = 33% RQD = 0 6/10 = 60% CLAYSTONE medium dark gray (N 4/0) unweathered damp	<u>53.5 55.0</u> Standard penetration test 6 / 60 5 / 100
60			<u>59.0 61.0 SAMPLE.</u> Recovered 1 8/20 = 90% RQD = 0% CLAYSTONE olive black (5 Y 2/1) trace silt trace very fine grained sand damp	<u>55.75-65.40</u> Packer Test Interval #6
			<u>61.0 63.0 SAMPLE.</u> Recovered 2 0/2.0 = 100% RQD = 1 11/20 = 56% CLAYSTONE same as above damp	

**LOG  
OF  
BOREHOLE**

Location Rocky Flats Plant East Trenches Area Borehole/Well No 34-87BR  
 Coordinates N 36840 38 E 24825 73 Ground Surface Elevation 5945 21'  
 Total Depth 124.00 Water Level Encountered 19 0  
 Static 5888 47' (12/01/87)  
 Drilling Company Boyles Bros Driller R Sharp, P Bushkovski  
 Date Drilled Aug 25-27, 1987, Aug 31-Sept 4 1987 Helper S Bradfield, K Parker  
 Drilling Method Hollow Stem Auger, Rotary Core Drilling Fluid 0-55 0' None  
 Logged By B.O. Hyde, K.D. Holliday Checked By 55 0'-124 0' Water *JHP*  
 Geologist Site Manager  
 CEARP Manager

Comments Surface casing set to 55 3 August 27 1987 by B Q Hyde

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
60			<u>63.0 66.0 SAMPLE.</u> Recovered 30/30 = 100% RQD = 25/30 = 83% CLAYSTONE same as above damp	
65			<u>66.0 69.0 SAMPLE.</u> Recovered 145/30 = 48% RQD = 0% CLAYSTONE same as above damp	<u>65.40 75.05</u> Packer Test Interval #5
70			<u>69.0 72.0 SAMPLE.</u> Recovered 39/30 = 130% RQD = 345/39 = 88% CLAYSTONE olive black (5 Y 2/1) trace silt lenses of fine grained sand medium gray (N 5/0) damp	
75			<u>72.0 76.0 SAMPLE.</u> Recovered 40/40 = 100% RQD = 388/40 = 97% 720 730 CLAYSTONE same as above damp	
80			730 760 SANDY CLAYSTONE olive black (5 Y 2/1) to light olive gray (5 Y 6/1) some silt sand 3525 phi sub rounded to subangular fairly well sorted occurs in lenses some organics damp	<u>75.05 84.70</u> , Packer Test Interval #4

**LOG  
OF  
BOREHOLE**

Location Rocky Flats Plant East Trenches Area Borehole/Well No 34-87BR  
 Coordinates N 36840 38 E 24825 73 Ground Surface Elevation 5945 21  
 Total Depth 124.00 Water Level Encountered 19 0  
 State 5888.47 (12/01/87)  
 Drilling Company Boyles Bros Driller R Sharp, P. Bushkovski  
 Date Drilled Aug 25-27, 1987, Aug 31-Sept 4 1987 Helper S Bradfield, K Parker  
 Drilling Method Hollow Stem Auger, Rotary Core Drilling Fluid 0-55 0' None  
 Logged By B.O. Hyde, K.D. Holliday Checked By 55 0'-124 0' Water *JJB*  
 Geologist Site Manager  
 CEARP Manager

Comments Surface casing set to 55 3 August 27 1987 by B Q Hyde

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
80			<p><u>76.0 80.0 SAMPLE.</u>            Recovered 40/40 = 100%            RQD = 37/40 = 93%            76.0 77.8 CLAYEY SANDSTONE same as above damp            77.8 79.0 CLAYSTONE same as above with lenses of sand damp            79.0 80.0 SAND SILT AND CLAY same as above damp</p>	<u>84.70 94.35</u> , Packer Test Interval #3
85			<p><u>80.0 84.0 SAMPLE.</u>            Recovered 40/40 = 100%            RQD = 34/40 = 85%            80.0 82.65 SAND SILT AND CLAY same as above damp            82.65 84.0 CLAYSTONE olive black (5 Y 2/1) some organics damp</p>	
90			<p><u>84.0 88.0 SAMPLE.</u>            Recovered 40/40 = 100%            RQD = 40/40 = 100%            CLAYSTONE dark greenish gray (5 GY 4/1) trace silt some organics damp</p>	
95			<p><u>88.0 92.0 SAMPLE.</u>            Recovered 16/40 = 40%            RQD = 0%            88.0 88.5 CLAYSTONE olive black (5 Y 2/1) damp            88.5 89.0 CLAYEY SILTSTONE olive black (5 Y 2/1) small stringers calcite indurated dry            89.0 89.6 CLAYSTONE olive black (5 Y 2/1) damp</p>	<u>94.35 104.00</u> Packer Test Interval #2
100				

**LOG  
OF  
BOREHOLE**

Location Rocky Flats Plant East Trenches Area Borehole/Well No 34-87BR  
 Coordinates N 36840 38 E 24825 73 Ground Surface Elevation 5945 21  
 Total Depth 124.00 Water Level Encountered 19 0'  
 Static 5888 47 (12/01/87)  
 Drilling Company Boyles Bros Driller R Sharp, P Bushkovski  
 Date Drilled Aug 25-27, 1987, Aug 31-Sept 4 1987 Helper S Bradfield, K Parker  
 Drilling Method Hollow Stem Auger, Rotary Core Drilling Fluid 0-55 0' None  
55 0'-124 0' Water  
 Logged By B.O. Hyde, K.D. Holliday Checked By [Signature]  
 Geologist Site Manager

CEARP Manager

Comments Surface casing set to 55 3' August 27 1987 by B Q Hyde

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
100			<p><u>92.0 96.0 SAMPLE.</u>            Recovered 2 25/40 = 56%            RQD = 0 7/2 25 = 31%            92 0 93 4 CLAYSTONE olive black (5 Y 2/1) to grayish black (N 2/0) trace silt some organics damp            93 4 93 9 CLAYEY SILTSTONE same as above dry            93 9 94 2 5 CLAYSTONE same as above dry</p>	<p><u>104.00 113.65</u> Packer Test Interval #1</p>
105		<p><u>96.0 98.0 SAMPLE.</u>            Recovered 2 4/20 = 120%            RQD = 1 92/29 = 66%            96 0 97 3 CLAY SILT AND SAND olive black (5 Y 2/1) sand 3 0 2 5 phi some silt some organics damp            97 3 98 0 CLAYEY SANDSTONE medium light gray (N 6/0) to medium dark gray (N 4/0) some clay some silt sand 3 0 2 0 phi fairly well sorted sub angular some organics damp</p>		
110			<p><u>98.0 101.0 SAMPLE.</u>            Recovered 3 0/30 = 100%            RQD = 2 8/30 = 93%            98 0 99 3 CLAYEY SANDSTONE same as above damp to dry            99 3 100 7 5 CLAYEY SILTSTONE olive black (5 Y 2/1) some very fine grained sand more clay than above some organics damp            100 7 5 101 0 CLAYEY SANDSTONE same as above damp</p>	
115				
120				

**LOG  
OF  
BOREHOLE**

Location Rocky Flats Plant East Trenches Area Borehole/Well No 34-87BR  
 Coordinates N 36840 38 E 24825 73 Ground Surface Elevation 5945 21  
 Total Depth 124.00 Water Level Encountered 19 0  
 Static 5888 47' (12/01/87)  
 Drilling Company Boyles Bros Driller R Sharp, P Bushkovski  
 Date Drilled Aug 25-27, 1987, Aug 31-Sept 4 1987 Helper S Bradfield, K Parker  
 Drilling Method Hollow Stem Auger, Rotary Core Drilling Fluid 0-55 0' None  
55 0'-124 0' Water  
 Logged By B.O. Hyde, K.D. Holliday Checked By [Signature]  
 Geologist Site Manager

**CEARP Manager**

Comments Surface casing set to 55 3 August 27 1987 by B Q Hyde

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
120	[Hatched Box]		<p><u>101.0 104.0 SAMPLE.</u>            Recovered 30/30 = 100%            RQD = 205/30 = 68%            SANDSTONE medium light gray (N 6/0) to medium dark gray (N 4/0) with lenses of olive black (5 Y 2/1) clay some silt and clay in lenses sand 20 30 phi fairly well sorted subrounded to subangular some organics coral fossils from 103 20 103 70 damp to dry</p>	
125			<p><u>104.0 108.0 SAMPLE.</u>            Recovered 38/40 = 95%            RQD = 308/38 = 81%            1040 10595 CLAYEY SILTSTONE dark greenish gray (5 GY 4/1) some clay some very fine grained sand some organics dry            10595 10695 CLAYEY SANDSTONE medium dark gray (N 4/0) sand 30 40 phi fairly well sorted some clay some silt some organics dry            10695 10800 SILTY CLAYSTONE medium dark gray (N 4/0) to olive black (5 Y 2/1) some sand some organics dry</p>	
			<p><u>108.00 112.50 SAMPLE.</u>            Recovered 45/45 = 100%            RQD = 35/45 = 78%            CLAYSTONE olive black (5 Y 2/1) to dark greenish gray (5 GY 4/1) many organics trace silt damp</p>	

**LOG  
OF  
BOREHOLE**

Location Rocky Flats Plant East Trenches Area Borehole/Well No 34-87BR  
 Coordinates N 36840 38 E 248<sup>25</sup> 73 Ground Surface Elevation 5945 21  
 Total Depth 124.00' Water Level Encountered 19 0  
 Static 5888 47' (12/01/87)  
 Drilling Company Boyles Bros Driller R Sharp, P Bushkovski  
 Date Drilled Aug 25-27, 1987, Aug 31-Sept 4 1987 Helper S Bradfield, K Parker  
 Drilling Method Hollow Stem Auger, Rotary Core Drilling Fluid 0-55 0' None  
 Logged By B.O. Hyde, K.D. Holliday Checked By 55 0'-124 0' Water *JJP*  
 Geologist Site Manager  
 CEARP Manager

Comments Surface casing set to 55 3' August 27 1987 by B Q Hyde

Depth Foot	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			<u>112.50 116.0 SAMPLE.</u> Recovered 3 5/3 5 = 100% RQD = 2 6/3 5 = 74% CLAYSTONE olive black (5 Y 2/1) many organics trace silt lignite coal 1133 1137 damp	
			<u>116.0 120.0 SAMPLE.</u> Recovered 4 4/4 0 = 110% RQD = 3 58/4 4 = 81% CLAYSTONE same as above damp	
			<u>120.0 124.0 SAMPLE.</u> Recovered 4 0/4 0 = 100% RQD = 3 6/4 0 = 90% CLAYSTONE same as above damp	
			TOTAL DEPTH 124 00	

# WELL COMPLETION INFORMATION

Location Rocky Flats Plant, East Trenches Area Well No 34-87BR  
 Coordinates N 36840.38 E 24825.73 Elevation Ground Surface 5945.21'  
 Total Depth Well 104.49' Top of Casing 5947.22'  
                   Borehole 124.00'

Formation of Completion Arapahoe Formation

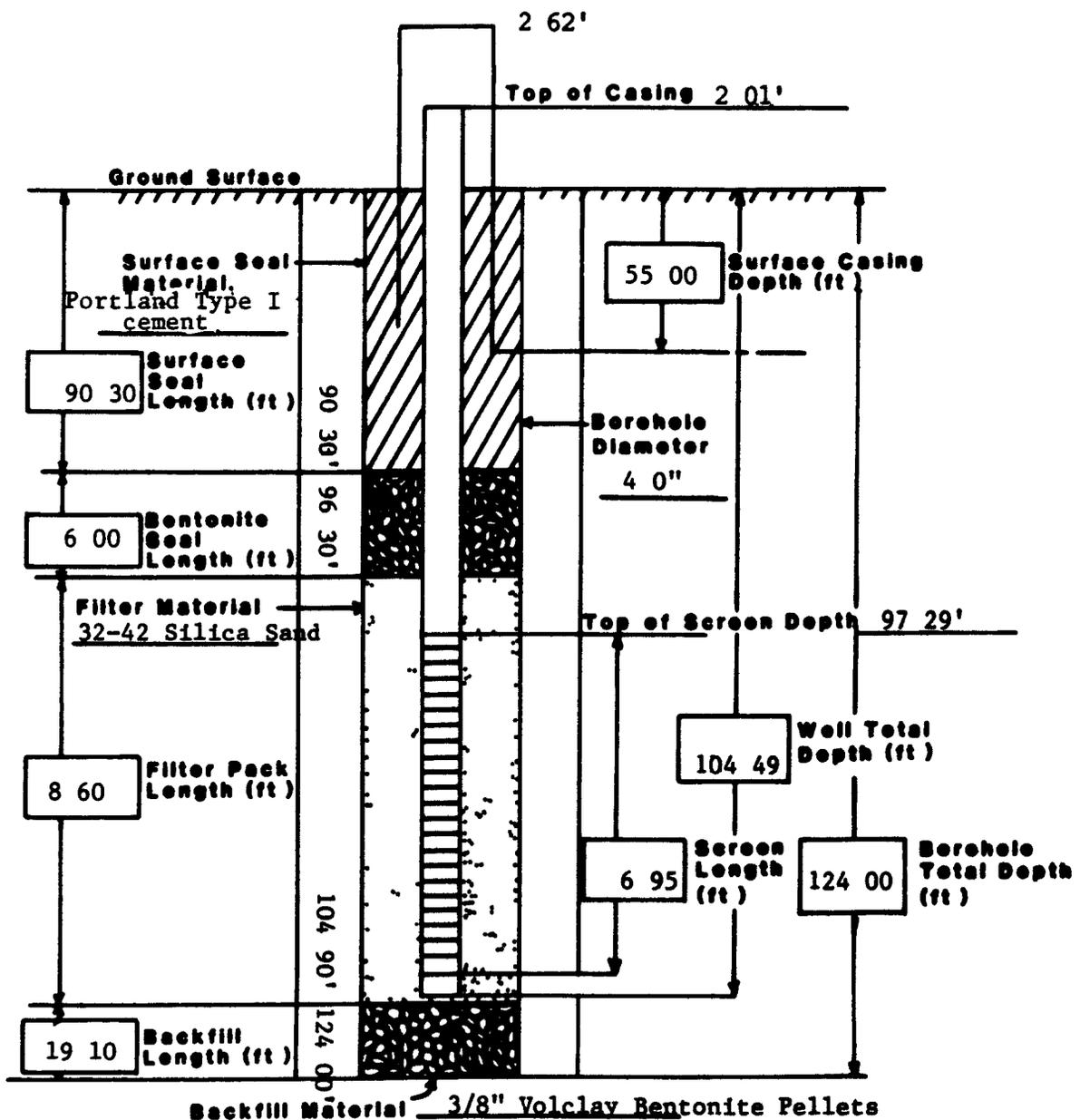
Casing Material Sch 5, type 316 TEI stainless steel Casing Diameter 2' ID

Screen Material 0.010 wire wrap, type 316 TFJ stainless steel Surface Casing Diameter 5" ID

Date Installed Sept. 3-4, 1987 Approved By [Signature]

Installed By K.D. Holliday Geologist [Signature] Site Manager  
[Signature] CRMP Manager

Comments Possible cave-in above filter pack from well sitting overnight



PACKER TEST ANALYSIS

WELL NO 34-87BR

ROCKY FLATS PLANT EAST TRENCHES JOB NO 2029-17-02

DATE TESTED 09/02/87 BY K D HOLLIWAY

TEST INTERVAL (FEET BELOW G S ) 65 40 - 75 05

MATERIAL TESTED ARAPAHOE CLAYSTONE

DEPTH TO WATER (FEET BELOW G S ) 72 85

$$K = \frac{Q}{2(\pi)(L)(H)} \ln\left(\frac{L}{R}\right)$$

1ST P1/3 TEST

Q = INJECTION RATE = 00218655 (FEET3/MIN)

L = LENGTH OF TEST INTERVAL = 9 65 FEET

TEST INTERVAL IS ABOVE WATER TABLE

HEAD = DEPTH OF CENTER OF INTERVAL + GAGE HEIGHT  
+ GAGE PRESSURE (IN FEET)

= 70 23 + 7 46 + 00 \* 2 31 = 77 69

R = BOREHOLE RADIUS = 17 FEET

K = HYDRAULIC CONDUCTIVITY = 00000188 FT/MIN

K = 00000096 CM/SEC

P2/3 TEST

Q = INJECTION RATE = 00144805 (FEET3/MIN)

L = LENGTH OF TEST INTERVAL = 9 65 FEET

TEST INTERVAL IS ABOVE WATER TABLE

HEAD = DEPTH OF CENTER OF INTERVAL + GAGE HEIGHT  
+ GAGE PRESSURE (IN FEET)

= 70 23 + 5 70 + 16 25 \* 2 31 = 113 46

R = BOREHOLE RADIUS = 17 FEET

K = HYDRAULIC CONDUCTIVITY = 00000085 FT/MIN

K = 00000043 CM/SEC

2ND P1/3 TEST

Q = INJECTION RATE = 00033305 (FEET3/MIN)

L = LENGTH OF TEST INTERVAL = 9 65 FEET

TEST INTERVAL IS ABOVE WATER TABLE

HEAD = DEPTH OF CENTER OF INTERVAL + GAGE HEIGHT  
+ GAGE PRESSURE (IN FEET)

= 70 23 + 9 08 + 00 \* 2 31 = 79 31

R = BOREHOLE RADIUS = 17 FEET

K = HYDRAULIC CONDUCTIVITY = 00000028 FT/MIN

K = 00000014 CM/SEC

PACKER TEST ANALYSIS

WELL NO 34-87BR

ROCKY FLATS PLANT; EAST TRENCHES

JOB NO 2029-17-02

DATE TESTED 9/02/87

BY K D HOLLIWAY

TEST INTERVAL (FEET BELOW G S )

75 05 - 84 70

MATERIAL TESTED ARAPAHOE CLAYSTONE

DEPTH TO WATER (FEET BELOW G S )

72 85

---

$$K = \frac{Q}{2(\pi)(L)(H)} \ln\left(\frac{L}{R}\right)$$

1ST P1/3 TEST

P2/3 TEST

Q = INJECTION RATE = 00005792 (FEET<sup>3</sup>/MIN)

L = LENGTH OF TEST INTERVAL = 9 65 FEET

TEST INTERVAL IS BELOW WATER TABLE

HEAD = DEPTH TO WATER + GAGE HEIGHT

+ GAGE PRESSURE (IN FEET)

= 72 85 + 5 70 + 18 50 \* 2 31 = 121 28

R = BOREHOLE RADIUS = 17 FEET

K = HYDRAULIC CONDUCTIVITY = 0000000320 FT/MIN

K = 00000002 CM/SEC

2ND P1/3 TEST

PACKER TEST ANALYSIS

WELL NO 34-87BR

ROCKY FLATS PLANT EAST TRENCHES JOB NO 2029-17-02

DATE TESTED 9/02/87 BY K D HOLLIWAY

TEST INTERVAL (FEET BELOW G S ) 84 70 - 94 35

MATERIAL TESTED ARAPAHOE CLAYSTONE

DEPTH TO WATER (FEET BELOW G S ) 72 85

---

$$K = \frac{Q}{2(\pi)(L)(H)} \ln\left(\frac{L}{R}\right)$$

1ST P1/3 TEST

P2/3 TEST

Q = INJECTION RATE = 00011584 (FEET<sup>3</sup>/MIN)

L = LENGTH OF TEST INTERVAL = 9 65 FEET

TEST INTERVAL IS BELOW WATER TABLE

HEAD = DEPTH TO WATER + GAGE HEIGHT

+ GAGE PRESSURE (IN FEET)

= 72 85 + 5 70 + 20 80 \* 2 31 = 126 60

R = BOREHOLE RADIUS = 17 FEET

K = HYDRAULIC CONDUCTIVITY = 0000000613 FT/MIN

K = 00000003 CM/SEC

2ND P1/3 TEST

PACKER TEST ANALYSIS

WELL NO 34-87BR

ROCKY FLATS PLANT EAST TRENCH JOB NO 2029-17-02

DATE TESTED 9/02/87 BY K D HOLLIWAY

TEST INTERVAL (FEET BELOW G S ) 94 35 - 104 00

MATERIAL TESTED ARAPAHOE SANDSTONE

DEPTH TO WATER (FEET BELOW G S ) 72 85

$$K = \frac{Q}{2(\pi)(L)(H)} \ln\left(\frac{L}{R}\right)$$

1ST P1/3 TEST

Q = INJECTION RATE = 00001448 (FEET3/MIN)

L = LENGTH OF TEST INTERVAL = 9 65 FEET

TEST INTERVAL IS BELOW WATER TABLE

HEAD = DEPTH TO WATER + GAGE HEIGHT

+ GAGE PRESSURE (IN FEET)

= 72 85 + 8 22 + 00 \* 2 31 = 81 07

R = BOREHOLE RADIUS = 17 FEET

K = HYDRAULIC CONDUCTIVITY = 0000000120 FT/MIN

K = 00000001 CM/SEC

P2/3 TEST

Q = INJECTION RATE = 00041993 (FEET3/MIN)

L = LENGTH OF TEST INTERVAL = 9 65 FEET

TEST INTERVAL IS BELOW WATER TABLE

HEAD = DEPTH TO WATER + GAGE HEIGHT

+ GAGE PRESSURE (IN FEET)

= 72 85 + 5 70 + 23 10 \* 2 31 = 131 91

R = BOREHOLE RADIUS = 17 FEET

K = HYDRAULIC CONDUCTIVITY = 0000002132 FT/MIN

K = 00000011 CM/SEC

2ND P1/3 TEST

PACKER TEST ANALYSIS

WELL NO 34-87BR

ROCKY FLATS PLANT EAST TRENCH JOB NO 2029-17-02

DATE TESTED 9/02/87 BY K D HOLLIWAY

TEST INTERVAL (FEET BELOW G S ) 104 00 - 113 65

MATERIAL TESTED ARAPAHOE CLAYSTONE

DEPTH TO WATER (FEET BELOW G S ) 72 85

---

$$K = \frac{Q}{2(\pi)(L)(H)} \ln\left(\frac{L}{R}\right)$$

1ST P1/3 TEST

P2/3 TEST

Q = INJECTION RATE = 00011584 (FEET<sup>3</sup>/MIN)

L = LENGTH OF TEST INTERVAL = 9 65 FEET

TEST INTERVAL IS BELOW WATER TABLE

HEAD = DEPTH TO WATER + GAGE HEIGHT

+ GAGE PRESSURE (IN FEET)

= 72 85 + 5 70 + 25 40 \* 2 31 = 137 22

R = BOREHOLE RADIUS = 17 FEET

K = HYDRAULIC CONDUCTIVITY = 0000000565 FT/MIN

K = 00000003 CM/SEC

2ND P1/3 TEST



12, 11/87

Water Level Data  
for  
Rockwell (Rocky Flats)

Date  
Measured

Depth to Water  
from TOC

Elevation  
TOC (ft)

Water Level  
Elev (ft)

\*\* Well Number 3487BR

12/01/87

58 75

5947 22

5888 47

## INDEX OF DATA

Boring No 35-87

Completed as well? Yes

### Data in File

- Log of Borehole
- Well Construction Summaries
- Well Development Summaries
- Hydraulic Conductivity Test Data  
and Results
- Packer Test Data and Results
- Water Level Data

LOG  
OF  
BOREHOLE

Location <u>Rocky Flats Plant, East Trenches Area</u>	Borehole/Well No <u>35-87</u>
Coordinates <u>N 36981.20 E 24162 59</u>	Ground Surface Elevation <u>5949 36</u>
Total Depth <u>14.40</u>	Water Level Encountered <u>None</u>
	Static <u>5940 27 (12/01/87)</u>
Drilling Company <u>Boyles Bros</u>	Driller <u>R Sharp</u>
Date Drilled <u>August 31, 1987</u>	Helper <u>S Bradfield</u>
Drilling Method <u>Hollow Stem Auger</u>	Drilling Fluid <u>None</u>
Logged By <u>J.B Bergman</u> Geologist	Checked By <u>J. Pasella</u> Site Manager <u>Brent ...</u> CEAMP Manager

Comments \_\_\_\_\_

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<b>TOPSOIL</b>	
			<u>0.0 1.5 SAMPLE.</u> Recovered 13/15 = 87% TOPSOIL dusky brown (5 YR 2/2) clay abundant quartzite gravels abundant roots and grasses angular poorly sorted consolidated dry to moist	HNu Background=04 OVA Background=00 No Ludlum readings taken  <u>0.0 1.5</u> Standard penetration test 6 /14 6 /10 2 /14
5			<b>ROCKY FLATS ALLUVIUM</b>	
			<u>1.5 3.0 SAMPLE.</u> Recovered 13/15 = 93% SAND AND GRAVEL moderate yellowish brown (10 YR 5/4) abundant quartzite gravels angular some caliche medium to coarse grained sand poorly sorted unconsolidated dry	<u>1.5 3.0</u> Standard penetration test 6 /22 6 /62 5 /38  <u>3.0 4.5</u> Standard penetration test 6 /89 6 /11 0 /0
10			<u>3.0 4.0 SAMPLE.</u> Recovered 07/10 = 70% SAND AND GRAVEL pale yellowish brown (10 YR 6/2) sand matrix with abundant quartzite gravels angular some caliche medium to coarse grained sand poorly sorted unconsolidated dry	<u>8.4 10.4</u> Readings on core HNu = 12 OVA = 00  <u>10.4 12.4</u> Readings on core HNu = 5 OVA = 00
15			<u>4.0 5.2 SAMPLE.</u> No recovery Drilled with center bit  <u>5.2 6.0 SAMPLE.</u> Recovered 20/08 = 250% SAND AND GRAVEL same as 30 45 except moderate yellowish brown (10 YR 5/4) dry	<u>12.4 14.4</u> Readings on core HNu = 24 OVA = 00

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No 35-87  
 Coordinates N 36981.20 E 24162 59 Ground Surface Elevation 5949 36  
 Total Depth 14.40' Water Level Encountered None  
 Static 5940 27 (12/01/87)  
 Drilling Company Boyles Bros Driller R Sharp  
 Date Drilled August 31, 1987 Helper S Bradfield  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By J B. Bergman Checked By J. Paselke  
 Geologist Site Manager  
 CEARP Manager

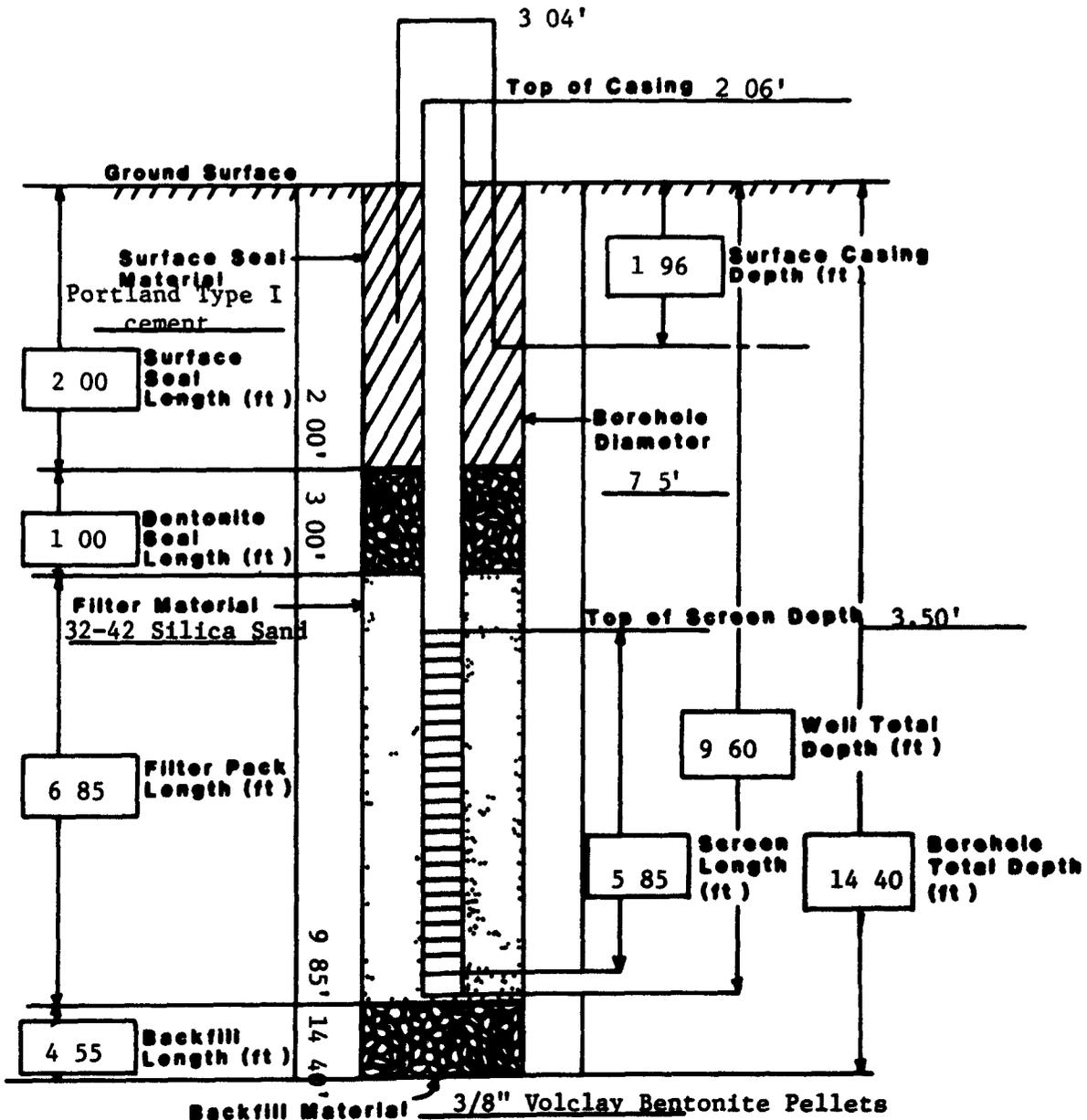
Comments \_\_\_\_\_  
 \_\_\_\_\_

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			<p><u>6.0 8.0 SAMPLE.</u>            Recovered 09/20 = 45%            SAND AND GRAVEL some gravel light brown (5 YR 5/6) patch of sand coarse grained sand FeO stains angular unsorted dry</p>	
			<p>TOTAL DEPTH WITH PLOPPER 84            READJUST DEPTH</p>	
			<p><u>8.4 10.4 SAMPLE.</u>            Recovered 20/20 = 100%            84 91 same as above</p>	
			<p><u>ARAPAHOE FORMATION</u></p>	
			<p>91 104 CLAYSTONE light gray (N 7/0) few dark yellowish orange (10 YR 6/6) weathered some very fine grained sand rounded some caliche well sorted dry</p>	
			<p><u>10.4 12.4 SAMPLE.</u>            Recovered 20/20 = 100%            CLAYSTONE same as above</p>	
			<p><u>12.4 14.4 SAMPLE.</u>            Recovered 20/20 = 100%            CLAYSTONE same as above with more mottles in lower 4 consolidated dry</p>	
			<p>TOTAL DEPTH 14 40</p>	

# WELL COMPLETION INFORMATION

Location Rocky Flats Plant, East Trenches Area Well No 35-87  
 Coordinates N 36981 20 E 24162.59 Elevation Ground Surface 5949 36'  
 Total Depth Well 9.60 Top of Casing 5951 42'  
 Borehole 14 40'  
 Formation of Completion Rocky Flats Alluvium  
 Casing Material Sch 5, type 316 TEJ stainless steel Casing Diameter 2" ID  
 Screen Material 0.010' wire wrap, type 316 TFJ stainless steel Surface Casing Diameter 5" ID  
 Date Installed Sept. 1, 1987 Approved By J. Passolunghi  
 Installed By J.B. Bergman Site Manager  
 Geologist Brent Lewis CEAP Manager

Comments \_\_\_\_\_



12/11/87

Water Level Data  
for  
Rockwell (Rocky Flats)

Date  
Measured

Depth to Water  
from TOC

Elevation  
TOC (ft)

Water Level  
Elev (ft)

\*\* Well Number 3587

12/01/87

11 15

5951 42

5940 27

INDEX OF DATA

Boring No 36-87BR

Completed as well? Yes

Data in File

- Log of Borehole
- Well Construction Summaries
- Well Development Summaries
- Hydraulic Conductivity Test Data  
and Results
- Packer Test Data and Results
- Water Level Data

## INDEX OF DATA

Boring No 36-87BR

Completed as well? Yes

### Data in File

- Log of Borehole
- Well Construction Summaries
- Well Development Summaries
- Hydraulic Conductivity Test Data  
and Results
- Packer Test Data and Results
- Water Level Data

**LOG  
OF  
BOREHOLE**

Location Rocky Flats Plant. East Trenches Area Borehole/Well No 36-87BR  
 Coordinates N 36985 79 E 24189 80 Ground Surface Elevation 5949.04'  
 Total Depth 74.50 Water Level Encountered 35.0  
 Static 5917.22' (12/01/87)  
 Drilling Company Boyles Bros Driller R. Sharp, T Merritt  
 Date Drilled August 18-27, 1987 Helper S. Bradfield, J. Duncan  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By R T Treat Checked By J. J. Passolunghi  
 Geologist Brent Glass Site Manager  
CEARP Manager

Comments \_\_\_\_\_

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<b>TOPSOIL</b>	
			<u>0.0 2.0 SAMPLE.</u> Recovered 1 3/20 = 65%	
			<u>00 03 TOPSOIL</u> grayish brown (5 YR 3/2) sandy silty gravel and cobbles dry	HNu Background=00 OVA Background=00 No readings over background
			<b>ROCKY FLATS ALLUVIUM</b>	
5			<u>03 13 CLAYEY GRAVEL</u> grayish brown (5 YR 3/2) clayey subangular and angular gravel poorly sorted calcareous dry	<u>8.0</u> Readings on core HNu = 35 OVA = 20
			<u>2.0 4.0 SAMPLE.</u> Recovered 1 5/20 = 75%	
			<u>SANDY GRAVELS</u> very pale orange (10 YR 8/2) to white medium grained sand subangular to subrounded gravel and cobbles poorly sorted some clay abundant caliche dry	<u>9.0 11.0</u> Readings on core HNu = 05 OVA = 15
10			<u>4.0 4.5 SAMPLE.</u> Recovered 0 4/05 = 80%	
			<u>SAND AND GRAVEL</u> moderate orange pink (5 YR 8/4) to light brown (5 YR 6/4) subangular and angular cobbles and gravel calcareous sand dry to slightly damp	<u>11.0 TD</u> No readings over background
15			<u>4.5 5.0 SAMPLE.</u> No recovery Drilled with center bit	
20				

LOG  
OF  
BOREHOLE

Location <u>Rocky Flats Plant, East Trenches Area</u>	Borehole/Well No <u>36-87BR</u>
Coordinates <u>N 36985 79 E 24189 80</u>	Ground Surface Elevation <u>5949 04</u>
Total Depth <u>74.50</u>	Water Level Encountered <u>35.0'</u>
	Static <u>5917.22 (12/01/87)</u>
Drilling Company <u>Boyles Bros</u>	Driller <u>R. Sharp, T. Merritt</u>
Date Drilled <u>August 18-27, 1987</u>	Helper <u>S. Bradfield, J. Duncan</u>
Drilling Method <u>Hollow Stem Auger</u>	Drilling Fluid <u>None</u>
Logged By <u>R T Treat</u> Geologist	Checked By <u>J. Pasche</u> Site Manager
	<u>CEARP Manager</u>

Comments \_\_\_\_\_

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20			<p><u>5.0 6.5 SAMPLE.</u> Recovered 13/15 = 87% SAND AND GRAVEL moderate brown (5 YR 4/4) to dark yellowish orange (10 YR 6/6) clayey medium grained sands poorly sorted massive slightly calcareous damp</p>	
25			<p><u>6.5 7.0 SAMPLE.</u> No recovery Drilled with center bit</p>	
30			<p><u>7.0 9.0 SAMPLE.</u> Recovered 17/20 = 85% 70 75 CLAY AND GRAVEL pale yellowish brown (10 YR 6/2) to grayish orange (10 YR 7/4) fine grained sand angular gravel clay very calcareous damp</p> <p style="text-align: center;"><b><u>ARAPAHOE FORMATION</u></b></p>	
35			<p>75 90 SANDY CLAYSTONE yellowish gray (5 Y 7/2) fine grained sand FeO stained calcareous weathered damp to slightly moist</p> <p><u>9.0 11.0 SAMPLE.</u> Recovered 20/20 = 100% SANDY CLAYSTONE same as above moist</p>	
40			<p><u>11.0 13.0 SAMPLE.</u> Recovered 20/20 = 100% SANDY CLAYSTONE light olive gray (5 Y 5/2) to yellowish gray (5 Y 7/2) fine grained sand calcareous weathered moist</p>	

**LOG  
OF  
BOREHOLE**

Location <u>Rocky Flats Plant, East Trenches Area</u>	Borehole/Well No <u>36-87BR</u>
Coordinates <u>N 36985 79 E 24189 80</u>	Ground Surface Elevation <u>5949.04'</u>
Total Depth <u>74.50</u>	Water Level Encountered <u>35.0</u>
	Static <u>5917.22 (12/01/87)</u>
Drilling Company <u>Boyles Bros</u>	Driller <u>R. Sharp, T. Merritt</u>
Date Drilled <u>August 18-27, 1987</u>	Helper <u>S. Bradfield, J. Duncan</u>
Drilling Method <u>Hollow Stem Auger</u>	Drilling Fluid <u>None</u>
Logged By <u>R T Treat</u> Geologist	Checked By <u>J. Pasallo</u> Site Manager
	<u>CEARP Manager</u>

Comments \_\_\_\_\_

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
40			<u>13.0 15.0 SAMPLE.</u> Recovered 20/20 = 100% <b>SANDY CLAYSTONE</b> same as above with Fe staining moist	
45			<u>15.0 17.0 SAMPLE.</u> Recovered 20/20 = 100% <b>SANDY CLAYSTONE</b> same as above moist	
	[Stippled pattern]		<u>17.0 19.0 SAMPLE.</u> Recovered 20/20 = 100% <b>SANDY CLAYSTONE</b> same as above moist	
50			<u>19.0 21.0 SAMPLE.</u> Recovered 20/20 = 100% <b>SANDSTONE</b> light gray (N 7/0) to yel lowish gray (5 Y 7/2) fine to medium grained sands weakly cemented clayey weathered moist	
55			<u>21.0 21.5 SAMPLE.</u> Recovered 05/05 = 100% <b>SANDSTONE</b> yellowish gray (5 Y 7/2) medium grained poorly sorted sands rounded to subrounded silty weakly ce mented massive weathered moist	
	[Stippled pattern]		<u>21.5 23.0 SAMPLE.</u> Recovered 15/15 = 100% <b>SANDSTONE</b> same as above moist	
60				

LOG  
OF  
BOREHOLE

Location <u>Rocky Flats Plant, East Trenches Area</u>	Borehole/Well No <u>36-87BR</u>
Coordinates <u>N 36985 79 E 24189 80</u>	Ground Surface Elevation <u>5949 04</u>
Total Depth <u>74.50'</u>	Water Level Encountered <u>35.0</u> Static <u>5917.22 (12/01/87)</u>
Drilling Company <u>Boyles Bros</u>	Driller <u>R. Sharp, T Merritt</u>
Date Drilled <u>August 18-27, 1987</u>	Helper <u>S. Bradfield, J. Duncan</u>
Drilling Method <u>Hollow Stem Auger</u>	Drilling Fluid <u>None</u>
Logged By <u>R T Treat</u> Geologist	Checked By <u>J Pasella</u> Site Manager
	CEARP Manager

Comments \_\_\_\_\_

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
60			<u>23.0 24.5 SAMPLE.</u> Recovered 15/15 = 100% SANDSTONE light olive gray (5 Y 6/1) medium grained poorly sorted sand mas sive moderately cemented weathered moist	
65			<u>24.5 26.0 SAMPLE.</u> Recovered 15/15 = 100% SANDSTONE same as above with fine grained sand weathered moist	
70			<u>26.0 27.5 SAMPLE.</u> Recovered 15/15 = 100% SANDSTONE dark yellowish orange (10 YR 6/6) fine grained sand silty FeO stained massive weathered moist	
75			<u>27.5 29.0 SAMPLE.</u> Recovered 15/15 = 100% SANDSTONE light gray (N 7/0) to dark yellowish orange (10 YR 6/6) fine grained sand FeO stained moderately cemented weathered moist	
			<u>29.0 30.5 SAMPLE.</u> Recovered 15/15 = 100% SANDSTONE same as above moist	
			<u>30.5 32.5 SAMPLE.</u> Recovered 20/20 = 100% SANDSTONE yellowish gray (5 Y 7/2) fine grained sand silty Fe stained mas sive weathered moist	

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No 36-87BR  
 Coordinates N 36985 79 E 24189 80 Ground Surface Elevation 5949 04  
 Total Depth 74.50 Water Level Encountered 35.0  
 Static 5917.22 (12/01/87)  
 Drilling Company Boyles Bros Driller R. Sharp, T Merritt  
 Date Drilled August 18-27, 1987 Helper S. Bradfield, J. Duncan  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By R T Treat Checked By J. Pasche  
 Geologist Site Manager  
 CEARP Manager

Comments \_\_\_\_\_

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			<u>32.5 34.0 SAMPLE.</u> Recovered 15/15 = 100% SANDSTONE same as above moist	
			<u>34.0 35.5 SAMPLE.</u> Recovered 15/15 = 100% SANDSTONE pale yellowish orange (10 YR 8/6) to dark yellowish brown (10 YR 4/2) fine grained sand silty poorly sorted weakly cemented massive FeO stained weathered moist to wet	
			<u>35.5 37.0 SAMPLE.</u> Recovered 15/15 = 100% SANDSTONE dark yellowish orange (10 YR 6/6) to pale yellowish orange (10 YR 8/6) medium grained sand weakly cemented massive weathered moist	
			<u>37.0 38.5 SAMPLE.</u> Recovered 13/15 = 87% SANDSTONE grayish orange (10 YR 7/4) to light bluish gray (5 B 7/1) fine grained sand silty thin bedded weathered moist	
			<u>38.5 40.0 SAMPLE.</u> Recovered 15/15 = 100% SANDSTONE browns fine grained silty Fe stained weakly cemented weathered moist	
			<u>40.0 41.5 SAMPLE.</u> Recovered 14/15 = 93% SANDSTONE same as above moist	

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No 36-87BR  
 Coordinates N 36985 79 E 24189 80 Ground Surface Elevation 5949 04  
 Total Depth 74.50 Water Level Encountered 35.0  
 Static 5917 22 (12/01/87)  
 Drilling Company Boyles Bros Driller R Sharp, T Merritt  
 Date Drilled August 18-27, 1987 Helper S. Bradfield, J. Duncan  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By R T Treat Checked By J. Paselle  
 Geologist Site Manager  
 CEARP Manager

Comments \_\_\_\_\_

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
—			<u>41.5 43.0 SAMPLE.</u> Recovered 09/15 = 60% SANDSTONE dark yellowish orange (10 YR 6/6) to grayish orange (10 YR 7/4) fine grained sands subrounded to subangular poorly cemented weakly cemented weathered moist to wet	
—			<u>43.0 44.0 SAMPLE.</u> Recovered 08/10 = 80% SANDSTONE same as above moist to wet	
—			<u>44.0 45.5 SAMPLE.</u> Recovered 07/15 = 47% SANDSTONE same as above moist	
—			<u>45.5 47.0 SAMPLE.</u> Recovered 15/15 = 100% CLAYEY SANDSTONE light brown (5 YR 5/6) to light gray (N 7/0) moderately cemented weathered moist	
—			<u>47.0 48.0 SAMPLE.</u> Recovered 03/10 = 30% CLAYEY SANDSTONE light olive gray (5 Y 6/1) fine grained poorly sorted sand weakly cemented weathered moist	
—			<u>48.0 49.0 SAMPLE.</u> No recovery Drilled with center bit	

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No 36-87BR  
 Coordinates N 36985 79 E 24189 80 Ground Surface Elevation 5949.04  
 Total Depth 74.50 Water Level Encountered 35.0  
 Static 5917.22' (12/01/87)  
 Drilling Company Boyles Bros Driller R. Sharp, T. Merritt  
 Date Drilled August 18-27, 1987 Helper S. Bradfield, J. Duncan  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By R T Treat Checked By J. Pasolun  
 Geologist Site Manager  
 CEARP Manager

Comments \_\_\_\_\_

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			<p><u>49.0 49.5 SAMPLE.</u>            Recovered 05/05 = 100%            CLAYEY SANDSTONE light olive gray            (5 Y 6/1) fine grained poorly sorted            sand subangular to subrounded moder-            ately cemented weathered moist</p>	
			<p><u>49.5 50.0 SAMPLE.</u>            Recovered 05/05 = 100%            SANDSTONE light gray (N 7/0) fine            grained sand silty clayey poorly sorted            trace FeO staining weathered moist</p>	
			<p><u>50.0 51.0 SAMPLE.</u>            Recovered 10/10 = 100%            500 507 SANDSTONE same as above            moist            507 510 CLAYSTONE dark gray (N            3/0) fine grained sand medium plastic            weathered moist</p>	
			<p><u>51.0 52.5 SAMPLE.</u>            Recovered 15/15 = 100%            510 518 SANDY CLAYSTONE dark            gray (N 3/0) to medium light gray (N            6/0) fine grained sand moderately ce-            mented weathered moist            518 525 SANDSTONE medium gray (N            5/0) subrounded and subangular poorly            sorted fine grained sands weakly ce-            mented weathered moist</p>	
			<p><u>52.5 52.8 SAMPLE.</u>            Recovered 03/03 = 100%            SANDSTONE light gray (N 7/0) fine            grained moderately cemented massive            weathered moist</p>	

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No 36-87BR  
 Coordinates N 36985 79 E 24189 80 Ground Surface Elevation 5949 04  
 Total Depth 74.50 Water Level Encountered 35.0'  
 Static 5917.22 (12/01/87)  
 Drilling Company Boyles Bros Driller R. Sharp, T Merritt  
 Date Drilled August 18-27, 1987 Helper S. Bradfield, J. Duncan  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By R T Treat Checked By J. Pasche  
 Geologist Site Manager  
 CEARP Manager

Comments \_\_\_\_\_

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			<p><u>52.8 53.8 SAMPLE.</u> No recovery SANDSTONE same as above</p>	
			<p><u>53.8 54.0 SAMPLE.</u> Recovered 0 55/0 2 = 275% CLAYEY SANDSTONE dark yellowish orange (10 YR 6/6) to light gray (N 7/0) medium to fine grained sand clayey moderately cemented FeO stained weathered moist</p>	
			<p><u>54.0 55.5 SAMPLE.</u> Recovered 0 95/1 5 = 63% CLAYEY SANDSTONE same as above moist</p>	
			<p><u>55.5 56.0 SAMPLE.</u> No recovery Drilled with center bit</p>	
			<p><u>56.0 57.0 SAMPLE.</u> Recovered 1 0/1 0 = 100% CLAYEY SANDSTONE light gray (N 7/0) to medium gray (N 5/0) fine grained subrounded to rounded poorly sorted sand weakly cemented clayey weathered moist</p>	
			<p><u>57.0 57.5 SAMPLE.</u> Recovered 0 35/0 5 = 70% CLAYEY SANDSTONE same as above moist</p>	

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No 36-87BR  
 Coordinates N 36985 79 E 24189 80 Ground Surface Elevation 5949 04  
 Total Depth 74.50 Water Level Encountered 35.0  
 Static 5917.22' (12/01/87)  
 Drilling Company Boyles Bros Driller R Sharp, T Merritt  
 Date Drilled August 18-27, 1987 Helper S. Bradfield, J. Duncan  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By R T Treat Checked By J. Pasalle  
 Geologist Site Manager

CEARP Manager

Comments \_\_\_\_\_

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			<u>57.5 58.0 SAMPLE.</u> Recovered 0 5/0 5 = 100% SANDSTONE light gray (N 7/0) to dark yellowish orange (10 YR 6/6) fine to medium grained sands highly FeO stained clayey to less clay downward weathered moist	
			<u>58.0 58.5 SAMPLE.</u> Recovered 0 5/0 5 = 100% SANDSTONE same as above moist	
			<u>58.5 59.0 SAMPLE.</u> Recovered 0 5/0 5 = 100% SANDSTONE same as above except coarser sand moist	
			<u>59.0 59.5 SAMPLE.</u> Recovered 0 5/0 5 = 100% SANDSTONE same as above moist to wet	
			<u>59.5 60.0 SAMPLE.</u> Recovered 0 5/0 5 = 100% SANDSTONE same as above moist	
			<u>60.0 61.0 SAMPLE.</u> Recovered 0 7/1 0 = 70% SANDSTONE same as above except more fine grained moist	
			<u>61.0 62.0 SAMPLE.</u> Recovered 0 75/1 0 = 75% SANDSTONE dark yellowish orange (10 YR 6/6) fine grained sand weakly ce mented weathered moist	



LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No 36-87BR  
 Coordinates N 36985 79 E 24189 80 Ground Surface Elevation 5949.04'  
 Total Depth 74.50 Water Level Encountered 35.0  
 Static 5917.22' (12/01/87)  
 Drilling Company Boyles Bros Driller R Sharp, T Merritt  
 Date Drilled August 18-27, 1987 Helper S. Bradfield, J. Duncan  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By R T Treat Checked By A Pasche  
 Geologist Site Manager  
 CEARP Manager

Comments \_\_\_\_\_

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			<u>67.0 68.0 SAMPLE.</u> Recovered 0 65/10 = 65% CLAYEY SANDSTONE medium gray (N 5/0) fine grained sands massive moderately to weakly cemented moist	
			<u>68.0 69.0 SAMPLE.</u> No recovery	
			<u>69.0 70.5 SAMPLE.</u> No recovery	
			<u>70.5 72.0 SAMPLE.</u> Recovered 1 15/15 = 77% CLAYEY SANDSTONE medium gray (N 5/0) fine grained sand clayey massive moderately cemented moist	
			<u>72.0 73.5 SAMPLE.</u> Recovered 1 10/15 = 73% CLAYEY SANDSTONE medium dark gray (N 4/0) fine grained sand clayey massive moist	
			<u>73.5 74.5 SAMPLE.</u> Recovered 10/10 = 100% SANDSTONE/CLAYSTONE medium dark gray (N 4/0) to dark gray (N 3/0) moderately cemented moist	
			TOTAL DEPTH 74.50	

# WELL COMPLETION INFORMATION

Location Rocky Flats Plant East Trenches Area Well No 36-87BR  
 Coordinates N 36985.79 E 24189.80 Elevation Ground Surface 5949.04'  
 Total Depth Well 63.59 Top of Casing 5951.12  
 Borehole 74 50

Formation of Completion Arapahoe Formation

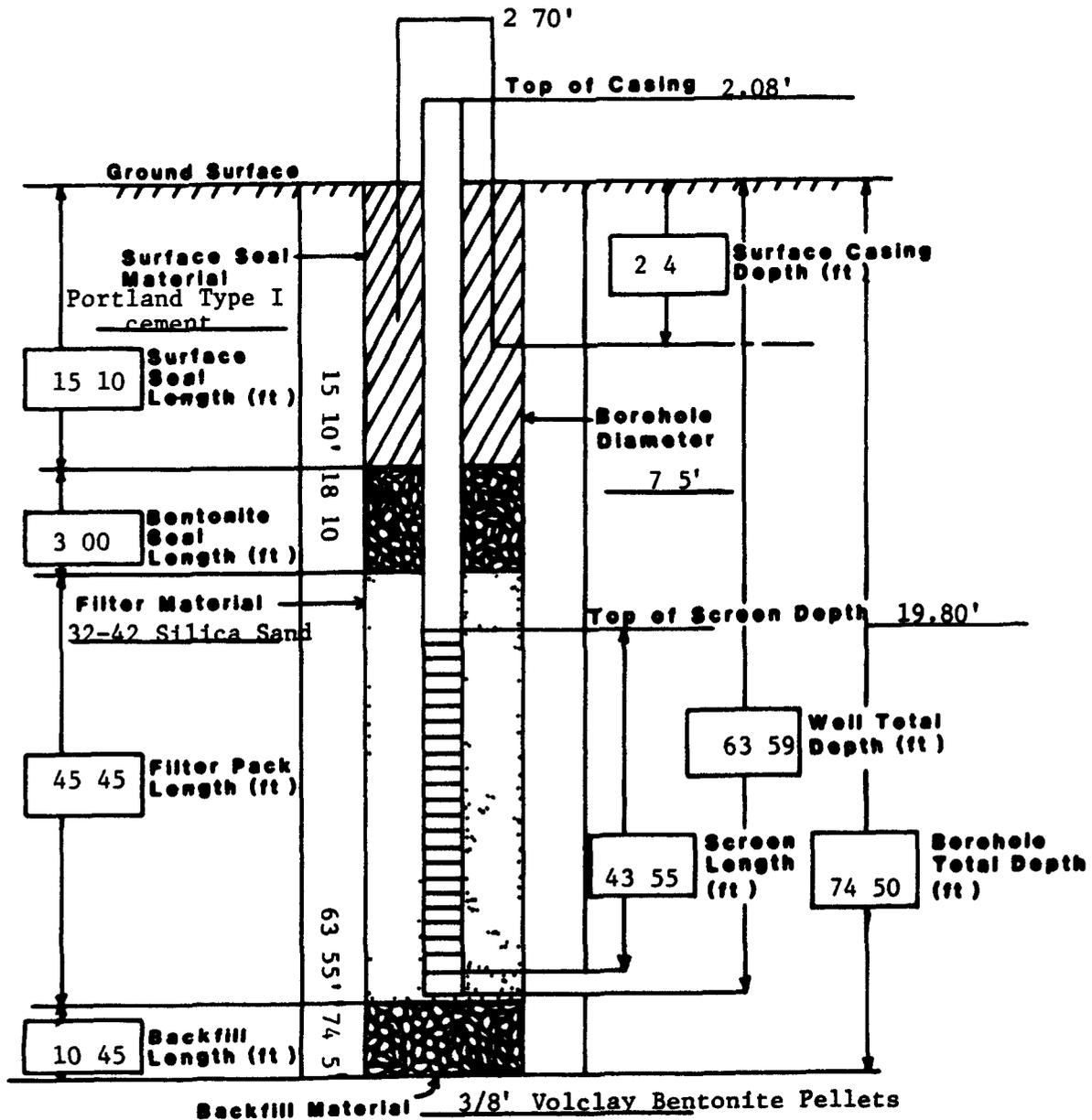
Casing Material Sch 5 type 316 TFJ stainless steel Casing Diameter 2 ID

Screen Material 0.010 wire wrap, type 316 TFJ stainless steel Surface Casing Diameter 5 ID

Date Installed Sept. 2, 1987 Approved By S. Paschke  
 Site Manager

Installed By S Paschke Geologist  
Brent Glass CEAMP Manager

Comments \_\_\_\_\_



PROGRAM SLUGT VERSION 4 OCT 1985

THIS PROGRAM CALCULATES MEAN TRANSMISSIVITIES FROM SLUG TEST DATA BASED ON TWO ANALYTICAL APPROACHES:  
(1) METHOD OF COOPER, BREDEHDEFT AND PAPADOPULOS 1967 (ARTICLE IN VOL 3 NO 1 OF WRR ENTITLED  
RESPONSE OF A FINITE DIAMETER WELL TO AN INSTANTANEOUS CHARGE OF WATER )  
(2) METHOD OF BOWMER AND RICE 1976 (ARTICLE IN VOL 12 NO 3 OF WRR ENTITLED  
A SLUG TEST FOR DETERMINING HYDRAULIC CONDUCTIVITY OF UNCONFINED AQUIFERS  
WITH COMPLETELY OR PARTIALLY PENETRATING WELLS )

PROJECT NO 6-011B-87

CLIENT Rockwell International

ITE LOCATION: Rocky Flats Plant

DATE OF SLUG TEST 10-14-87

FIELD INVESTIGATOR: Kevin McNeil

WELL NO 36 87 BR

INPUT DATA ARE:

INNER CASING DIAMETER 7 00 INCHES

INNER SCREEN OR OPEN HOLE DIAMETER 2 00 INCHES

DIAMETER OF DRILLED HOLE 7 50 INCHES

ESTIMATED POROSITY OF GRAVEL PACK 25

NUMBER OF HEAD TIME DATA POINTS

LENGTH OF SCREEN OR INTAKE PORTION 31 83 FEET

DEPTH FROM STATIC LEVEL TO BOTTOM OF SCREEN 31 83 FEET

THICKNESS OF SATURATED AQUIFER ZONE 31 50 FEET

FALLING HEAD INDEX 0 ( 1 IF FALLING 0 IF RISING)

42

TIME (sec )	HEAD (FEET)
1 00	1 190
2 00	1 150
3 00	1 110
4 00	1 080
5 00	1 040
6 00	1 010
7 00	980
8 00	950
9 00	920
10 00	890
11 00	860
12 00	840
13 00	810
14 00	790
15 00	770
16 00	750
17 00	730
18 00	710
19 00	690
20 00	670
22 00	640
25 00	590
27 00	560
30 00	520
32 00	490
35 00	460
40 00	400
45 00	360
50 00	320
55 00	290
60 00	260
70 00	210
80 00	180
89 00	150
109 00	110
129 00	080
149 00	070
179 00	050
209 00	040
294 00	030
534 00	020
774 00	020

HO WAS COMPUTED FROM INTERCEPT OF PLOT OF LOG(H) VS TIME

SUCCESSIVE COMPUTED  
VALUES FOR HO  
(FEET)

6183  
7194  
8886  
9722  
1 0100

METHOD OF BOWER AND RICE

COMPUTED RESULTS USING DIAMETER OF DRILLED HOLE:

PERMEABILITY 3 27E 05 FT/sec 9 98E-04 CM/sec

TRANSMISSIVITY 1 03E 03 FT\*\*2/sec

COMPUTED RESULTS USING DIAMETER OF CASING AND SCREEN:

PERMEABILITY 1 02E 05 FT/sec 3 11E 04 CM/sec

TRANSMISSIVITY 3 21E 04 FT\*\*2/sec

12/11/87

Water Level Data  
for  
Rockwell (Rocky Flats)

Date  
Measured

Depth to Water  
from TOC

Elevation  
TOC (ft)

Water Level  
Elev (ft)

\*\* Well Number 3687BR

12/01/87

33 90

5951 12

5917 22

1987 BOREHOLES

**EXPLANATION OF SYMBOLS AND TERMS**  
**ON BORING LOGS**

**SAMPLE TYPE**



**Split Spoon**



**NC Core**

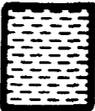


**Continuous Drive**

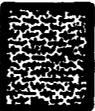


**Bulk**

**GRAPHIC LOG**



**Clay or Claystone**



**Clayey Sand or Sandy Clay**



**Silty Claystone**



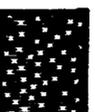
**Cobbles and/or Gravel**



**Sand and Sandstone**



**Sand and Gravel**



**Silt or Siltstone**

**PENETRATION RESISTANCE**



**Standard Penetration Test Results**  
**Blows Per Inch**

**INDEX OF DATA**

Boring No BH22-87

Completed as well? No

Data in File

- Log of Borehole
- Well Construction Summaries
- Well Development Summaries
- Hydraulic Conductivity Test Data  
and Results
- Packer Test Data and Results
- Water Level Data

## INDEX OF DATA

Boring No BH22-87

Completed as well? No

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- Well Development Summaries
- Hydraulic Conductivity Test Data  
and Results
- Packer Test Data and Results
- Water Level Data

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, 903 Pad Area  
 Coordinates N 35789.86 E 22535.86  
 Total Depth 27 20'

Borehole/Well No BH22-87  
 Ground Surface Elevation 5978.50'  
 Water Level Encountered 19.70  
 Static None

Drilling Company Boyles Bros  
 Date Drilled July 9, 1987  
 Drilling Method Hollow Stem Auger  
 Logged By K D Holliday  
                   Geologist

Driller R. Sharp  
 Helper T Merritt  
 Drilling Fluid None  
 Checked By J. J. Paschke  
                   Site Manager  
Brent Davis  
                   CAMP Manager

Comments Borehole backfilled with Portland Type I cement  
triples as samples BH228719WT and BH228720WS

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<b>ROCKY FLATS ALLUVIUM</b>	
5			<u>0.0 2.2 SAMPLE.</u> Recovered 1 1/2 2 = 50% CLAYEY SAND AND GRAVEL pale yellowish brown (10 YR 6/2) to moderate yellowish brown (10 YR 5/4) quartzite cobbles subangular sand fine grained occasional oxidized zones unconsolidated poorly sorted dry to slightly damp	HNu Background=02 OVA Background=10 Ludlum Background =150 Beta/Gamma Back ground=006 <u>0.0 9.3 Composite sample BH22870009</u> <u>0.0 9.3 Composite duplicate sample BH22870009D</u>
			<u>2.2 4.2 SAMPLE.</u> Recovered 1 65/20 = 83% CLAYEY SAND AND GRAVEL same as above damp	<u>5.0 Field screen readings HNu = 10            130 OVA = 10</u>
10			<u>4.2 7.2 SAMPLE.</u> Recovered 2 15/30 = 72% CLAYEY SAND AND GRAVEL same as above damp	<u>9.7 10.6 Waste sample BH228710WS</u>
			<u>7.2 9.7 SAMPLE.</u> Recovered 2 1/2.5 = 84% CLAYEY SAND AND GRAVEL same as above damp to dry	<u>10.0 Field screen readings HNu = 250            peak OVA = 10</u>
15			<u>9.7 12.2 SAMPLE.</u> Recovered 2 25/25 = 90% 97 1195 SAND AND GRAVEL same as above dry 1195 122 Drilled with center bit	<u>10.6 18.4 Composite sample BH22871018</u>
			<u>12.2 14.7 SAMPLE.</u> Recovered 1 6/25 = 64% SAND AND GRAVEL same as above dry	<u>12.2 14.7 Reading on core HNu = 50 500</u> <u>14.7 16.0 Reading on core HNu = 10 120</u>
20				<u>15.0 Field screen readings HNu = 65            peak OVA = 10</u>

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, 903 Pad Area  
 Coordinates N 35789.86 E 22535.86  
 Total Depth 27 20

Borehole/Well No BH22-87  
 Ground Surface Elevation 5978.50  
 Water Level Encountered 19.70  
 Static None

Drilling Company Boyles Bros  
 Date Drilled July 9, 1987  
 Drilling Method Hollow Stem Auger  
 Logged By K D Hollaway  
 Geologist

Driller R. Sharp  
 Helper T Merritt  
 Drilling Fluid None  
 Checked By J. Pasolke  
 Site Manager

Comments Borehole backfilled with Portland Type I cement  
triples as samples BH228719, T and BH228720, S  
 CEARP Manager  
 Sample BH228720CT

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20			<p><u>14.7 17.2 SAMPLE.</u>            Recovered 175/25 = 70%            SAND AND GRAVEL same as above            dry</p> <p><u>17.2 19.7 SAMPLE.</u>            Recovered 16/25 = 64%            SAND AND GRAVEL same as above            damp</p> <p><u>19.7 22.2 SAMPLE.</u>            Recovered 10/25 = 40%            197 206 SAND AND GRAVEL same as            above wet</p> <p style="text-align: center;"><b><u>ARAPAHOE FORMATION</u></b></p>	<p><u>18.4 20.6</u> Contact            sample BH228720CT</p> <p><u>20.0</u> Field screen            readings HNu = 50            peak OVA = 10</p> <p><u>22.2 22.35</u> Bedrock            sample BH228722BR</p>
25				
30			<p>206 207 CLAYSTONE light olive gray            (5 Y 6/1) mottled moist</p> <p><u>22.2 24.7 SAMPLE.</u>            Recovered 25/25 = 100%            CLAYSTONE light olive gray (5 Y 6/1)            to dusky yellow (5 Y 6/4) some iron            staining dark yellowish orange (10 YR            6/6) damp to dry</p> <p><u>24.7 27.2 SAMPLE.</u>            Recovered 25/25 = 100%            CLAYSTONE pale olive (10 Y 6/2) to            light olive brown (5 Y 5/6) iron staining            dark yellowish orange (10 YR 6/6) in            durated damp</p> <p>TOTAL DEPTH 27 20</p>	

## INDEX OF DATA

Boring No BH23-87

Completed as well? No

### Data in File

- Log of Borehole
- Well Construction Summaries
- Well Development Summaries
- Hydraulic Conductivity Test Data  
and Results
- Packer Test Data and Results
- Water Level Data

LOG  
OF  
BOREHOLE

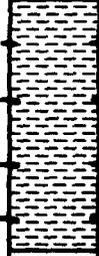
Location Rocky Flats Plant, 903 Pad Area  
 Coordinates N 35776 86 E 22778 47  
 Total Depth 12 50

Borehole/Well No BH23-87  
 Ground Surface Elevation 5964 20'  
 Water Level Encountered None  
 Static N/A

Drilling Company Boyles Bros  
 Date Drilled July 7, 1987  
 Drilling Method Hollow Stem Auger  
 Logged By K D Holliday  
                   Geologist

Driller R Sharp  
 Helper T Merritt  
 Drilling Fluid None  
 Checked By J Paschke  
                   Site Manager  
Brent Jones  
                   GEARP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<b>ROCKY FLATS ALLUVIUM</b>	
5			<u>0.0 2.0 SAMPLE.</u> Recovered 1 2/2 0 = 60% CLAYEY SAND dark yellowish brown (10 YR 4/2) to dusky yellowish brown (10 YR 2/2) quartzite cobbles subrounded to subangular very fine grained sand (3 5 40 phi) grass and roots to 0 4 dry to slightly damp	HNu Background=0 2 OVA Background=0 3 Ludlum Background =0 3 Beta/Gamma Back ground=0 7  <u>0.0 7.5 Composite Sample BH23870008</u>
10			<u>2.0 4.0 SAMPLE.</u> Recovered 1 3 5/2 0 = 67 5% SANDY GRAVEL moderate brown (5 YR 4/4) quartzite gravel subrounded to subangular fine to medium grained sand (2 5 2 0 phi to 0 5 0 0 phi) poorly sorted damp to dry	<u>0.0-7.5 Duplicate Composite Sample BH23870008D</u>  <u>3.35 Field screen readings HNu = 0 2 OVA = 1 1</u>
15			<u>4.0 7.5 SAMPLE.</u> Recovered 1 5/3 5 = 43% 4 0 6 0 Center bit drill 6 0 6 5 SANDY GRAVEL dusky brown (5 YR 2/2) and moderate brown (5 YR 4/4) quartzite gravel subrounded to sub angular very fine to medium grained sand (3 0 2 5 0 phi trace 3 5 4 0 phi and 1 5 1 0 phi some) trace clay moist 6 5 7 5 SANDY GRAVEL light brown (5 YR 5/6) same as above damp to moist	<u>7.2 8.2 Contact sample BH238708CT</u>  <u>10.0 Field screen readings. HNu = 0 2 OVA = 1 0</u>  <u>11.2 11.85 Bedrock sample BH238711BR</u>

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, 903 Pad Area  
 Coordinates N 35776 86 E 22778 47  
 Total Depth 12 50

Borehole/Well No BH23-87  
 Ground Surface Elevation 5964 20'  
 Water Level Encountered None  
 Static N/A

Drilling Company Boyles Bros  
 Date Drilled July 7, 1987  
 Drilling Method Hollow Stem Auger  
 Logged By K D Holliday  
                   Geologist

Driller R Sharp  
 Helper T Merritt  
 Drilling Fluid None  
 Checked By J. Pasella  
                   Site Manager

CEARP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			<p><u>7.5 10.0 SAMPLE.</u>            Recovered 2 5/2 5 = 100%            7 5 8 2 SANDY GRAVEL same as above            damp to moist</p> <p style="text-align: center;"><b><u>ARAPAHOE FORMATION</u></b></p> <p>8 2 10 0 CLAYSTONE light olive gray (5            Y 6/1) to olive gray (5 Y 4/1) trace iron            staining pale yellowish orange (10 YR            8/6) trace caliche stringers mottled            damp to dry</p> <p><u>10.0 12.5 SAMPLE.</u>            Recovered 2 5/2 5 = 100%            CLAYSTONE light olive gray (5 Y 5/2)            and olive gray (5 Y 4/1) some iron stain            ing (10 YR 5/4) trace very fine grained            sand weathered mottled damp to dry</p> <p>TOTAL DEPTH 12 50</p>	

## INDEX OF DATA

Boring No BH24-87

Completed as well? No

### Data in File

- Log of Borehole
- Well Construction Summaries
- Well Development Summaries
- Hydraulic Conductivity Test Data  
and Results
- Packer Test Data and Results
- Water Level Data

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, 903 Pad Area  
 Coordinates N 35839.2 E 23080.97  
 Total Depth 12.60'

Borehole/Well No BH24-87  
 Ground Surface Elevation 5953.60  
 Water Level Encountered None  
 Static N/A

Drilling Company Boyles Bros  
 Date Drilled July 8, 1987  
 Drilling Method Hollow Stem Auger  
 Logged By K D Holliday  
 Geologist

Driller R Sharp  
 Helper T Merritt  
 Drilling Fluid None  
 Checked By A J Pasolun  
 Site Manager  
Brent Lewis  
 NEARP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			<b>COLLUVIUM</b>	
			<u>0.0 2.0 SAMPLE</u> Recovered 17/20 = 85% CLAYEY SAND moderate brown (5 YR 3/4) quartzite cobbles subangular to broken sand medium (10 05 phi) and very fine grained subrounded fairly well sorted grass and roots to 04 damp	HNu Background=02 OVA Background=10 Ludlum Background =100 Beta/Gamma Back ground=0
5			<u>2.0 4.0 SAMPLE</u> Recovered 13/20 = 65% CLAYEY SAND moderate brown (5 YR 3/4) and dark yellowish brown (10 YR 4/2) quartzite cobbles subrounded and subangular fairly well sorted damp	<u>0.0 2.43</u> Composite sample BH24870002  <u>2.43 4.85</u> Contact sample BH248705CT
10			<u>4.0 7.5 SAMPLE</u> Recovered 09/35 = 26% 40 485 SANDY GRAVEL light brown (5 YR 5/6) quartzite subangular to sub rounded coarse to fine grained sand (05 00 phi some 15 10 phi some 25 20 phi trace) subangular poorly sorted moist to wet	<u>4.9</u> Field screen readings HNu = 88 OVA = 10  <u>8.3 8.9</u> Bedrock sample BH248708BR
15			<b>ARAPAHOE FORMATION</b>	<u>10.0</u> Field screen readings HNu = 50 OVA = 12  <u>10.0-10.9</u> Waste sample BH248710WS
			<u>485 490</u> CLAYSTONE dusky yellow (5 Y 6/4) damp	

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, 903 Pad Area  
 Coordinates N 35839.2 E 23080.97  
 Total Depth 12.60

Borehole/Well No BH24-87  
 Ground Surface Elevation 5953.60'  
 Water Level Encountered None  
 Static N/A

Drilling Company Boyles Bros  
 Date Drilled July 8, 1987  
 Drilling Method Hollow Stem Auger  
 Logged By K D Holliday  
                   Geologist

Driller R Sharp  
 Helper T Merritt  
 Drilling Fluid None  
 Checked By J J Pasollee  
                   Site Manager

CEARP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
—			<p><u>7.5 10.0 SAMPLE.</u>            Recovered 25/25 = 100%            CLAYSTONE light olive gray (5 Y 6/1)            and dusky yellow (5 Y 6/4) some iron            staining dark yellowish orange (10 YR            6/6) iron nodules at 985 dusky yellowish            brown (10 YR 2/2) trace caliche damp to            moist</p>	
—			<p><u>10.0 12.6 SAMPLE.</u>            Recovered 26/26 = 100%            CLAYSTONE yellowish gray (5 Y 7/2)            and dusky yellow (5 Y 6/4) some iron            staining dark yellowish orange (10 YR            6/6) some iron nodules dusky yellowish            brown (10 YR 2/2) some caliche damp</p>	
—			<p>TOTAL DEPTH 12 60</p>	

## INDEX OF DATA

Boring No BH25-87

Completed as well? No

### Data in File

- Log of Borehole
- Well Construction Summaries
- Well Development Summaries
- Hydraulic Conductivity Test Data  
and Results
- Packer Test Data and Results
- Water Level Data

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, 903 Pad Area  
 Coordinates N 35600.88 E 22719.63  
 Total Depth 22 30'

Borehole/Well No BH25-87  
 Ground Surface Elevation 5953 20  
 Water Level Encountered 8 50'  
 Static N/A

Drilling Company Boyles Bros  
 Date Drilled June 18, 1987  
 Drilling Method Hollow Stem Auger  
 Logged By K D Holliday  
                   Geologist

Driller R. Sharp  
 Helper T Merritt  
 Drilling Fluid None  
 Checked By A. Pasella  
                   Site Manager  
Brent Lewis  
                   CEAMP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<b>COLLUVIUM</b>	
			<u>0.0 2.0 SAMPLE.</u> Recovered 165/20 = 83% SANDY CLAY dusky yellowish brown (10 YR 2/2) occasional quartzite cobbles and pebbles sandy very fine grained (35 40 phi) clayey roots and grasses damp to moist	HNu Background=02 05 OVA Background=10 Photovac Background =00 GM Pancake=50
5			<u>2.0 4.0 SAMPLE.</u> Recovered 195/20 = 98% SANDY CLAY dark yellowish brown (10 YR 4/2) and moderate yellowish brown (10 YR 5/4) occasional quartzite pebbles and cobbles fine grained sand (30 35 phi) clayey damp	<u>0.0 2.0.</u> Readings on core HNu = 50 Photovac = 03  <u>0.0 9.0</u> Composite sample BH25870009 and Duplicate com posite sample BH25870009D
10			<u>4.0-7.0 SAMPLE.</u> No recovery Lost core	<u>2.0 4.0.</u> Readings on core HNu = 50 100 Photovac = 03
			<u>7.0 9.5 SAMPLE.</u> Recovered 20/25 = 80% CLAYEY GRAVEL moderate yellowish brown (10 YR 5/4) and moderate brown (5 YR 4/4) quartzite cobbles and pebbles very fine grained sand (35 40 phi) clayey moist to wet	<u>5.0</u> Field screen readings HNu = 00 320 OVA = 150
15			<u>9.5 12.0 SAMPLE.</u> Recovered 09/25 = 36% SANDY GRAVEL moderate yellowish brown (10 YR 5/4) quartzite cobbles and pebbles very fine grained sand (35 40 phi) some clay moist	<u>8.4 8.85.</u> Water table sample BH258709WT  <u>9.5 10.40.</u> Composite sample BH25870910
20			<u>12.0 14.5 SAMPLE.</u> No recovery Lost core Rock in shoe of barrel	<u>7.0 9.5</u> Readings on core HNu = 50 100 Photovac = 21 OVA = 12

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, 903 Pad Area  
 Coordinates N 35600.88 E 22719.63  
 Total Depth 22 30'

Borehole/Well No RH25-87  
 Ground Surface Elevation 5953 20'  
 Water Level Encountered 8 50  
 Static N/A

Drilling Company Boyles Bros  
 Date Drilled June 18, 1987  
 Drilling Method Hollow Stem Auger  
 Logged By K D Hollway  
 Geologist

Driller R. Sharp  
 Helper T Merritt  
 Drilling Fluid None  
 Checked By [Signature]  
 Site Manager

CEARP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20	[Hatched Box]		<p><b>14.5 17.3 SAMPLE.</b>            Recovered 25/28 = 89%            145 156 SANDY GRAVEL moderate yellowish brown (10 YR 5/4) quartzite cobbles and pebbles very fine grained sand (35 40 phi) and clay unconsolidated wet</p>	<p><b>10.0.</b> Field screen readings HNu = 0            100 OVA = 100</p>
25			<p><b>ARAPAHOE FORMATION</b></p>	<p><b>9.5 12.0.</b> Readings on core HNu = 50            Photovac = 06 OVA = 11</p>
			<p>156 173 CLAYSTONE light olive gray (5 Y 6/1) to olive gray (5 Y 4/1) with dark yellowish orange (10 YR 6/6) iron staining patches small fractures weathered damp to moist</p>	<p><b>15.0.</b> Field screen readings HNu = 200 OVA = 220 400</p>
			<p><b>17.3 19.8 SAMPLE.</b>            Recovered 27/25 = 108%            CLAYSTONE light olive gray (5 Y 6/1) and olive gray (5 Y 4/1) dark yellowish orange (10 YR 6/6) iron staining trace sand small fractures weathered damp to moist.</p>	<p><b>14.5 15.7.</b> Contact sample BH258716CT</p> <p><b>18.5 19.3.</b> Bedrock sample BH258718BR</p>
			<p><b>19.8 22.3 SAMPLE.</b>            Recovered 32/25 = 128%            CLAYSTONE light olive brown (5 Y 5/6) and yellowish gray (5 Y 7/2) to olive gray (5 Y 4/1) at 205 dark yellowish orange (10 YR 6/6) iron staining in small fractures some sand weathered damp to moist</p>	<p><b>19.7 20.5.</b> Waste sample BH258720WS</p> <p><b>14.5 17.3.</b> Readings on core Photovac = 100</p>
			<p>TOTAL DEPTH 22 30</p>	<p><b>20.0.</b> Field screen readings HNu = 350 OVA = 280 520</p> <p><b>19.8 22.3.</b> Readings on core HNu = 50</p>

## INDEX OF DATA

Boring No BH26-87/11-87BRA

Completed as well? No

### Data in File

- Log of Borehole
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- Hydraulic Conductivity Test Data  
and Results
- Packer Test Data and Results
- Water Level Data

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, 903 Pad Area  
 Coordinates N 35581.47 E 22946.34  
 Total Depth 8.00

Borehole/Well No BH26-87/11-87BRA  
 Ground Surface Elevation 5934.10  
 Water Level Encountered None  
 Static N/A

Drilling Company Boyles Bros  
 Date Drilled July 16, 1987  
 Drilling Method Hollow Stem Auger  
 Logged By S Rogal  
 Geologist

Driller D. Jarvie  
 Helper J. Duncan  
 Drilling Fluid None  
 Checked By J. Pasolun  
 Site Manager  
Brent Lewis  
 GEARP Manager

Comments \_\_\_\_\_

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<b><u>COLLUVIUM</u></b>	
			<u>0.0 2.0 SAMPLE</u> Recovered 17/20 = 85% CLAYEY SILT dusky brown (5 YR 2/2) trace fine grained sand trace gravel medium plastic grasses and roots damp	HNu Background=3.5 OVA Background=2 Ludlum Background =0.0
5			<u>2.0 4.0 SAMPLE</u> Recovered 20/20 = 100% 2.0 3.0 CLAYEY SILT dusky yellow (5 Y 6/4) trace sand iron staining dry	<u>0.3 2.5</u> , Composite sample BH26870003
			<b><u>ARAPAHOE FORMATION</u></b>	
10			<u>3.0 4.0 SANDSTONE</u> light olive gray (5 Y 5/2) fine grained well sorted iron staining dry	<u>2.0 3.0</u> , Field screen readings HNu = 0.5 OVA = 2.0
			<u>4.0 6.0 SAMPLE</u> Recovered 20/20 = 100% SANDSTONE light olive gray (5 Y 5/2) iron stains laminated fine grained well sorted dry	<u>2.15 2.95</u> Contact sample BH268703CT
			<u>6.0 8.0 SAMPLE</u> Recovered 19/20 = 95% SILTSTONE light olive gray (5 Y 5/2) iron stains several fractures low plasti city damp	<u>5.0</u> Field screen readings HNu = 0.5 OVA = 2.0
			TOTAL DEPTH 8.00	<u>6.0-6.9</u> , Bedrock contact BH268706BR

## INDEX OF DATA

Boring No BH27-87

Completed as well? No

### Data in File

- Log of Borehole
- Well Construction Summaries
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- Hydraulic Conductivity Test Data  
and Results
- Packer Test Data and Results
- Water Level Data

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant 903 Pad Area  
 Coord nates N 35659 96 E 22896 72  
 Total Depth 17.00

Borehole Well No BH27-87  
 Ground Surface Elevation 5944 70  
 Water Level Encountered 9 50'  
 Static N/A

Drilling Company Boyles Bros  
 Date Drilled July 6 1987  
 Drilling Method Hollow Stem Auger  
 Logged By K D Holliday  
 Geologist

Driller R Sharp  
 Helper T Merritt  
 Drilling Fluid None  
 Checked By A Pasallo  
 Site Manager  
Brent Lewis  
 CEARP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<b>COLLUVIUM</b>	
			<u>0.0 2.0 SAMPLE.</u> Recovered 175/20 = 88% SANDY CLAY dark yellowish brown (10 YR 4/2) some quartzite gravel very fine grained sand (40 35 phi) grass and roots to 02 damp to moist	HNu Background= 025 OVA Background=10 Field Screen Sample Background HNu = 04 OVA = 42
5			<u>2.0 4.0 SAMPLE.</u> Recovered 15/20 = 75% SANDY GRAVEL dark yellowish brown (10 YR 4/2) to grayish orange (10 YR 7/4) gravel zone 26 29 some quartzite gravel sand ranges from fine to coarse grained (25 05 phi) poorly sorted trace clay damp to dry	<u>0.90</u> Reading on core OVA = 70  <u>4.8 10.0</u> Contact sample BH278710CT
10			<u>4.0 7.0 SAMPLE.</u> Recovered 155/30 = 52% SANDY GRAVEL moderate brown (5 YR 4/4) quartzite gravel subrounded to subangular coarse grained sand (00 10 phi) poorly sorted	<u>5.0</u> Field screen readings HNu = 02 OVA = 44  <u>10.0</u> Field screen readings HNu = 01 OVA = 46
15			<u>7.0 9.0 SAMPLE.</u> Recovered 08/20 = 40% SANDY GRAVEL same as above wet	<u>13.0 14.4</u> Bedrock sample BH278713BR
20			<u>9.0 12.0 SAMPLE.</u> Recovered 195/30 = 65% 90-100 SANDY GRAVEL moderate yellowish brown (10 YR 5/4) quartzite gravel fine grained sand (20 35 phi) trace clay wet	<u>15.0</u> Field screen readings HNu = 02 OVA = 42

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant 903 Pad Area  
 Coord nates N 35659 96 E 22898 72  
 Total Depth 17.00

Borehole/Well No BH27-87  
 Ground Surface Elevation 5944 70  
 Water Level Encountered 9 50'

Drilling Company Boyles Bros  
 Date Drilled July 6 1987  
 Drilling Method Hollow Stem Auger  
 Logged By K D Holliday  
                   Geologist

Static N/A  
 Driller R Sharp  
 Helper T Merritt  
 Drilling Fluid None  
 Checked By J. Pasche  
                   Site Manager

CEARP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			<b><u>ARAPAHOE FORMATION</u></b>	
			100 1095 CLAYSTONE olive gray (5 Y 4/1) trace iron staining dark yellowish orange (10 YR 6/6) weathered dry	
			<b><u>12.0 14.5 SAMPLE.</u></b> Recovered 2 4/2 5 = 96%	
			CLAYSTONE olive gray (5 Y 4/1) to light olive gray (5 Y 6/1) and grayish orange (10 YR 7/4) trace iron staining dark yellowish orange (10 YR 6/6) damp to dry	
			<b><u>14.5 17.0 SAMPLE.</u></b> Recovered 2 5/2 5 = 100%	
			CLAYSTONE dusky yellowish brown (10 YR 2/2) to light olive gray (5 Y 5/2) mottled with iron staining dark yellowish orange (10 YR 6/6) some fracturing wet at 152 damp to moist	
			<b>TOTAL DEPTH 17 00</b>	

**INDEX OF DATA**

Boring No BH28-87

Completed as well? No

Data in File

- Log of Borehole
- Well Construction Summaries
- Well Development Summaries
- Hydraulic Conductivity Test Data  
and Results
- Packer Test Data and Results
- Water Level Data

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, 903 Pad Area  
 Coordinates N 35803 33 E 23131 28  
 Total Depth 15 00

Borehole/Well No BH28-87  
 Ground Surface Elevation 5946 70  
 Water Level Encountered 0 0  
 Static N/A

Drilling Company Boyles Bros  
 Date Drilled July 13, 1987  
 Drilling Method Hollow Stem Auger  
 Logged By K. D. Holliday  
 Geologist

Driller T Merritt  
 Helper J Duncan  
 Drilling Fluid None  
 Checked By [Signature]  
 Site Manager  
[Signature]  
 CEARP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<b><u>COLLUVIUM</u></b>	
			<u>0.0 2.0 SAMPLE.</u> Recovered 09/20 = 45% CLAYEY SAND dusky brown (5 YR 2/2) occasional quartzite cobbles sub rounded grass and organics wet	HNu Background=04 OVA Background=10 Alpha=00  <u>0.0 0.9</u> Water table sample BH288700WT
5			<u>2.0 4.0 SAMPLE.</u> Recovered 190/20 = 95% CLAYEY SAND same as above wet	<u>0.9 3.75</u> Composite sample BH28870104
			<u>4.0 7.0 SAMPLE.</u> Recovered 30/30 = 100% 40 59 CLAYEY SAND same as above wet	<u>3.75 4.85</u> Waste sample BH288705WS
			<b><u>ARAPAHOE FORMATION</u></b>	<u>5.0</u> Field screen readings HNu = 260 OVA = 10
10			<u>59 70</u> CLAYSTONE light olive gray (5 Y 6/1) to light olive brown (5 Y 5/6) some iron staining dark yellowish orange (10 YR 6/6) moist	<u>4.85 5.90</u> Contact sample BH288706CT
			<u>7.0 11.0 SAMPLE.</u> Recovered 20/40 = 50% CLAYSTONE same as above moist	<u>9.0</u> Field screen readings HNu = 150 OVA = 10
15			<u>11.0 15.0 SAMPLE.</u> Recovered 10/40 = 25% CLAYSTONE light olive gray (5 Y 6/1) and iron staining dark yellowish orange (10 YR 6/6) trace caliche many iron nodules blackish red (5 R 2/2) and light brown (5 YR 5/6) moist	<u>8.80 9.0</u> and <u>11.0</u> <u>12.0</u> Bedrock sample BH288709BR
			TOTAL DEPTH 15 00	

**INDEX OF DATA**

Boring No     BH31-87    

Completed as well?     No    

Data in File

- Log of Borehole
- Well Construction Summaries
- Well Development Summaries
- Hydraulic Conductivity Test Data  
and Results
- Packer Test Data and Results
- Water Level Data

**LOG  
OF  
BOREHOLE**

Location Rocky Flats Plant, Ground Area  
 Coordinates 36498 76 E 22297 23  
 Total Depth 22 85

Borehole/Well No BH31-87  
 Ground Surface Elevation 5973 80  
 Water Level Encountered None  
 Static N/A

Drilling Company Boyles Bros  
 Date Drilled August 4 1987  
 Drilling Method Follow Stem Auger  
 Logged By K D Holliday  
 Geologist

Driller R Sharp  
 Helper J Duncan  
 Drilling Fluid None  
 Checked By [Signature]  
 Site Manager  
[Signature]  
 CEARP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<b>ROCKY FLATS ALLUVIUM</b>	
			<u>0.0 2.0 SAMPLE.</u> Recovered 1 3/20 = 65% SAND AND CLAY dark yellowish brown (10 YR 4/2) some quartzite gravel broken to subangular very fine grained sand to 20 25 phi poorly sorted subrounded iron staining dark yellowish orange (10 YR 6/6) damp	HNu Background=02 OVA Background=03 No Ludlum readings taken  <u>0.0 11.7.</u> Composite sample BH31870013
5			<u>2.0 4.0 SAMPLE.</u> Recovered 20/20 = 100% SAND AND CLAY dark yellowish brown (10 YR 4/2) to light olive gray (5 Y 6/1) some quartzite gravel subangular to sub rounded some sand very fine grained to 25 20 phi poorly sorted subrounded some clay damp	<u>0.0 11.7.</u> Duplicate composite sample BH31870013D  <u>5.0.</u> Field screen readings HNu = 02 OVA = 03
10			<u>4.0 7.6 SAMPLE.</u> Recovered 36/36 = 100% SAND AND CLAY dark yellowish brown (10 YR 4/2) to moderate yellowish brown (10 YR 5/4) with some light olive gray (5 Y 5/2) and dark reddish brown (10 R 3/4) at 40 60 some iron staining dark yellowish orange (10 YR 6/6) some caliche some quartzite gravel subangular to angular some clay sand 20 30 phi fairly well sorted subrounded to subangular damp	<u>10.0.</u> Field screen readings HNu = 02 OVA = 03  <u>11.7 12.6.</u> Contact sample BH318713CT
15				<u>15.0.</u> Field screen readings HNu = 02 OVA = 03
20				<u>15.7 22.85.</u> Bedrock sample BH318716BR

**LOG  
OF  
BOREHOLE**

Location Rocky Flats Plant, Mound Area  
 Coordinates N 36498 76 E 22297 23  
 Total Depth 22 85

Borehole/Well No BH31-87  
 Ground Surface Elevation 5973 80  
 Water Level Encountered None  
 Static N/A

Drilling Company Boyles Bros  
 Date Drilled August 4 1987  
 Drilling Method Hollow Stem Auger  
 Logged By K D Holliway  
 Geologist

Driller R Sharp  
 Helper J Duncan  
 Drilling Fluid None  
 Checked By J J Pasella  
 Site Manager  
 CEARP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20			<p><u>7.6 10.1 SAMPLE.</u>            Recovered 2 15/25 = 84%            SAND AND CLAY moderate yellowish brown (10 YR 5/4) and dark yellowish orange (10 YR 6/6) to light brown (5 YR 4/4) iron staining sand 30 20 phi fairly well sorted subrounded to subangular some caliche damp</p>	<p>20.0 Field screen readings HNu = 02            OVA = 03</p>
25		<p><u>10.1 12.6 SAMPLE.</u>            Recovered 2 5/25 = 100%            SAND AND CLAY light olive gray (5 Y 6/1) to moderate yellowish brown (10 YR 5/4) with some dark yellowish orange (10 YR 6/6) iron staining some subangular quartzite gravel sand 35 40 phi fairly well sorted subrounded to subangular some clay some caliche damp</p>		
—		<p><u>12.6 15.1 SAMPLE.</u>            Recovered 2 5/25 = 100%            126 127 SAND AND CLAY same as above damp</p>		
—		<p style="text-align: center;"><b><u>ARAPAHOE FORMATION</u></b></p> <p>127 151 CLAYSTONE light olive gray (5 Y 6/1) to (5 Y 5/2) with some dark yellowish orange (10 YR 6/6) iron staining some sand very fine grained in lenses damp</p>		

**LOG  
OF  
BOREHOLE**

Location Rocky Flats Plant, Mound Area  
 Coordinates T 36498 76 E 22297 23  
 Total Depth 22 85

Borehole/Well No BH31-87  
 Ground Surface Elevation 5973 80'  
 Water Level Encountered None  
 Static N/A

Drilling Company Boyles Bros  
 Date Drilled August 4 1987  
 Drilling Method Hollow Stem Auger  
 Logged By K D Holliday  
 Geologist

Driller R Sharp  
 Helper J Duncan  
 Drilling Fluid None  
 Checked By A J Pasella  
 Site Manager

CEARP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			<p><u>15.1 17.8 SAMPLE.</u>            Recovered 08/27 = 30%            CLAYSTONE light olive gray (5 Y 5/2)            with some light brown (5 YR 5/6) iron            staining some caliche damp</p>	
			<p><u>17.8 20.3 SAMPLE.</u>            Recovered 07/25 = 28%            SANDY CLAYSTONE moderate yellow            ish brown (10 YR 5/4) with dark yellow            ish orange (10 YR 6/6) iron staining sand            very fine grained fairly well sorted            trace caliche damp</p>	
			<p><u>20.3 22.85 SAMPLE.</u>            Recovered 08/255 = 31.3%            SANDY CLAYSTONE light olive gray (5            Y 5/2) with dark yellowish orange (10            YR 6/6) iron staining some very fine            grained sand</p>	
			TOTAL DEPTH 22 85	

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Boring No BH32-87

Completed as well? No

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and Results
- Packer Test Data and Results
- Water Level Data

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, Mound Area  
 Coordinates N 36497 67 E 22420 92  
 Total Depth 20 50

Borehole/Well No BH32-87  
 Ground Surface Elevation 5971 70  
 Water Level Encountered 20  
 Static N/A

Drilling Company Boyles Bros  
 Date Drilled August 3, 1987  
 Drilling Method Hollow Stem Auger  
 Logged By L. A. Gregory-Frost  
 Geologist

Driller R Sharp  
 Helper J Duncan  
 Drilling Fluid None  
 Checked By A. J. Powell  
 Site Manager  
Brent Lewis  
 CEARP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<b>TOPSOIL</b>	
			<u>0.0 2.0 SAMPLE.</u> Recovered 18/20 = 90%	HNu Background=0.4 OVA Background=0.2 No Ludlum readings taken
			<u>0.0 0.85 SANDY TOPSOIL</u> moderate yellowish brown (10 YR 5/4) silty sandy very fine grained rounded abundant quartzite pebbles subangular grasses roots calcareous unconsolidated dry	<u>0.0 8.0 Composite sample</u> BH32870008
5			<b>ROCKY FLATS ALLUVIUM</b>	
			<u>0.85 2.0 CLAYEY GRAVEL</u> grayish brown (5 YR 3/2) quartzite and granite pebbles and cobbles up to 0.25 diameter subangular to angular calcareous iron stone nodules slightly sandy consolidated to unconsolidated dry	<u>8.0 15.0 Composite sample</u> BH32870815
			<u>2.0 4.0 SAMPLE.</u> No recovery Gravel as in 0.85 2.0 in cuttings	<u>8.0 15.0 Duplicate composite sample</u> BH3287815D
10			<u>4.0 7.7 SAMPLE.</u> Recovered 14/37 = 38%	<u>10.0 Field screen readings</u> HNu = 0.4 OVA = 0.2
			<u>4.0 4.6 CLAYEY GRAVEL</u> same as 0.85 2.0 moderate yellowish brown (10 YR 5/4) unconsolidated dry	<u>15.0 Field screen readings</u> HNu = 0.4 OVA = 0.2
			<u>4.6-4.8 CALICHE</u> pinkish gray (5 YR 8/1) broken up dry	
			<u>4.8 5.4 CLAYEY GRAVEL</u> same as 0.85 2.0 moderate yellowish brown (10 YR 5/4) unconsolidated dry	<u>15.1 16.2 Contact sample</u> BH328716CT
15				
				<u>17.2 18.0 Bedrock sample</u> BH328718BR
20				

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, Mound Area  
 Coordinates N 36497 67 E 22420 92  
 Total Depth 20 50

Borehole/Well No BH32-87  
 Ground Surface Elevation 5971 70  
 Water Level Encountered 20  
 Static N/A

Drilling Company Boyles Bros  
 Date Drilled August 3, 1987  
 Drilling Method Hollow Stem Auger  
 Logged By L. A. Gregory-Frost  
                   Geologist

Driller R Sharp  
 Helper J Duncan  
 Drilling Fluid None  
 Checked By A. Passolunghi  
                   Site Manager

CEARP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20			<u>7.7 10.2 SAMPLE.</u> Recovered 29/25 = 116% 77 81 CLAYEY GRAVEL same as 0 85 20 81 102 SAND moderate yellowish brown (10 YR 5/4) very fine to fine grained sand grading into fine to medium grained sand at base subangular well sorted slightly clayey with occa sional very clayey zones occasional caliche deposits rare quartzite pebbles consolidated dry	
25			<u>10.2 12.7 SAMPLE.</u> Recovered 29/25 = 116% SAND moderate yellowish brown (10 YR 5/4) fine to medium grained subangular well sorted interbedded slightly clayey unconsolidated zones with occasional very clayey calcareous zones occasional caliche deposits rare quartzite pebbles dry	
			<u>12.7 15.2 SAMPLE.</u> Recovered 29/25 = 116% SAND same as 10 2 12 7 dry	
			<u>15.5 18.0 SAMPLE.</u> Recovered 30/25 = 120% 15 5 16 2 SAND same as 10 2 12 7 no pebbles damp	

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, Mound Area

Borehole/Well No BH32-87

Coordinates N 36497 67 E 22420 92

Ground Surface Elevation 5971 70

Total Depth 20 50

Water Level Encountered 20

Static N/A

Drilling Company Boyles Bros

Driller R Sharp

Date Drilled August 3, 1987

Helper J Duncan

Drilling Method Hollow Stem Auger

Drilling Fluid None

Logged By L. A. Gregory-Frost  
Geologist

Checked By *A. Pasallo*  
Site Manager

CEARP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			<b><u>ARAPAHOE FORMATION</u></b>	
			162 180 CLAYSTONE moderate yellow ish brown (10 YR 5/4) and light olive gray (5 Y 5/2) abundant very fine grained sandy and silty layers abundant carbonaceous debris consolidated weath ered damp	
			<b><u>18.0 20.5 SAMPLE</u></b> Recovered 2 5/2 5 = 100% CLAYSTONE same as 18 0 20 5 fining upward moist to saturated	
			TOTAL DEPTH 20 50	

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Completed as well? No

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and Results
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- Water Level Data

**LOG  
OF  
BOREHOLE**

Location Rocky Flats Plant, Mound Area  
 Coordinates N 36499 27 E 22658 54  
 Total Depth 20 80'

Borehole/Well No BH33-87  
 Ground Surface Elevation 5967 90'  
 Water Level Encountered 20 0'  
 Static N/A

Drilling Company Boyles Bros  
 Date Drilled July 30, 1987  
 Drilling Method Hollow Stem Auger  
 Logged By L A Gregory-Frost  
                   Geologist

Driller R Sharp  
 Helper J Duncan  
 Drilling Fluid None  
 Checked By [Signature]  
                   Site Manager  
[Signature]  
                   CRMP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<b>TOPSOIL</b>	
			<b>0.0 2.0 SAMPLE</b> Recovered 20/20 = 100%	
			00 07 TOPSOIL dark yellowish brown (10 YR 4/2) clayey sand fine grained rounded abundant caliche deposits abundant quartzite pebbles roots grasses unconsolidated dry	HNu Background=00 OVA Background=00 Ludlum Background = 00 No readings over background
5			<b>ROCKY FLATS ALLUVIUM</b>	<b>0.0 0.4</b> Composite sample BH33870004
			07 10 CALICHE pinkish gray (5 YR 8/1) soft chalky dry	<b>5.0</b> Field screen readings HNu = Background OVA = Background
			10 20 CLAY moderate yellowish brown (10 YR 5/4) fine to medium grained sandy rounded to subangular abundant quartzite pebbles subangular to angular caliche deposits consolidated calcareous dry to damp	<b>7.8 14.7</b> Composite sample BH33870815
			<b>2.0-4.0 SAMPLE</b> Recovered 22/20 = 110%	<b>7.8 14.7</b> Duplicate composite sample BH3387815D
			CLAY moderate yellowish brown (5 Y 4/4) fine to medium grained sandy rounded silty occasional quartzite pebbles calcareous consolidated dry	
15			<b>4.0 7.8 SAMPLE</b> No recovery	<b>10.0</b> Field screen readings HNu = Background OVA = Background
				<b>14.7 15.9</b> Contact sample BH338716CT
20				

**LOG  
OF  
BOREHOLE**

Location Rocky Flats Plant. Mound Area  
 Coordinates N 36499 27 E 22658 54  
 Total Depth 20 80

Borehole/Well No BH33-87  
 Ground Surface Elevation 5967 90  
 Water Level Encountered 20 0'  
 Static N/A

Drilling Company Boyles Bros  
 Date Drilled July 30, 1987  
 Drilling Method Hollow Stem Auger  
 Logged By L A Gregory-Frost  
                   Geologist

Driller R Sharp  
 Helper J Duncan  
 Drilling Fluid None  
 Checked By J Pasella  
                   Site Manager

CEARP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20			<p><u>7.8 10.3 SAMPLE.</u>            Recovered 25/25 = 100%            7883 CLAY moderate yellowish brown (10 YR 5/4) and moderate olive brown (5 YR 4/4) caliche deposits carbonaceous debris calcareous consolidated dry            8391 SAND moderate yellowish brown (10 YR 5/4) coarse grained well sorted well rounded carbonaceous debris loose grains unconsolidated dry to moist            91995 CLAY moderate yellowish brown (10 YR 5/4) and moderate olive brown (5 YR 4/4) caliche deposits carbonaceous debris calcareous dry            995103 SAND moderate yellowish brown (10 YR 5/4) coarse grained well sorted well rounded carbonaceous debris loose grains unconsolidated damp to moist</p>	<p><u>15.0</u> Field screen readings HNu = Background OVA = Background   <u>18.9 19.8</u> Bedrock sample BH338719BR   <u>19.5 20.8</u> Water table sample BH338720WT</p>
25			<p><u>10.3 12.8 SAMPLE.</u>            Recovered 25/25 = 100%            103105 CLAY moderate yellowish brown (10 YR 5/4) and moderate olive brown (5 YR 4/4) caliche deposits carbonaceous debris calcareous consolidated moist            105125 SAND moderate yellowish brown (10 YR 5/4) fine grained well sorted well rounded unconsolidated loose grains moist            125128 CLAY moderate yellowish brown (10 YR 5/4) and moderate olive brown (5 YR 4/4) caliche deposits carbonaceous debris calcareous consolidated moist</p>	

**LOG  
OF  
BOREHOLE**

Location Rocky Flats Plant. Mound Area  
 Coordinates N 36499 27 E 22658 54  
 Total Depth 20 80'

Borehole/Well No BH33-87  
 Ground Surface Elevation 5967 90  
 Water Level Encountered 20 0'  
 Static N/A

Drilling Company Boyles Bros  
 Date Drilled July 30, 1987  
 Drilling Method Hollow Stem Auger  
 Logged By L A Gregory-Frost  
                   Geologist

Driller R Sharp  
 Helper J Duncan  
 Drilling Fluid None  
 Checked By A J Danello  
                   Site Manager

CEARP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Foot	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
—			<u>12.8 15.3 SAMPLE.</u> Recovered 2 5/2 5 = 100% SAND moderate yellowish brown (10 YR 5/4) with light gray (N 8/0) fine to medium grained well rounded well sorted alternating clayey consolidated zones with unconsolidated non clayey zones moist	
—			<u>15.3 17.8 SAMPLE.</u> Recovered 2 5/2 5 = 100% 153 159 SAND moderate yellowish brown (10 YR 5/4) medium to coarse grained poorly sorted subangular iron stone nodules quartzite pebbles caliche deposits clayey at top carbonaceous debris unconsolidated moist	
—			<u>ARAPAHOE FORMATION</u>	
—			159 172 CLAYSTONE moderate yellowish brown (10 YR 5/4) and medium gray (N 5/0) slightly silty weathered moist 172 178 SANDSTONE moderate yellowish brown (10 YR 5/4) fine to medium grained rounded well sorted unconsolidated loose grains moist	

**LOG  
OF  
BOREHOLE**

Location Rocky Flats Plant. Mound Area  
 Coordinates N 36499 27 E 22658 54  
 Total Depth 20 80'

Borehole/Well No BH33-87  
 Ground Surface Elevation 5967 90  
 Water Level Encountered 20 0'  
 Static N/A

Drilling Company Boyles Bros  
 Date Drilled July 30, 1987  
 Drilling Method Hollow Stem Auger  
 Logged By L A Gregory-Frost  
                   Geologist

Driller R Sharp  
 Helper J Duncan  
 Drilling Fluid None  
 Checked By J J Pasell  
                   Site Manager

CEARP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Foot	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
—			<u>17.8 20.3 SAMPLE.</u> Recovered 2 5/2 5 = 100% 178 192 SANDSTONE same as 172 178 192 203 SANDSTONE/CLAYSTONE interbedded 03 layers of sandstone mod erate yellowish brown (10 YR 5/4) fine to coarse grained poorly sorted ironstone nodules unconsolidated moist with clay stone moderate yellowish brown (10 YR 5/4) slightly silty consolidated weath ered moist	
—			<u>20.3 20.8 SAMPLE.</u> Recovered 0 5/0 5 = 100% SANDSTONE moderate yellowish brown (10 YR 5/4) coarse grained well rounded well sorted unconsolidated sat urated	
—			TOTAL DEPTH 20 80	

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Boring No BH34-87

Completed as well? No

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LOG  
OF  
BOREHOLE

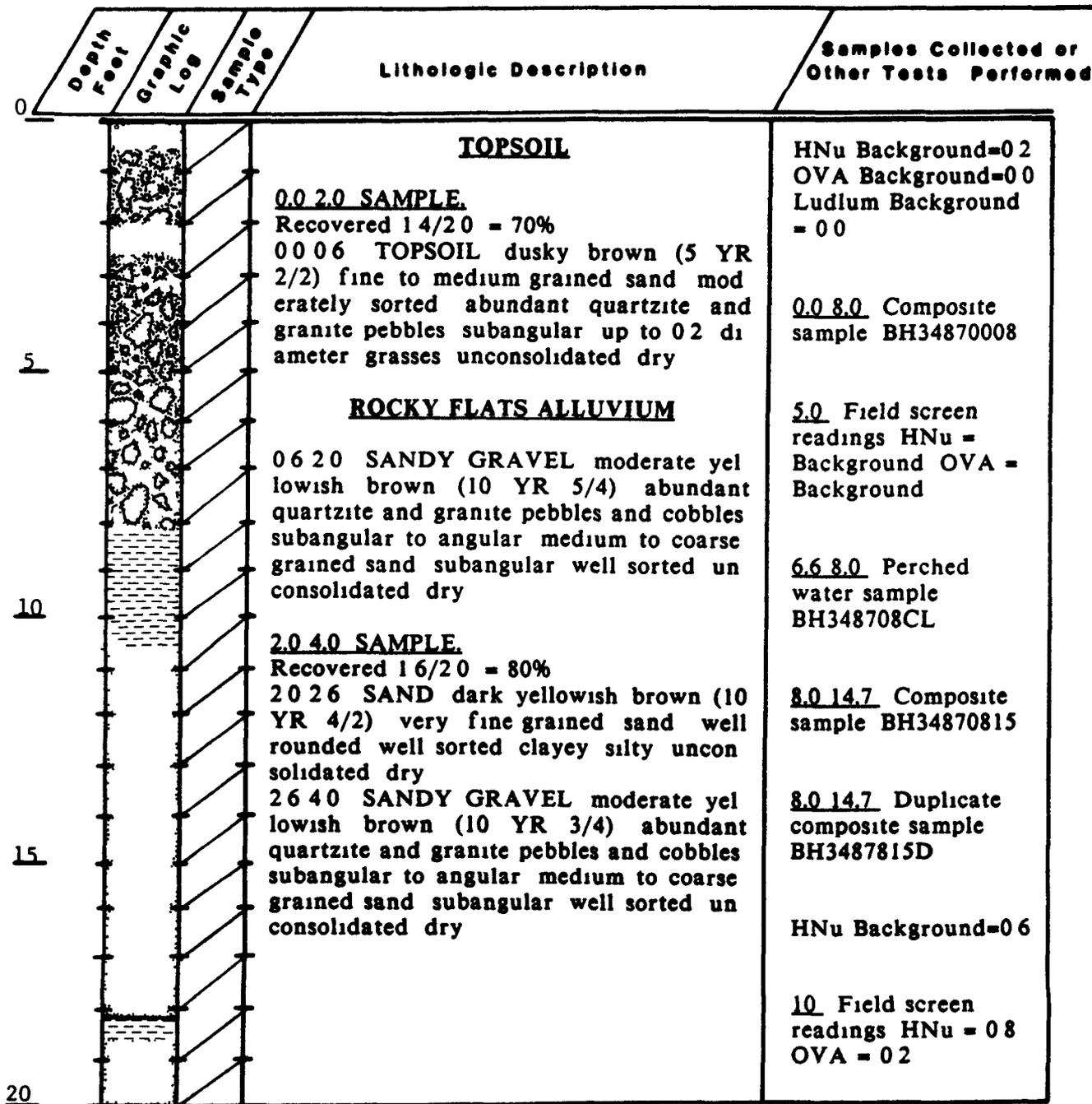
Location Rocky Flats Plant, Mound Area  
 Coordinates N 36473.68 E 22785.69  
 Total Depth 22 70

Borehole/Well No BH34-87  
 Ground Surface Elevation 5971.40'  
 Water Level Encountered 20'  
 Static N/A

Drilling Company Boyles Bros  
 Date Drilled July 29, 1987  
 Drilling Method Hollow Stem Auger  
 Logged By L A Gregory-Frost  
 Geologist

Driller R Sharp  
 Helper J Duncan  
 Drilling Fluid None  
 Checked By J. Passalunghi  
 Site Manager  
Drew Davis  
 O&A Manager

Comments Borehole backfilled with Portland Type I cement.



LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, Mound Area  
 Coordinates N 36473.68 E 22785.69  
 Total Depth 22 70

Borehole/Well No BH34-87  
 Ground Surface Elevation 5971.40  
 Water Level Encountered 20

Drilling Company Boyles Bros  
 Date Drilled July 29, 1987  
 Drilling Method Hollow Stem Auger  
 Logged By L A Gregory-Frost  
                   Geologist

Static N/A  
 Driller R Sharp  
 Helper J Duncan  
 Drilling Fluid None  
 Checked By J Passolunghi  
                   Site Manager

CEARP Manager

Comments Borehole backfilled with Portland Type I cement.

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20			<u>4.0 4.7 SAMPLE.</u> Recovered 09/07 = 128% SANDY GRAVEL same as 26 40 light brown (5 YR 6/4) becomes clayey and consolidated at base dry	<u>10.7 12.7</u> Readings on core HNu = 10 OVA = Background
25			<u>4.7 6.7 SAMPLE.</u> Recovered 18/20 = 90% SANDY GRAVEL same as above (26 40)	<u>12.7 14.7</u> Readings on core HNu = Background OVA = 23
			<u>6.7 8.7 SAMPLE.</u> Recovered 18/20 = 90% 67 81 SANDY GRAVEL same as 26 40 moderate yellowish brown (10 YR 5/4) 81 87 CLAY moderate yellowish brown (10 YR 5/4) very fine to fine grained sandy rounded to subangular silty consolidated moist	<u>14.7 16.3</u> Waste sample BH348715WS  <u>15.0</u> Field screen readings HNu = 7 OVA = 29
			<u>8.7 10.7 SAMPLE.</u> Recovered 21/20 = 105% CLAY same as above (81 87)	<u>17.0 18.0</u> Contact sample BH348718CT  <u>18.0</u> HNu Background=12
			<u>10.7 12.7 SAMPLE.</u> Recovered 20/20 = 100% SAND moderate yellowish brown (10 YR 5/4) fine grained rounded well sorted clayey rare quartzite pebbles consolidated moist	<u>18.7 20.7</u> Field screen readings HNu = 15 OVA = 20
				<u>21.0 22.1</u> Bedrock sample BH348721BR

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, Mound Area  
 Coordinates N 36473.68 E 22785.69  
 Total Depth 22 70

Borehole/Well No BH34-87  
 Ground Surface Elevation 5971.40  
 Water Level Encountered 20  
 Static N/A

Drilling Company Boyles Bros  
 Date Drilled July 29, 1987  
 Drilling Method Hollow Stem Auger  
 Logged By L A Gregory-Frost  
 Geologist

Driller R Sharp  
 Helper J Duncan  
 Drilling Fluid None  
 Checked By [Signature]  
 Site Manager

CEARP Manager

Comments Borehole backfilled with Portland Type I cement.

Depth Foot	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			<p><b>12.7 14.7 SAMPLE.</b>            Recovered 19/20 = 95%            SAND moderate yellowish brown (10 YR 5/4) medium to very coarse grained well rounded well sorted rare quartzite and granite pebbles subangular slightly clayey moist</p>	
			<p><b>14.7 16.7 SAMPLE.</b>            Recovered 16/20 = 80%            SAND same as above (12.7 14.7) abundant quartzite and granite pebbles and cobbles</p>	
			<p><b>16.7 18.7 SAMPLE.</b>            Recovered 20/20 = 100%            16.7 18.1 SAND same as above (12.7 14.7) no pebbles from 17.4 18.1</p>	
			<p><b>ARAPAHOE FORMATION</b></p>	
			<p>18.1 18.7 CLAYSTONE moderate yellowish brown (10 YR 5/4) very sandy very fine to fine grained consolidated weathered moist</p>	
			<p><b>18.7 20.7 SAMPLE.</b>            Recovered 18/20 = 90%            SANDSTONE moderate yellowish brown (10 YR 5/4) fine to medium grained rounded well sorted clayey weathered moist</p>	



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Completed as well? No

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and Results
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- Water Level Data

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant Mound Area  
 Coordinates N 36440 4 E 22961 7  
 Total Depth 20 50

Borehole/Well No BH35-87  
 Ground Surface Elevation 5970.50  
 Water Level Encountered None  
 Static N/A

Drilling Company Boyles Brcs  
 Date Drilled July 27-28, 1987  
 Drilling Method Hollow Stem Auger  
 Logged By K Holliday, L A Gregory-Frost  
 Geologist

Driller R Sharp  
 Helper J. Duncan  
 Drilling Fluid None  
 Checked By J. Passler  
 Site Manager  
D. [Signature]  
 CEARP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<b>TOPSOIL</b>	
			<u>0.0 2.0 SAMPLE.</u> Recovered 12/20 = 60% 0.0 1.2 TOPSOIL grayish brown (5 YR 3/2) very fine grained sandy subangular moderately sorted quartzite cobbles up to 0.25 diameter subangular trace clay dry	HNu Background=0.2 OVA Background=2.0 Ludlum Background = 0.0
5			<b>ROCKY FLATS ALLUVIUM</b>	
			<u>2.0 4.0 SAMPLE.</u> Recovered 19/20 = 95% SAND very pale orange (10 YR 8/2) to pale yellowish brown (10 YR 6/2) becoming very pale orange (10 YR 8/2) to grayish orange (10 YR 7/4) at 2.7 very fine grained moderately sorted subangular dry	<u>0.0 2.0</u> Readings on core HNu = 0.3 OVA = 2.0
10			<u>4.0 6.0 SAMPLE.</u> Recovered 10/20 = 50% 4.0 5.0 CLAYEY SAND very pale orange (10 YR 8/2) to light brown (5 YR 5/6) very fine to coarse grained poorly sorted quartzite cobbles up to 0.2 diameter sub angular to angular damp	<u>5.0</u> Field screen readings HNu = Background OVA = Background  <u>0.0 12.3</u> Composite sample BH35870012
15			<u>6.0 7.4 SAMPLE.</u> Recovered 14/14 = 100% SANDY GRAVEL moderate yellowish brown (10 YR 4/2) quartzite cobbles subangular to angular up to 0.25 diameter very fine to very coarse grained sand poorly sorted some clay slightly consolidated dry	<u>0.0 12.3</u> Duplicate composite sample BH35870012D  <u>10.0</u> Field screen readings. HNu = Background OVA = Background
20				<u>12.0 15.0</u> Composite sample BH35871215

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant Mound Area  
 Coordinates N 36440 4 E 22961 7  
 Total Depth 20 50

Borehole/Well No BH35-87  
 Ground Surface Elevation 5970.50  
 Water Level Encountered None  
 Static N/A

Drilling Company Boyles Bracs  
 Date Drilled July 27-28, 1987  
 Drilling Method Hollow Stem Auger  
 Logged By K Holliday, L A Gregory-Frost  
 Geologist

Driller R Sharp  
 Helper J. Duncan  
 Drilling Fluid None  
 Checked By J. Pasalle  
 Site Manager

CEARP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20			<p><b>8.3 10.3 SAMPLE.</b>            Recovered 19/20 = 95%            SANDY GRAVEL moderate yellowish brown (10 YR 5/4) quartzite cobbles up to 02 diameter subangular to sub rounded fine to very coarse grained sand subangular to subrounded poorly sorted some clay slightly consolidated damp</p>	<p><b>14.1 15.4</b> Contact and waste sample BH358715CT</p>
25			<p><b>10.3 12.3 SAMPLE.</b>            Recovered 15/20 = 75%            SANDY GRAVEL same as above (83 103)</p>	<p><b>15.0</b> Field screen readings HNu = 1200 OVA not functioning</p>
			<p><b>12.5 14.5 SAMPLE.</b>            Recovered 18/20 = 90%            125 138 SANDY GRAVEL same as 83 103 moderate yellowish brown (10 YR 5/4) and grayish brown (5 YR 3/2) clay streaks unconsolidated dry            138 145 CLAY moderate yellowish brown (10 YR 5/4) very fine grained sandy silty occasional quartzite pebbles consolidated damp</p>	<p><b>18.4 19.45</b> Bedrock sample BH358718BR</p>
			<p><b>14.5 16.5 SAMPLE.</b>            Recovered 19/20 = 90%            145 156 CLAY same as above (138 145)</p>	
			<p><b>ARAPAHOE FORMATION</b></p>	
			<p>156 165 CLAYSTONE moderate yellowish brown (10 YR 5/4) silty trace very fine grained sand light olive gray (5 Y 6/1) lenses weathered damp to moist</p>	

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant Mound Area  
 Coordinates N 36440 4 E 22961 7  
 Total Depth 20 50

Borehole/Well No BH35-87  
 Ground Surface Elevation 5970.50  
 Water Level Encountered None  
 Static N/A

Drilling Company Boyles Brcs  
 Date Drilled July 27-28, 1987  
 Drilling Method Hollow Stem Auger  
 Logged By K Holliday, L A Gregory-Frost  
                   Geologist

Driller R Sharp  
 Helper J. Duncan  
 Drilling Fluid None  
 Checked By J. Pasella  
                   Site Manager  
 \_\_\_\_\_  
                   CEARP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			<u>16.5 18.5 SAMPLE.</u> Recovered 20/20 = 100% CLAYSTONE same as above (15 6 16 5)	
			<u>18.5 20.5 SAMPLE.</u> Recovered 20/20 = 100% CLAYSTONE same as above (15 6 16 5)	
			TOTAL DEPTH 20 50	

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Completed as well? No

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and Results
- Packer Test Data and Results
- Water Level Data

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant. Mound Area  
 Coordinates N 36512 16 E 23042 08  
 Total Depth 26.00'

Borehole Well No BH36-87  
 Ground Surface Elevation 5969 40  
 Water Level Encountered None  
 Static N/A

Drilling Company Boyles Bros  
 Date Drilled July 20, 1987  
 Drilling Method Hollow Stem Auger  
 Logged By J. B Bergman  
 Geologist

Driller T High  
 Helper J Duncan  
 Drilling Fluid None  
 Checked By A. Passella  
 Site Manager  
Brent Adams  
 O&A Manager

Comments Borehole backfilled with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<b><u>ROCKY FLATS ALLUVIUM</u></b>	
			<b><u>0.0 2.0 SAMPLE.</u></b> Recovered 1 3/20 = 65% GRAVEL AND COBBLES moderate yel lowish brown (10 YR 5/4) clay matrix gray quartzite cobbles and pebbles unsorted unconsolidated abundant caliche abundant roots and grasses slightly moist	HNu Background=08 OVA Background=108 Ludlum Background=00
5			<b><u>2.0 4.0 SAMPLE.</u></b> Recovered 20/20 = 100% GRAVEL AND COBBLES same as above no vegetation more caliche granite pebbles slightly moist	<b><u>0.0 5.0 Composite sample BH36870005</u></b>
			<b><u>4.0 6.0 SAMPLE.</u></b> Recovered 1 3/20 = 65% GRAVEL AND COBBLES same as above slightly moist	<b><u>0.0 5.0 Duplicate composite sample BH36870005D</u></b>
10			<b><u>6.0-8.0 SAMPLE.</u></b> Recovered 0 6/20 = 30% GRAVEL moderate yellowish brown (10 YR 5/4) clay matrix quartzite and granite gravel subangular poorly sorted unconsolidated slightly moist	<b><u>4.6 5.5 Waste sample BH368705WS</u></b>
			<b><u>8.0 10.0 SAMPLE.</u></b> No recovery	<b><u>5.0 Field screen readings HNu = 12 OVA = 108</u></b>
			<b><u>10.0 12.0 SAMPLE.</u></b> Recovered 0 6/20 = 30% CLAY moderate yellowish brown (10 YR 5/4) occasional quartzite and granite gravel subangular poorly sorted unconsolidated slightly moist	<b><u>5.0 15.0 Composite sample BH36870515</u></b>
15				<b><u>10.0 Field screen readings HNu = 08 OVA = 108</u></b>
20				<b><u>15.0 Field screen readings HNu = 08 OVA = 108</u></b>

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, Mound Area  
 Coordinates N 36512 16 E 23042 08  
 Total Depth 26.00

Borehole/Well No BH36-87  
 Ground Surface Elevation 5969 40'  
 Water Level Encountered None  
 Static N/A

Drilling Company Boyles Bros  
 Date Drilled July 20, 1987  
 Drilling Method Hollow Stem Auger  
 Logged By J. B Bergman  
 Geologist

Driller T High  
 Helper J Duncan  
 Drilling Fluid None  
 Checked By J Paschke  
 Site Manager

CEARP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed	
20			<u>12.0 15.0 SAMPLE.</u> Recovered 0 65/30 = 20% CLAY light brown (5 YR 5/6) ribbons slightly occasional gravels of quartzite poorly sorted to well sorted consolidated moist  No sample from 15 0 16 20	<u>17.7 20.4.</u> Contact sample BH368720CT  <u>20.0</u> Field screen readings HNu = 0 8 OVA = 10 8	
25			<u>16.2 19.2 SAMPLE.</u> Recovered 1 5/30 = 50% CLAY moderate yellowish brown (10 YR 5/4) abundant quartzite pebbles trace gravels trace caliche some light brown (5 YR 5/6) clay patches dry	<u>23.4 24.5</u> Bedrock sample BH368723BR	
30			<u>19.2 21.2 SAMPLE.</u> Recovered 1 8/20 = 90% 19 2 20 4 CLAY same as above dry  <p style="text-align: center;"><b><u>ARAPAHOE FORMATION</u></b></p>	<u>25.0</u> Field screen readings HNu = 0 8 OVA = 10 8	
				20 4 21 0 CLAYSTONE light olive gray (5 Y 5/2) abundant moderate yellowish brown (10 YR 5/4) mottles consolidated weathered dry	
				<u>21.0 23.0 SAMPLE.</u> Recovered 1 2/20 = 60% CLAYSTONE olive gray (5 Y 5/2) trace dark yellowish orange (10 YR 6/6) mot tiles homogenous unconsolidated ho mogenous dry	

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, Mound Area  
 Coordinates N 36512 16 E 23042 08  
 Total Depth 26.00

Borehole Well No BH36-87  
 Ground Surface Elevation 5969 40  
 Water Level Encountered None  
 Static N/A

Drilling Company Boyles Bros  
 Date Drilled July 20, 1987  
 Drilling Method Hollow Stem Auger  
 Logged By J. B. Bergman  
 Geologist

Driller T High  
 Helper J Duncan  
 Drilling Fluid None  
 Checked By J. Paszko  
 Site Manager

CEARP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			<p><b>23.0 26.0 SAMPLE.</b>            Recovered 30/30 = 100%            CLAYSTONE same as above some pale            green (10 G 6/2) mottles moist at 233            235</p> <p>TOTAL DEPTH 26 00</p>	

## INDEX OF DATA

Boring No BH37-87

Completed as well? No

### Data in File

- Log of Borehole
- Well Construction Summaries
- Well Development Summaries
- Hydraulic Conductivity Test Data  
and Results
- Packer Test Data and Results
- Water Level Data

**LOG  
OF  
BOREHOLE**

Location Rocky Flats Plant, Mound Area  
 Coordinates N 36620.50 E 23021.20  
 Total Depth 28 00'

Borehole/Well No BH37-87  
 Ground Surface Elevation 5968 80'  
 Water Level Encountered None  
 Static N/A

Drilling Company Boyles Bros  
 Date Drilled July 16-17, 1987  
 Drilling Method Hollow Stem Auger  
 Logged By J. Vann, J. B Beroman  
                   Geologist

Driller T. Merritt  
 Helper T. High  
 Drilling Fluid None  
 Checked By J. Pasolka  
                   Site Manager  
Brent Lewis  
                   CEAMP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Foot	Graphic Log	Lithologic Description	Samples Collected or Other Tests Performed
0		<b>ROCKY FLATS ALLUVIUM</b>	HNu Background=02 OVA Background=70
		<u>0.0 2.0 SAMPLE.</u> Recovered 19/20 = 95%	
		00-004 SANDY SILT white and grayish brown (5 YR 3/2) 20% subrounded cobbles and gravel 1/4 to 2 inch diameter non plastic poorly sorted loose dry	<u>0.0 5.0</u> Composite sample BH37870005
		004 045 CLAY olive brown (5 Y 4/4) high plasticity little fine sand trace 1/4 round gravel dry	<u>0.0 5.0</u> Duplicate composite sample BH37870005D
5		045 066 GRAVEL white (10 YR 8/2) angular granite gravel 1/4 to 1 and silty sand as above crushed rock	<u>5.0</u> Field screen readings HNu = 30 OVA = 70
		066 133 SANDY SILT light brown (10 YR 8/6) medium to fine grained little angular and subangular gravel moderately well sorted dry	<u>5.0</u> Field screen sample BH378705WS
10		<u>2.0 4.0 SAMPLE.</u> Recovered 16/20 = 80%	
		SAND AND SILT orangey tan medium grained large subangular cobbles dry	<u>11.0 12.3</u> Composite sample BH37871113
		<u>4.0 7.0 SAMPLE.</u> Recovered 15/30 = 50%	
		CLAYEY SILT brown some angular rocks dry	<u>18.0 21.7</u> Contact sample BH378721CT
15		<u>5.6 6.0 SAMPLE.</u> No recovery Drilled with center bit	<u>20.0</u> Field screen reading HNu = 02 OVA = 00
		DEPTH WITH PLOPPER 60 Adjust depth	
		<u>6.0-11.0 SAMPLE.</u> No recovery	<u>25.0</u> Field screen reading HNu = 02 OVA = 00
20			

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, Mound Area  
 Coordinates N 36620.50 E 23021.20  
 Total Depth 28 00'

Borehole/Well No BH37-87  
 Ground Surface Elevation 5968 80'  
 Water Level Encountered None  
 State N/A

Drilling Company Boyles Bros  
 Date Drilled July 16-17, 1987  
 Drilling Method Hollow Stem Auger  
 Logged By J. Vann, J. B Beroman  
                   Geologist

Driller T. Merritt  
 Helper T. High  
 Drilling Fluid None  
 Checked By J. Pascho  
                   Site Manager

CEARP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20			<u>11.0 13.0 SAMPLE.</u> Recovered 13/20 = 65% SAND AND GRAVEL dark yellowish orange (10 YR 6/6) unsorted subangular granite and quartzite gravels and pebbles fine grained sand unconsolidated dry	<u>25.0 26.2 Bedrock</u> sample BH378725BR
25			<u>13.0 16.0 SAMPLE.</u> No recovery  <b style="text-align: center;">ARAPAHOE FORMATION</b>  14.0 16.0 SANDY CLAYSTONE (based on cuttings) moderate yellowish brown (10 YR 5/4) mottled dark yellowish orange (10 YR 6/6) moist	
30			<u>16.0 18.0 SAMPLE.</u> No recovery  <u>18.0 19.0 SAMPLE.</u> Recovered 03/10 = 33% CLAYEY SANDSTONE moderate yellowish brown (10 YR 5/4) few dark yellowish orange (10 YR 6/6) mottles poorly sorted unconsolidated dry	
—			<u>19.0 20.0 SAMPLE.</u> No recovery  <u>20.0-21.0 SAMPLE.</u> Recovered 05/10 = 50% CLAYSTONE moderately yellowish brown (10 YR 5/4) abundant quartzite and granite pebbles and gravels slough poorly sorted subrounded dry	
—				

**LOG  
OF  
BOREHOLE**

Location Rocky Flats Plant, Mound Area  
 Coordinates N 36620.50 E 23021.20  
 Total Depth 28 00'

Borehole/Well No BH37-87  
 Ground Surface Elevation 5968 80'  
 Water Level Encountered None  
 Static N/A

Drilling Company Boyles Bros  
 Date Drilled July 16-17, 1987  
 Drilling Method Hollow Stem Auger  
 Logged By J. Vann, J. B Beroman  
 Geologist

Driller T. Merritt  
 Helper T. High  
 Drilling Fluid None  
 Checked By J. Paschke  
 Site Manager

**CEARP Manager**

Comments Borehole backfilled with Portland Type I cement

Depth Foot	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			<u>21.0 23.0 SAMPLE</u> Recovered 20/20 = 100% 210 217 CLAYSTONE same as above dry	
			217 230 CLAYSTONE moderate yellow ish brown (10 YR 5/4) abundant light brown (5 YR 5/6) mottles consolidated few caliche patches trace sand dry	
			<u>23.0 25.0 SAMPLE</u> Recovered 20/20 = 100% CLAYSTONE same as above dry to moist	
			<u>25.0 28.0 SAMPLE</u> Recovered 40/30 = 125% CLAYSTONE moderate yellowish brown (10 YR 5/4) abundant light brown (5 YR 5/6) mottles weathered consolidated small patches of caliche and very fine grained sand dry	
			TOTAL DEPTH 28 00	

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Completed as well? No

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and Results
- Packer Test Data and Results
- Water Level Data

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, Mound Area  
 Coordinates N 36679.43 E 23201.68  
 Total Depth 23 40'

Borehole/Well No BH38-87  
 Ground Surface Elevation 5965 30  
 Water Level Encountered None  
 Static N/A

Drilling Company Boyles Bros  
 Date Drilled July 14, 1987  
 Drilling Method Hollow Stem Auger  
 Logged By K.D. Holliday  
 Geologist

Driller T Merritt  
 Helper T High  
 Drilling Fluid None  
 Checked By J. Pasolka  
 Site Manager  
Brent Harris  
 GRAP Manager

Comments Borehole backfilled with Portland Type I cement No contact sample collected due to insufficient recovery

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<b>ROCKY FLATS ALLUVIUM</b>	
			<u>0.0 2.0 SAMPLE.</u> Recovered 1 30/20 = 65%	HNu Background=0 8 OVA Background=1 2 Ludlum Background = 0 1
			0 10 CLAYEY SAND moderate brown (5 YR 3/4) some quartzite gravel sub rounded to subangular poorly sorted un consolidated dry	<u>5.0</u> Field screen reading HNu = 30 0 OVA = 1 0
5			10 13 SAND AND GRAVEL moderate brown (5 YR 3/4) some quartzite gravel sub rounded to subangular sand sub rounded to subangular very fine grained poorly sorted unconsolidated dry	<u>0.0 9.5</u> Composite sample BH38870010
			<u>2.0 4.0 SAMPLE.</u> Recovered 1 1/20 = 55%	<u>10.0</u> Field screen reading HNu = 80 0 OVA = 1 0
10			SAND AND GRAVEL very pale orange (10 YR 8/2) to light brown (5 YR 5/6) quartzite gravel sand subangular to subrounded 20 10 phi and 35 40 phi poorly sorted unconsolidated slightly damp	<u>9.5 10.85</u> Waste sample BH388710WS
			<u>4.0 7.0 SAMPLE.</u> Recovered 1 75/30 = 58%	<u>20.4 21.3</u> Bedrock sample BH388720BR
15			SAND AND GRAVEL same as above subangular to subrounded dry	
20				

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, Mound Area  
 Coordinates N 36679.43 E 23201.68  
 Total Depth 23 40'

Borehole/Well No BH38-87  
 Ground Surface Elevation 5965 30'  
 Water Level Encountered None  
 Static N/A

Drilling Company Boyles Bros  
 Date Drilled July 14, 1987  
 Drilling Method Hollow Stem Auger  
 Logged By K.D. Holliday  
 Geologist

Driller T Merritt  
 Helper T High  
 Drilling Fluid None  
 Checked By [Signature]  
 Site Manager

CEARP Manager

Comments Borehole backfilled with Portland Type I cement No contact sample collected due to insufficient recovery

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20			<p><u>7.0 9.5 SAMPLE.</u>            Recovered 1 0/25 = 40%            SAND AND GRAVEL same as above            slightly damp</p>	
25			<p><u>9.5 12.4 SAMPLE.</u>            Recovered 1 35/290 = 47%            SAND AND GRAVEL same as above            dry</p> <p><u>12.4 14.4 SAMPLE.</u>            Recovered 0 0/20 = 0%            124 130 Cuttings went from SANDY            GRAVEL to a CLAYEY SAND of bed            rock at approximately 130</p> <p style="text-align: center;"><b><u>ARAPAHOE FORMATION</u></b></p> <p>130 144 CLAYEY SANDSTONE dry            (from cuttings)</p>	
			<p><u>14.4 16.4 SAMPLE.</u>            Recovered 0 2/20 = 10%            CLAYEY SANDSTONE yellowish gray (5            Y 7/2) to very pale orange (10 YR 8/2)            sand 3 5 40 phi well sorted poorly con-            solidated dry</p>	
			<p><u>16.4 18.4 SAMPLE.</u>            Recovered 0 2/20 = 10%            CLAYEY SANDSTONE very pale orange            (10 YR 8/2) to grayish orange (10 YR            7/4) sand 3 5 40 phi well sorted poorly            consolidated dry</p>	



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Completed as well? No

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LOG  
OF  
BOREHOLE

Location <u>Rocky Flats Plant East Trenches Area</u>	Borehole/Well No <u>BH39-87</u>
Coordinates <u>N 36768 12 E 23799 02</u>	Ground Surface Elevation <u>5956 90</u>
Total Depth <u>22 00'</u>	Water Level Encountered <u>21</u>
	Static <u>N/A</u>
Drilling Company <u>Boyles Bros</u>	Driller <u>T High</u>
Date Drilled <u>August 12, 1987</u>	Helper <u>B Keeney</u>
Drilling Method <u>Hollow Stem Auger</u>	Drilling Fluid <u>None</u>
Logged By <u>L A Gregory-Frost</u> Geologist	Checked By <u>J J Pasolho</u> Site Manager
	<u>Brent Harris</u> CEARP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<b>TOPSOIL</b>	
			<u>0.0 2.0 SAMPLE.</u> Recovered 2 1/20 = 105% 00 05 TOPSOIL grayish brown (5 YR 3/2) sandy rooted quartzite pebbles grasses unconsolidated dry	HNu Background = 08 16 OVA Background=04 No Ludlum readings taken
5			<b>ROCKY FLATS ALLUVIUM</b>	
			05 20 CLAY grayish brown (5 YR 3/2) granite and quartzite pebbles and cobbles very coarse grained angular minerals weathered from granite cobbles consolidated dry	<u>0.0 2.0</u> Field screen readings HNu = 48 OVA = 04
			<u>2.0 4.0 SAMPLE.</u> Recovered 20/20 = 100%	<u>0.0 2.0</u> Field screen sample BH398700FS
10			20 245 SAND grayish brown (5 YR 3/2) arkosic very coarse grained angular to subangular poorly sorted sand composed of granitic minerals clayey unconsolidated dry	<u>2.0 4.0</u> Readings on core HNu = 28 OVA = 04
			245 35 GRAVEL moderate yellowish brown (10 YR 5/4) quartzite and granite pebbles and cobbles angular to subangular very coarse grained sand subangular poorly sorted clayey caliche deposits very calcareous consolidated to unconsolidated dry	<u>2.0 4.0</u> Direct hit sample BH398702DH
15			35-40 SAND same as 20 45 less feldspar and more quartz dry	<u>4.0-6.0</u> Readings on core HNu = 105 OVA = 04
				<u>4.0 6.0</u> Direct hit sample BH398704DH
				<u>7.0 9.0</u> Readings on core HNu = 320 OVA = 04
				<u>7.0 9.0</u> Direct hit sample BH398707DH
20				<u>9.5 12.0</u> Field screen readings HNu = 88 OVA = 04

LOG  
OF  
BOREHOLE

Location <u>Rocky Flats Plant East Trenches Area</u>	Borehole/Well No <u>BH39-87</u>
Coordinates <u>N 36768 12 E 23799 02</u>	Ground Surface Elevation <u>5956 90</u>
Total Depth <u>22 00</u>	Water Level Encountered <u>21</u>
	Static <u>N/A</u>
Drilling Company <u>Boyles Bros</u>	Driller <u>T High</u>
Date Drilled <u>August 12, 1987</u>	Helper <u>B Keeney</u>
Drilling Method <u>Hollow Stem Auger</u>	Drilling Fluid <u>None</u>
Logged By <u>L A Gregory-Frost</u> Geologist	Checked By <u>J Pasella</u> Site Manager
	<u>CEARP Manager</u>

Comments Borehole backfilled with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20			<p><u>4.0 7.0 SAMPLE.</u> Recovered 20/30 = 67%</p> <p>40 46 CALICHE pinkish gray (5 YR 8/1) dark yellowish orange (10 YR 6/6) streaks very soft dry</p> <p>46 70 GRAVEL grayish brown (5 YR 3/2) granite and quartzite pebbles and cobbles angular up to 0.25 diameter clayey very coarse grained sand and feldspar grains angular poorly sorted unconsolidated calcareous dry</p>	<p><u>9.5 12.0</u> Field screen sample BH397809FS</p> <p><u>12.0 14.0</u> Field screen readings HNu = 28 OVA = 04</p> <p><u>12.0 14.0</u> Upper contact sample BH398712UC</p> <p><u>14.5 17.0</u> Contact sample BH398714CT</p>
25			<p><u>7.0 9.5 SAMPLE.</u> Recovered 20/25 = 80%</p> <p>GRAVEL same as above (46 60) moderate yellowish brown (10 YR 5/4)</p>	<p><u>17.0 19.5</u> Bedrock sample BH398717BR</p>
			<p><u>9.5 12.0 SAMPLE.</u> Recovered 25/25 = 100%</p> <p>95 115 GRAVEL same as above (46 60) moderate yellowish brown (10 YR 5/4)</p> <p>115 120 SAND moderate yellowish brown (10 YR 5/4) very coarse grained rounded to subrounded moderately sorted quartzite and granite pebbles rounded to subangular clayey moist</p>	<p><u>17.0 19.5</u> Readings on cuttings HNu = 850</p> <p><u>19.5 22.0</u> Readings on core HNu = 12 OVA not functioning</p>
			<p><u>12.0 14.5 SAMPLE.</u> Recovered 20/25 = 80%</p> <p>GRAVEL moderate yellowish brown (10 YR 5/4) granite and quartzite pebbles and cobbles subangular clayey very coarse grained sand and feldspar grains angular poorly sorted unconsolidated calcareous dry</p>	<p><u>19.5 22.0</u> Direct hit sample BH398719DH</p>

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant East Trenches Area Borehole/Well No BH39-87  
 Coordinates N 36768 12 E 23799 02 Ground Surface Elevation 5956 90  
 Total Depth 22 00 Water Level Encountered 21  
 Static N/A  
 Drilling Company Boyles Bros Driller T High  
 Date Drilled August 12, 1987 Helper B Keeney  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By L A Gregory-Frost Checked By A. Pasella  
 Geologist Site Manager

CEARP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			<b>ARAPAHOE FORMATION</b>	
			<u>14.5 17.0 SAMPLE.</u> Recovered 25/25 = 100%	
			145 165 CLAYSTONE moderate yellow ish brown (10 YR 5/4) ironstone nodules and layers up to 0.25 long silty very fine grained sand consolidated dry	
			165 170 SANDSTONE moderate yellow ish brown (10 YR 5/4) fine grained sub angular to rounded well sorted abundant ironstone layers slightly clayey unconsol idated weathered dry	
			<u>17.0 19.5 SAMPLE.</u> Recovered 25/25 = 100%	
			SANDSTONE moderate yellowish brown (10 YR 5/4) fine to medium grained rounded well sorted rare ironstone nod ules occasional 0.2 interbeds of light olive gray (5 Y 6/1) claystone carbona ceous debris carbonized leaf molds in claystone unconsolidated weathered dry to moist	
			<u>19.5 22.0 SAMPLE.</u> Recovered 25/25 = 100%	
			SANDSTONE same as above (170 195) moist	
			TOTAL DEPTH 22 00	

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Completed as well? No

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- Hydraulic Conductivity Test Data  
and Results
- Packer Test Data and Results
- Water Level Data

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant East Trenches Area Borehole/Well No BH40-87  
 Coordinates N 36857.45 E 23919.73 Ground Surface Elevation 5953.70'  
 Total Depth 14 50 Water Level Encountered None  
 Static N/A  
 Drilling Company Boyles Bros Driller T High  
 Date Drilled August 13, 1987 Helper B Keeney  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By L A Gregory-Frost Checked By J J Pasella  
 Geologist Site Manager  
Brent Lewis  
 CAMP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<b>TOPSOIL</b>	
			<u>0.0 2.0 SAMPLE</u> Recovered 18/20 = 90%	
			00 05 TOPSOIL grayish brown (5 YR 3/2) sandy clayey quartzite pebbles and cobbles subangular rooted grasses calcareous unconsolidated dry	<u>0.0 1.8</u> Field screen readings HNu = 02 OVA = 04
5			<b>ROCKY FLATS ALLUVIUM</b>	
			05 13 GRAVEL grayish brown (5 YR 3/2) quartzite and granite pebbles and cobbles angular to subangular approximately 45% clay matrix consolidated dry	<u>2.0 3.6</u> Field screen readings HNu = 02 OVA = 04
			13 20 CALICHE pinkish gray (5 YR 8/1) rare quartzite and granite pebbles and cobbles soft unconsolidated dry	<u>4.0 6.8</u> Field screen readings HNu = 02 OVA = 04
10			<u>2.0-4.0 SAMPLE</u> Recovered 16/20 = 80%	
			20 245 CALICHE same as above (13 20) dry	<u>4.0 6.8</u> Upper contact sample BH408704UC
			245 40 GRAVEL moderate yellowish brown (10 YR 5/4) arkosic quartzite and granite pebbles subangular to angular very coarse grained sand composed of quartz and weathering feldspars angular clayey calcareous unconsolidated dry	<u>7.0 9.3</u> Field screen readings HNu = 02 OVA = 04
15				<u>7.0 9.3</u> Contact sample BH408707CT
				<u>9.5 12.0</u> Field screen readings. HNu = 02 OVA = 04
				<u>9.5 12.0</u> Bedrock sample BH408709BR

LOG  
OF  
BOREHOLE

Location <u>Rocky Flats Plant East Trenches Area</u>	Borehole/Well No <u>BH40-87</u>
Coordinates <u>N 36857.45 E 23919.73</u>	Ground Surface Elevation <u>5953.70</u>
Total Depth <u>14 50'</u>	Water Level Encountered <u>None</u>
	Static <u>N/A</u>
Drilling Company <u>Boyles Bros</u>	Driller <u>T High</u>
Date Drilled <u>August 13, 1987</u>	Helper <u>B Keeney</u>
Drilling Method <u>Hollow Stem Auger</u>	Drilling Fluid <u>None</u>
Logged By <u>L A Gregory-Frost</u> Geologist	Checked By <u>A Pasella</u> Site Manager
	CEARP Manager

Comments Borehole backfilled with Portland Type I cement.

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
—			<p><b>40 70 SAMPLE.</b> Recovered 28/30 = 93% GRAVEL moderate yellowish brown (10 YR 5/4) arkosic quartzite and granite pebbles and cobbles angular to subangular fine to very coarse grained sand composed of quartz and weathered granitic minerals angular to subangular poorly sorted clayey abundant caliche deposits calcareous unconsolidated to consolidated dry</p>	
—			<p><b>70 95 SAMPLE.</b> Recovered 23/25 = 92% 70 81 GRAVEL same as above (40 70)</p> <p style="text-align: center;"><b>ARAPAHOE FORMATION</b></p> <p>81 91 CLAYSTONE light olive gray (5 Y 6/1) silty becoming slightly sandy at base very fine grained caliche deposits consolidated weathered dry</p> <p>91 95 CLAYSTONE light olive gray (5 Y 6/1) with moderate yellowish brown (10 YR 5/4) streaks very sandy very fine grained silty calcareous deposits consolidated weathered dry</p>	
—				

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant East Trenches Area Borehole/Well No BH40-87  
 Coordinates N 36857.45 E 23919.73 Ground Surface Elevation 5953.70  
 Total Depth 14 50 Water Level Encountered None  
 Static N/A  
 Drilling Company Boyles Bros Driller T High  
 Date Drilled August 13, 1987 Helper B Keeney  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By L A Gregory-Frost Checked By A Pasella  
 Geologist Site Manager

CEARP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Foot	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			<p><u>9.5 12.0 SAMPLE.</u>            Recovered 25/25 = 100%            9.5 10.1 CLAYSTONE same as above            (9.1 9.5) dry            10.1 12.0 CLAYSTONE light olive gray            (5 Y 6/1) with moderate yellowish brown            (10 YR 5/4) streaks and mottling silty            slightly sandy very fine grained caliche            deposits calcareous weathered damp to            moist</p>	
			<p><u>12.0 14.5 SAMPLE.</u>            Recovered 25/25 = 100%            CLAYSTONE light olive gray (5 Y 6/1)            silty fining upward slightly to very            sandy very fine grained calcareous con            solidated weathered moist</p>	
			TOTAL DEPTH 14 50	

**INDEX OF DATA**

Boring No BH41-87

Completed as well? No

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- Log of Borehole
- Well Construction Summaries
- Well Development Summaries
- Hydraulic Conductivity Test Data  
and Results
- Packer Test Data and Results
- Water Level Data

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No BH41-87  
 Coordinates N 36944 03 E 24212 34 Ground Surface Elevation 5950.20  
 Total Depth 19 50' Water Level Encountered None

Static N/A

Drilling Company Boyles Bros Driller T High  
 Date Drilled August 17, 1987 Helper B Keeney

Drilling Method Hollow Stem Auger Drilling Fluid None

Logged By L. A. Gregory-Frost Checked By [Signature]  
 Geologist Site Manager

[Signature]  
SEARP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<b>TOPSOIL</b>	
			<u>0.0 2.0 SAMPLE.</u> Recovered 18/20 = 90%	HNu Background=00 OVA Background=02 No readings taken over background No Ludlum readings taken
			00 13 TOPSOIL grayish brown (5 YR 3/2) to grayish red (5 R 3/2) sandy clayey rooted grasses subangular quartzite pebbles unconsolidated dry	<u>0.0 1.8</u> Field screen readings HNu = 00 OVA = 02
5			<b>ROCKY FLATS ALLUVIUM</b>	
			13 20 CLAY grayish red (5 R 4/2) abundant quartzite and granite pebbles and cobbles rooted abundant caliche deposits consolidated dry	<u>2.0 4.0</u> Field screen readings HNu = 00 OVA = 02
			<u>2.0 4.0 SAMPLE.</u> Recovered 20/20 = 100%	<u>4.0 5.45</u> Field screen readings HNu = 00 OVA = 02
10			SAND light brown (5 YR 6/4) very fine to medium grained rounded moderately sorted abundant quartzite and granite pebbles and cobbles weathering granite cobbles individual granitic mineral grains feldspar quartz angular to subangular caliche deposits very calcareous unconsolidated dry	<u>7.0 8.4</u> Field screen readings HNu = 00 OVA = 02
			<u>4.0 7.0 SAMPLE.</u> Recovered 145/30 = 48%	<u>9.5 10.8</u> Field screen readings HNu = 00 OVA = 02
15			SAND same as above primarily quartzite pebbles and cobbles moderate yellowish brown (10 YR 5/4) at base calcareous dry	<u>0.0 10.8</u> Composite sample BH41870012 <u>0.0 10.8</u> Duplicate composite sample BH4187012D
20				

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No BH41-87  
 Coordinates N 36944 03 E 24212 34 Ground Surface Elevation 5950.20  
 Total Depth 19 50 Water Level Encountered None  
 Static N/A

Drilling Company Boyles Bros Driller T High  
 Date Drilled August 17, 1987 Helper B Keeney  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By L. A. Gregory-Frost Checked By [Signature]  
 Geologist Site Manager

CEARP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			<u>7.0 9.5 SAMPLE.</u> Recovered 14/25 = 56% SAND same as above becomes very clayey and moist at 8 2	<u>9.5 10.8. VOA</u> composite sample BH41870912
			<u>9.5 12.0 SAMPLE.</u> Recovered 13/25 = 52% 9 5 10 3 SAND moderate yellowish brown (10 YR 5/4) and moderate reddish brown (10 R 4/6) fine to medium grained rounded to subangular poorly sorted abundant granite and quartzite pebbles and cobbles subangular unconsolidated dry 10 3 10 8 CLAY moderate yellowish brown (10 YR 5/4) and moderate reddish brown (10 R 4/6) very sandy medium grained abundant granite pebbles and cobbles subangular unconsolidated dry to moist	<u>12.0 14.5</u> Field screen readings HNu = 00 OVA = 02  <u>12.0 14.5</u> Upper contact sample BH418712UC  <u>14.5 17.0</u> Field screen readings HNu = 00 OVA = 02  <u>14.5 17.0</u> Contact sample BH418714CT
			<u>12.0 14.5 SAMPLE.</u> Recovered 25/25 = 100% CLAY moderate yellowish brown (10 YR 5/4) very sandy medium to very coarse grained fine to very coarse grained sand lenses rounded to subangular poorly sorted light olive gray (5 Y 5/2) clay lenses pebble size feldspar crystals quartzite and granite pebbles subangular unconsolidated moist to dry	<u>17.0 19.5</u> Field screen readings HNu = 00 OVA = 02  <u>17.0 19.5. Bedrock</u> sample BH418717BR

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No BH41-87  
 Coordinates N 36944 03 E 24212 34 Ground Surface Elevation 5950.20  
 Total Depth 19 50' Water Level Encountered None  
 Static N/A  
 Drilling Company Boyles Bros Driller T High  
 Date Drilled August 17, 1987 Helper B Keeney  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By L. A. Gregory-Frost Checked By *L. A. Gregory-Frost*  
 Geologist Site Manager

CEARP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			<p><u>14.5 17.0 SAMPLE.</u>            Recovered 2 6/2 5 = 104%            14 5 15 6 CLAY same as above dry</p> <p style="text-align: center;"><b>ARAPAHOE FORMATION</b></p> <p>15 6 17 0 CLAYSTONE moderate yellow            ish brown (10 YR 5/4) and light olive            gray (5 Y 5/2) silty trace very fine            grained sand consolidated weathered            moist to dry</p> <p><u>17.0 19.5 SAMPLE.</u>            Recovered 2 6/2 5 = 104%            CLAYSTONE moderate yellowish brown            (10 YR 5/4) and light olive gray (5 Y            5/2) and medium gray (N 5/0) silty trace            very fine grained sand occasional caliche            deposits stiff consolidated weathered            moist to damp</p> <p>TOTAL DEPTH 19 50</p>	

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Boring No BH41-87A

Completed as well? No

### Data in File

- Log of Borehole
- Well Construction Summaries
- Well Development Summaries
- Hydraulic Conductivity Test Data  
and Results
- Packer Test Data and Results
- Water Level Data

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No BH41-87A  
 Coordinates N Ground Surface Elevation \_\_\_\_\_  
 Total Depth 9 50 Water Level Encountered None  
 Static N/A  
 Drilling Company Boyles Bros Driller T. High  
 Date Drilled August 14, 1987 Helper B Keeney  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By L A Gregory-Frost Checked By [Signature]  
 Geologist Geologist [Signature]  
 Site Manager  
 CRMP Manager  
 Comments Abandoned at 9 5' due to cobbles and boulders Borehole backfilled  
with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<b>TOPSOIL</b>	HNu Background=00 OVA Background=02 No Ludlum readings taken
			<b>0.0 2.0 SAMPLE</b> Recovered 16/20 = 80% 00 055 TOPSOIL grayish brown (5 YR 3/2) abundant quartzite and granite cobbles angular to subangular very clayey sandy rooted grasses unconsolidated dry	
5			<b>ROCKY FLATS ALLUVIUM</b>	
			055 16 GRAVEL grayish brown (5 YR 3/2) to grayish red (5 R 4/2) granite and quartzite pebbles and cobbles angular to subangular sandy clay matrix pebbles and cobbles coated with caliche consolidated dry	
10			<b>2.0 4.0 SAMPLE</b> Recovered 16/20 = 80% 20 30 GRAVEL grayish red (5 R 4/2) clay and sandy clay matrix granite and quartzite pebbles and cobbles granites weathering in place sand grains pebbles and cobbles have caliche coating consolidated dry 30 36 GRAVEL moderate yellowish brown (10 YR 5/4) quartzite and granite pebbles and cobbles clayey very coarse to coarse grained sand matrix granites weathering in place angular to subangular poorly sorted calcareous unconsolidated to consolidated dry	



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Boring No BH42-87

Completed as well? No

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and Results
- Packer Test Data and Results
- Water Level Data

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No BH42-87  
 Coordinates N 36869.17 E 24278.85 Ground Surface Elevation 5950 50  
 Total Depth 55 50' Water Level Encountered 17 0 25 0  
 Static N/A

Drilling Company Boyles Bros Driller T. High  
 Date Drilled August 18-26, 1987 Helper B Keeney  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By L.A. Gregory-Frost Checked By [Signature]  
 Geologist Site Manager  
CEAMP Manager

Comments Borehole backfilled with Portland Type I cement Sample BH428727BR  
doubles as a direct hit sample

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<b>TOPSOIL</b>	
			<u>0.0 2.0 SAMPLE</u> Recovered 14/20 = 70%	
			00 095 TOPSOIL grayish red (5 R 4/2) sandy quartzite pebbles and cobbles sub angular to angular rooted grasses uncon solidated dry	<u>0.0 8.3</u> Composite sample BH42870009
5			<b>ROCKY FLATS ALLUVIUM</b>	
			095 14 CALICHE grayish pink (5 R 8/2) occasional quartzite pebbles suban gular soft unconsolidated dry	<u>0.0 8.3</u> Duplicate composite sample BH4287009D
			<u>2.0 4.0 SAMPLE</u> Recovered 14/20 = 70%	
			20 29 CALICHE grayish pink (5 R 8/2) occasional quartzite pebbles suban gular soft unconsolidated dry	<u>0.0 1.4</u> Field screen readings HNu = 00 OVA = 02
10			29 34 GRAVEL grayish pink (5 R 8/2) caliche matrix quartzite and granite cob bles up to 03 diameter angular uncon solidated dry	<u>2.0 3.4</u> Field screen readings HNu = 00 OVA = 02
			<u>4.0 7.0 SAMPLE</u> Recovered 24/30 = 80%	
			SANDY GRAVEL moderate yellowish brown (10 YR 5/4) coarse to very coarse grained subangular to rounded poorly sorted coarsening upward becoming fine to medium grained at base feldspar grains abundant quartzite and granite pebbles angular to subangular caliche deposits calcareous unconsolidated dry	<u>4.0 6.4</u> Field screen readings HNu = 00 OVA = 02
15				<u>7.0 8.3</u> Field screen readings HNu = 00 OVA = 02
				<u>9.5 11.3</u> VOA composite sample BH42870709
20				<u>12.0 13.3</u> Field screen readings HNu = 00

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No BH42-87  
 Coordinates N 36869.17 E 24278.85 Ground Surface Elevation 5950 50  
 Total Depth 55.50 Water Level Encountered 17 0 25 0  
 Static N/A  
 Drilling Company Boyles Bros Driller T. High  
 Date Drilled August 18-26, 1987 Helper B Keeney  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By L.A. Gregory-Frost Checked By J. Paselka  
 Geologist Site Manager

CEARP Manager

Comments Borehole backfilled with Portland Type I cement Sample BH428727BR  
doubles as a direct hit sample

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20		7.0 9.5 SAMPLE	Recovered 1 3/2 5 = 52% SANDY GRAVEL same as above fine to very coarse grained upper dry	14.5 16.5 Field screen readings HNu = 00 OVA = 02
		9.5 12.0 SAMPLE	Recovered 1 8/2 5 = 72% SANDY GRAVEL same as above occa sional clayey zones dry	17.0 18.8 Field screen readings HNu = 00 OVA = 02
25		12.0 14.5 SAMPLE	Recovered 1 3/2 5 = 52% SANDY GRAVEL same as above clayey at base abundant granite cobbles suban gular moist	17.0 18.8 Water table sample BH428717WT 19.5 22.0 Field screen readings HNu = 00 OVA = 02
30		14.5 17.0 SAMPLE	Recovered 2 0/2 5 = 80% SAND moderate yellowish brown (10 YR 5/4) very coarse to medium grained predominantly very coarse grained angular to rounded poorly sorted slightly clayey quartzite and granite pebbles and cobbles angular to subangular unconsoli dated moist	22.0 24.5 Field screen readings HNu = 00 OVA = 02 22.0 24.5 Contact sample BH428722CT
35				24.5 27.0 Readings on core HNu = 42 OVA = 02
40			24.5 27.0 Direct hit sample BH428724DH 27.0 29.5 Readings on core HNu = 30 OVA = 04 27.0 29.5 Bedrock sample BH428727BR	

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No BH42-87  
 Coordinates N 36869.17 E 24278.85 Ground Surface Elevation 5950 50'  
 Total Depth 55.50' Water Level Encountered 17 0' 25 0  
 Static N/A  
 Drilling Company Boyles Bros Driller T. High  
 Date Drilled August 18-26, 1987 Helper B Keeney  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By L.A. Gregory-Frost Checked By *A. D. ...*  
 Geologist Site Manager

Comments Borehole backfilled with Portland Type I cement CEARP Manager  
doubles as a direct hit sample Sample BH428727BR

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
40				
			<p><u>17.0 19.5 SAMPLE.</u>            Recovered 18/25 = 72%            170-185 GRAVEL moderate yellowish brown (10 YR 5/4) to dark yellowish brown (10 YR 4/2) quartzite and granite cobbles angular to subangular medium to very coarse grained sand and clayey sand matrix rounded to subangular poorly sorted unconsolidated saturated</p>	<p><u>29.5.</u> Reading in borehole HNu = 43 OVA = 02   <u>29.5 32.0</u> Readings on core HNu = 60 25 OVA = 02   <u>29.5 32.0</u> Direct hit sample BH428729DH</p>
45			<p>185 188 CLAY light olive gray (5 Y 5/2) silty and very coarse grained sand streaks quartzite pebbles rounded medium to very coarse grained sand consolidated saturated</p>	<p><u>32.0 34.5</u> Field screen readings HNu = 32 OVA = 02</p>
			<p><u>19.5 22.0 SAMPLE.</u>            Recovered 27/25 = 108%            CLAY light olive gray (5 Y 5/2) silty very coarse grained sandy at top coarsening upward abundant quartzite and rose quartz pebbles rounded to subangular consolidated moist</p>	<p><u>32.0 34.5</u> Field screen sample BH428732FS</p>
50			<p><u>22.0 24.5 SAMPLE.</u>            Recovered 25/25 = 100%            220 224 CLAY same as above moist            224 2385 GRAVEL moderate yellowish brown (10 YR 5/4) quartzite and granite pebbles and cobbles subangular weathering granite cobbles medium to very coarse grained sandy clayey matrix poorly sorted angular to subangular consolidated moist</p>	<p><u>34.5 35.90</u> Field screen readings HNu = 52 OVA = 02   <u>34.5 35.90</u> Field screen sample BH428734FS</p>
55				<p><u>37.0 39.5.</u> Field screen readings HNu = 15   <u>37.0 39.5.</u> Field screen sample BH428737FS</p>
60				

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No BH42-87  
 Coordinates N 36869.17 E 24278.85 Ground Surface Elevation 5950 50'  
 Total Depth 55 50 Water Level Encountered 17 0 25 0  
 Static N/A  
 Drilling Company Boyles Bros Driller T. High  
 Date Drilled August 18-26, 1987 Helper B Keeney  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By L.A. Gregory-Frost Checked By J. Pasolun  
 Geologist Site Manager

Comments Borehole backfilled with Portland Type I cement Sample BH428727BR  
doubles as a direct hit sample CEARP Manager

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			<b>ARAPAHOE FORMATION</b>	
			23 85 24 5 SANDSTONE light olive gray (5 Y 5/2) to moderate yellowish brown (10 YR 5/4) very fine to fine grained rounded well sorted very clayey sharp upper contact consolidated weathered moist	HNu Background=0 2 OVA Background=0 2  39.5 40.4 Field screen readings HNu = 0 2 OVA = 0 2  Field screen heated for 30 minutes OVA = 3 8
			<u>24.5 27.0 SAMPLE.</u> Recovered 2 5/2 5 = 100% SANDSTONE moderate yellowish brown (10 YR 5/4) and light olive gray (5 Y 5/2) very fine to fine grained rounded to subangular well sorted occasional very clayey zones occasional sandy clay lenses caliche deposits occasional carbonaceous debris occasional hematite cemented layers unconsolidated to consolidated moist to saturated	39.5 40.4 Field screen sample BH428739FS  43.0 43.5 Field screen readings HNu = 0 2 OVA = 0 2
			<u>27.0 29.5 SAMPLE.</u> Recovered 2 5/2 5 = 100% SANDSTONE same as above very clayey at base occasional 0 03 caliche layers consolidated moist to saturated	HNu Background=0 0 OVA Background=0 2  45.5 47.0. Readings on core HNu = 1 4 OVA = 0 2
				45.5 47.0 Direct hit sample BH428745DH
				48.5 49.4 Field screen readings HNu = 0 0

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No BH42-87  
 Coordinates N 36869.17 E 24278.85 Ground Surface Elevation 5950 50  
 Total Depth 55.50 Water Level Encountered 17 0 25 0  
 Static N/A  
 Drilling Company Boyles Bros Driller T. High  
 Date Drilled August 18-26, 1987 Helper B Keeney  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By L.A. Gregory-Frost Checked By J. P. Parullo  
 Geologist Site Manager

CEARP Manager

Comments Borehole backfilled with Portland Type I cement Sample BH428727BR  
doubles as a direct hit sample

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			<p><b>29.5 32.0 SAMPLE.</b>            Recovered 3 05/25 = 122%</p> <p>29 5 30 35 SANDSTONE moderate yel lowish brown (10 YR 5/4) with light olive gray (5 Y 5/2) layers fine to medium grained well sorted well rounded slightly clayey to very clayey occasional carbonaceous debris caliche deposits occasional ironstone layers consolidated moist to saturated</p> <p>30 35 30 50 SANDSTONE dusky brown (5 YR 3/2) medium grained well rounded well sorted unconsolidated saturated (H<sub>Nu</sub> = 23 25)</p> <p>30 50 31 30 SANDSTONE same as 29 5 30 35</p> <p>31 30 31 35 SANDSTONE same as 30 35 30 50</p> <p>31 35 31 65 SANDSTONE same as 29 50 30 35</p> <p>31 65 31 70 SANDSTONE same as 30 35 30 50</p> <p>31 70 32 00 SANDSTONE same as 29 50 30 35</p>	
			<p><b>32.0 34.5 SAMPLE.</b>            Recovered 2 5/25 = 100%</p> <p>32 0 33 5 SANDSTONE moderate yellow ish brown (10 YR 5/4) with light olive gray (5 Y 5/2) fine to medium grained rounded well sorted slightly clayey occasional carbonaceous debris caliche deposits occasional medium to coarse grained sand lenses well sorted well rounded occasional cemented layers consolidated saturated</p>	

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No BH42-87  
 Coordinates N 36869.17 E 24278.85 Ground Surface Elevation 5950 50'  
 Total Depth 55 50 Water Level Encountered 17 0 25 0'  
 Static N/A  
 Drilling Company Boyles Bros Driller T. High  
 Date Drilled August 18-26, 1987 Helper B Keeney  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By L.A. Gregory-Frost Checked By [Signature]  
 Geologist Site Manager

CEARP Manager  
 Sample BH428727BR

Comments Borehole backfilled with Portland Type I cement  
doubles as a direct hit sample

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			33 5 34 5 SANDSTONE moderate yellowish brown (10 YR 5/4) coarse to very coarse grained well rounded well sorted primarily very coarse grained abundant dark grains unconsolidated saturated	
			<u>34.5 37.0 SAMPLE.</u> Recovered 1 4/25 = 56% SANDSTONE same as above (33 5 34 5)	
			<u>37.0 39.5 SAMPLE.</u> Recovered 5 0/25 = 200% SANDSTONE same as above (33 5 34 5) medium to very coarse grained predominantly coarse to very coarse grained	
			<u>39.5 43.0 SAMPLE.</u> Recovered 0 9/35 = 26% SANDSTONE very light gray (N 8/0) medium to very coarse grained rounded moderately sorted occasional cemented lenses abundant dark grains unconsolidated saturated	
			<u>43.0 45.5 SAMPLE.</u> Recovered 0 5/25 = 20% SANDSTONE same as above (39 5 43 0) moderate yellowish brown (10 YR 5/4) occasional dark gray (N 3/0) claystone chips saturated	

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No BH42-87  
 Coordinates N 36869.17 E 24278.85 Ground Surface Elevation 5950 50  
 Total Depth 55 50 Water Level Encountered 17 0 25 0  
 Static N/A  
 Drilling Company Boyles Bros Driller T. High  
 Date Drilled August 18-26, 1987 Helper B Keeney  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By L.A. Gregory-Frost Checked By [Signature]  
 Geologist Site Manager

Comments Borehole backfilled with Portland Type I cement Sample BH428727BR  
doubles as a direct hit sample  
 CEARP Manager

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			<p><u>45.5 48.5 SAMPLE.</u>            Recovered 15/30 = 50%            SANDSTONE moderate yellowish brown            (10 YR 5/4) and light gray (N 8/0) fine            to medium grained rounded well sorted            unconsolidated saturated</p>	
			<p><u>48.5 50.0 SAMPLE.</u>            Recovered 09/151 = 60%            SANDSTONE moderate yellowish brown            (10 YR 5/4) fine to medium grained            rounded well sorted light gray (N 7/0)            coarse grained layers at base rounded            well sorted unconsolidated saturated</p>	
			<p><u>50.0 52.5 SAMPLE.</u>            Recovered 17/25 = 68%            50 0 50 8 CUTTINGS slough            50 8 51 7 CLAYSTONE moderate yellow            ish brown (10 YR 5/4) and light olive            gray (5 Y 6/1) occasional medium dark            gray (N 4/0) layers very sandy fine            grained well sorted rounded occasional            light gray (N 7/0) medium grained sand            stone lenses well sorted well rounded            consolidated weathered saturated            51 7 52 05 SANDSTONE light olive gray            (5 Y 6/1) to light gray (N 7/0) fine            grained well sorted rounded slightly            clayey consolidated moist            52 05 52 5 CLAYSTONE medium gray            (N 5/0) to dark gray (N 3/0) fine grained            sandy at top silty at base consolidated            moist</p>	

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No BH42-87  
 Coordinates N 36869.17 E 24278.85 Ground Surface Elevation 5950 50  
 Total Depth 55.50' Water Level Encountered 17 0 25 0  
 Static N/A  
 Drilling Company Boyles Bros Driller T. High  
 Date Drilled August 18-26, 1987 Helper B Keeney  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By L.A. Gregory-Frost Checked By [Signature]  
 Geologist Site Manager

CEARP Manager

Comments Borehole backfilled with Portland Type I cement Sample BH428727BR  
doubles as a direct hit sample

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			<b>52.5 55.5 SAMPLE.</b> Recovered 2 6/30 = 87% 52 5 53 45 CLAYSTONE mottled medium gray (N 5/0) to dark gray (N 3/0) trace very fine grained sand light gray (N 3/0) fine grained sandstone lenses at base consolidated moist  53 45 53 7 SANDSTONE moderate yel lowish brown (10 YR 5/4) very clayey very fine grained well sorted rounded consolidated weakly cemented saturated 53 7 53 9 CLAYSTONE moderate yellow ish brown (10 YR 5/4) silty trace very fine grained sand consolidated moist 53 9 55 5 SANDSTONE moderate yellow ish brown (10 YR 5/6) with occasional light olive gray (5 Y 6/1) fine grained well sorted rounded clayey occasional moderate yellowish brown (10 YR 5/4) and olive gray (5 Y 4/1) silty claystone lenses consolidated saturated  <b>TOTAL DEPTH 55 50</b>	

## INDEX OF DATA

Boring No BH43-87

Completed as well? No

### Data in File

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- Well Construction Summaries
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- Hydraulic Conductivity Test Data  
and Results
- Packer Test Data and Results
- Water Level Data

LOG  
OF  
BOREHOLE

Location <u>Rocky Flats Plant, East Trenches Area</u>	Borehole/Well No <u>BH43-87</u>
Coordinates <u>N 36642 07 E 23919 86</u>	Ground Surface Elevation <u>5956 50'</u>
Total Depth <u>34.70'</u>	Water Level Encountered <u>None</u>
	Static <u>N/A</u>
Drilling Company <u>Boyles Bros</u>	Driller <u>T High</u>
Date Drilled <u>September 4, 1987</u>	Helper <u>N Wheeler, B Keeney</u>
Drilling Method <u>Hollow Stem Auger</u>	Drilling Fluid <u>None</u>
Logged By <u>L A Gregory-Frost J B Bergman</u> Geologist	Checked By <u><i>A. Pasella</i></u> Site Manager
	<u><i>Brent Lewis</i></u> GEARP Manager
Comments <u>Borehole backfilled with Portland Type I cement September 8, 1987</u> <u>by J B Bergman</u>	

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<b>ROCKY FLATS ALLUVIUM</b>	
	0.0	2.0	<p><b>0.0 2.0 SAMPLE.</b> Recovered 16/20 = 80% GRAVEL grayish brown (5 YR 3/2) sandy clay matrix quartzite and granite pebbles and cobbles angular to subangular grasses and roots consolidated dry to moist</p>	<p>HNu Background=00 OVA Background=00 No Ludlum readings taken</p> <p>Field screen reading sample reading (field blank reading)</p>
5		2.0	<p><b>2.0 4.0 SAMPLE.</b> Recovered 16/20 = 80% 2.0 2.55 GRAVEL same as above dry 2.55 4.0 GRAVEL moderate yellowish brown (10 YR 5/4) to very pale orange (10 YR 8/2) quartzite and granite pebbles and cobbles up to 0.25 diameter angular to subangular slightly sandy clayey matrix from 2.55 2.85 caliche matrix from 2.85 3.6 consolidated dry</p>	<p>0.0 1.6 Field screen readings HNu = 78 (00) OVA = 00(00)</p> <p>0.0 1.6 Field screen sample BH438700FS</p> <p>2.0 3.6 Field screen readings HNu = 210 (00) OVA = 00(00)</p>
10		4.0	<p><b>4.0 7.0 SAMPLE.</b> Recovered 13/30 = 43% GRAVEL same as above (2.55 4.0) cobbles less than 0.2 diameter dry</p>	<p>2.0 3.6 Field screen sample BH438702FS</p> <p>4.0 5.3 Readings on core HNu = 32 OVA = 00</p>
15		7.0	<p><b>7.0 9.5 SAMPLE.</b> Recovered 09/25 = 36% GRAVEL moderate yellowish brown (10 YR 5/4) fine to coarse grained sandy matrix poorly sorted subangular quartzite pebbles and cobbles angular to subangular unconsolidated dry</p>	<p>4.0 5.3 Direct hit sample BH438704DH</p> <p>4.0 5.3 Duplicate sample BH4387407D</p>
20				<p>7.0 7.9 Readings on core HNu = 42 OVA = 00</p>

LOG  
OF  
BOREHOLE

Location <u>Rocky Flats Plant, East Trenches Area</u>	Borehole/Well No <u>BH43-87</u>
Coordinates <u>N 36642 07 E 23919 86</u>	Ground Surface Elevation <u>5956 50'</u>
Total Depth <u>34 70</u>	Water Level Encountered <u>None</u>
	Static <u>N/A</u>
Drilling Company <u>Boyles Bros</u>	Driller <u>T High</u>
Date Drilled <u>September 4, 1987</u>	Helper <u>N Wheeler, B Keeney</u>
Drilling Method <u>Hollow Stem Auger</u>	Drilling Fluid <u>None</u>
Logged By <u>L A Gregory-Frost, J B Bergman</u> Geologist	Checked By <u><i>A. Pasalun</i></u> Site Manager

CEARP Manager

Comments Borehole backfilled with Portland Type I cement September 8, 1987  
by J B Bergman

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20			<u>9.5 12.0 SAMPLE.</u> Recovered 08/25 = 32% SAND moderate yellowish brown (10 YR 5/4) fine to very coarse grained angular to subangular poorly sorted slightly clayey abundant quartzite and granite pebbles and cobbles up to 0.3 diameter occasional granite cobbles weathering in place producing coarse to very coarse poorly sorted angular feldspar quartz mica and black mineral grains unconsolidated dry	<u>7.0 7.9.</u> Direct hit sample BH438707DH  <u>9.5 10.3.</u> Readings on core HNu = 820 OVA = 00  <u>9.5 10.3.</u> Direct hit sample BH438709DH
25			<u>12.0 14.5 SAMPLE.</u> Recovered 09/25 = 36% SAND same as above dry	<u>12.0 12.9.</u> Readings on core HNu = 540 OVA = 18  <u>12.0 12.9.</u> Direct hit sample BH438712DH
30			<u>14.5 17.0 SAMPLE.</u> Recovered 13/25 = 52% SAND same as above dry	<u>14.5 15.8.</u> Readings on core HNu = 300 OVA = 00  <u>14.5 15.8.</u> Direct hit sample BH438714DH
			<u>17.0 19.5 SAMPLE.</u> Recovered 13/25 = 52% SAND same as above dry	<u>17.0 18.3.</u> Readings on core HNu = 480 OVA = 00  <u>17.0 18.3.</u> Direct hit sample BH438717DH
			TOTAL DEPTH WITH PLOPPER 19.7 READJUST DEPTH	<u>19.7 21.9.</u> Field screen readings HNu = 0.4(0.6) OVA = 00 (00)
35			<u>19.7 22.2 SAMPLE.</u> Recovered 22/25 = 88% CLAY AND GRAVEL moderate brown (5 YR 4/4) some very fine grained sand quartzite gravels and pebbles angular broken poorly sorted consolidated dry	

LOG  
OF  
BOREHOLE

Location <u>Rocky Flats Plant, East Trenches Area</u>	Borehole/Well No <u>BH43-87</u>
Coordinates <u>N 36642 07 E 23919 86</u>	Ground Surface Elevation <u>5956 50</u>
Total Depth <u>34 70'</u>	Water Level Encountered <u>None</u>
	Static <u>N/A</u>
Drilling Company <u>Boyles Bros</u>	Driller <u>T High</u>
Date Drilled <u>September 4, 1987</u>	Helper <u>N Wheeler, B Keeney</u>
Drilling Method <u>Hollow Stem Auger</u>	Drilling Fluid <u>None</u>
Logged By <u>L A Gregory-Frost, J B Bergman</u> Geologist	Checked By <u>J Pasello</u> Site Manager
	CEARP Manager
Comments <u>Borehole backfilled with Portland Type I cement September 8, 1987</u> <u>by J B Bergman</u>	

Depth Foot	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
—			<u>22.2 24.7 SAMPLE.</u> Recovered 10/25 = 40% <b>CLAY AND GRAVEL</b> same as above dry	<u>22.2 23.2.</u> Readings on core HNu = 0 OVA = 20
—			<u>24.7 27.2 SAMPLE.</u> Recovered 13/25 = 52% <b>CLAY AND GRAVEL</b> same as above with more silt and very fine grained sand dry	<u>22.2 23.2.</u> Direct hit sample BH438722DH  <u>24.7 26.0</u> Upper contact sample BH438725UC
			<b><u>ARAPAHOE FORMATION</u></b>	<u>24.7 26.0</u> Field screen readings HNu = 04(06) OVA = 00(00)
—			<u>27.2 29.7 SAMPLE.</u> Recovered 13/25 = 52% <b>CLAYSTONE</b> moderate brown (5 YR 4/4) thin (<01) beds of sandstone light gray (N 7/0) clayey very fine grained dark yellowish orange (10 YR 6/6) mot tles sorted slightly moist	<u>27.2.</u> Readings on cuttings HNu = 5 OVA = 04
—			<u>29.7 32.2 SAMPLE.</u> Recovered 23/25 = 92% <b>CLAYSTONE</b> same as above with some dark yellowish orange (10 YR 6/6) and dusky red (5 R 3/4) FeO nodules dry	<u>27.2 28.5.</u> Contact sample BH438727CT
—			<u>32.2 34.7 SAMPLE.</u> Recovered 25/25 = 100% <b>32.2 33.2 SANDSTONE</b> light gray (N 7/0) very fine grained rounded well sorted abundant dark yellowish orange (10 YR 6/6) stains some clay consoli dated trace FeO nodules slightly moist	<u>29.7 32.0.</u> Bedrock sample BH438730BR  <u>29.7 32.0.</u> Duplicate sample BH4387300D
				<u>32.2 34.7.</u> Field screen readings HNu = 06(12) OVA = 00(00)

LOG  
OF  
BOREHOLE

Location <u>Rocky Flats Plant, East Trenches Area</u>	Borehole/Well No <u>BH43-87</u>
Coordinates <u>N 36642 07 E 23919 86</u>	Ground Surface Elevation <u>5956 50'</u>
Total Depth <u>34 70</u>	Water Level Encountered <u>None</u>
	Static <u>N/A</u>
Drilling Company <u>Boyles Bros</u>	Driller <u>T High</u>
Date Drilled <u>September 4, 1987</u>	Helper <u>N Wheeler, B Keeney</u>
Drilling Method <u>Hollow Stem Auger</u>	Drilling Fluid <u>None</u>
Logged By <u>L A Gregory-Frost, J B Bergman</u> Geologist	Checked By <u><i>[Signature]</i></u> Site Manager

CEARP Manager

Comments Borehole backfilled with Portland Type I cement September 8, 1987  
by J B Bergman

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
—			332 347 CLAYSTONE moderate brown (5 YR 4/4) abundant light gray (N 7/0) sand patches not laminated very fine grained rounded well sorted consoli dated dry	
			TOTAL DEPTH 34 70	
—				
—				
—				

## INDEX OF DATA

Boring No BH44-87

Completed as well? No

### Data in File

- Log of Borehole
- Well Construction Summaries
- Well Development Summaries
- Hydraulic Conductivity Test Data  
and Results
- Packer Test Data and Results
- Water Level Data

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No BH44-87  
 Coordinates 36691 73 E 23978 41 Ground Surface Elevation 5956 10  
 Total Depth 34 50 Water Level Encountered 29 5  
 Drilling Company Boyles Bros Driller T High  
 Date Drilled September 9, 1987 Helper B Keeney  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By J B Bergman Geologist Checked By A J Pasella  
 Site Manager  
Brent Ellis  
 CRAP Manager

Comments Borehole backfilled with Portland Type I cement. Sample BH448724DH  
doubles as upper contact sample, and BH448729WT doubles as the contact  
sample

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<b><u>TOPSOIL</u></b>	
			<b><u>0.0 2.0 SAMPLE.</u></b> Recovered 20/20 = 100% 00 05 TOPSOIL grayish brown (5 YR 3/2) abundant roots and grasses silty some quartzite pebbles angular poorly sorted dry	HNu Background=06 OVA Background=02 No Ludlum readings taken  Field screen readings sample reading (field blank reading)
5			<b><u>ROCKY FLATS ALLUVIUM</u></b>	
			05 20 CLAY AND GRAVEL dark reddish brown (10 R 3/4) clay matrix abundant quartzite pebbles angular poorly sorted consolidated dry	0.0 2.0 Field screen readings HNu = 04(04) OVA = 00(00)
10			<b><u>2.0 4.0 SAMPLE.</u></b> Recovered 18/20 = 90% GRAVEL moderate reddish brown (10 R 4/6) clay and sand matrix very fine grained abundant quartzite pebbles and gravels angular poorly sorted unconsolidated some dark reddish brown (10 R 3/4) areas dry	2.0 3.8 Field screen readings HNu = 06(08) OVA = 04(04)
15			<b><u>4.0 7.0 SAMPLE.</u></b> Recovered 22/30 = 73% CLAY AND GRAVEL dark yellowish brown (10 YR 4/2) quartzite pebbles and gravels poorly sorted unconsolidated some very fine grained to silty sand dry	4.0 6.2 Readings on core HNu = 08 OVA = 14  4.0 6.2 Direct hit sample BH448704DH
20				7.0 8.5 Field screen readings HNu = 08(08) OVA = 04(06)
				9.5 10.4 Field screen readings HNu = 06(06) OVA = 04(04)

LOG  
OF  
BOREHOLE

Location <u>Rocky Flats Plant, East Trenches Area</u>	Borehole/Well No <u>BH44-87</u>
Coordinates <u>36691 73 E 23978 41</u>	Ground Surface Elevation <u>5956 10</u>
Total Depth <u>34 50</u>	Water Level Encountered <u>29 5</u>
	Static <u>N/A</u>
Drilling Company <u>Boyles Bros</u>	Driller <u>T High</u>
Date Drilled <u>September 9, 1987</u>	Helper <u>B Keeney</u>
Drilling Method <u>Hollow Stem Auger</u>	Drilling Fluid <u>None</u>
Logged By <u>J B Bergman</u> Geologist	Checked By <u>J. Pardo</u> Site Manager

CEARP Manager

Comments Borehole backfilled with Portland Type I cement. Sample BH448724DH doubles as upper contact sample, and BH448729WT doubles as the contact sample

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20			<p><u>7.0 9.5 SAMPLE.</u> Recovered 15/25 = 60% CLAY AND GRAVEL same as above dry</p>	<p><u>12.0.</u> Readings on cuttings HNu = 80 OVA = 100</p>
25			<p><u>9.5 12.0 SAMPLE.</u> Recovered 09/25 = 37% CLAY AND GRAVEL same as above less pebbles cobble of quartzite in shoe dry</p>	<p><u>12.0 12.7</u> Field screen readings HNu = 06(06) OVA = 04(04)</p>
			<p><u>12.0 14.5 SAMPLE.</u> Recovered 07/25 = 28% COBBLE quartzite broken</p>	<p><u>14.5 16.4</u> Readings on core HNu = 06 OVA = 24</p>
30			<p><u>14.5 17.0 SAMPLE.</u> Recovered 19/25 = 76% SAND AND GRAVEL moderate brown (5 YR 3/4) sand matrix very fine grained some clay angular to sub rounded unconsolidated poorly sorted dry</p>	<p><u>14.5 16.4</u> Direct hit sample BH448714DH</p> <p><u>17.0 18.3</u> Field screen readings HNu = 04(04) OVA = 02(02)</p>
35			<p><u>17.0 19.5 SAMPLE.</u> Recovered 13/25 = 52% SAND AND GRAVEL same as above with moderate yellowish brown (10 YR 5/4) matrix no pebbles some silt dry</p>	<p><u>19.5 22.0.</u> Readings on core HNu = 08 OVA = 18</p> <p><u>19.5 22.0</u> Direct hit sample BH448719DH</p> <p><u>22.0 23.5</u> Readings on core HNu = 20 OVA = 04</p> <p><u>22.0 23.5</u> Direct hit sample BH448722DH</p>

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No BH44-87  
 Coordinates 136691 73 E 23978 +1 Ground Surface Elevation 5956 10'  
 Total Depth 34 50 Water Level Encountered 29 5  
 Static N/A  
 Drilling Company Boyles Bros Driller T High  
 Date Drilled September 9, 1987 Helper B Keeney  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By J B Bergman Checked By [Signature]  
 Geologist Site Manager

CEARP Manager

Comments Borehole backfilled with Portland Type I cement. Sample BH448724DH  
doubles as upper contact sample, and BH448729WT doubles as the contact  
sample

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
19.5		22.0	<p><u>19.5 22.0 SAMPLE.</u>            Recovered 2 5/2 5 = 100%            SAND AND GRAVEL moderate brown            (5 YR 4/4) abundant quartzite gravels            mica and feldspar common angular to            subrounded unconsolidated some clay            poorly sorted large cobble ~1 5 in diame            ter at top some dark yellowish orange (10            YR 6/6) patches dry</p>	<p><u>24.5 27.0</u> Readings            on core HNu = 40            OVA = 06</p> <p><u>24.5 27.0</u> Direct hit            sample BH448724DH</p> <p><u>29.5 32.0</u> Water table            sample BH448729WT</p>
22.0		24.5	<p><u>22.0 24.5 SAMPLE.</u>            Recovered 1 5/2 5 = 60%            SAND AND GRAVEL same as above            with some light olive gray (5 Y 3/2)            patches of clay some medium grained            sand dry</p>	<p><u>32.0 34.5</u> Bedrock            sample BH448732BR</p> <p><u>32.0 34.5</u> Field            screen readings HNu            = 0 4(0 4) OVA =            0 0(0 0)</p>
24.5		27.0	<p><u>24.5 27.0 SAMPLE.</u>            Recovered 2 5/2 5 = 100%            SAND AND GRAVEL moderate brown            (5 YR 4/4) very fine grained quartzose            sand feldspar grains some clay moder            ately poor sorting subrounded quartzite            pebbles and cobbles common slightly            moist</p>	
27.0-29.5			<p><u>27.0-29.5 SAMPLE.</u> No recovery</p>	

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No BH44-87  
 Coordinates T 36691 73 E 23978 41 Ground Surface Elevation 5956 10  
 Total Depth 34 50 Water Level Encountered 29 5  
 Static N/A  
 Drilling Company Boyles Bros Driller T High  
 Date Drilled September 9, 1987 Helper B Keeney  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By J B Bergman Checked By J Pasella  
 Geologist Site Manager

CEARP Manager

Comments Borehole backfilled with Portland Type I cement. Sample BH448724DH  
doubles as upper contact sample, and BH448729WT doubles as the contact  
sample

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			<b>ARAPAHOE FORMATION</b>	
			<b>29.5 32.0 SAMPLE.</b> Recovered 2 5/2 5 = 100% SANDSTONE grayish orange (10 YR 7/4) medium to fine grained rounded unconsolidated well sorted dark yellow ish orange (10 YR 6/6) and light brown (5 YR 5/6) patches in shoe some light olive gray (5 Y 5/2) clay in shoe wet	
			<b>32.0 34.5 SAMPLE.</b> Recovered 2 5/2 5 = 100% 32 0 32 7 SANDSTONE same as above wet 32 7 34 5 CLAYSTONE moderate brown (5 YR 3/4) abundant dark yellowish or ange (10 YR 6/6) stains and light olive gray (5 Y 3/2) patches abundant medium to very fine grained sand trace organics dry	
			<b>TOTAL DEPTH 34 50</b>	

## INDEX OF DATA

Boring No BH45-87

Completed as well? No

### Data in File

- Log of Borehole
- Well Construction Summaries
- Well Development Summaries
- Hydraulic Conductivity Test Data  
and Results
- Packer Test Data and Results
- Water Level Data

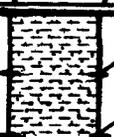
LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No BH45-87  
 Coordinates N 36744 21 E 24157 71 Ground Surface Elevation 5952 70  
 Total Depth 40 00 Water Level Encountered 27 5

Static N/A

Drilling Company Boyles Bros Driller T. High  
 Date Drilled Aug 28 & 31, Sept 1, 1987 Helper B. Keeney  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By J B Bergman, L A Gregory-Frost Checked By [Signature]  
 Geologist [Signature] CEASFP Manager

Comments Borehole backfilled with Portland Type I cement On September 1, 1987  
BH458722BR doubles as a DH sample

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<b>ROCKY FLATS ALLUVIUM</b>	
			<b>0.0 2.0 SAMPLE.</b> Recovered 20/20 = 100% SANDY CLAY AND GRAVEL dusky brown (5 YR 2/2) sandy clay matrix abundant quartzite pebbles and cobbles roots and grasses unsorted angular to subangular moderately consolidated damp	HNu Background = 04 08 OVA Background = 00 04 No Ludlum readings taken  Field screen readings sample reading (field blank reading)
5			<b>2.0 4.0 SAMPLE.</b> Recovered 12/20 = 60% SAND AND GRAVEL moderate yellow ish brown (10 YR 5/4) quartzite pebbles and gravels poorly sorted angular to subrounded some dusky brown (5 YR 2/2) patches quartzose sand medium to coarse grained abundant clay slightly damp	<b>0.0 2.0</b> Field screen readings HNu = 08 (08) OVA = 04(04)  <b>2.0 3.2</b> Field screen readings HNu = 08 (08) OVA = 04(04)
10			<b>4.0 7.0 SAMPLE.</b> Recovered 24/30 = 80% SAND AND GRAVEL pale red (5 R 6/2) abundant quartzite and granite gravel poorly sorted sandy matrix subrounded coarse grained sand quartzose sand some caliche unconsolidated dry	<b>0.9 9.5</b> Composite sample BH45870009  <b>7.0 9.5</b> VOA composite sample BH45870709
15				<b>4.0 6.4</b> Field screen readings HNu = 08 (08) OVA 04(04)
20				<b>7.0 9.5</b> Field screen readings HNu = 06 (06) OVA = 04(04)

**LOG  
OF  
BOREHOLE**

Location Rocky Flats Plant, East Trenches Area Borehole/Well No BH45-87  
 Coordinates N 36744 21 E 24157 71 Ground Surface Elevation 5952 70  
 Total Depth 40 00 Water Level Encountered 27 5'  
 Static N/A

Drilling Company Boyles Bros Driller T. High  
 Date Drilled Aug 28 & 31, Sept 1, 1987 Helper B. Keeney  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By J B Bergman, L A Gregory-Frost Checked By [Signature]  
 Geologist Site Manager

CEARP Manager

Comments Borehole backfilled with Portland Type I cement On September 1, 1987  
BH458722BR doubles as a DH sample

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20		<u>7.0 9.5 SAMPLE.</u>	Recovered 25/25 = 100% SAND AND GRAVEL pale yellowish brown (10 YR 6/2) moderate brown (5 YR 5/4) zone at 75 80 quartzose sand quartzite pebbles and gravels medium to coarse grained subrounded poorly sorted abundant caliche trace clay dry	<u>9.5 11.7.</u> Field screen readings HNu = 06 (06) OVA = 00(00)
25		<u>9.5 12.0 SAMPLE.</u>	Recovered 22/25 = 88% SAND AND GRAVEL same as above dry	<u>12.0 14.5</u> Field screen readings HNu = 06(06) OVA = 00(00)
30		<u>12.0 14.5 SAMPLE.</u>	Recovered 25/25 = 100% SAND AND GRAVEL same as above except moderate yellowish brown (10 YR 5/4) dry	<u>14.5 17.0</u> Field screen readings HNu = 06(06) OVA = 00(00)
35		<u>14.5 17.0 SAMPLE.</u>	Recovered 20/25 = 80% SAND AND GRAVEL same as above trace clay no caliche dry	<u>9.5 17.0</u> Composite sample BH45870917
40		<u>17.5 20.0 SAMPLE.</u>	Recovered 24/25 = 96% GRAVEL moderate brown (5 YR 4/4) to moderate yellowish brown (10 YR 5/4) very sandy clay matrix fine to very coarse grained poorly sorted rounded to angular quartzite and granite pebbles and cobbles angular to subangular unconsolidated moist	<u>14.5 16.5</u> VOA composite sample BH45871417  HNu Background=00 OVA Background=02
				<u>17.5 19.90.</u> Field screen sample HNu = 08(00) OVA = 02(02)
				<u>17.5 19.9</u> Upper contact sample BH458717UC
				<u>20.0 22.3.</u> Contact sample BH458720CT

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No BH45-87  
 Coordinates N 36744 21 E 24157 71 Ground Surface Elevation 5952 70  
 Total Depth 40 00 Water Level Encountered 27 5  
 Static N/A  
 Drilling Company Boyles Bros Driller T. High  
 Date Drilled Aug 28 & 31, Sept 1, 1987 Helper B. Keeney  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By J B Bergman, L A Gregory-Frost Checked By J. Passalunghi  
 Geologist Site Manager

CEARP Manager

Comments Borehole backfilled with Portland Type I cement On September 1, 1987  
BH458722BR doubles as a DH sample

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			<p><u>20.0 22.5 SAMPLE.</u>            Recovered 23/25 = 92%            200 203 GRAVEL same as above (175            200) less abundant quartzite and granite            pebbles</p> <p style="text-align: center;"><b>ARAPAHOE FORMATION</b></p> <p>203 225 SANDSTONE light olive gray            (5 Y 6/1) and moderate yellowish brown            (10 YR 5/4) fine to medium grained            predominantly fine grained well sorted            rounded to subangular coarsening up            ward clayey to very clayey at base occa            sional 003 light olive gray (5 Y 6/1)            sandy clay layers at base weathered un            consolidated moist</p> <p><u>22.5 25.0 SAMPLE.</u>            Recovered 27/25 = 108%            225 230 SANDSTONE same as above            moist            230 236 CLAYSTONE light olive gray            (5 Y 6/1) mottled with moderate yellow            ish brown (10 YR 5/4) abundant car            bonaceous debris consolidated weath            ered moist            236 250 Interbedded 03 layers of            CLAYSTONE light olive gray (5 Y 6/1)            mottled with moderate yellowish brown            (10 YR 5/4) occasionally sandy            consolidated weathered moist with            SANDSTONE light olive gray (5 Y 6/1)            and moderate yellowish brown (10 YR            5/4) fine grained well sorted rounded            slightly clayey abundant dark grains            unconsolidated weathered moist</p>	<p><u>22.5 25.0</u> Reading on            borehole HNu = 15            OVA = 17</p> <p><u>22.5 25.0</u> Readings            on core HNu = 08            OVA = 18 32</p> <p><u>22.5 25.0</u> Bedrock            sample BH458722BR</p> <p><u>25.0 27.5</u> Field            screen readings HNu            = 72(00) OVA =            02(02)</p> <p><u>25.0 27.5</u> Field            screen sample            BH458725FS</p> <p><u>27.5 30.0</u> Readings            on core HNu = 12            OVA = 22</p> <p><u>27.5 30.0</u>, Direct hit            sample BH458727DH</p> <p><u>30.0 32.2</u>, Readings            on core HNu = 1.2            OVA = 08</p> <p><u>30.0 32.2</u> Direct hit            sample BH458730DH</p>

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No BH45-87  
 Coordinates N 36744 21 E 24157 71 Ground Surface Elevation 5952 70  
 Total Depth 40 00 Water Level Encountered 27 5  
 Static N/A  
 Drilling Company Boyles Bros Driller T. High  
 Date Drilled Aug 28 & 31, Sept 1, 1987 Helper B. Keeney  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By J B Bergman, L A Gregory-Frost Checked By J. Paschke  
 Geologist Site Manager

CEARP Manager

Comments Borehole backfilled with Portland Type I cement On September 1, 1987  
BH458722BR doubles as a DH sample

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
—			<p><u>25.0 27.5 SAMPLE.</u>            Recovered 25/25 = 100%            CLAYSTONE light olive gray (5 Y 6/1) and moderate yellowish brown (10 YR 5/4) mottled and banded abundant carbonaceous debris rare light gray (N 7/0) very fine grained sandstone lenses fine to very fine grained sand from 25 8 26 2 consolidated weathered moist to saturated</p>	<p><u>32.5 33.9.</u> Field screen readings HNu = 10(00) OVA = 02(02)</p> <p><u>32.5 33.9.</u> Field screen sample BH458732FS</p>
—			<p><u>27.5 30.0 SAMPLE.</u>            Recovered 25/25 = 100%            CLAYSTONE light olive gray (5 Y 6/1) and moderate yellowish brown (10 YR 5/4) mottled and banded abundant carbonaceous debris abundant light gray (N 7/0) fine grained sandstone lenses very fine to fine grained sand rare calcareous nodules abundant ironstone nodules consolidated weathered moist to saturated</p>	<p><u>35.0 37.5.</u> Field screen sample HNu = 08(00) OVA = 02(02)</p> <p><u>35.0 37.5.</u> Field screen sample BH458735FS</p>
—			<p><u>30.0 32.5 SAMPLE.</u>            Recovered 25/25 = 100%            CLAYSTONE same as above except very sandy occasional 0 15 light gray (N 7/0) very fine to fine grained sandstone layers moist to saturated</p>	<p><u>37.5 40.0.</u> Field screen readings HNu = 04(08) OVA = 00(00)</p>

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No BH45-87  
 Coordinates N 36744 21 E 24157 71 Ground Surface Elevation 5952 70  
 Total Depth 40 00 Water Level Encountered 27 5  
 Static N/A  
 Drilling Company Boyles Bros Driller T. High  
 Date Drilled Aug 28 & 31, Sept 1, 1987 Helper B. Keeney  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By J B Bergman, L A Gregory-Frost Checked By [Signature]  
 Geologist Site Manager  
 CEARP Manager  
 Comments Borehole backfilled with Portland Type I cement On September 1, 1987  
BH458722BR doubles as a DH sample

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
—			<p><b>32.5 35.0 SAMPLE.</b>            Recovered 14/25 = 56%            32.5 33.5 SANDSTONE moderate yellow            ish brown (10 YR 5/4) and light brown (5            YR 5/6) predominantly coarse to very            coarse grained trace medium grained oc            casional clayey streaks at base occasional            light olive gray (5 Y 6/1) fine to very            fine grained sandstone lenses at base well            rounded to rounded well sorted uncon            solidated weathered saturated</p> <p>33.5 33.9 SANDSTONE light olive gray            (5 Y 6/1) very fine grained well sorted            rounded slightly clayey weakly ce            mented consolidated weathered satu            rated</p>	
—			<p><b>35.0 37.5 SAMPLE.</b>            Recovered 37/25 = 148%            33.9 36.7 SANDSTONE light olive gray            (5 Y 6/1) grading into moderate yellowish            brown (10 YR 5/4) very fine to fine            grained well sorted rounded slightly to            very clayey at base consolidated weath            ered saturated</p> <p>36.7 37.5 CLAYSTONE moderate yellow            ish brown (10 YR 5/4) very sandy very            fine grained occasional light gray (N            7/0) fine grained sandstone lenses well            sorted well rounded consolidated weath            ered saturated</p>	



## INDEX OF DATA

Boring No BH46-87

Completed as well? No

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and Results
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- Water Level Data

LOG  
OF  
BOREHOLE

Location <u>Rocky Flats Plant East Trenches Area</u>	Borehole/Well No <u>BH46-87</u>
Coordinates <u>N 36701 27 E 24215 40</u>	Ground Surface Elevation <u>5952.60</u>
Total Depth <u>32 00'</u>	Water Level Encountered <u>None</u>
	Static <u>N/A</u>
Drilling Company <u>Boyles Bros</u>	Driller <u>T. High</u>
Date Drilled <u>September 2-3, 1987</u>	Helper <u>B Keeney</u>
Drilling Method <u>Hollow Stem Auger</u>	Drilling Fluid <u>None</u>
Logged By <u>L A Gregory-Frost</u> Geologist	Checked By <u>A Pasella</u> Site Manager <u>Brent Lewis</u> CEMP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<b>ROCKY FLATS ALLUVIUM</b>	
5	(Graphic log showing gravel and sand)	<u>0.0 2.0 SAMPLE</u>	Recovered 18/20 = 90% GRAVEL dark reddish brown (10 R 3/4) sandy clay matrix quartzite and granite pebbles and cobbles up to 03 diameter subangular to angular rooted grasses calcareous unconsolidated to consolidated dry	HNu Background=00 OVA Background=02 No Ludlum readings taken  Field screen reading sample reading (field blank reading)  <u>0.0 1.8</u> Field screen readings HNu = 04 (08) OVA = 02(02)
10		<u>2.0 4.0 SAMPLE</u>	Recovered 16/20 = 80% GRAVEL same as above dark reddish brown (10 R 3/4) and moderate yellowish brown (10 YR 5/4) cobbles up to 02 diameter dry	<u>0.0 9.0</u> Composite sample BH46870009  <u>2.0 3.6</u> Field screen readings HNu = 00 (02) OVA = 02(02)
15		<u>4.0 7.0 SAMPLE</u>	Recovered 20/30 = 67% 40 43 GRAVEL same as above dry 43 70 SAND moderate yellowish brown (10 YR 5/4) abundant quartzite and granite pebbles rare cobbles subangular to angular clayey fine to medium grained subangular poorly sorted unconsolidated dry	<u>4.0-6.0</u> Field screen readings HNu = 02 (02) OVA = 02(02)  <u>7.0 9.0</u> VOA composite sample BH46870709  <u>7.0 9.0</u> Field screen readings HNu = 04 (04) OVA = 02(02)
20				<u>9.5 11.8</u> Field screen readings HNu = 02 (02) OVA = 02(02)

LOG  
OF  
BOREHOLE

Location <u>Rocky Flats Plant East Trenches Area</u>	Borehole/Well No <u>BH46-87</u>
Coordinates <u>N 36701 27 E 24215 40</u>	Ground Surface Elevation <u>5952.60</u>
Total Depth <u>32 00'</u>	Water Level Encountered <u>None</u>
	Static <u>N/A</u>
Drilling Company <u>Boyles Bros</u>	Driller <u>T. High</u>
Date Drilled <u>September 2-3, 1987</u>	Helper <u>B Keeney</u>
Drilling Method <u>Hollow Stem Auger</u>	Drilling Fluid <u>None</u>
Logged By <u>L A Gregory-Frost</u> Geologist	Checked By <u>[Signature]</u> Site Manager
	<u>CEARP Manager</u>

Comments Borehole backfilled with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20				
			<p><u>7.0 9.5 SAMPLE.</u> Recovered 2 0/2 5 = 80% SAND moderate yellowish brown (10 YR 5/4) with dusky red (5 R 3/4) bands quartzite pebbles and cobbles subangular to angular fine to very coarse grained angular to subangular poorly sorted moderate reddish brown (10 R 4/6) granite cobbles weathering in place very coarse grained to pebble size feldspar black minerals and quartz clayey unconsolidated to consolidated dry</p>	<p><u>12.0 14.5</u> Field screen readings HNu = 0 2(0 2) OVA = 0 2 (0 2)</p> <p><u>14.5 16.8</u> Field screen readings HNu = 0 0(0 2) OVA = 0 2 (0 2)</p> <p><u>17.0 17.8</u> Field screen readings HNu = 0 0(0 2) OVA = 0 2 (0 2)</p>
25			<p><u>9.5 12.0 SAMPLE.</u> Recovered 2 3/2 5 = 92% SAND same as above dry</p>	<p><u>9.5 17.8</u> Composite sample BH46870919</p>
30			<p><u>12.0 14.5 SAMPLE.</u> Recovered 2 5/2 5 = 100% SAND same as above caliche deposits dry</p>	<p><u>17.0 17.8</u> VOA composite sample BH46871719</p>
			<p><u>14.5 17.0 SAMPLE.</u> Recovered 2 3/2 5 = 92% SAND same as above cobbles up to 0 3 diameter dry</p>	<p><u>19.5 22.0</u> Field screen readings HNu = 0 0(0 2) OVA = 0 2 (0 2)</p>
35			<p><u>17.0 19.5 SAMPLE.</u> Recovered 0 8/2 5 = 32% SAND same as above dry</p>	<p><u>22.0 22.9</u> Field screen readings HNu = 0 0(0 2) OVA = 0 2 (0 2)</p>
				<p><u>24.5 25.1</u> Upper contact sample BH468724UC</p>

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant East Trenches Area Borehole/Well No BH46-87  
 Coordinates N 36701 27 E 24215 40 Ground Surface Elevation 5952.60  
 Total Depth 32 00' Water Level Encountered None  
 Static N/A  
 Drilling Company Boyles Bros Driller T. High  
 Date Drilled September 2-3, 1987 Helper B Keeney  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By L A Gregory-Frost Checked By [Signature]  
 Geologist Site Manager  
 CEARP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			<p><u>19.5 22.0 SAMPLE.</u>            Recovered 2 5/2 5 = 100%            SAND moderate yellowish brown (10 YR 5/4) fine to coarse grained poorly sorted rounded to subangular abundant quartzite and granite pebbles and occasional cobbles rounded to angular up to 0.25 diameter clayey to very clayey unconsolidated dry to moist</p>	<p><u>24.5 25.1</u> Field screen readings HNu = 0.2(0.2) OVA = 0.2(0.2)</p> <p><u>27.0 29.5</u> Contact sample BH468726CT</p>
			<p><u>22.0 24.5 SAMPLE.</u>            Recovered 0.9/2.5 = 36%            SAND same as above granite cobbles weathering in place to very coarse grained feldspar black minerals and quartz grains moist</p>	<p><u>27.0 29.5</u> Field screen readings HNu = 0.0(0.0) OVA = 0.2(0.2)</p> <p><u>29.5 32.0</u> Bedrock sample BH468729BR</p>
			<p><u>24.5 27.0 SAMPLE.</u>            Recovered 0.6/2.5 = 24%            24.5 25.1 SAND same as above moist</p>	<p><u>29.5 32.0</u> Field screen readings HNu = 0.0(0.0) OVA = 0.2(0.2)</p>
			<p><u>27.0 29.5 SAMPLE.</u>            Recovered 3.2/2.5 = 128%</p> <p style="text-align: center;"><b><u>ARAPAHOE FORMATION</u></b></p> <p>25.1 29.5 CLAYSTONE moderate yellowish brown (10 YR 5/4) and light olive gray (5 Y 5/2) slightly sandy silty light brown (5 YR 5/6) bands occasional carbonaceous debris consolidated weathered moist</p>	

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant East Trenches Area Borehole/Well No BH46-87  
 Coordinates N 36701 27 E 24215 40 Ground Surface Elevation 5952.60  
 Total Depth 32 00' Water Level Encountered None  
 Static N/A  
 Drilling Company Boyles Bros Driller T. High  
 Date Drilled September 2-3, 1987 Helper B Keeney  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By L A Gregory-Frost Checked By [Signature]  
 Geologist Site Manager  
 CEARP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Foot	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			<p><b>29.5 32.0 SAMPLE.</b>            Recovered 2 5/2 5 = 100%            29 5 30 3 CLAYSTONE light olive gray            (5 Y 5/2) mottled with moderate yellow            ish brown (10 YR 5/4) very sandy fine            grained occasional light gray (N 7/0)            fine grained sand lenses well sorted well            rounded occasional carbonaceous debris            consolidated weathered moist            30 3 32 0 CLAYSTONE light olive gray            (5 Y 5/2) to light olive gray (5 Y 6/1)            with moderate yellowish brown (10 YR            5/4) mottling slightly sandy occasional            carbonaceous debris consolidated            weathered moist</p> <p>TOTAL DEPTH 32 00</p>	

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Boring No BH47-87

Completed as well? No

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LOG  
OF  
BOREHOLE

Location <u>Rocky Flats Plant, East Trenches Area</u>	Borehole/Well No <u>BH47-87</u>
Coordinates <u>N 36620.37 E 24463 34</u>	Ground Surface Elevation <u>5951 40</u>
Total Depth <u>28 20'</u>	Water Level Encountered <u>22 8'</u>
	Static <u>N/A</u>
Drilling Company <u>Boyles Bros</u>	Driller <u>P. Mesa, R. Sharp</u>
Date Drilled <u>Sept 11, 14, 15, 1987</u>	Helper <u>D Jarvie, T Merritt</u>
Drilling Method <u>Hollow Stem Auger</u>	Drilling Fluid <u>None</u>
Logged By <u>J L Bannon</u> Geologist	Checked By <u>A Pasolho</u> Site Manager <u>Brent Lewis</u> GEARP Manager
Comments <u>Borehole backfilled with Portland Type I cement as upper contact sample</u>	Sample <u>BH478722WT doubles</u>

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<b>TOPSOIL</b>	
		<u>0.0 2.0 SAMPLE</u>	Recovered 14/20 = 70%	HNu Background=06 OVA Background=08 No Ludlum readings taken
		<u>0.0 0.48</u>	TOPSOIL very dark organic rich soil with roots grass and cobbles dry	Field screen readings Sample readings (field blank reading)
5			<b>ROCKY FLATS ALLUVIUM</b>	
		<u>0.48 1.4</u>	CLAY AND GRAVEL pale yel lowish brown (10 YR 8/2) clay matrix with cobbles of caliche coated quartz and granite very dry	<u>0.0 1.40</u> Field screen readings HNu = 84 (02) OVA = 18 (18)
		<u>2.0 4.0 SAMPLE</u>	Recovered 163/20 = 81%	<u>0.0 1.40</u> Field screen sample BH478700FS
10		<u>2.0 3.63</u>	SAND AND GRAVEL light brown (5 YR 5/6) clayey sand with abundant quartz and quartzite pebbles and cobbles with heavy caliche rind very dry	Field screen readings HNu = 30 (02) OVA = 28(28)
		<u>4.0 5.7 SAMPLE</u>	Recovered 132/17 = 78%	<u>2.0 3.63</u> Field screen sample BH478702FS
15		<u>4.0 5.32</u>	SAND AND GRAVEL very pale orange (10 YR 8/2) to dark yellowish orange (10 YR 6/6) very fine to fine grained sand with angular to subangular quartzite and schist minor clay unconsolidated dry	Readings on core HNu = 180 OVA = 08
		<u>6.0 7.15</u>	No recovery Drilled with center bit	<u>4.0 5.32</u> Direct hit sample BH478704DH
20				<u>6.0 7.15</u> Readings on core HNu = 350 OVA = 08
				<u>6.0 7.15</u> Direct hit sample BH478706DH

LOG  
OF  
BOREHOLE

Location <u>Rocky Flats Plant, East Trenches Area</u>	Borehole/Well No <u>BH47-87</u>
Coordinates <u>N 36620.37 E 24463 34</u>	Ground Surface Elevation <u>5951 40'</u>
Total Depth <u>28 20'</u>	Water Level Encountered <u>22 8'</u>
	Static <u>N/A</u>
Drilling Company <u>Boyles Bros</u>	Driller <u>P. Mesa, R. Sharp</u>
Date Drilled <u>Sept 11, 14, 15, 1987</u>	Helper <u>D Jarvie, T Merritt</u>
Drilling Method <u>Hollow Stem Auger</u>	Drilling Fluid <u>None</u>
Logged By <u>J L Bannon</u> Geologist	Checked By <u>A J Pasella</u> Site Manager

CEARP Manager  
Sample BH47872ZWT doubles

Comments Borehole backfilled with Portland Type I cement as upper contact sample

Depth Foot	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20			<p><u>6.0 7.8 SAMPLE.</u> Recovered 115/18 = 64% SAND AND GRAVEL very pale orange (10 YR 8/2) to dark yellowish orange (10 YR 6/6) poorly sorted very fine to medium grained clayey sand with subangular to subround caliche coated quartzite pebbles moderately consolidated dry</p>	<p><u>7.8</u> Reading at well head HNu = 40</p> <p><u>8.0 9.0</u> Readings on core HNu = 88 OVA = 08</p> <p><u>8.0 9.0</u> Direct hit sample BH478708DH</p>
25	[Hatched Box]		<p><u>7.8 8.0 SAMPLE.</u> No recovery Drilled with center bit</p> <p><u>8.0 9.3 SAMPLE.</u> Recovered 10/13 = 77% 80 85 SAND moderate yellowish brown (10 YR 5/4) very fine grained well sorted clayey sand unconsolidated dry</p> <p>85 90 SAND AND GRAVEL dark yellowish orange (10 YR 6/6) very fine grained poorly sorted clayey sand with abundant subangular to subrounded caliche coated quartzite pebbles moderately consolidated dry</p>	<p><u>9.5 10.52.</u> Readings on core HNu = 80 OVA = 08</p> <p><u>9.5 10.52.</u> Direct hit sample BH478709DH</p>
30			<p><u>9.3 9.5 SAMPLE.</u> No recovery Drilled with center bit</p> <p><u>9.5 11.0 SAMPLE.</u> Recovered 102/15 = 68% SAND AND GRAVEL light brown (5 YR 5/6) fine to coarse grained poorly sorted clayey sand with abundant subangular to subrounded caliche coated quartz and quartzite pebbles strong HCl reaction dry</p>	<p><u>11.0</u> Readings on cuttings HNu = 150 Readings in breathing zone HNu = 80</p> <p><u>11.5 12.66.</u> Readings on core HNu = 300 OVA = 08</p> <p><u>11.5 12.66</u> Direct hit sample BH478711DH</p> <p><u>13.5 14.78</u> Readings on core HNu = 600 OVA = 08</p> <p><u>13.5 14.78.</u> Direct hit sample BH478713DH</p>

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No BH47-87  
 Coordinates N 36620 37 E 24463 34 Ground Surface Elevation 5951 40'  
 Total Depth 28 20' Water Level Encountered 22 8  
 Static N/A  
 Drilling Company Boyles Bros Driller P. Mesa, R. Sharp  
 Date Drilled Sept 11, 14, 15, 1987 Helper D Jarvie, T Merritt  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By J L Bannon Checked By A Passell  
 Geologist Site Manager

CEARP Manager

Comments Borehole backfilled with Portland Type I cement Sample BH478722WT doubles  
as upper contact sample

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			<u>11.0 11.5 SAMPLE.</u> No recovery Drilled with center bit	<u>15.0 15.65</u> Readings on core HNu = 500 OVA = 08
			<u>11.5 13.0' SAMPLE.</u> Recovered 1 16/15 = 77% SAND AND GRAVEL light brown (5 YR 5/6) medium to coarse grained moderately sorted clayey sand with subangular to subrounded quartzite pebbles moderately consolidated dry	<u>15.0 15.65</u> Direct hit sample BH478715DH
			<u>13.0 13.5 SAMPLE.</u> No recovery Drilled with center bit	<u>16.0-17.62</u> Field screen reading HNu = 195(02) OVA = 10 (10)
			<u>13.5 15.0 SAMPLE.</u> Recovered 1 28/15 = 85% SAND AND GRAVEL light brown (5 YR 5/6) fine to medium grained moderately sorted clayey sand with subangular to subrounded caliche coated quartzite pebbles in zones moderately consolidated dry	<u>16.0 17.62</u> Field screen sample BH478716FS
			<u>15.0 16.0 SAMPLE.</u> Recovered 0 65/10 = 65% SAND AND GRAVEL same as above dry	<u>18.0</u> No readings above background at cuttings and breathing zone
			<u>16.0 18.0 SAMPLE.</u> Recovered 1 62/20 = 81% SAND AND GRAVEL light brown (5 YR 5/6) fine to medium grained moderately sorted clayey sand with abundant quartzite pebbles and cobbles moderately consolidated very weak HCl reaction indicates bottom of caliche zone damp	<u>18.5 20.21</u> Field screen readings HNu = 02(02) OVA = 10 (10)
				<u>20.5 21.0</u> Readings on core HNu = 1100 OVA = 28

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No BH47-87  
 Coordinates N 36620 37 E 24463 34 Ground Surface Elevation 5951 40'  
 Total Depth 28 20 Water Level Encountered 22 8'  
 Static N/A  
 Drilling Company Boyles Bros Driller P. Mesa, R. Sharp  
 Date Drilled Sept 11, 14, 15, 1987 Helper D Jarvie, T Merritt  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By J L Bannon Checked By J J Pasella  
 Geologist Site Manager

CEARP Manager

Comments Borehole backfilled with Portland Type I cement Sample BH478722WT doubles  
as upper contact sample

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			<u>18.0 18.5 SAMPLE.</u> No recovery Drilled with center bit	<u>20.5 21.0.</u> Direct hit sample BH478720DH
			<u>18.5 20.5 SAMPLE.</u> Recovered 1 71/20 = 85%	No readings over background on cuttings and breathing zone
			18.5 19.4 SAND AND GRAVEL moderate brown (5 YR 4/4) fine to coarse grained moderately sorted clayey sand with abundant cobbles and pebbles moderately consolidated damp	<u>21.0 22.5.</u> Field screen readings HNu = 62(2) OVA = 10 (10)
			19.4 19.71 CLAY moderate brown (5 YR 4/4) very dense homogenous clay consolidated damp	
			19.71 20.21 SAND AND GRAVEL moderate brown (5 YR 4/4) fine to coarse grained poorly sorted clayey sand with abundant quartzite pebbles and cobbles consolidated damp	<u>21.0 22.5</u> Field screen sample BH478721FS
			<u>20.5 21.0 SAMPLE.</u> Recovered 0 85/05 = 170%	<u>22.5 24.3.</u> Water table sample BH478722WT
			SAND AND GRAVEL moderate brown (5 YR 4/4) fine to coarse grained poorly sorted clayey sand with pebbles consolidated damp	<u>24.0 25.15.</u> Field screen readings HNu = 02(02) OVA = 14 (14)
			<u>21.0 22.5 SAMPLE.</u> Recovered 1 8/15 = 120%	<u>26.2 27.2</u> Contact sample BH478726CT
			SAND AND GRAVEL color difficult to distinguish due to water used by drillers for this run clayey sand with abundant quartz and quartzite pebbles unconsolidated wet	<u>26.2 27.2</u> Duplicate sample BH4787026D

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No BH47-87  
 Coordinates N 36620 37 E 24463 34 Ground Surface Elevation 5951 40  
 Total Depth 28 20' Water Level Encountered 22 8'  
 Static N/A  
 Drilling Company Boyles Bros Driller P. Mesa, R. Sharp  
 Date Drilled Sept 11, 14, 15, 1987 Helper D Jarvie, T Merritt  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By J L Bannon Checked By *J. Pasolke*  
 Geologist Site Manager

CEARP Manager

Comments Borehole backfilled with Portland Type I cement Sample BH478722WT doubles  
as upper contact sample

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
—			<p><u>22.5 24.5 SAMPLE.</u>            Recovered 1 8/20 = 90%            SAND AND GRAVEL fine to medium            grained clayey sand with abundant            gravel unconsolidated very wet</p> <p>TOTAL DEPTH WITH PLOPPER 240            READJUST DEPTH</p>	<p><u>27.2 28.2</u> Bedrock            sample BH478727BR</p> <p><u>27.2 28.2</u> Field            screen readings HNu            = 0.2(0.2) OVA = 0.6            (0.6)</p>
—			<p><u>24.0 25.5 SAMPLE.</u>            Recovered 1 15/15 = 77%            SAND well sorted coarse grained sand            with small subrounded to rounded            quartzite rose and clear quartz and            feldspar pebbles without large pebbles            and clay lower 01 like above clayey            sand with large pebbles unconsolidated            very wet</p>	
—			<p><u>25.5 26.2 SAMPLE.</u> No recovery Drilled            with center bit</p> <p style="text-align: center;"><b><u>ARAPAHOE FORMATION</u></b></p>	
—			<p><u>26.2 27.2 SAMPLE.</u>            Recovered 1 4/10 = 140%            CLAYSTONE yellowish gray (5 Y 7/2)            with dark yellowish orange (10 YR 6/6)            oxidized mottling homogenous clay con            solidated damp</p>	

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No BH47-87  
 Coordinates N 36620 37 E 24463 34 Ground Surface Elevation 5951 40  
 Total Depth 28 20' Water Level Encountered 22 8  
 Static N/A  
 Drilling Company Boyles Bros Driller P. Mesa, R. Sharp  
 Date Drilled Sept 11, 14, 15, 1987 Helper D Jarvie, T Merritt  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By J L Bannon Checked By [Signature]  
 Geologist Site Manager

Comments Borehole backfilled with Portland Type I cement as upper contact sample CEARP Manager  
Sample BH478722WT doubles

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
—			27.2 28.2 SAMPLE. Recovered 113/10 = 113% CLAYSTONE light olive gray (5 Y 5/2) with dark yellowish orange (10 YR 6/6) mottling consolidated damp  TOTAL DEPTH 28 20	
—				
—				
—				

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Boring No BH48-87

Completed as well? No

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- Well Development Summaries
- Hydraulic Conductivity Test Data  
and Results
- Packer Test Data and Results
- Water Level Data

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No BH48-87  
 Coordinates N 36555 21 E 24641 88 Ground Surface Elevation 5949.40  
 Total Depth 16.95 Water Level Encountered None  
 Static N/A  
 Drilling Company Boyles Bros Driller R Sharp  
 Date Drilled September 16-17, 1987 Helper T Merritt  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By J. L. Bannon Checked By J. J. Pasella  
 Geologist Site Manager  
Brent Davis  
 CEMP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<b>TOPSOIL</b>	
			<u>0.0 2.0 SAMPLE</u> Recovered 1 85/20 = 92%	HNu Background=0 2 OVA Background=0 8 No Ludlum readings taken
			<u>0.0 0.65 TOPSOIL</u> brown black (5 YR 2/1) organic rich clay with abundant roots unconsolidated	Field screen readings Sample reading (field blank reading)
5			<b>ROCKY FLATS ALLUVIUM</b>	
			<u>0.65 1.85 SANDY SILT</u> very pale orange (10 YR 8/2) sandy silt with subrounded caliche coated quartzite pebbles strong HCl reaction very dry	<u>0.0 1.85</u> Field screen readings HNu = 0 2 (0 2) OVA = 0 8(0 8)
			<u>2.0 4.0 SAMPLE</u> Recovered 1 3/20 = 65%	<u>2.0 3.3</u> Field screen readings HNu = 0 2 (0 2) OVA = 0 8(0 8)
10			<u>CLAY AND GRAVEL</u> dark yellowish orange (10 YR 6/6) to caliche coated very pale orange (10 YR 8/2) silty clay with common caliche coated subrounded quartzite pebbles powdery contains a 0 1 thick clayey sand layer well consolidated	<u>4.0 5.25</u> Field screen readings HNu = 0 2 (0 2) OVA = 0 8(0 8)
			lower 0 1 poorly sorted moderate orange pink (10 R 7/4) clayey fine to medium sand dry	<u>6.0 7.14</u> Field screen readings HNu = 0 2 (0 2) OVA = 0 8(0 8)
15			<u>4.0 6.0 SAMPLE</u> Recovered 1 25/20 = 62%	<u>0.0 7.14</u> Composite sample BH48870006
			<u>SAND AND GRAVEL</u> light brown (5 YR 5/6) to moderate red brown (10 R 4/6) poorly sorted fine to coarse clayey sand with large quartzite cobbles and smaller granite and schist pebbles dry	<u>8.0 9.5</u> Field screen readings HNu = 0 2 (0 2) OVA = 0 8(0 8)
20				<u>10.0 11.43</u> Field screen readings HNu = 0 2(0 2) OVA = 10 (1 0)

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No BH48-87  
 Coordinates N 36555 21 E 24641 88 Ground Surface Elevation 5949.40'  
 Total Depth 16.95' Water Level Encountered None  
 Static N/A  
 Drilling Company Boyles Bros Driller R Sharp  
 Date Drilled September 16-17, 1987 Helper T Merritt  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By J. L. Bannon Checked By A. D. D'Amico  
 Geologist Site Manager  
 CEARP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
—			<p><u>6.0 8.0 SAMPLE.</u>            Recovered 1 14/20 = 57%            SAND AND GRAVEL moderate brown (5 YR 4/4) to moderate reddish brown (10 R 4/6) poorly sorted fine to coarse clayey sand with subangular to subrounded quartzite pebbles without caliche rind dry</p>	<p><u>10.0 11.43</u> Upper contact sample BH488710UC   <u>13.2 15.11</u> Contact sample BH488713CT   <u>15.2 16.7</u> Bedrock sample BH488715BR</p>
—			<p><u>8.0 10.0 SAMPLE.</u>            Recovered 15/20 = 75%            SAND moderate brown (5 YR 4/4) to moderate reddish brown (10 R 4/6) moderately sorted fine to medium grained clayey sand without gravel contains a 0.3 thick grayish pink (5 R 8/2) caliche zone fine grained clayey sand very dry powdery very strong HCl reaction dry</p>	<p><u>15.2 16.7</u> Field screen readings HNu = 0.2(0.2) OVA = 0.4 (0.4)</p>
—			<p><u>10.0 11.5 SAMPLE.</u>            Recovered 1 43/15 = 95%            10.0 10.15 SILTY CLAY moderate brown (5 YR 4/4) well sorted silty clay dry            10.15 11.43 SAND AND GRAVEL dark yellowish orange (10 YR 6/6) to very pale orange (10 YR 8/2) poorly sorted fine to coarse grained clayey sand with abundant subrounded caliche coated quartzite pebbles moderate HCl reaction dry</p>	
—			<p><u>11.5 13.2 SAMPLE.</u> No recovery Drilled with center bit</p>	

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No BH48-87  
 Coordinates N 36555 21 E 24641 88 Ground Surface Elevation 5949.40'  
 Total Depth 16.95' Water Level Encountered None  
 Static N/A  
 Drilling Company Boyles Bros Driller R Sharp  
 Date Drilled September 16-17, 1987 Helper T Merritt  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By J. L. Bannon Checked By [Signature]  
 Geologist Site Manager  
 CEARP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			<p><u>13.2 15.2 SAMPLE.</u>            Recovered 19 1/20 = 95%</p> <p>13.2 13.5 SAND AND GRAVEL grayish orange (10 YR 7/4) very fine grained sand with a few subangular quartzite pebbles</p> <p style="text-align: center;"><b>ARAPAHOE FORMATION</b></p> <p>13.5 15.11 CLAYSTONE light olive gray (5 Y 5/2) slightly mottled homogenous clay</p> <p><u>15.2 16.7 SAMPLE.</u>            Recovered 2 15/15 = 143%</p> <p>CLAYSTONE light olive gray (5 Y 5/2) slightly mottled homogenous clay</p> <p>TOTAL DEPTH 16.95</p>	

## INDEX OF DATA

Boring No BH49-87

Completed as well? No

### Data in File

- Log of Borehole
- Well Construction Summaries
- Well Development Summaries
- Hydraulic Conductivity Test Data  
and Results
- Packer Test Data and Results
- Water Level Data

LOG  
OF  
BOREHOLE

Location <u>Rocky Flats Plant, East Trenches Area</u>	Borehole/Well No <u>BH49-87</u>
Coordinates <u>N 36500 88 E 24459 78</u>	Ground Surface Elevation <u>5953 00'</u>
Total Depth <u>25 80'</u>	Water Level Encountered <u>None</u>
	Static <u>N/A</u>
Drilling Company <u>Boyles Bros</u>	Driller <u>R Sharp</u>
Date Drilled <u>September 18, 21, 1987</u>	Helper <u>T Merritt, B Keeney</u>
Drilling Method <u>Hollow Stem Auger</u>	Drilling Fluid <u>None</u>
Logged By <u>J L Bannon</u> Geologist	Checked By <u>J. Pasella</u> Site Manager <u>Brent Davis</u> CEARP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<b>TOPSOIL</b>	
		0.0 2.0	<p><b>SAMPLE.</b> Recovered 1 62/20 = 81%</p> <p>00 02 TOPSOIL dusky yellowish brown (10 YR 2/2) abundant roots and grass unconsolidated damp</p>	<p>HNu Background=0 2 OVA Background=0 8 No Ludlum readings taken</p> <p>Field screen readings Sample reading (field blank reading)</p>
5			<b>ROCKY FLATS ALLUVIUM</b>	
		0.2 1.52	<p>CLAY AND GRAVEL dusky yellowish brown (10 YR 2/2) grading down into dark reddish brown (10 R 3/4) clay with some subangular to subrounded quartzite pebbles abundant roots and grass in top 0.2 unconsolidated down to 1.28 consolidated from 1.28 1.52 damp</p>	<p>0.0 1.62 Field screen readings HNu = 0 2 (0 2) OVA = 0 7(0 7)</p> <p>2.0 No readings above background at cuttings or well head</p>
10		1.52 1.62	<p>CLAY grayish orange pink (10 R 8/2) caliche clay powdery strong HCl reaction very dry</p>	<p>2.0 3.38 Field screen readings HNu = 0 4 (0 4) OVA = 1 4(1 4)</p>
		2.0 4.0	<p><b>SAMPLE.</b> Recovered 1 38/20 = 69%</p> <p>SAND AND GRAVEL moderate orange pink (5 YR 8/4) caliche sand with abundant large quartzite pebbles powdery very strong HCl reaction dry</p>	<p>4.0 5.15 Field screen readings HNu = 0 2 (0 2) OVA = 1 0(1 0)</p>
15				<p>6.0 7.3 Field screen readings HNu = 0 2 (0 2) OVA = 0 8(0 8)</p>
		0.0 2.3		<p>Composite sample BH49870008</p>
20				

LOG  
OF  
BOREHOLE

Location <u>Rocky Flats Plant, East Trenches Area</u>	Borehole/Well No <u>BH49-87</u>
Coordinates <u>N 36500 88 E 24459 78</u>	Ground Surface Elevation <u>5953.00</u>
Total Depth <u>25 80'</u>	Water Level Encountered <u>None</u>
	Static <u>N/A</u>
Drilling Company <u>Boyles Bros</u>	Driller <u>R Sharp</u>
Date Drilled <u>September 18, 21, 1987</u>	Helper <u>T Merritt, B Keeney</u>
Drilling Method <u>Hollow Stem Auger</u>	Drilling Fluid <u>None</u>
Logged By <u>J L Bannon</u> Geologist	Checked By <u>J Pasche</u> Site Manager

CEARP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20			<p><u>4.0 6.0 SAMPLE.</u> Recovered 1 15/20 = 57% SAND AND GRAVEL moderate reddish brown (10 R 4/6) to light brown (5 YR 5/6) poorly sorted fine grained clayey sand with small pebbles powdery very strong HCl reaction lower core is very pale orange (10 YR 8/2) fine grained caliche sand with abundant large quartzite pebbles moderately consolidated very strong HCl reaction dry to damp</p>	<p><u>8.0 9.15.</u> Field screen readings HNu = 02 (02) OVA = 10(10)</p> <p><u>10.0 11.5.</u> Field screen readings HNu = 02(02) OVA = 08 (08)</p> <p><u>12.0 13.4.</u> Field screen readings HNu = 02(02) OVA = 08 (08)</p>
25	[Graphic Log: Hatched pattern]		<p><u>6.0 8.0 SAMPLE.</u> Recovered 1 3/20 = 65% SAND AND GRAVEL moderate reddish brown (10 R 4/6) poorly sorted fine grained clayey sand with abundant large caliche-coated quartzite pebbles moderately consolidated strong HCl reaction dry</p>	<p><u>14.0 15.54.</u> Field screen readings HNu = 02(02) OVA = 04 (04)</p> <p><u>8.0 15.54.</u> Composite sample BH49870816</p>
30			<p><u>8.0 10.0 SAMPLE.</u> Recovered 1 15/20 = 57% SAND AND GRAVEL dusky red (5 R 3/4) to moderate reddish brown (10 R 4/6) poorly sorted fine to medium grained clayey sand moderately consolidated bottom is dark yellowish brown (10 YR 4/2) poorly sorted very coarse clayey sand with caliche coated large quartzite cobbles damp</p>	<p><u>16.0.</u> Readings at well head HNu = 02 OVA = 15</p>

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No BH49-87  
 Coordinates N 36500 88 E 24459 78 Ground Surface Elevation 5953.00  
 Total Depth 25 80' Water Level Encountered None  
 Static N/A  
 Drilling Company Boyles Bros Driller R. Sharp  
 Date Drilled September 18, 21, 1987 Helper T Merritt, B Keeney  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By J L Bannon Checked By J Paselle  
 Geologist Site Manager  
 CEARP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
10.0		12.0	<u>10.0 12.0 SAMPLE.</u> Recovered 15/20 = 75% SAND AND GRAVEL light brown (5 YR 5/6) poorly sorted fine to medium grained clayey with abundant caliche coated quartzite pebbles consolidated strong HCl reaction weak on fresh pebble faces dry	<u>16.0 17.2</u> Field screen readings HNu = 02(02) OVA = 00 (00)  <u>18.0 19.65</u> Field screen readings HNu = 02(02) OVA = 04 (04)
12.0		14.0	<u>12.0 14.0 SAMPLE.</u> Recovered 14/20 = 70% SAND AND GRAVEL grayish pink (5 R 8/2) poorly sorted fine to medium grained clayey sand with abundant quartzite cobbles powdery weak HCl reaction dry	<u>20.0 21.4</u> Field screen readings Hnu = 02(02) OVA = 25 (25)
14.0		16.0	<u>14.0 16.0 SAMPLE.</u> Recovered 154/20 = 77% SAND AND GRAVEL pale yellowish orange (10 YR 8/6) poorly sorted fine to medium grained clayey sand with abundant quartzite pebbles moderately consolidated very weak HCl reaction dry	<u>20.0 21.4</u> Upper contact sample BH498720UC  <u>22.0 24.0</u> Contact sample BH498722CT
16.0		18.0	<u>16.0 18.0 SAMPLE.</u> Recovered 12/20 = 60% SAND AND GRAVEL dark yellowish orange (10 YR 6/6) poorly sorted fine to coarse grained clayey sand with abundant quartzite pebbles unconsolidated to moderately consolidated no HCl reaction contains a thin zone of bedrock type damp homogenous clay dry	<u>24.14 25.64</u> Field screen readings HNu = 05(05) OVA = 27 (27)  <u>24.14 25.64</u> Bedrock sample BH498724BR

LOG  
OF  
BOREHOLE

Location <u>Rocky Flats Plant, East Trenches Area</u>	Borehole/Well No <u>BH49-87</u>
Coordinates <u>N 36500 88 E 24459 78</u>	Ground Surface Elevation <u>5953 00</u>
Total Depth <u>25 80</u>	Water Level Encountered <u>None</u>
	Static <u>N/A</u>
Drilling Company <u>Boyles Bros</u>	Driller <u>R. Sharp</u>
Date Drilled <u>September 18, 21, 1987</u>	Helper <u>T Merritt, B Keeney</u>
Drilling Method <u>Hollow Stem Auger</u>	Drilling Fluid <u>None</u>
Logged By <u>J L Bannon</u> Geologist	Checked By <u>J. Pasella</u> Site Manager

CEARP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
—			<p><u>18.0 20.0 SAMPLE.</u> Recovered 1 65/20 = 82%</p> <p>180 190 SAND light brown (5 YR 5/6) very well sorted fine grained sand grading down to sandy clay contains few pebbles moderately consolidated damp</p> <p>190 1965 SAND AND GRAVEL poorly sorted sand with abundant quartzite pebbles minor clay no HCl reaction damp</p>	
—			<p><u>20.0 22.0 SAMPLE.</u> Recovered 1 4/20 = 70%</p> <p>SAND AND GRAVEL moderate yellowish brown (10 YR 5/4) moderately sorted medium to coarse grained clayey sand with subangular to angular quartzite pebbles consolidated no HCl reaction damp</p>	
—			<p><u>22.0 24.0 SAMPLE.</u> Recovered 2 14/20 = 107%</p> <p>220 22 15 SAND moderate yellowish brown (10 YR 5/4) clayey sand unconsolidated damp</p>	
			<b><u>ARAPAHOE FORMATION</u></b>	
—			<p>22 15 24 14 CLAYSTONE yellowish gray (5 Y 7/2) to light olive gray (5 Y 5/2) homogenous clay with light brown (5 YR 5/6) mottling consolidated</p>	
			<p><u>24.14 25.64 SAMPLE.</u> Recovered 1 7/15 = 113%</p> <p>CLAYSTONE same as above mottled bedrock clay consolidated</p>	
			TOTAL DEPTH 25 80	

**INDEX OF DATA**

Boring No BH50-87

Completed as well? No

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- Log of Borehole
- Well Construction Summaries
- Well Development Summaries
- Hydraulic Conductivity Test Data  
and Results
- Packer Test Data and Results
- Water Level Data

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No BH50-87  
 Coordinates N 36558 31 E 24759 83 Ground Surface Elevation 5949 20  
 Total Depth 19 50' Water Level Encountered None

Static N/A

Drilling Company Boyles Bros Driller T High  
 Date Drilled September 17, 1987 Helper B Keeney  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By K D Holliday Checked By J. J. Pasallo  
Geologist Site Manager  
 Brent Lewis  
 CEARP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<b><u>ROCKY FLATS ALLUVIUM</u></b>	
			<u>0.0 2.0 SAMPLE.</u> Recovered 20/20 = 100% SANDY CLAY dusky yellowish brown (10 YR 2/2) to very pale orange (10 YR 8/2) few quartzite cobbles slightly damp to dry	HNu Background=02 OVA Background=10 No readings over background
5			<u>2.0 4.0 SAMPLE.</u> Recovered 14/20 = 70% SANDY CLAY grayish orange (10 YR 7/4) fine grained sand few quartzite cobbles dry	<u>7.0 8.9</u> Field screen sample BH508707FS OVA = 12
10			<u>4.0 7.0 SAMPLE.</u> Recovered 11/30 = 37% CLAYEY SAND light brown (5 YR 6/4) to moderate yellowish brown (10 YR 5/4) sand fine to medium grained (25 20 phi up to 10 phi) poorly sorted subrounded some quartzite cobbles some caliche damp	<u>12.0 12.9</u> Upper contact sample BH508712UC
15			<u>7.0 9.5 SAMPLE.</u> Recovered 19/25 = 76% CLAYEY SAND moderate yellowish brown (10 YR 5/4) fine to medium grained sand (20 15 phi up to 05 phi) poorly sorted subangular to subrounded some quartzite cobbles some caliche damp	<u>14.5 17.0</u> Contact sample BH508715CT  <u>17.0 19.5</u> Bedrock sample BH508717BR
20				

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No BH50-87  
 Coordinates N 36558 31 E 24759 83 Ground Surface Elevation 5949 20  
 Total Depth 19 50 Water Level Encountered None  
 Static N/A  
 Drilling Company Boyles Bros Driller T High  
 Date Drilled September 17, 1987 Helper B Keeney  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By K D Holliday Checked By [Signature]  
 Geologist Site Manager

CEARP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			<u>9.5 12.0 SAMPLE.</u> Recovered 13/25 = 52% CLAYEY SAND same as above except no caliche damp	
			<u>12.0 14.5 SAMPLE.</u> Recovered 09/25 = 36% CLAYEY SAND same as above damp	
			<u>14.5 17.0 SAMPLE.</u> Recovered 25/25 = 100% 145 147 CLAYEY SAND same as above damp 147 149 SANDY CLAY light olive gray (5 Y 5/2) very fine grained sand damp to dry	
			<u>ARAPAHOE FORMATION</u>	
			149 170 SANDY CLAYSTONE light olive gray (5 Y 5/2) to grayish orange (10 YR 7/4) very fine grained sand some iron staining damp	
			<u>17.0 19.5 SAMPLE.</u> Recovered 25/25 = 100% CLAYSTONE light olive gray (5 Y 5/2) with dark yellowish orange (10 YR 6/6) iron staining very fine grained sand dry	
			TOTAL DEPTH 19 50	

## INDEX OF DATA

Boring No BH51-87

Completed as well? No

### Data in File

- Log of Borehole
- Well Construction Summaries
- Well Development Summaries
- Hydraulic Conductivity Test Data  
and Results
- Packer Test Data and Results
- Water Level Data

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No BH51-87  
 Coordinates N 36489.05 E 24821 99 Ground Surface Elevation 5949.00  
 Total Depth 19.50' Water Level Encountered 12.0'  
 Static N/A  
 Drilling Company Boyles Bros Driller T High  
 Date Drilled September 18 & 22, 1987 Helper B Keeney  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By K.D. Holliday, L.A. Gregory-Frost Checked By [Signature]  
 Geologist [Signature] Site Manager [Signature]  
 CEARP Manager [Signature]  
 Comments Borehole backfilled with Portland Type I cement Sample BH518712WT both  
the water table and upper contact sample

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<b>ROCKY FLATS ALLUVIUM</b>	
			<u>0.0 2.0 SAMPLE.</u> Recovered 20/20 = 100% CLAYEY SAND moderate brown (5 YR 3/4) some quartzite gravel grasses and roots to 0.4 moderate orange pink (5 YR 8/4) caliche at 1.8 dry	HNu Background=0.2 OVA Background=0.1 No readings above background
5			<u>2.0 4.0 SAMPLE.</u> Recovered 17/20 = 85% CLAYEY CALICHE moderate orange pink (5 YR 8/4) powdery dry	<u>0.0 9.0.</u> Composite sample BH51870009
			<u>4.0 7.0 SAMPLE.</u> Recovered 20/30 = 67% CLAYEY CALICHE same as above dry	
10			<u>7.0 9.5 SAMPLE.</u> Recovered 20/25 = 80% CLAYEY SAND AND GRAVEL light brown (5 Y 5/6) to moderate yellowish brown (10 YR 5/4) quartzite gravel sand poorly sorted slightly damp	<u>12.0 14.4</u> Water table sample BH518712WT
			<u>9.5 12.0 SAMPLE.</u> Recovered 08/25 = 32% SAND moderate yellowish brown (10 YR 5/4) to very pale orange (10 YR 8/2) fine to medium grained rounded to subangular moderately sorted granite and quartzite pebbles and cobbles angular to subangular clayey caliche deposits unconsolidated dry	<u>14.5 17.0</u> Contact sample BH518714CT
15				<u>17.0 19.5</u> Bedrock sample BH51871/BR
20				

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No BH51-87  
 Coordinates N 36489.05 E 24821 99 Ground Surface Elevation 5949.00  
 Total Depth 19.50' Water Level Encountered 12.0'  
 Static N/A  
 Drilling Company Boyles Bros Driller T High  
 Date Drilled September 18 & 22, 1987 Helper B Keeney  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By K.D. Holliday; L.A. Gregory-Frost Checked By [Signature]  
 Geologist Site Manager

CEARP Manager

Comments Borehole backfilled with Portland Type I cement Sample BH518712WT both  
the water table and upper contact sample

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			<p><u>12.0 14.5 SAMPLE.</u>            Recovered 2 4/25 = 96%            120 134 SAND moderate yellowish brown (10 YR 5/4) with very pale orange (10 YR 8/2) caliche zones abundant caliche fine to coarse grained rounded moderately sorted occasional quartzite and granite pebbles and cobbles subangular to rounded rose quartz pebbles calcareous unconsolidated moist to saturated</p> <p>134 144 CLAY moderate yellowish brown (10 YR 5/4) very sandy fine to medium grained rounded occasional quartzite pebbles and cobbles caliche deposits calcareous consolidated moist</p>	
			<p><u>14.5 17.0 SAMPLE.</u>            Recovered 2 5/25 = 100%            145 157 SAND same as 120 134 except moderate brown (5 YR 4/4) moist to saturated            157 1605 CLAY same as 134 144 except moderate yellowish brown (10 YR 5/4) moist</p>	
			<p><b><u>ARAPAHOE FORMATION</u></b></p>	
			<p>1605 170 CLAYSTONE light olive gray (5 Y 6/1) and moderate yellowish brown (10 YR 5/4) very sandy fine to medium grained well sorted rounded lenses of fine to medium grained sand rounded consolidated weathered moist</p>	

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No BH51-87  
 Coordinates N 36489.05 E 24821 99 Ground Surface Elevation 5949.00  
 Total Depth 19 50 Water Level Encountered 12.0'  
 Static N/A  
 Drilling Company Boyles Bros Driller T High  
 Date Drilled September 18 & 22, 1987 Helper B Keeney  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By K.D. Holliday, L.A. Gregory-Frost Checked By A. Pasella  
 Geologist Site Manager

CEARP Manager

Comments Borehole backfilled with Portland Type I cement. Sample BH518712WT both the water table and upper contact sample

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
—			<p><u>17.0 19.5 SAMPLE.</u>            Recovered 25/25 = 100%            SANDSTONE AND CLAYSTONE light olive gray (5 Y 6/1) with moderate yellowish brown (10 YR 5/4) streaking and mottling approximately 0309 gradational interbedded layers of sandstone fine to medium grained well sorted rounded clayey unconsolidated moist with claystone slightly to very sandy very fine to fine grained well rounded well sorted consolidated weathered moist</p> <p>TOTAL DEPTH 19 50</p>	
—				
—				

## INDEX OF DATA

Boring No BH52-87

Completed as well? No

### Data in File

- Log of Borehole
- Well Construction Summaries
- Well Development Summaries
- Hydraulic Conductivity Test Data  
and Results
- Packer Test Data and Results
- Water Level Data

LOG  
OF  
BOREHOLE

Location <u>Rocky Flats Plant East Trenches Area</u>	Borehole/Well No <u>BH52-87</u>
Coordinates <u>N 36559 04 E 24881 41</u>	Ground Surface Elevation <u>5948 10</u>
Total Depth <u>25.00'</u>	Water Level Encountered _____
	Static <u>N/A</u>
Drilling Company <u>Boyles Bros</u>	Driller <u>S Bradfield P Mesa</u>
Date Drilled <u>September 22, 1987</u>	Helper <u>P Mesa S Bradfield</u>
Drilling Method <u>Hollow Stem Auger</u>	Drilling Fluid <u>None</u>
Logged By <u>R T Treat</u> Geologist	Checked By <u><i>A. Pasella</i></u> Site Manager
	<u><i>Brent Lewis</i></u> CEARP Manager
Comments <u>Borehole backfilled on September 23, 1987 with Portland Type I cement</u>	

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<b>TOPSOIL</b>	
		0.0 2.0	<b>SAMPLE</b> Recovered 10/20 = 50%	
			00 05 TOPSOIL dusky yellowish brown (10 YR 2/2) silty sands subangular to subrounded gravels	HNu Background=00 OVA Background=00 No Ludlum readings taken
5			<b>ROCKY FLATS ALLUVIUM</b>	
			05 20 CLAY AND GRAVEL pale yellowish orange (10 YR 8/6) subangular to subrounded gravels slightly moist	Field screen readings Sample reading (field blank reading)
		2.0 4.0	<b>SAMPLE</b> Recovered 10/20 = 50%	0.0 1.0 Field screen readings HNu = 00 (00) OVA = 00(00)
			SAND AND GRAVEL pale yellowish orange (10 YR 8/6) poorly sorted fine grained (2.5 2.0 phi) sands subrounded to subangular gravels weakly cemented very calcareous slightly moist	2.0 3.0 Field screen readings HNu = 00 (00) OVA = 00(00)
10				4.0 4.7 Field screen readings HNu = 00 (00) OVA = 00(00)
		4.0 6.0	<b>SAMPLE</b> Recovered 07/20 = 35%	6.0 7.7 Field screen readings HNu = 01 (02) OVA = 00(00)
			SAND pale yellowish orange (10 YR 8/6) poorly sorted fine grained (2.0 3.5 phi) sands silty scattered gravels calcareous weakly cemented slightly moist	8.0 9.5 Field screen readings HNu = 02 (03) OVA = 00(00)
15				0.0 9.5 Composite sample BH52870010
20				

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant East Trenches Area

Coordinates N 36559 04 E 24881 41

Total Depth 25.00'

Drilling Company Boyles Bros

Date Drilled September 22, 1987

Drilling Method Hollow Stem Auger

Logged By R T Treat  
Geologist

Borehole/Well No BH52-87

Ground Surface Elevation 5948 10

Water Level Encountered \_\_\_\_\_  
Static N/A

Driller S Bradfield P Mesa

Helper P Mesa S Bradfield

Drilling Fluid None

Checked By [Signature]  
Site Manager

CEARP Manager

Comments Borehole backfilled on September 23, 1987 with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20			<p><u>6.0 8.0 SAMPLE.</u> Recovered 17/20 = 85%</p> <p>6.0 7.0 CLAYEY SAND clayey poorly sorted fine grained sand moderately cemented slightly calcareous moist</p> <p>7.0 8.0 SAND AND GRAVEL pinkish gray (5 YR 8/1) gravels and cobbles weakly cemented very calcareous poorly sorted</p>	<p><u>10.0 11.0</u> Field screen readings HNu = 00(00) OVA = 00 (00)</p> <p><u>12.0 13.0</u> Readings on core HNu = 04 OVA = 00</p> <p><u>12.0 13.0</u> Direct hit sample BH528712DH</p>
25			<p><u>8.0 10.0 SAMPLE.</u> Recovered 15/20 = 75%</p> <p>SAND AND GRAVEL pinkish gray (5 YR 8/1) clayey gravels up to 35mm poorly sorted medium grained (10 20 phi) sands calcareous slightly moist</p>	<p><u>14.0 15.0</u> Field screen readings HNu = 00(00) OVA = 00 (00)</p>
			<p><u>10.0 12.0 SAMPLE.</u> Recovered 10/20 = 50%</p> <p>SAND AND GRAVEL pale yellowish or orange (10 YR 8/6) to moderate yellowish brown (10 YR 5/4) poorly sorted medium grained sands (10 20 phi) sub angular to subrounded gravels calcareous weakly cemented slightly moist</p>	<p><u>16.0 18.0</u> Field screen readings HNu = 00(00) OVA = 00 (00)</p>
			<p><u>12.0 14.0 SAMPLE.</u> Recovered 10/20 = 50%</p> <p>SAND AND GRAVEL same as above moist</p>	<p><u>22.0 24.0</u> Alluvial bedrock contact sample BH528722CT</p>
				<p><u>24.0-25.0</u> Bedrock sample BH528724BR</p>



**INDEX OF DATA**

Boring No BH53-87

Completed as well? No

Data in File

- Log of Borehole
- Well Construction Summaries
- Well Development Summaries
- Hydraulic Conductivity Test Data  
and Results
- Packer Test Data and Results
- Water Level Data

LOG  
OF  
BOREHOLE

Location <u>Rocky Flats Plant, East Trenches Area</u>	Borehole/Well No <u>BH53-87</u>
Coordinates <u>N 36690.70 E 24633.75</u>	Ground Surface Elevation <u>5948 32'</u>
Total Depth <u>24 00'</u>	Water Level Encountered <u>19 0'</u>
	Static <u>N/A</u>
Drilling Company <u>Boyles Bros</u>	Driller <u>S. Bradfield</u>
Date Drilled <u>September 11 &amp; 14, 1987</u>	Helper <u>R Sharp, P Mesa</u>
Drilling Method <u>Hollow Stem Auger</u>	Drilling Fluid <u>None</u>
Logged By <u>L A Gregory-Frost, J B Bergman</u> Geologist	Checked By <u>J J Paselke</u> Site Manager <u>Brent Lewis</u> CEARP Manager
Comments <u>Borehole backfilled with Portland Type I cement</u>	Sample <u>BH538719WT 1S</u>
<u>water table, upper contact and direct hit sample</u>	

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<b>ROCKY FLATS ALLUVIUM</b>	
			<u>0.0 2.0 SAMPLE.</u> Recovered 18/20 = 90%	HNu Background=00 OVA Background=02
			<u>0.0 1.3 SANDY GRAVEL</u> dusky brown (5 YR 2/2) quartzite and granite pebbles and cobbles subangular fine grained sand well sorted rounded abundant grasses and roots unconsolidated dry	<u>0.0 1.8.</u> Readings on core HNu = 00 OVA = 18
5			<u>1.3 1.8 CALICHE</u> very pale orange (10 YR 8/2) occasional quartzite cobbles consolidated to unconsolidated dry (OVA hit of 18 in this zone)	<u>0.0 1.8</u> Direct hit sample BH538700DH
			<u>2.0 4.0 SAMPLE.</u> Recovered 15/20 = 75%	<u>2.0 3.5</u> Readings on core. HNu = 900 OVA = 02
			<u>2.0 2.6 SAND</u> pale yellowish brown (10 YR 6/2) very fine grained rounded well sorted very calcareous caliche deposits soft unconsolidated dry	<u>2.0 3.5</u> Direct hit sample BH538702DH
10			<u>2.6 3.4 SAND</u> same as above (2.0 2.6) except very pale orange (10 YR 8/2) to moderate yellowish brown (10 YR 5/4) dry	<u>6.0 7.8</u> Readings on core HNu = 00 OVA = 08 10
			<u>3.4 3.8 GRAVEL</u> moderate yellowish brown (10 YR 5/4) granite and quartzite pebbles and cobbles subangular abun dant very coarse grained feldspar grains clayey sand matrix medium to coarse grained poorly sorted rounded to angu lar caliche deposits consolidated dry	<u>6.0 7.8</u> Direct hit sample BH538706DH
15				<u>8.0 9.9</u> Readings on core HNu = 00 OVA = 23
20				

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No BH53-87  
 Coordinates N 36690.70 E 24633.75 Ground Surface Elevation 5948 32'  
 Total Depth 24 00' Water Level Encountered 19 0  
 Static N/A  
 Drilling Company Boyles Bros Driller S. Bradfield  
 Date Drilled September 11 & 14, 1987 Helper R Sharp, P Mesa  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By L A Gregory-Frost, J B Bergman Geologist Checked By A J Pasella  
 Site Manager

CEARP Manager

Comments Borehole backfilled with Portland Type I cement Sample BH538719WT is  
water table, upper contact and direct hit sample

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20			<p><u>4.0 6.0 SAMPLE.</u>            Recovered 18/20 = 90%            40 49 SAND moderate yellowish brown (10 YR 5/4) very fine to fine grained well sorted rounded calcareous caliche deposits soft unconsolidated dry            49 58 GRAVEL moderate yellowish brown (10 YR 5/4) granite and quartzite pebbles and cobbles subangular abundant very coarse grained feldspar grains clayey sand matrix medium to coarse grained poorly sorted rounded to angular caliche deposits consolidated dry</p>	<p><u>8.0 9.9</u> Direct hit sample BH538708DH             HNu Background=08            OVA Background=00   <u>11.6 13.2</u> Field screen readings HNu = 06(08) OVA = 00 (00)   <u>14.2 16.2</u> Readings on core HNu = 10 OVA = 02   <u>14.2 16.2</u> Direct hit sample BH538714DH   <u>16.2 17.9</u> Readings on core HNu = 10 OVA = 12   <u>16.2 17.9</u> Direct hit sample BH538716DH   <u>17.9</u> Readings in borehole HNu = 08 OVA = 58</p>
25			<p><u>6.0 8.0 SAMPLE.</u>            Recovered 18/20 = 90%            SAND moderate yellowish brown (10 YR 5/4) very fine grained rounded well sorted very coarse grained where granite cobbles weathering in place clayey abundant feldspar quartz and black muscovite grains abundant quartzite and granite pebbles and cobbles subangular to angular soft to hard consolidated where clayey otherwise unconsolidated dry</p>	
			<p><u>8.0 10.0 SAMPLE.</u>            Recovered 19/20 = 95%            80 93 SAND moderate yellowish brown (10 YR 5/4) very fine to fine grained well sorted well rounded occasional quartzite and granite pebbles and cobbles subangular calcareous unconsolidated dry</p>	

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No BH53-87  
 Coordinates N 36690.70 E 24633.75 Ground Surface Elevation 5948 32  
 Total Depth 24 00' Water Level Encountered 19 0'  
 Static N/A  
 Drilling Company Boyles Bros Driller S. Bradfield  
 Date Drilled September 11 & 14, 1987 Helper R Sharp, P Mesa  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By L.A Gregory-Frost, J B Bergman Checked By [Signature]  
 Geologist Site Manager

CEARP Manager

Comments Borehole backfilled with Portland Type I cement Sample BH538719WT 1S  
water table, upper contact and direct hit sample

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
—			93 935 SAND same as above except moderate red (5 R 4/6) to very dark red (5 R 2/6) dry	18.2 19.8 Field screen readings HNu = 06(08) OVA = 00 (00)
—			935 99 GRAVEL moderate yellowish brown (10 YR 5/4) clayey sand matrix fine to very coarse grained poorly sorted angular to subangular granite cobbles weathering in place clayey coarse to very coarse grained poorly sorted angular feldspar quartz black and mica grains quartzite and granite pebbles and cobbles subangular to angular consolidated dry	18.6 20.6 Readings on core HNu = 12 OVA = 30  18.6 20.6 Water table sample BH538719WT
—			10.0 10.7 SAMPLE. No recovery Drilled with center bit	20.6 22.6 Contact sample BH538720CT
—			10.7 13.0 SAMPLE. Recovered 23/23 = 100%	22.6 Readings in borehole HNu = 06 OVA = 6
—			107 125 SAND moderate yellowish brown (10 YR 5/4) very fine grained rounded well sorted very coarse grained where granite cobbles weathering in place clayey abundant feldspar quartz and black muscovite grains abundant quartzite and granite pebbles and cobbles subangular to angular soft to hard consolidated where clayey otherwise un consolidated dry	22.6 24.0 Bedrock sample BH538722BR  22.6 24.0 Field screen readings HNu = 08(10) OVA = 04 (04)
—			125 130 GRAVEL same as 935 990 dry	

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No BH53-87  
 Coordinates N 36690.70 E 24633.75 Ground Surface Elevation 5948 32'  
 Total Depth 24 00' Water Level Encountered 19 0'  
 Static N/A  
 Drilling Company Boyles Bros Driller S. Bradfield  
 Date Drilled September 11 & 14, 1987 Helper R Sharp, P Mesa  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By L A Gregory-Frost, J B Bergman Checked By [Signature]  
 Geologist Site Manager

CEARP Manager

Comments Borehole backfilled with Portland Type I cement Sample BH538719WT is water table, upper contact and direct hit sample

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			TOTAL DEPTH WITH PLOPPER 11 60 READJUST DEPTH	
			<u>11.6 13.6 SAMPLE.</u> Recovered 16/20 = 80% SAND AND GRAVEL moderate yellow ish brown (10 YR 5/4) medium grained rounded sand quartzite gravels broken angular unsorted unconsolidated large quartzite cobble in shoe dry	
			<u>13.6 14.2 SAMPLE.</u> No recovery Drilled with center bit	
			<u>14.2 16.2 SAMPLE.</u> Recovered 20/20 = 100% SAND AND GRAVEL same as above coarsening downward feldspar grains slightly moist to dry	
			<u>16.2 18.2 SAMPLE.</u> Recovered 17/20 = 85% 162 167 SAND AND GRAVEL same as above 167 179 CLAY moderate brown (5 YR 4/4) some fine grained sand rounded sorted abundant very coarse quartzite and feldspar grains some gravels consol idated slightly moist	
			<u>18.2 20.2 SAMPLE.</u> Recovered 16/20 = 80% SANDY CLAY dark yellowish brown (10 YR 4/2) some dark yellowish orange (10 YR 6/6) stains near shoe abundant quartzite gravels moderate sorting sub- rounded slightly moist to dry	

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No BH53-87  
 Coordinates N 36690.70 E 24633.75 Ground Surface Elevation 5948 32'  
 Total Depth 24 00' Water Level Encountered 19 0'  
 Static N/A  
 Drilling Company Boyles Bros Driller S. Bradfield  
 Date Drilled September 11 & 14, 1987 Helper R. Sharp, P. Mesa  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By L A Gregory-Frost, J B Bergman Geologist Checked By A. Pasella  
 Site Manager

CEARP Manager

Comments Borehole backfilled with Portland Type I cement Sample BH538719WT 1s  
water table, upper contact and direct hit sample

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
—			TOTAL DEPTH WITH PLOPPER 18 60 READJUST DEPTH	
—			<u>18.6 20.6 SAMPLE.</u> Recovered 20/20 = 100% SAND AND GRAVEL moderate yellow ish brown (10 YR 5/4) very fine grained at top 05 coarse grained to very coarse grained from 19 5 20 6 poorly sorted subrounded unconsolidated some clay quartzite cobble in shoe wet at 19 0	
—			<u>20.6 22.6 SAMPLE.</u> Recovered 20/20 = 100% 20 6 21 4 SAND AND GRAVEL same as above wet 21 4 22 2 CLAY AND GRAVEL light olive gray (5 Y 5/2) clay matrix abun dant quartzite pebbles consolidated un sorted rounded some granite pebbles moist	
—			<b><u>ARAPAHOE FORMATION</u></b>	
—			22 2 22 6 CLAYSTONE light olive gray (5 Y 5/2) no pebbles consolidated moist	
—			<u>22.6 24.0 SAMPLE.</u> Recovered 20/14 = 143% CLAYSTONE light olive gray (5 Y 5/2) homogenous consolidated some dark yellowish orange (10 YR 6/6) stains dense moist	
—			TOTAL DEPTH 24 00	

## INDEX OF DATA

Boring No BH54-87

Completed as well? No

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- Well Construction Summaries
- Well Development Summaries
- Hydraulic Conductivity Test Data  
and Results
- Packer Test Data and Results
- Water Level Data

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No BH54-87  
 Coordinates N 36557.95 E 24999 95 Ground Surface Elevation 5946.20'  
 Total Depth 44.50' Water Level Encountered 2.0'  
 Static N/A  
 Drilling Company Boyles Bros Driller P Mesa, S Bradfield  
 Date Drilled September 15-21, 1987 Helper S Bradfield, P Mesa  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By J B Bergman, R T Treat Checked By [Signature]  
 Geologist [Signature] Site Manager  
GEARP Manager

Comments Borehole backfilled with Portland Type I cement Sample BH548738WT  
doubles as an upper contact sample

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<b>TOPSOIL</b>	
			<u>0.0 2.0 SAMPLE</u> Recovered 20/20 = 100%	HNu Background=0.4 OVA Background=0.0 No Ludlum readings taken
			<u>0.0 0.5 TOPSOIL</u> dusky brown (5 YR 2/2) sandy soil very fine grained to silty abundant grasses and roots abundant quartzite gravels dry	Field screen readings sample reading (field blank reading)
5			<b>ROCKY FLATS ALLUVIUM</b>	
			<u>0.5 2.0 SAND AND GRAVEL</u> grayish orange pink (5 YR 7/2) sand and silt matrix quartzite and schist gravels abundant caliche reacts strongly with HCl unconsolidated abundant dark yellowish brown (10 YR 4/2) mottles angular gravels and cobbles large cobble at 0.8 1.0 another cobble in shoe dry	<u>0.0 2.0</u> Field screen readings HNu = 0.6 (0.6) OVA = 0.0(0.0) <u>2.0 4.0</u> Water table sample BH548702WT
10				<u>4.0 6.0</u> Field screen readings HNu = 0.6 (0.6) OVA = 0.2(0.4)
			<u>2.0 4.0 SAMPLE</u> Recovered 20/20 = 100%	<u>6.0 7.5</u> Readings on core: HNu = 1.75 OVA = 0 Direct hit sample BH548706DH
			<u>2.0 2.4 CLAY</u> olive gray (5 Y 3/2) abundant quartzite gravels wet	
			<u>2.4 3.1 SAND AND CLAY</u> pale brown (5 YR 5/2) very fine grained abundant black organic fragments abundant quartzite gravels dry	<u>8.0 9.65</u> Readings on core HNu = 4.60 OVA = 5.5 Direct hit sample BH548708DH
15			<u>3.1 4.0 SAND AND GRAVEL</u> grayish orange pink (5 YR 7/2) sand and silt matrix quartzite and schist gravels abundant caliche unconsolidated dry	
20				

LOG  
OF  
BOREHOLE

Location <u>Rocky Flats Plant, East Trenches Area</u>	Borehole/Well No <u>BH54-87</u>
Coordinates <u>N 36557.95 E 24999 95</u>	Ground Surface Elevation <u>5946.20</u>
Total Depth <u>44.50'</u>	Water Level Encountered <u>2.0'</u>
	Static <u>N/A</u>
Drilling Company <u>Boyles Bros</u>	Driller <u>P Mesa, S Bradfield</u>
Date Drilled <u>September 15-21, 1987</u>	Helper <u>S Bradfield, P Mesa</u>
Drilling Method <u>Hollow Stem Auger</u>	Drilling Fluid <u>None</u>
Logged By <u>J B Bergman, R T Treat</u> Geologist	Checked By <u>J J Pasella</u> Site Manager

CEARP Manager

Comments Borehole backfilled with Portland Type I cement Sample BH548738WT  
doubles as an upper contact sample

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20	[Stippled pattern]		<p><u>4.0 6.0 SAMPLE.</u> Recovered 20/20 = 100% CALICHE grayish orange pink (5 YR 7/2) some clay abundant gravels quartzite and granite unconsolidated reacts strongly with HCl abundant moderate brown (5 YR 4/4) patches moist</p>	<p><u>10.0 11.5</u> Readings on core HNu = 355 OVA = 0 Direct hit sample BH548710DH</p>
25	[Stippled pattern]		<p><u>6.0 8.0 SAMPLE.</u> Recovered 15/20 = 75% SAND AND GRAVEL grayish orange (10 YR 7/4) to moderate yellowish brown (10 YR 5/4) angular to subangular gravels fine to medium grained sands clayey weakly cemented highly calcareous moist</p>	<p><u>12.2 14.2</u> Readings on core HNu = 60 OVA = 0 Direct hit sample BH548712DH</p> <p><u>14.2 15.2</u> Field screen readings HNu = 00(00) OVA = 00(00)</p>
30	[Stippled pattern]		<p><u>8.0 10.0 SAMPLE.</u> Recovered 165/20 = 83% 80 90 SAND with scattered gravels medium grained sands slightly calcareous slightly moist 90 100 SAND AND GRAVEL clayey moderately cemented calcareous slightly moist</p>	<p><u>17.4 18.8</u> Field screen readings HNu = 00(00) OVA = 00(00)</p> <p><u>19.4 21.5</u> Field screen readings HNu = 00(00) OVA = 00(00)</p>
35	[Stippled pattern]		<p><u>10.0 12.2 SAMPLE.</u> Recovered 15/22 = 68% SAND AND GRAVEL same as above slightly moist</p>	
40	[Stippled pattern]			

LOG  
OF  
BOREHOLE

Location <u>Rocky Flats Plant, East Trenches Area</u>	Borehole/Well No <u>BH54-87</u>
Coordinates <u>N 36557.95 E 24999 95</u>	Ground Surface Elevation <u>5946 20</u>
Total Depth <u>44.50</u>	Water Level Encountered <u>2.0'</u>
	Static <u>N/A</u>
Drilling Company <u>Boyles Bros</u>	Driller <u>P Mesa, S Bradfield</u>
Date Drilled <u>September 15-21, 1987</u>	Helper <u>S Bradfield, P Mesa</u>
Drilling Method <u>Hollow Stem Auger</u>	Drilling Fluid <u>None</u>
Logged By <u>J B Bergman, R T Treat</u> Geologist	Checked By <u><i>J. Paschke</i></u> Site Manager

Comments Borehole backfilled with Portland Type I cement CEARP Manager  
doubles as an upper contact sample Sample BH548738WT

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
40			<p><u>12.2 14.2 SAMPLE.</u> Recovered 20/20 = 100%</p> <p>12.2 12.9 CLAYEY SAND moderate yellowish brown (10 YR 5/4) clayey scattered gravels fine grained sands slightly moist</p> <p>12.9 14.2 GRAVEL light brown (5 YR 5/6) to moderate brown (5 YR 4/4) clayey angular to subangular gravels medium grained sands weakly cemented poorly sorted slightly calcareous slightly moist</p>	<p><u>21.5 22.8</u> Field screen readings HNu = 00(00) OVA = 00 (00)</p> <p><u>14.20 22.8</u> Composite sample BH54871424 VOAs from 21 50 22 80</p>
45	[Hatched Box]		<p><u>14.2 15.5 SAMPLE.</u> Recovered 10/13 = 77%</p> <p>SAND moderate yellowish brown (10 YR 5/4) to dark yellowish brown (10 YR 4/2) clayey scattered angular gravels medium grained sands weakly cemented slightly calcareous moist</p>	<p><u>23.5 24.7</u> Field screen readings HNu = 00(00) OVA = 00 (00)</p> <p><u>25.5 27.2</u> Field screen readings HNu = 00(00) OVA = 00 (00)</p>
			<p><u>15.5 17.4 SAMPLE.</u> No recovery Drilled with center bit</p>	<p><u>27.5 29.0</u> Field screen readings HNu = 00(00) OVA = 00 (00)</p>
			<p><u>17.4 19.4 SAMPLE.</u> Recovered 14/20 = 70%</p> <p>SAND slightly clayey to clayey with scattered gravels fine grained (2 3 2 0 phi) sand angular and subangular moist</p>	<p><u>31.5 32.8</u> Field screen readings HNu = 00(00) OVA = 00 (00)</p>
			<p><u>19.4 21.5 SAMPLE.</u> Recovered 21/21 = 100%</p> <p>CLAYEY SAND light brown (5 YR 5/6) fine to medium grained (20 1 5 phi) sand clayey weakly cemented some scattered gravels subangular and subrounded moist</p>	<p><u>23.5 32.8</u> Composite sample BH54872334 VOAs from 33 0 34 4</p>

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No BH54-87  
 Coordinates N 36557.95 E 24999 95 Ground Surface Elevation 5946.20  
 Total Depth 44.50' Water Level Encountered 2.0'  
 Static N/A  
 Drilling Company Boyles Bros Driller P Mesa, S Bradfield  
 Date Drilled September 15-21, 1987 Helper S Bradfield, P Mesa  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By J B Bergman, R T Treat Checked By J Pasallo  
 Geologist Site Manager

CEARP Manager

Comments Borehole backfilled with Portland Type I cement Sample BH548738WT  
doubles as an upper contact sample

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
—			<p><u>21.5 23.5 SAMPLE.</u> Recovered 1 3/20 = 65% CLAYEY SAND light brown (5 YR 5/6) fine grained (2 5 20 phi) sands weak to moderately cemented moist</p>	<p><u>34.4 34.9</u> Field screen readings HNu = 00(00) OVA = 00 (00)</p>
—			<p><u>23.5 25.5 SAMPLE.</u> Recovered 1 2/20 = 60% CLAYEY SAND same as above with scat tered gravels moist</p>	<p><u>38.5 39.0</u> Water table/upper contact sample BH548738WT</p>
—			<p><u>25.5 27.5 SAMPLE.</u> Recovered 1 7/20 = 85% CLAYEY SAND same as above moist</p>	<p><u>40.5 41.0</u> Contact sample BH548740CT</p>
—			<p><u>27.5 29.5 SAMPLE.</u> Recovered 1 5/20 = 75% CLAYEY SAND same as above moist</p>	<p><u>42.5 44.0</u> Bedrock sample BH548742BR Duplicate sample BH548742D</p>
			<p>TOTAL DEPTH MEASUREMENT 3 15 ADJUST DEPTH</p>	
—			<p><u>31.5 34.4 SAMPLE.</u> Recovered 1 3/29 = 45% CLAYEY SAND moderate brown (5 YR 4/4) fine grained sand clayey weakly to moderately cemented poorly sorted moist</p>	
—			<p><u>34.4 36.4 SAMPLE.</u> Recovered 0 5/20 = 25% CLAYEY SAND same as above with scat tered gravels moist</p>	

LOG  
OF  
BOREHOLE

Location <u>Rocky Flats Plant, East Trenches Area</u>	Borehole/Well No <u>BH54-87</u>
Coordinates <u>N 36557.95 E 24999 95</u>	Ground Surface Elevation <u>5946.20</u>
Total Depth <u>44.50'</u>	Water Level Encountered <u>2.0'</u>
	Static <u>N/A</u>
Drilling Company <u>Boyles Bros</u>	Driller <u>P Mesa, S Bradfield</u>
Date Drilled <u>September 15-21, 1987</u>	Helper <u>S Bradfield, P Mesa</u>
Drilling Method <u>Hollow Stem Auger</u>	Drilling Fluid <u>None</u>
Logged By <u>J B Bergman, R T Treat</u> Geologist	Checked By <u>A Pasella</u> Site Manager

CEARP Manager

Comments Borehole backfilled with Portland Type I cement Sample BH548738WT  
doubles as an upper contact sample

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
—			<u>36.4 38.5 SAMPLE.</u> Recovered 0 4/2 1 = 19% SAND AND GRAVEL pale yellowish or ange (10 YR 8/6) to dark yellowish orange (10 YR 6/6) poorly sorted fine grained sand weakly cemented sub rounded to rounded gravels moist	
—			<u>38.5 40.5 SAMPLE.</u> Recovered 0 5/2 0 = 25% SAND AND GRAVEL moderate yellow ish brown (10 YR 5/3) scattered gravels coarse grained poorly sorted sand weakly cemented moist to wet	
—			<u>40.5 42.5 SAMPLE.</u> Recovered 0 5/2 0 = 25% 40 5 42 3 SAND AND GRAVEL same as above wet	
			<b>ARAPAHOE FORMATION</b>	
			42 3 42 5 CLAYSTONE light gray (N 7/0) to medium light gray (N 6/0) medium plastic moist	
—			<u>42.5 44.5 SAMPLE.</u> Recovered 1 5/2 0 = 75% CLAYSTONE light gray (N 7/0) to medium light gray (N 6/0) fine grained sands oxide stained blocky moist	
			TOTAL DEPTH 44 50	

**INDEX OF DATA**

Boring No BH55-87

Completed as well? No

Data in File

- Log of Borehole
- Well Construction Summaries
- Well Development Summaries
- Hydraulic Conductivity Test Data  
and Results
- Packer Test Data and Results
- Water Level Data

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No BH55-87  
 Coordinates N 36737 98 E 24935.44 Ground Surface Elevation 5944 90  
 Total Depth 39 50' Water Level Encountered 12 0

Static N/A

Drilling Company Boyles Bros Driller T High  
 Date Drilled September 15-16, 1987 Helper B Keeney  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By K D Holliday Checked By A J Pasella  
Geologist Site Manager

Brent Lewis  
CEARP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<b>ROCKY FLATS ALLUVIUM</b>	
			<b>0.0 2.0 SAMPLE.</b> Recovered 14/20 = 70% CLAYEY SAND AND GRAVEL dusky yellowish brown (10 YR 2/2) to very pale orange (10 YR 8/2) some subangular quartzite gravel very fine grained sand unconsolidated surface dampness to dry	HNu Background=02 OVA Background=50  0.1.4 No readings over background on core  2.0 3.3 Readings on core HNu = 04 OVA = 62
5			<b>2.0 4.0 SAMPLE.</b> Recovered 13/20 = 65% CLAYEY SAND AND GRAVEL moderate yellowish brown (10 YR 5/4) some subangular quartzite gravel very fine grained sand unconsolidated dry	2.0 3.3 Sample BH558702DH  9.5 10.9 Readings on core HNu = 02 OVA = 62
10			<b>4.0 7.0 SAMPLE.</b> Recovered 15/30 = 50% CLAYEY SAND AND GRAVEL moderate yellowish brown (10 YR 5/4) to very pale orange (10 YR 8/2) some subangular quartzite gravel very fine grained sand some caliche unconsolidated dry	9.5 10.9 Direct hit sample BH558710DH
			<b>7.0 9.5 SAMPLE.</b> No recovery	12.0 14.0 Readings on core HNu = 02 OVA = 54 Water table sample BH558712WT
15			<b>9.5 12.0 SAMPLE.</b> Recovered 14/25 = 56% CLAYEY SAND AND GRAVEL grayish orange (10 YR 7/4) some subrounded to subangular quartzite gravel fine grained sand unconsolidated dry	
20				

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No BH55-87  
 Coordinates N 36737 98 E 24935.44 Ground Surface Elevation 5944 90  
 Total Depth 39 50' Water Level Encountered 12 0  
 Static N/A  
 Drilling Company Boyles Bros Driller T High  
 Date Drilled September 15-16, 1987 Helper B Keeney  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By K D Holliway Checked By A J Pasallo  
 Geologist Site Manager  
 CEARP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20			<u>12.0 14.5 SAMPLE.</u> Recovered 20/25 = 80% CLAYEY SAND AND GRAVEL moderate yellowish brown (10 YR 5/4) to moderate brown (5 YR 4/4) some subangular quartzite gravel medium to coarse grained (20 15 phi to 05 10 phi) sand poorly sorted subrounded to subangular trace caliche moist 120 132 damp 132 140	<u>14.5 23.5 Composite sample BH55871424</u>
25			<u>14.5 17.0 SAMPLE.</u> Recovered 28/25 = 112% 145 160 CLAYEY SAND AND GRAVEL moderate brown (5 YR 4/4) to light brown (5 YR 5/6) some subrounded to broken quartzite gravel fine to medium grained (30 25 phi 35 30 phi 05 10 phi) sand poorly sorted sub rounded damp to dry	<u>27.0 29.2 Upper contact sample BH558727UC</u>  <u>29.5 32.0 Contact sample BH558729CT</u>
30			160 170 SANDY CLAY light brown (5 YR 5/6) to light olive gray (5 Y 5/2) some quartzite gravel very fine grained sand consolidated damp	<u>32.0 34.1 Readings on core HNu = 03 OVA = 30 Bedrock sample BH558732BR Duplicate sample BH558732BRD</u>
35			<u>17.0 19.5 SAMPLE.</u> Recovered 25/25 = 100% SANDY CLAY same as above damp	<u>34.5 36.6 Readings on core OVA = 100 Waste sample BH558734DH</u>
40			<u>19.5 22.0 SAMPLE.</u> Recovered 21/25 = 84% SANDY CLAY moderate yellowish brown (10 YR 5/4) some fine grained sand some subangular to angular/broken quartzite gravel damp	

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No BH55-87  
 Coordinates N 36737 98 E 24935.44 Ground Surface Elevation 5944.90  
 Total Depth 39 50' Water Level Encountered 12 0  
 Static N/A  
 Drilling Company Boyles Bros Driller T High  
 Date Drilled September 15-16, 1987 Helper B Keeney  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By K D Holliday Checked By J J Parolke  
 Geologist Site Manager  
 CEARP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			<p><u>22.0 24.5 SAMPLE.</u>            Recovered 1 5/2 5 = 60%            SANDY CLAY same as above damp</p>	
			<p><u>24.5 27.0 SAMPLE.</u>            Recovered 1 2/2 5 = 48%            SANDY CLAY same as above damp</p>	
			<p><u>27.0 29.5 SAMPLE.</u>            Recovered 2 2/2 5 = 88%            CLAYEY SAND same as above damp to dry</p>	
			<p><u>29.5 32.0 SAMPLE.</u>            Recovered 3 0/2 5 = 120%            29 5 30 4 CLAYEY SAND yellowish gray (5 Y 7/2) to light olive gray (5 Y 5/2) fine grained sand (3 5 4 0 phi) fairly well sorted few quartzite cobbles            30 4 31 4 SANDY CLAY same as above damp</p>	
			<p><b><u>ARAPAHOE FORMATION</u></b></p>	
			<p>31 4 32 0 SANDY CLAYSTONE same as above damp</p>	

LOG  
OF  
BOREHOLE

Location Rocky Flats Plant, East Trenches Area Borehole/Well No BH55-87  
 Coordinates N 36737 98 E 24935.44 Ground Surface Elevation 5944 90  
 Total Depth 39 50 Water Level Encountered 12 0  
 Static N/A  
 Drilling Company Boyles Bros Driller T High  
 Date Drilled September 15-16, 1987 Helper B. Keeney  
 Drilling Method Hollow Stem Auger Drilling Fluid None  
 Logged By K D Holliday Checked By [Signature]  
 Geologist Site Manager  
 CEARP Manager

Comments Borehole backfilled with Portland Type I cement

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			<u>32.0 34.5 SAMPLE.</u> Recovered 2 1/2 5 = 84% SANDY CLAYSTONE olive gray (5 Y 3/2) to yellowish gray (5 Y 7/2) very fine grained sand damp	
			<u>34.5 37.0 SAMPLE.</u> Recovered 2 1/2 5 = 84% SANDY CLAYSTONE same as above dry	
			<u>37.0 39.5 SAMPLE.</u> Recovered 2 5/2 5 = 100% CLAYSTONE olive gray (5 Y 4/1) to yellowish gray (5 Y 7/2) some very fine grained sand some dark yellowish orange (10 YR 6/6) iron staining weathered slightly damp	
			TOTAL DEPTH 39 50	