

**REMEDIAL INVESTIGATION REPORT
FOR HIGH PRIORITY SITES
(881 HILLSIDE AREA)**

**VOLUME III
(APPENDIX D)**

**U.S. DEPARTMENT OF ENERGY
ROCKY FLATS PLANT
GOLDEN, COLORADO
JULY 1, 1987**



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

**UNITED STATES DEPARTMENT OF ENERGY
ADMINISTRATION CONTRACT DE-AC04-76DPO3533**

ADMIN RECORD

REVIEWED FOR CLASSIFICATION/UCM

By [Signature] JNN
Date 12/16/91

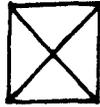
A-DU01-000256

APPENDIX D
HYDROGEOLOGIC DATA

EXPLANATION OF SYMBOLS AND TERMS

ON BORING LOGS

SAMPLE TYPE



Split Spoon



NC Core

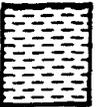


Continuous Drive

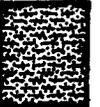
GRAPHIC LOG



Lignite



Clay or Claystone or Shale



Clayey Sand or Sandy Clay



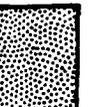
Clay and Gravel



Gravel



Sand and Gravel



Sand or Sandstone



Silt or Siltstone

WATER CONTENT



Water Level Encountered During Drilling



Static Water Level on 06/24/87

INDEX OF DATA

Boring No.: 9-74

Completed as well? Yes

Data in File

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

WELL SUMMARY

J10K

W-1-60

Well Name: W-9-74

Elev. of Ground: _____

Elev. of Top of Casing: _____

Coordinates: _____

Date of Construction: _____

Constructed By: _____

Available Information

Geologic Log: _____

Geophysical Log: _____

Construction Details: _____

Permeability Test: _____

Water Level Data: ✓

Water Quality Data: _____

23.25' 16.43
3/21/85

7.14' 15:57

3/22/85

Condition of Surface

Internal Casing

PVC

Material: PVC

5 7/8"

Internal Diameter: 6"

6 7/8"

Outside Diameter: 6 1/4"

27.78'

Total Depth: 20.10'

2.19'

Stick-Up: 1.09'

GOOD, DIRTY

Condition: GOOD BUT DIRTY

NONR

Protective Casing

Material: THIN GAUGE STEEL

Internal Diameter: 11 7/8"

Outside Diameter: 12"

Total Depth: _____

Stick-Up: 1.65'

NO GALV.
STEEL SLIP
LAP

Locked: NO. 9 HINGED LID

Condition: GOOD

NONR

Surface Seal: 2' φ CONC. CONCRETE (1" THK) CONCENTRIC

CRACKS AROUND OUTSIDE

WATER LEVEL DATA
9-74

Elevation of Top of Inner Casing (feet)	Date	Time	Depth Water to Water (feet)	Water Elevation (feet)	Comments
5,926.39	08/29/83	-	4.50	5,921.89	
	11/22/83	-	7.00	5,919.39	
	03/22/85	1557	7.14	5,919.25	
	08/27/86	1615	10.11	5,916.28	
	08/28/86	1030	15.35	5,911.04	?
	08/29/86	1700	14.00	5,912.39	Sampled
	01/--/87	-	10.71	5,915.68	
	03/02/87	-	10.38	5,916.02	
	03/09/87	-	10.13	5,916.27	TD = 19.79
	05/08/87	1124	6.29	5,920.10	
	06/24/87	-	6.99	5,919.40	

INDEX OF DATA

Boring No.: 10-74

Completed as well? Yes

Data in File

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

WELL SUMMARY

J10K

Well Name: W-10-74

Elev. of Ground: _____

Elev. of Top of Casing: _____

Coordinates: _____

Date of Construction: _____

Constructed By: _____

Available Information

Geologic Log: _____

(see p. 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100)

Geophysical Log: NO

Construction Details: NO

Permeability Test: NO

Water Level Data: 1

Water Quality Data: YES

7.21' @ 15:54 3/22/85

Condition of Surface

Internal Casing

Material: 6" NC 9 SLIP CAP

Internal Diameter: 6"

Outside Diameter: 6 3/8"

Total Depth: 9.96'

Stick-Up: 0.06'

Condition: GOOD DIRTY

Protective Casing

Material: THIN GAUGE STEEL

Internal Diameter: 11 1/4"

Outside Diameter: 12"

Total Depth: _____

Stick-Up: 2.0'

Locked: NO HINGE LID 9 1/2" DIA

Condition: _____

Surface Seal: 3' Ø CONCR PAD BHT CRACK

ON SOUTH SIDE

WATER LEVEL DATA
10-74

Elevation of Top of Inner Casing (feet)	Date	Time	Depth to Water (feet)	Water Elevation (feet)	Comments
5,926.00	05/29/83	-	7.00	5,919.00	
	11/22/83	-	7.00	5,919.00	
	03/22/85	1554	7.21	5,918.79	
	08/27/86	1720	-		Dry
	01/--/87	-	-		Dry
	03/02/87	-	-		Dry to 9.63
	03/09/87	-	-		Dry to 9.58
	05/08/87	1120	7.19	5,918.81	
	06/24/87	-	7.24	5,918.76	

INDEX OF DATA

Boring No.: 1-82

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

WELL SUMMARY

J10K

Well Name: 1-82

Elev. of Ground: _____

Elev. of Top of Casing: _____

Coordinates: _____

Date of Construction: _____

Constructed By: _____

Available Information

Geologic Log: _____

Geophysical Log: _____

Construction Details: _____

Permeability Test: _____

Water Level Data: ✓

Water Quality Data: _____

6.77' 10:58 2/22/85

Condition of Surface

Internal Casing

Material: 6" SCH 40 PVC

Internal Diameter: 6"

Outside Diameter: 6 7/8"

Total Depth: 22.05'

Stick-Up: 1.62 ft PVC PAD

Condition: GOOD w/ SLIP CAP

Protective Casing

Material: NO

Internal Diameter: _____

Outside Diameter: _____

Total Depth: _____

Stick-Up: _____

Locked: NO

Condition: _____

Surface Seal: 18" SG CONCRETE PAD

WATER LEVEL DATA
1-82

<u>Elevation of Top of Inner Casing (feet)</u>	<u>Date</u>	<u>Time</u>	<u>Depth Water to Water (feet)</u>	<u>Water Elevation (feet)</u>	<u>Comments</u>
5,912.79	03/22/85	1058	6.77	5,906.02	
	06/24/87	-	7.10	5,905.69	

INDEX OF DATA

Boring No.: 2-82

Completed as well? Yes

Data in File

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

WELL SUMMARY

J10K

Well Name: 2-82

Elev. of Ground: _____

Elev. of Top of Casing: _____

Coordinates: _____

Date of Construction: _____

Constructed By: _____

Available Information

Geologic Log: NO

Geophysical Log: NO

Construction Details: NO

Permeability Test: NO

Water Level Data: ✓
DRY 11:01

Water Quality Data: ?
3/22/85

Condition of Surface

Internal Casing

Material: 6" SCH 40 PVC

Internal Diameter: 6"

Outside Diameter: 6 7/8"

Total Depth: 11.99'

Stick-Up: 1.83 OFF CAP

Condition: EXCEL. w/ SLIP CAP

Protective Casing

Material: NO

Internal Diameter: _____

Outside Diameter: _____

Total Depth: _____

Stick-Up: _____

Locked: NO

Condition: _____

Surface Seal: 18" SQ CONCR PAD

WATER LEVEL DATA
2-82

<u>Elevation of Top of Inner Casing (feet)</u>	<u>Date</u>	<u>Time</u>	<u>Depth Water to Water (feet)</u>	<u>Elevation (feet)</u>	<u>Comments</u>
5,913.32	09/02/83	-	8.00	5,905.32	
	11/11/83	-	-		Dry
	03/22/85	1101	-		Dry, TD=11.99
	06/24/87	-	10.93	5,902.39	

INDEX OF DATA

Boring No.: 58-86

Completed as well? Yes

Data in File

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

Project: Rocky Flats Plant LOG OF BORING NO. 58-86

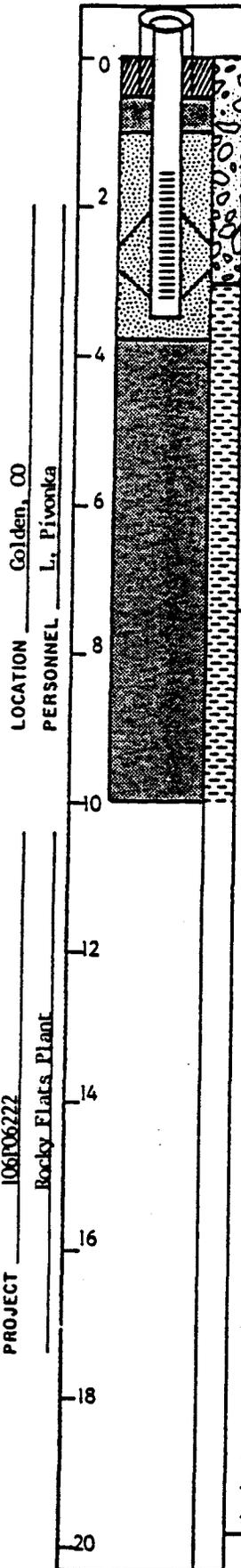
Date Drilled 9/10/86 Coordinates
 Boring Method Hollow Stem Auger Ground Surface Elevation 5992

Elev. (feet)	Depth (feet)	Sample Type	Graphic Log	Material Description	Penetration Resistance (Blows/Inch)		Water Content (%)		Other Tests
					20	40	20	40	
	0			<p>VALLEY FILL ALLUVIUM</p> <p>0-0.6'-Sample. Recovered 0.3/0.6'=50%. GRAVEL: dusky yellowish brown (10YR 2/2); granitic pebbles and cobbles; some silty sand; poorly sorted; unconsolidated; damp.</p> <p>0.6-3.0'-Sample. Recovered 0.0/2.4'=0%. COBBLES AND BOULDERS: dry.</p>					
	5			<p>ARAPAHOE FORMATION</p> <p>3.0-4.0'-Sample. Recovered 1.0/1.0'=100%. CLAYSTONE: pale yellowish brown (10YR 6/2); silty; mottled iron staining; consolidated; damp.</p> <p>4.0-7.5'-Sample. Recovered 2.7/3.5'=77%. CLAYSTONE: pale yellowish brown (10YR 6/2); silty; mottled iron staining; consolidated; damp.</p> <p>7.5-10.0'-Sample. Recovered 2.5/2.5'=100%. CLAYSTONE: Same as above; with some organic fragments; damp.</p>					
	10			TOTAL DEPTH: 10.0'					
	15								
	20								

Remarks Logged by: L. Pivonka Checked by: *[Signature]*

WELL CONSTRUCTION SUMMARY

LOCATION or COORDS: _____ ELEVATION: GROUND LEVEL 5892'
 TOP OF CASING 5895.00'



LOCATION Golden, CO
 PERSONNEL L. Pivonka

PROJECT 106106222
Rocky Flats Plant

DRILLING SUMMARY:

TOTAL DEPTH Well: 3.50' Hole: 10.00'
 BOREHOLE DIAMETER 7 1/2"
 DRILLER Boyles Brothers Drilling Co.
15865 W. Sch Avenue
Golden, CO (Jim Horn)
 RIG Mobile B-57
 BIT(S) Blade bit
 DRILLING FLUID None
 SURFACE CASING 5" x 4' steel w/ locking cap

WELL DESIGN:

BASIS: GEOLOGIC LOG X GEOPHYSICAL LOG _____
 CASING STRING(S): C=CASING S=SCREEN

0.00'	1.50'	CI	-	-
1.50'	3.50'	SI	-	-
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-

CASING: CI 2" I.D. Sch. 5 type 316 stainless steel, threaded and flush jointed.

SCREEN: SI 2" I.D. Sch. 5 type 316 stainless steel, threaded and flush jointed, 0.010" wire wrap screen 0.25' welded bottom cap.

CENTRALIZERS Type 304 stainless steel 2.12' - 3.29'

FILTER MATERIAL 32-42 silica sand 1.00' - 3.70'

CEMENT Portland Type I 0.00' - 0.50'

OTHER 3/8" bentonite pellets 0.50' - 1.00'
3.70' - 10.00'

CONSTRUCTION TIME LOG:

TASK	START		FINISH	
	DATE	TIME	DATE	TIME
DRILLING:	1986		1986	
<u>7 1/2" auger</u>	<u>9/10</u>	<u>1000</u>	<u>9/10</u>	<u>1135</u>
GEOPHYS. LOGGING:	-	-	-	-
CASING:				
<u>2" stainless</u>	<u>9/6</u>	<u>1615</u>	<u>9/10</u>	<u>1618</u>
FILTER PLACEMENT:	<u>9/10</u>	<u>1618</u>	<u>9/10</u>	<u>1629</u>
CEMENTING:	<u>9/10</u>	<u>1632</u>	<u>9/10</u>	<u>1640</u>
DEVELOPMENT:	<u>9/13</u>	<u>1245</u>	<u>9/13</u>	<u>1245</u>
OTHER:				
<u>Bentonite</u>	<u>9/10</u>	<u>1629</u>	<u>9/10</u>	<u>1632</u>
	<u>9/10</u>	<u>1608</u>	<u>9/10</u>	<u>1615</u>

WELL DEVELOPMENT

See Well Development Summary Sheet.

COMMENTS:

No water encountered during drilling.
Top of stainless steel casing: 3.00'

WATER LEVEL DATA
58-86

<u>Elevation of Top of Inner Casing (feet)</u>	<u>Date</u>	<u>Time</u>	<u>Depth Water to Water (feet)</u>	<u>Water Elevation (feet)</u>	<u>Comments</u>
5,891.37	09/13/86	1245	-		Dry
	10/13/86	1210	-		Dry
	01/--/87	-	6.00	5,885.37	
	05/08/87	1005	5.90	5,885.47	
	06/24/87	-	-		Dry

INDEX OF DATA

Boring No.: 59-86BR

Completed as well? Yes

Data in File

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

Project: Rocky Flats Plant

LOG OF BORING NO.

59-86

Date Drilled 9/22/86

Coordinates

Boring Method Hollow Stem Auger

Ground Surface Elevation 5926

Elev. (feet)	Depth (feet)	Sample Type	Graphic Log	Material Description	Penetration Resistance (Blows/Inch)		Water Content (%)		Other Tests
					20	40	20	40	
	0			<p>COLLUVIUM</p> <p>0-0.5'-Sample. Recovered 0.5/0.5'=100%. CLAY: dark yellowish brown (10YR 4/2); silty; some granitic pebbles; mottled iron staining; poorly sorted; unconsolidated; damp.</p> <p>0.5-2.0'-Sample. Recovered 1.5/1.5'=100%. CLAY: dark yellowish brown (10YR 4/2); some coarse sand; mottled iron staining; poorly sorted; unconsolidated; damp.</p>					
	5			<p>2.0-5.0'-Sample. Recovered 2.5/3.0'=84%. GRAVEL: moderate yellowish brown (10YR 5/4); granitic pebbles with coarse sand; clayey; poorly sorted; unconsolidated; damp.</p> <p>5.0-7.5'-Sample. Recovered 0.5/2.5'=25%. GRAVEL: Same as above; damp.</p>					
	10			<p>ARAPAHOE FORMATION</p> <p>7.5-10.0'-Sample. Recovered 2.0/2.5'=80%. CLAYSTONE: light gray (N 7) to dark yellowish orange (10YR 6/6); weathered; consolidated; moist.</p> <p>10.0-12.5'-Sample. Recovered 1.7/2.5'=68%. CLAYSTONE: Same as above; moist.</p> <p>12.5-15.0'-Sample. Recovered 0.9/2.5'=36%. CLAYSTONE: Same as above; moist.</p>					
	15			<p>15.0-17.5'-Sample. Recovered 2.3/2.5'=92%. CLAYSTONE: light olive gray (5 Y 6/1); blocky texture; some iron staining; weathered; consolidated; moist.</p> <p>17.5-19.0'-Sample. Recovered 1.0/1.5'=67%. CLAYSTONE: Same as above; moist.</p>					
	20			<p>19.0-20.0'-Sample. Recovered 0.0/1.0'=80%. SANDSTONE: olive gray (5Y 6/1); clayey; some iron staining; well sorted; moist.</p>					

Remarks Logged by: L. Pivonka

Checked by: *[Signature]*

Project No. 106P06222

Hydro-Search, Inc.

Page 1 of 2

Project: Rocky Flats Plant LOG OF BORING NO. 59-86

Date Drilled 9/22/86 Coordinates
 Boring Method Hollow Stem Auger Ground Surface Elevation 5926

Elev. (feet)	Depth (feet)	Sample Type	Graphic Log	Material Description	Penetration Resistance (Blows/Inch)		Water Content (%)		Other Tests
					20	40	20	40	
	20			20.0-22.5'-Sample. Recovered 2.2/2.5'=88%. SANDSTONE: Same as above; friable; moist.					
				22.5-25.0'-Sample. Recovered 2.0/2.5'=80%. SANDSTONE: Same as above; moist.					
	25			25.0-26.5'-Sample. Recovered 0.2/1.5'=33%. SANDSTONE: Same as above; moist.			▽		
				26.5-27.5'-Sample. Recovered 0.5/1.0'=50%. CLAYSTONE: pale yellowish brown (10YR 6/2) and dark yellowish orange (10YR 6/6); silty; mottled iron staining; consolidated; moist.					
	30			27.5-30.0'-Sample. Recovered 1.0/2.5'=40%. CLAYSTONE: Same as above; moist.					
				30.0-32.5'-Sample. Recovered 0.8/2.5'=32%. CLAYSTONE: medium light gray (N 6); silty; iron staining; blocky texture; consolidated; moist.					
				TOTAL DEPTH: 32.5'					
	35								
	40								

Remarks Logged by: L. Pivonka Checked by: *[Signature]*

AQUIFER TEST DATA WELL 59-86

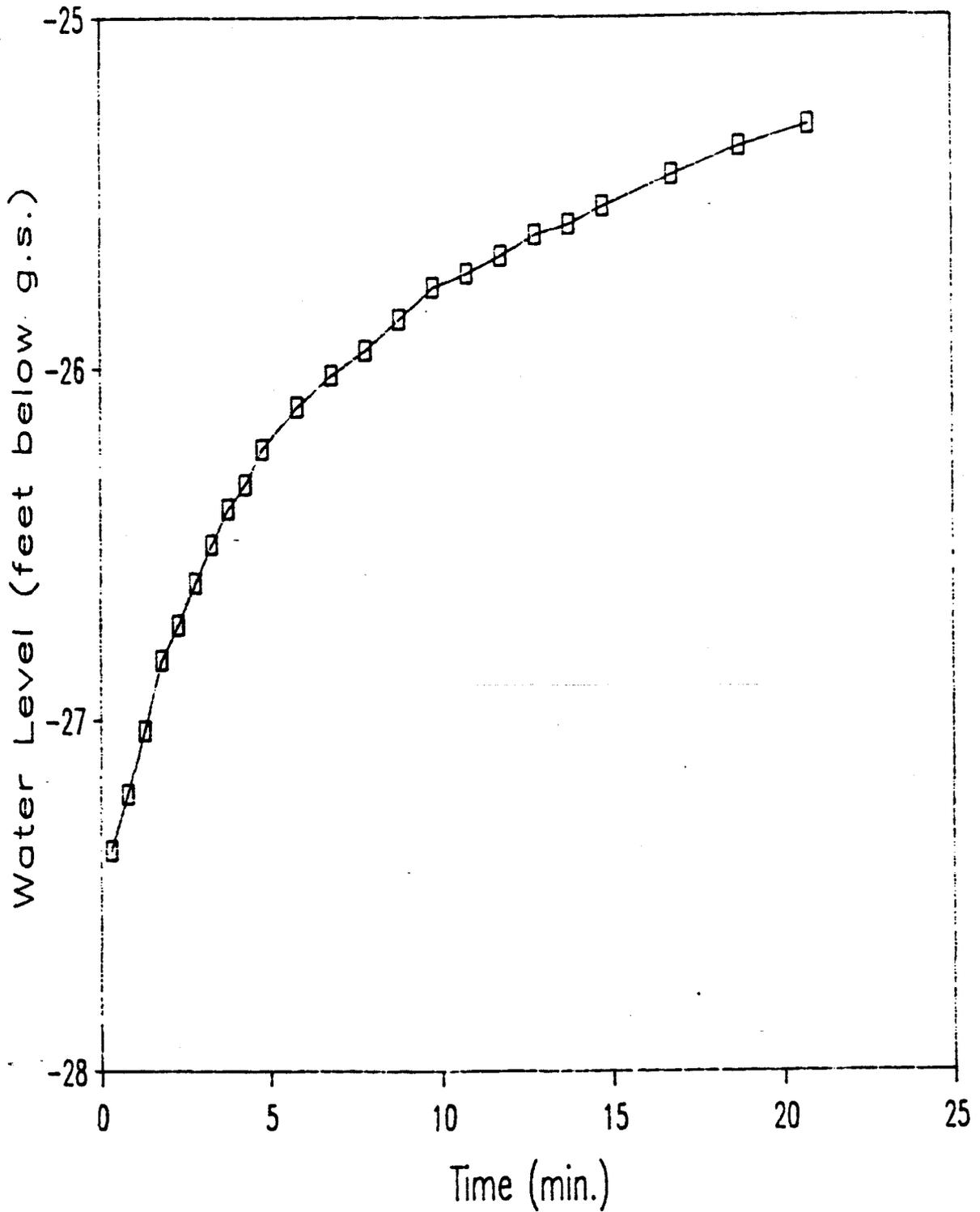
Type of Aquifer Test: Bail down - Recovery Project No.: 106P06222
 How Q Measured: 4.5 gallon bucket Location: Rocky Flats Plant
 How W.L.'s Measured: Olypic Well Scouner Personnel: M. Bergaan, J. Pearce
 Measuring Point for W.L.'s: Top of Casing
 Elevation of Measuring Point: 5927.5

Depth of pump/airline: N/A
 Start bailing: 10/23/86 Time: 10:30:00
 Stop bailing: 10/23/86 Time: 10:50:00
 Duration of Aquifer Test: 41 minutes

TIME		WATER LEVEL DATA		COMMENTS
t = 20.2 min.	at t' = 0	Static Water Level: 25.09'		
t	t'	Water Level	Draw-down	
0				Begin bailing
20.2	0	27.45	2.37	Stop bailing
20.5	.3	27.37	2.28	Bailed 1.5 gallons
21.0	.8	27.21	2.12	
21.5	1.3	27.03	1.94	
22.0	1.8	26.83	1.74	
22.5	2.3	26.73	1.64	
23.0	2.8	26.61	1.52	
23.5	3.3	26.50	1.41	
24.0	3.8	26.40	1.31	
24.5	4.3	26.33	1.24	
25.0	4.8	26.23	1.14	
26.0	5.8	26.11	1.02	
27.0	6.8	26.02	.93	
28.0	7.8	25.95	.86	
29.0	8.8	25.86	.77	
30.0	9.8	25.77	.68	
31.0	10.8	25.73	.64	
32.0	11.8	25.68	.59	
33.0	12.8	25.62	.53	
34.0	13.8	25.59	.50	
35.0	14.8	25.54	.45	
37.0	16.8	25.45	.36	
39.0	18.8	25.37	.28	
41.0	20.8	25.31	.22	90% Recovered at 25.32'

AQUIFER TEST DATA

WELL 59-86



WATER LEVEL DATA
59-86

<u>Elevation of Top of Inner Casing (feet)</u>	<u>Date</u>	<u>Time</u>	<u>Depth Water to Water (feet)</u>	<u>Water Elevation (feet)</u>	<u>Comments</u>
5,915.30	09/30/86	1530	26.68	5,888.62	Airlifted, TD = 29.60
	10/02/86	1315	26.70	5,888.60	Purged
	10/03/86	1340	26.67	5,888.63	Purged
	10/06/86	830	26.78	5,888.52	Purged
	10/07/86	1450	26.78	5,888.52	Purged
	10/08/86	1205	26.78	5,888.52	Sampled
	10/13/86	1300	26.80	5,888.50	
	10/23/86	1030	25.09	5,890.21	Bail-down test
	01/--/87	-	25.52	5,889.78	
	05/07/87	1106	24.25	5,891.05	Labeled 69-86 in notes
	06/24/87	-	26.54	5,888.76	

INDEX OF DATA

Boring No.: 61-86

Completed as well? Yes

Data in File

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

Project: Rocky Flats

LOG OF BORING NO. 61-46

Date Drilled 11/19/86

Coordinates

Boring Method Hollow Stem Auger

Ground Surface Elevation 5967'

Elev. (feet)	Depth (feet)	Sample Type	Graphic Log	Material Description	Penetration Resistance (Blows/inch)		Water Content (%)		Other Tests
					20	40	20	40	
	0			Top Soil Dark Yellowish Brown (10YR 4/2) silty clay rich soil with abundant small cobbles + some gravel. Moist					
	1			Disturbed(?) R = 2.0/2.5 @ 0%					
	2								
	3			Disturbed Arapahoe Clay - Yellowish Gray (5Y 8/1) - White (M) gray clay with abundant (FeO) occurring throughout. Some nodular staining in lower 1.0' FeO staining R = 2.0/2.5					
	4			Disturbed Arapahoe Claystone / Topsoil Yellowish Gray (5Y 8/1) Dark Yellowish Brown (10YR 4/2) clays, silts, sand, gravel, and small cobbles (intermediate)					
	5								
	6			Moist with heavy FeO staining in lower 3.0'					
	7								
	8			R = 4.0/6.5					
	9								
	10			Disturbed Matrix					
	11								
	12			Arapahoe Claystone Dark Yellowish Orange (10YR 4/6) claystone - gray, silty, Moist R = 7.0/10.0					
	13			Arapahoe Claystone Dark Yellowish Orange (10YR 4/6) - Light Olive Gray (5Y 4/1) blocky, gray, bedded claystone					
	14								
	15			Moist R = 4.0/5.0					
	16								
	17			TO = 18.5'					
	18								
	19								
	20								

Remarks

Project No. 106 Pa 6 222

Hydro-Search, Inc.

Lee J. Pivonta

WELL CONSTRUCTION SUMMARY

LOCATION or COORDS: _____

ELEVATION: GROUND LEVEL 5967'
TOP OF CASING 5968.60'

DRILLING SUMMARY:

TOTAL DEPTH Well: 12.25' Hole: 18.50'
BOREHOLE DIAMETER 7 1/4"
DRILLER Boyles Brothers Drilling Co.
15865 W. 5th Avenue
Golden, CO (Jim Horn)
RIG Mobile B-57
BIT(S) Blade bit
DRILLING FLUID None
SURFACE CASING 5" x 4' steel w/ locking cap

WELL DESIGN:

BASIS: GEOLOGIC LOG X GEOPHYSICAL LOG _____
CASING STRING(S): C=CASING S=SCREEN

<u>0.00'</u>	<u>5.00'</u>	<u>C1</u>	_____
<u>5.00'</u>	<u>12.00'</u>	<u>S1</u>	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

CASING: C1 2" I.D. Sch. 5 type 316 stain-
less steel, threaded and flush
jointed.

SCREEN: S1 2" I.D. Sch. 5 type 316 stain-
less steel, threaded and flush
jointed, 0.010" wire wrapped
screen, 0.25' welded bottom cap.

CENTRALIZERS Type 304 stainless steel
7.84' - 9.01'

FILTER MATERIAL 32-42 silica sand
4.00' - 12.50'

CEMENT Portland Type I
0.00' - 3.00'

OTHER 3/8" bentonite pellets
3.00' - 4.00'
12.50' - 18.50'

CONSTRUCTION TIME LOG:

TASK	START		FINISH	
	DATE	TIME	DATE	TIME
DRILLING:	1986		1986	
<u>7 1/4" auger</u>	<u>11/19</u>	<u>1157</u>	<u>11/19</u>	<u>1247</u>
GEOPHYS. LOGGING:	---	---	---	---
CASING:				
<u>2" stainless</u>	<u>11/19</u>	<u>1429</u>	<u>11/19</u>	<u>1431</u>
FILTER PLACEMENT:	<u>11/19</u>	<u>1427</u>	<u>11/19</u>	<u>1435</u>
CEMENTING:	<u>11/19</u>	<u>1436</u>	<u>11/19</u>	<u>1447</u>
DEVELOPMENT:				
OTHER:				
<u>Bentonite</u>	<u>11/19</u>	<u>1435</u>	<u>11/19</u>	<u>1436</u>
	<u>11/19</u>	<u>1425</u>	<u>11/19</u>	<u>1427</u>

WELL DEVELOPMENT

See Well Development Summary Sheet.

COMMENTS:

Water encountered at 8.50' during drilling.

Top of stainless steel casing: 1.60'

LOCATION Rocky Flats Plant
PERSONNEL L. Pivonka

PROJECT 106R06222

PROJECT

WATER LEVEL DATA
61-86

<u>Elevation of Top of Inner Casing (feet)</u>	<u>Date</u>	<u>Time</u>	<u>Depth Water to Water (feet)</u>	<u>Water Elevation (feet)</u>	<u>Comments</u>
6,001.16	01/--/87	-	10.13	5,991.04	
	03/10/87	-	8.33	5,992.83	TD = 13.42
	05/08/87	1243	9.04	5,992.12	
	06/24/87	-	10.85	5,990.31	

INDEX OF DATA

Boring No.: 62-86BR

Completed as well? Yes

Data in File

 X Log of Borehole

 X Well Construction Summaries

 X Well Development Summaries

Data only Hydraulic Conductivity Test Data
 and Results

 Packer Test Data and Results

 X Water Level Data

Project: Rocky Flats Plant

LOG OF BORING NO.

62-86

Date Drilled 9/25/86

Coordinates

Boring Method Hollow Stem Auger

Ground Surface Elevation 5916

Elev. (feet)	Depth (feet)	Sample Type	Graphic Log	Material Description	Penetration Resistance (Blows/Inch)		Water Content (%)		Other Tests
					20	40	20	40	
	0			COLLUVIUM					
	0-0.5'			0-0.5'-Sample. Recovered 0.5/0.5'=100%. CLAY: dusky yellowish brown (10YR 2/2); silty; some granitic pebbles and small cobbles; poorly sorted; unconsolidated; dry.					
	0.5-4.8'			0.5-4.8'-Sample. Recovered 3.7/4.3'=86%. CLAY: dusky yellowish brown (10YR 2/2) and moderate yellowish brown (10YR 5/4); silty; trace of small granitic cobbles; poorly sorted; consolidated; damp.					
	4.8-7.5'			4.8-7.5'-Sample. Recovered 1.6/2.7'=59%. CLAY: Same as above; damp.					
	7.5-10.5'			7.5-10.5'-Sample. Recovered 3.0/3.0'=100%. CLAY: Same as above; moist.					
	10.5-12.7'			10.5-12.7'-Sample. Recovered 1.3/2.2'=59%. CLAY: Same as above; moist.					
	12.7-14.0'			12.7-14.0'-Sample. Recovered 0.6/1.3'=46%. GRAVEL: moderate brown (5YR 4/4); granitic pebbles and cobbles; some clay and sand; poorly sorted; unconsolidated; wet.					
	14.0-14.5'			14.0-14.5'-Sample. Recovered 0.5/0.5'=100%. CLAY: light olive gray (5Y 6/1); mottled iron staining; unconsolidated; moist.					
	14.5-17.8'			14.5-17.8'-Sample. Recovered 1.6/3.3'=48%. CLAY: moderate brown (5YR 4/4); silty; trace of small granitic cobbles; poorly sorted; unconsolidated; moist.					
	17.8-20.3'			17.8-20.3'-Sample. Recovered 1.0/2.5'=40%. GRAVEL: moderate brown (5YR 4/4); granitic pebbles and cobbles, some sand and micaceous clay; poorly sorted; unconsolidated; wet.					

Remarks Logged by: L. Pivorka

Checked by: *[Signature]*

Project No.

106P06222

Hydro-Search, Inc.

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Project: Rocky Flats Plant

LOG OF BORING NO.

62-86

Date Drilled 9/25/86

Coordinates

Boring Method Hollow Stem Auger

Ground Surface Elevation 5916

Elev. (feet)	Depth (feet)	Sample Type	Graphic Log	Material Description	Penetration Resistance (Blows/Inch)		Water Content (%)		Other Tests
					20	40	20	40	
	20			20.3-22.0'-Sample. Recovered 0.9/1.7'=53%. GRAVEL: Same as above; wet.					
			ARAPAHOE FORMATION						
				22.0-22.8'-Sample. Recovered 0.3/0.8'=38%. CLAYSTONE: light olive gray (5Y 6/1) and dark yellowish orange (10YR 6/6); weathered; consolidated; moist.					
	25			22.8-25.3'-Sample. Recovered 2.0/2.5'=80%. CLAYSTONE: Same as above; moist.					
				25.3-27.8'-Sample. Recovered 1.5/2.5'=60%. SANDSTONE: light olive gray (5Y 6/1) and dark yellowish orange (10YR 6/6); weathered; well sorted; moderately well cemented; moist.					
				27.8-30.3'-Sample. Recovered 2.5/2.5'=100%. SANDSTONE: Same as above; moist.					
	30			30.3-32.8'-Sample. Recovered 2.5/2.5'=100%. SANDSTONE: Same as above; moist.					
				32.4-34.5'-Sample. Recovered 2.3/2.3'=100%. SANDSTONE: Same as above; moist.					
				34.5-35.4'-Sample. Recovered 0.9/0.9'=100%. CLAYSTONE: medium gray (N 5) and dark yellowish orange (10YR 6/6); some fine-grained sand; weathered; consolidated; damp.					
	35			35.4-37.9'-Sample. Recovered 2.5/2.5'=100%. CLAYSTONE: Same as above; damp.					
				37.9-40.4'-Sample. Recovered 2.0/2.5'=80%. CLAYSTONE: Same as above; damp.					
	40								

Remarks Logged by: L. Pivonka

Checked by: *ALP*

Project No.
106P06222

Hydro-Search, Inc.

Page 2 of 3

Date Drilled 9/25/86 Coordinates
 Boring Method Hollow Stem Auger Ground Surface Elevation 5916

Elev. (feet)	Depth (feet)	Sample Type	Graphic Log	Material Description	Penetration Resistance (Blows/Inch)		Water Content (%)		Other Tests
					20	40	20	40	
	40			40.4-42.9'-Sample. Recovered 2.5/2.5'=100%. SANDSTONE: medium gray (N 5); some iron staining; plant fossils; well sorted; weathered; consolidated; damp.					
				42.9-45.4'-Sample. Recovered 2.5/2.5'=100%. SANDSTONE: Same as above; damp.					
	45			45.4-47.9'-Sample. Recovered 2.5/2.5'=100%. SANDSTONE: medium gray (N 5) and dark yellowish orange (10YR 6/6); some iron staining; plant fossils; interbedded claystone beds "1.0" thick; weathered; well sorted; consolidated; damp.					
				47.9-50.0'-Sample. Recovered 2.1/2.1'=100%. CLAYSTONE: medium gray (N 5) and dark yellowish orange (10YR 6/6); sandy; iron staining; plant fossils; weathered; consolidated; damp.					
	50			50.0-52.8'-Sample. Recovered 2.8/2.8'=100%. SANDSTONE: olive gray (5Y 4/1); fine to medium-grained; clayey; mottled iron staining; well sorted; consolidated; moist.					
				52.8-55.3'-Sample. Recovered 2.5/2.5'=100%. SANDSTONE: olive gray (5Y 4/1); medium-grained sand; clay laminae; well sorted; consolidated; moist to wet.					
	55			55.3-57.8'-Sample. Recovered 2.0/2.5'=80%. SANDSTONE: Same as above; wet.					
				57.8-59.3'-Sample. Recovered 1.5/1.5'=100%. SANDSTONE: Same as above; wet.					
	60			TOTAL DEPTH: 59.5'					

Remarks Logged by: L. Pivonka Checked by: *[Signature]*

WELL DEVELOPMENT SUMMARY

WELL 62-86

DATE	TIME	METHOD	VOLUME	APPEARANCE	COMMENTS
10-6-86	1610				1 Well Bore Volume = 1.4 gals. 10 Well Bore Volumes = 14.4 gals.
10-6-86	1610	Airlifted	1.4 gals.	Light brown mist	None
10-7-86	1530	Bailed	1.8 gals.	Light brown, slightly turbid	1.8/14.4 gals. purged to date
10-8-86	1425	Bailed	2.0 gals.	Very light brown, slightly turbid	3.8/14.4 gals. purged to date
10-9-86	1230	Bailed	2.0 gals.	Light to very light brown	5.8/14.4 gals. purged to date
10-9-86	1700	Bailed	1.5 gals.	Light brown to clear	7.3/14.4 gals. purged to date
10-10-86	0835	Bailed	2.0 gals.	Clear	9.3/14.4 gals. purged to date
10-10-86	1100	Bailed	1.5 gals.	Clear, slightly turbid	10.8/14.4 gals. purged to date
10-10-86	1540	Bailed	2.0 gals.	Clear, slightly turbid	12.8/14.4 gals purged to date
10-14-86	1045	Bailed	2.0 gals.	Clear, slightly turbid	14.8/14.4 gals. purged to date
10-15-86	1040	Bailed	2.0 gals.	Clear, slightly turbid	16.8/14.4 gals. purged to date
10-16-86	0940	Bailed	—	Clear, slightly turbid	Sampled

AQUIFER TEST DATA

WELL 62-86
 PUMPING or OBSERVATION WELL
 PUMPING or RECOVERY DATA
 PAGE 2 OF 2

TYPE OF AQUIFER TEST 3-Bar Down Recovery Test
 HOW Q MEASURED 4.5m Bucket
 HOW W.L.'s MEASURED 25m PL
 RAD./DIST. OF/FROM PUMPING WELL 1"
 MEAS. POINT FOR W.L.'s n/a
 ELEVATION OF MEAS. POINT _____

DEPTH OF PUMP/AIRPIPE _____
 PUMP ON: date 9-15-86 time 11:17:10 EST
 PUMP OFF: date 9-15-86 time _____
 DURATION OF AQUIFER TEST _____

DAY	TIME		WATER LEVEL DATA						DISCHARGE	RECORDED BY	COMMENTS	
	CLOCK TIME	t	t'	READING	CONVERSION CORRECTIONS	WATER LEVEL	s or ϕ	READING				Q
	12:35:00	1:35:00	95	25+9.80	-1.91	27.89	-2.77					
	12:45:00	1:45:00	105	25+9.63	"	27.72	-2.60					
	12:55:00	1:55:00	115	25+9.30		27.59	-2.47					90% Rec = 27.96
	13:05:00	2:05:00	125	25+9.35		27.44	-2.32					(NOT REC)
	13:15:00	2:15:00	135	25+9.26		27.35	-2.23					
	13:25:00	2:25:00	145	25+9.17		27.26	-2.14					
	13:35:00	2:35:00	155	25+9.09		27.18	-2.06					
	13:45:00	2:45:00	165	25+9.03		27.12	-2.00					
	13:55:00	2:55:00	175	25+8.98		27.07	-1.95					
	14:05:00	3:05:00	185	25+8.93		27.02	-1.90					
	14:20:00	3:20:00	200	25+8.83		26.92	-1.80					
	14:35:00	3:35:00	215	25+8.73		26.82	-1.70					
	14:50:00	3:50:00	230	25+8.64		26.76	-1.64					
	15:05:00	4:05:00	245	25+8.55		26.70	-1.62					
	15:20:00	4:20:00	260	25+8.46		26.64	-1.57					
	15:35:00	4:35:00	275	25+8.37		26.63	-1.51					
	15:50:00	4:50:00	290	25+8.30		26.59	-1.47					
	16:05:00	5:05:00	305	25+8.27		26.56	-1.44					
	16:20:00	5:20:00	320	25+8.23		26.52	-1.40					
	16:35:00	5:35:00	335	25+8.20		26.49	-1.37					
	16:50:00	5:50:00	365	25+8.14		26.43	-1.31					
	17:05:00	6:05:00	395	25+8.10		26.39	1.27					
	17:20:00	6:20:00	425									

AQUIFER TEST DATA

WELL 62-86
 PUMPING or OBSERVATION WELL
 PUMPING or RECOVERY DATA
 PAGE 1 OF 2

TYPE OF AQUIFER TEST BACK DOWN RECOVERY TEST
 HOW Q MEASURED 4 GAL BUCKET
 HOW W.L.'s MEASURED OLYMIC
 RAD./DIST. OF/FROM PUMPING WELL 1'
 MEAS. POINT FOR W.L.'s N/A
 ELEVATION OF MEAS. POINT _____

DEPTH OF PUMP/AIRPIPE _____
 PUMP ON: date 10-15-86 time 11:10:00
 PUMP OFF: date 10-15-86 time _____
 DURATION OF AQUIFER TEST _____

DAY		TIME		WATER LEVEL DATA					DISCHARGE		RECORDED BY	COMMENTS
		t =	of t' = 0	STATIC WATER LEVEL <u>25+2.03</u>		WATER LEVEL	s or s'	READING	Q			
CLOCK TIME	t	t'	READING	CONVERSION CORRECTIONS								
				25+2.03	-1.91	25.12'					MB	T.D. -36.76
	11:00:00			35+1.33	-1.91	34.42		-9.30			MB	
	11:00:30	00:30	.5	35+1.12	"	34.21		-9.09			MB	90% RECOVERY =
	11:01:00	00:00	1	35+0.93	"	34.02		-8.90			"	27.96'
	11:01:30	01:30	1.5	35+0.76	"	33.85		-8.73			"	(NOT REC.)
	11:02:00	02:00	2	35+0.61	"	33.70		-8.58			"	
	11:02:30	02:30	2.5	35+.47	"	33.56		-8.44			"	
	11:03:00	03:00	3	35+0.36	"	33.45		-8.33			"	
	11:03:30	03:30	3.5	35+0.27	"	33.36		-8.24			"	
	11:04:00	04:00	4	35+.15	"	33.24		-8.12			"	
	11:04:30	04:30	4.5	35+0.06	"	33.15		-8.03			"	
	11:05:00	05:00	5	30+4.92	"	33.01		-7.89			"	
	11:06:00	06:00	6	30+4.73	"	32.82		-7.70			"	
	11:07:00	07:00	7	30+4.57	"	32.66		-7.54			"	
	11:08:00	08:00	8	30+4.39	"	32.47		-7.35			"	
	11:09:00	09:00	9	30+4.19	"	32.28		-7.16			"	
	11:10:00	10:00	10	30+4.00	"	32.09		-6.97			"	
	11:11:00	11:00	11	30+3.82	"	31.81		-6.79			"	
	11:12:00	12:00	12	30+3.67	"	31.76		-6.64			"	
	11:13:00	13:00	13	30+3.50	"	31.50		-6.47			"	
	11:14:00	14:00	14	30+3.34	"	31.34		-6.31			"	
	11:15:00	15:00	15	30+3.19	"	31.19		-6.16			"	
	11:16:00	16:00	16	30+3.03	"	31.03		-5.99			"	
	11:17:00	17:00	17	30+2.89	"	30.89		-5.82			"	
	11:18:00	18:00	18	30+2.75	"	30.74		-5.66			"	
	11:19:00	19:00	19	30+2.65	"	30.64		-5.52			"	
	11:20:00	20:00	20	30+2.53	"	30.52		-5.40			"	
	11:21:00	21:00	21	30+2.43	"	30.43		-5.29			"	
	11:22:00	22:00	22	30+2.32	"	30.31		-5.19			"	
	11:23:00	23:00	23	30+2.22	"	30.24		-5.09			"	
	11:24:00	24:00	24	30+2.15	"	30.14		-5.02			"	
	11:25:00	25:00	25	30+2.05	"	30.04		-4.92			"	
	11:26:00	26:00	26	30+1.98	"	29.97		-4.85			"	
	11:27:00	27:00	27	30+1.91	"	29.91		-4.78			"	
	11:28:00	28:00	28	30+1.85	"	29.85		-4.72			"	
	11:29:00	29:00	29	30+1.80	"	29.80		-4.65			"	
	11:30:00	30:00	30	30+1.75	"	29.74		-4.59			"	
	11:31:00	31:00	31	30+1.71	"	29.69		-4.54			"	
	11:32:00	32:00	32	30+1.67	"	29.64		-4.49			"	
	11:33:00	33:00	33	30+1.64	"	29.60		-4.45			"	
	11:34:00	34:00	34	30+1.61	"	29.56		-4.41			"	
	11:35:00	35:00	35	30+1.57	"	29.52		-4.37			"	
	11:36:00	36:00	36	30+1.54	"	29.48		-4.33			"	
	11:37:00	37:00	37	30+1.51	"	29.44		-4.29			"	
	11:38:00	38:00	38	30+1.48	"	29.40		-4.25			"	
	11:39:00	39:00	39	30+1.45	"	29.36		-4.21			"	
	11:40:00	40:00	40	30+1.42	"	29.32		-4.17			"	
	11:41:00	41:00	41	30+1.39	"	29.28		-4.13			"	
	11:42:00	42:00	42	30+1.36	"	29.24		-4.09			"	
	11:43:00	43:00	43	30+1.33	"	29.20		-4.05			"	
	11:44:00	44:00	44	30+1.30	"	29.16		-4.01			"	
	11:45:00	45:00	45	30+1.27	"	29.12		-3.97			"	
	11:46:00	46:00	46	30+1.24	"	29.08		-3.93			"	
	11:47:00	47:00	47	30+1.21	"	29.04		-3.89			"	
	11:48:00	48:00	48	30+1.18	"	29.00		-3.85			"	
	11:49:00	49:00	49	30+1.15	"	28.96		-3.81			"	
	11:50:00	50:00	50	30+1.12	"	28.92		-3.77			"	
	11:51:00	51:00	51	30+1.09	"	28.88		-3.73			"	
	11:52:00	52:00	52	30+1.06	"	28.84		-3.69			"	
	11:53:00	53:00	53	30+1.03	"	28.80		-3.65			"	
	11:54:00	54:00	54	30+1.00	"	28.76		-3.61			"	
	11:55:00	55:00	55	30+0.97	"	28.72		-3.57			"	
	11:56:00	56:00	56	30+0.94	"	28.68		-3.53			"	
	11:57:00	57:00	57	30+0.91	"	28.64		-3.49			"	
	11:58:00	58:00	58	30+0.88	"	28.60		-3.45			"	
	11:59:00	59:00	59	30+0.85	"	28.56		-3.41			"	
	12:00:00	12:00:00	60	30+0.82	"	28.52		-3.37			"	
	12:01:00	1:10:00	70	30+0.91	"	28.60		-3.20			"	
	12:02:00	1:15:00	75	30+0.97	"	28.66		-3.14			"	
	12:03:00	1:20:00	80	30+1.08	"	28.77		-3.05			"	
	12:04:00	1:25:00	85	30+1.00	"	28.69		-2.97			"	

LOCATION PERSONNEL

PROJECT

WATER LEVEL DATA
62-86

<u>Elevation of Top of Inner Casing (feet)</u>	<u>Date</u>	<u>Time</u>	<u>Depth Water to Water (feet)</u>	<u>Water Elevation (feet)</u>	<u>Comments</u>
5,898.75	10/06/86	1610	27.90	5,870.85	Airlifted, TD = 36.80
	10/07/86	1530	27.91	5,870.84	Purged 1.75 gals.
	10/08/86	1425	27.98	5,870.77	Purged 2 gals.
	10/10/86	835	28.00	5,870.75	Purged 2 gals.
	10/13/86	1315	27.83	5,870.92	
	10/14/86	1045	27.89	5,870.86	Purged 2 gals.
	10/15/86	1040	28.03	5,870.72	Purged 2 gals.
	10/16/86	940	27.99	5,870.76	Sampled
	01/--/87	-	27.96	5,870.79	
	05/07/87	1055	27.83	5,870.92	
	06/24/87	-	27.16	5,871.59	

INDEX OF DATA

Boring No.: 63-86

Completed as well? Yes

Data in File

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

Project: Rocky Flats Plant

LOG OF BORING NO.

63-86

Date Drilled 9/26/86

Coordinates

Boring Method Hollow Stem Auger

Ground Surface Elevation 5916

Elev. (feet)	Depth (feet)	Sample Type	Graphic Log	Material Description	Penetration Resistance (Blows/Inch)		Water Content (%)		Other Tests
					20	40	20	40	
	0			COLLUVIUM					
				0-0.5'-Sample. Recovered 0.5/0.5'=100%. CLAY: dusky yellowish brown (10YR 2/2); silty; some small granitic cobbles; poorly sorted; unconsolidated; damp.					
				0.5-3.8'-Sample. Recovered 0.4/3.3'=12%. CLAY: dark yellowish orange (10YR 6/6); silty; trace granitic pebbles; poorly sorted; unconsolidated; damp.					
				3.8-5.8'-Sample. Recovered 1.0/2.0'=50%. CLAY: Same as above; damp.					
				5.8-7.3'-Sample. Recovered 1.5/1.5'=100%. CLAY: Same as above; moist.					
				7.3-9.8'-Sample. Recovered 1.2/2.5'=48%. CLAY: Same as above; moist.					
				9.8-12.3'-Sample. Recovered 2.0/2.5'=80%. CLAY: Same as above; moist.					
				12.3-14.2'-Sample. Recovered 1.5/2.0'=80%. CLAY: Same as above; moist.					
				14.8-17.3'-Sample. Recovered 2.5/2.5'=100%.					
	15			14.4-14.8'. GRAVEL: moderate yellowish brown (10YR 5/4) and grayish orange (10YR 7/4); granitic pebbles and cobbles; sandy; poorly sorted; unconsolidated; moist to wet.					
				ARAPAHOE FORMATION					
				14.8-17.3'. CLAYSTONE: light olive gray (5Y 6/1); mottled iron staining; unconsolidated; moist.					
	20			TOTAL DEPTH: 17.3'					

Remarks Logged by: L. Pivonka

Checked by: *[Signature]*

Project No.
106P06222

Hydro-Search, Inc.

Page 1 of 1

WATER LEVEL DATA
63-86

<u>Elevation of Top of Inner Casing (feet)</u>	<u>Date</u>	<u>Time</u>	<u>Depth Water to Water Elevation (feet)</u>	<u>Elevation (feet)</u>	<u>Comments</u>
5,897.48	10/06/86	1610	-		Dry to 17.10
	10/13/86	1310	-		Dry
	01/--/87	-	-		Dry
	05/07/87	1059	-		Dry
	06/24/87	-	-		Dry

INDEX OF DATA

Boring No.: 64-86

Completed as well? Yes

Data in File

<u> X </u>	Log of Borehole
<u> X </u>	Well Construction Summaries
<u> X </u>	Well Development Summaries
<u> </u>	Hydraulic Conductivity Test Data and Results
<u> </u>	Packer Test Data and Results
<u> X </u>	Water Level Data

Project: Rocky Flats Plant

LOG OF BORING NO.

64-86

Date Drilled 9/10/86

Coordinates

Boring Method Hollow Stem Auger

Ground Surface Elevation 5836

Elev. (feet)	Depth (feet)	Sample Type	Graphic Log	Material Description	Penetration Resistance (Blows/Inch)		Water Content (%)		Other Tests
					20	40	20	40	
	0			<p>VALLEY FILL ALLUVIUM</p> <p>0-2.0'-Sample. Recovered 2.0/2.0'=100%. GRAVEL: grayish brown (5YR 3/2); granite and quartzite pebbles and cobbles; some silty and sand; poorly sorted; angular to subrounded; unconsolidated; dry.</p> <p>3.0'-Cuttings. GRAVEL: Same as above; dry.</p> <p>3.3-4.0'-Sample. Recovered 0.7/1.7'=41%. GRAVEL: Same as above; dry.</p> <p>4.0-6.0'-Sample. Recovered 2.0/2.0'=100%. GRAVEL: pale brown (5YR 5/2); granite and quartzite pebbles and cobbles; some silt and sand; grades downward into yellowish gray (5Y 7/2) silty sand; angular; unconsolidated; dry.</p> <p>6.0-8.0'-Sample. Recovered 0.6/2.0'=30%. GRAVEL: moderate yellowish brown (10YR 5/4); granite and quartzite pebbles and cobbles; sandy to clayey; poorly sorted; unconsolidated; angular; dry.</p>					
	2								
	4								
	6								
	8								

Remarks Logged by: J. Bergman

Checked by: *[Signature]*

Project No.
106P06222

Hydro-Search, Inc.

Page 1 of 2

Project: Rocky Flats Plant

LOG OF BORING NO. 64-86

Date Drilled 9/10/86

Coordinates

Boring Method Hollow Stem Auger

Ground Surface Elevation 5836

Elev. (feet)	Depth (feet)	Sample Type	Graphic Log	Material Description	Penetration Resistance (Blows/Inch)		Water Content (%)		Other Tests
					20	40	20	40	
	8			<p>8.0-10.0'-Sample. Recovered 2.0/2.0'=100%.</p> <p>8.0-8.8'. CLAY: greenish gray (5GY 6/1) and moderate yellowish brown (10YR 5/4); trace granitic pebbles; poorly sorted; unconsolidated; dry.</p> <p>ARAPAHOE FORMATION</p> <p>8.8-10.0'. CLAYSTONE: greenish gray (5GY 6/1) and moderate yellowish brown (10YR 5/4); homogenous; some black organic fragments; consolidated; dry.</p> <p>10.0-12.0'-Sample. Recovered 2.0/2.0'=100%. CLAYSTONE: moderate yellowish brown (10YR 5/4) with some greenish gray (5GY 6/1) clay; homogenous; consolidated; dry.</p> <p>12.0-14.0'-Sample. Recovered 2.0/2.0'=100%. CLAYSTONE: moderate yellowish brown (10YR 5/4) with some greenish gray (5GY 6/1) clay; homogenous; consolidated; dry.</p>					
	10								
	12								
	14								
	16			TOTAL DEPTH: 14.0'					

Remarks Logged by: J. Bergman

Checked by: *[Signature]*

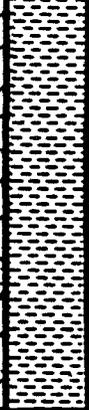
Project No. 106P06722

Hydro-Search, Inc.

Page 2 of 2

WATER LEVEL DATA
64-86

<u>Elevation of Top of Inner Casing (feet)</u>	<u>Date</u>	<u>Time</u>	<u>Depth Water to Water (feet)</u>	<u>Elevation (feet)</u>	<u>Comments</u>
5,836.46	09/13/86	1215	-		Dry to 12.50
	10/13/86	1230	11.27	5,825.19	
	01/--/87	-	7.27	5,829.19	
	05/08/87	945	7.02	5,829.44	
	06/24/87	-	9.50	5,826.96	

Project: Rocky Flats Plant				LOG OF BORING NO. 68-86			
Date Drilled 9/10/86			Coordinates				
Boring Method Hollow Stem Auger			Ground Surface Elevation 5890				
Elev. (feet)	Depth (feet)	Sample Type	Graphic Log	Material Description	Penetration Resistance (Blows/Inch) 20 40	Water Content (%) 20 40	Other Tests
	0			<p style="text-align: center;">VALLEY FILL ALLUVIUM</p> <p>0-0.9'-Sample. Recovered 0.7/0.9'=78%. GRAVEL: dusky yellowish brown (10YR 2/2); granitic pebbles and cobbles; some sand and silt; poorly sorted; unconsolidated; moist.</p> <p>0.9-2.0'-Sample. Recovered 0.0/1.1'=0%. Cuttings. COBBLES: quartzite, wet.</p> <p>2.0-2.8'-Sample. Recovered 0.8/0.8'=100%. GRAVEL: dark yellowish brown (10YR 4/2); granite and quartzite pebbles and cobbles with sand and silt; poorly sorted; unconsolidated; wet.</p>		▽ ▽	
	5			<p style="text-align: center;">ARAPAHOE FORMATION</p> <p>2.8-7.0'-Sample. Recovered 1.7/3.9'=44%. CLAYSTONE: pale yellowish brown (10YR 6/2); silty; some iron staining; weathered; moist.</p> <p>7.0-9.0'-Sample. Recovered 2.0/2.0'=100%. CLAYSTONE: Same as above; moist.</p>			
	10			TOTAL DEPTH: 9.0'			
	15						
	20						
Remarks Logged by: L. Pivonka				Checked by: 			
Project No. 106P06222				Hydro-Search, Inc.			Page 1 of 1

AQUIFER TEST DATA WELL 68-86

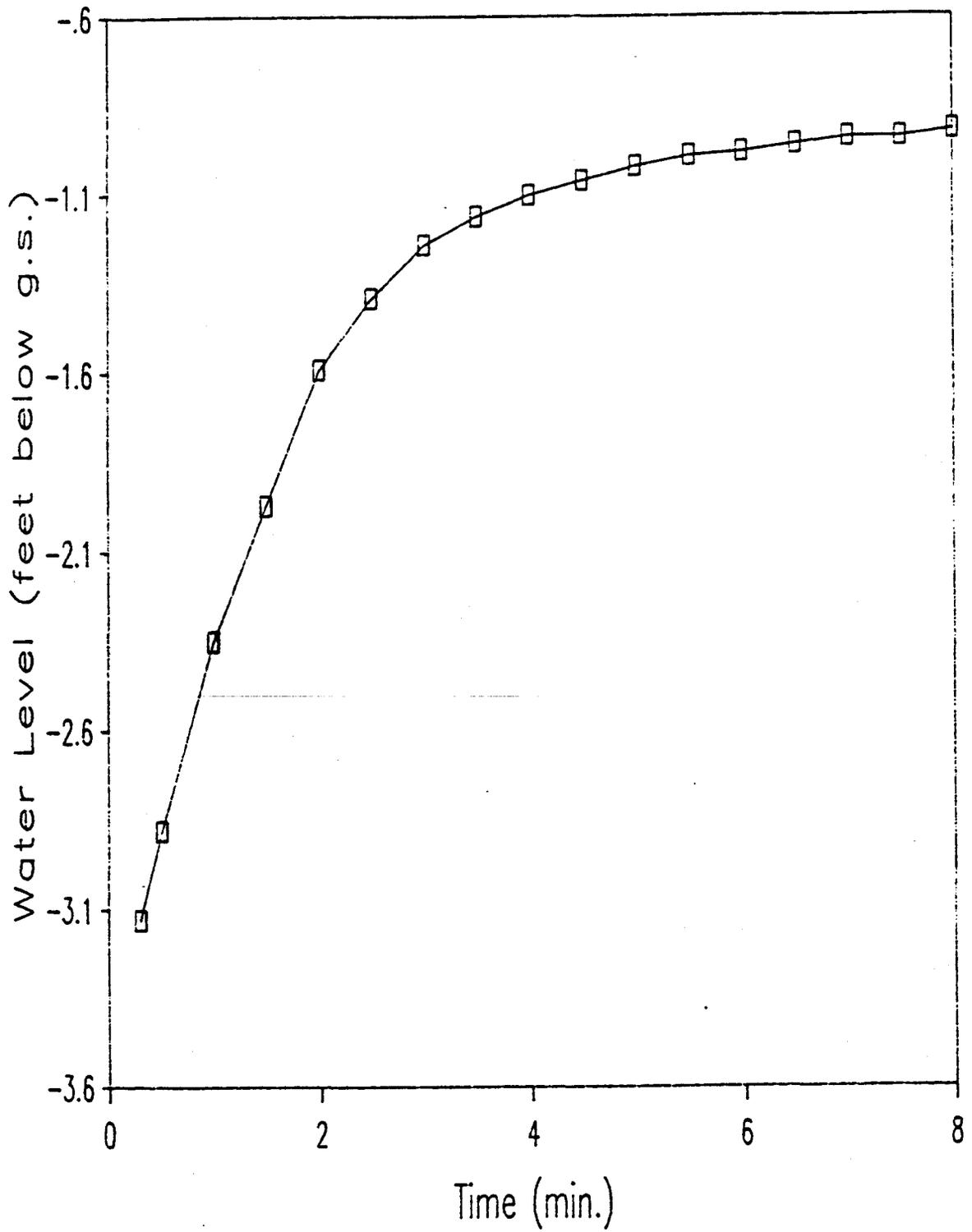
Type of Aquifer Test: Bail down - Recovery Project No.: 106P06222
 How Q Measured: 4.5 gallon bucket Location: Rocky Flats Plant
 How W.L.'s Measured: Olypic Well Sounder Personnel: W. Herst, D. Pavlick
 Measuring Point for W.L.'s: Top of Casing
 Elevation of Measuring Point: 5895.74

Depth of pump/airlines: N/A
 Start bailing: 9/29/86 Time: 1230:00
 Stop bailing: 9/29/86 Time: 1240:00
 Duration of Aquifer Test: 10.0 minutes

TIME		WATER LEVEL DATA		COMMENTS
t = 2	at t' = 0	Static Water Level: .92		
t	t'	Water Level	Draw-down	
0		.92		Begin bailing
2.0	0			Stop bailing
2.3	.3	3.13	2.21	
2.5	.5	2.88	1.96	
3.0	1.0	2.35	1.43	Total depth = 3.6'
3.5	1.5	1.97	1.05	
4.0	2.0	1.59	.67	
4.5	2.5	1.39	.47	
5.0	3.0	1.24	.32	
5.5	3.5	1.16	.24	
6.0	4.0	1.10	.18	
6.5	4.5	1.06	.14	
7.0	5.0	1.02	.10	
7.5	5.5	.99	.07	
8.0	6.0	.98	.06	
8.5	6.5	.96	.04	
9.0	7.0	.94	.02	
9.5	7.5	.94	.02	
10.0	8.0	.92	.00	100% recovered

AQUIFER TEST DATA

WELL 68-86



WATER LEVEL DATA
68-86

<u>Elevation of Top of Inner Casing (feet)</u>	<u>Date</u>	<u>Time</u>	<u>Depth Water to Water (feet)</u>	<u>Water Elevation (feet)</u>	<u>Comments</u>
5,883.77	09/13/86	1300	4.54	5,879.23	Purged
	09/17/86	1300	3.87	5,879.90	Purged 2 gals.
	09/19/86	1515	3.89	5,879.88	Purged 6.25 gals.
	09/22/86	1560	3.81	5,879.96	Sampled
	10/13/86	1220	3.38	5,880.39	
	01/--/87	-	3.08	5,880.69	Water frozen
	05/08/87	1000	3.40	5,880.37	
	06/24/87	-	4.20	5,879.57	

INDEX OF DATA

Boring No.: 69-86

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

Project: Rocky Flats Plant

LOG OF BORING NO. 69-86

Date Drilled 9/24/86

Coordinates

Boring Method Hollow Stem Auger

Ground Surface Elevation 5925

Elev. (feet)	Depth (feet)	Sample Type	Graphic Log	Material Description	Penetration Resistance (Blows/Inch)		Water Content (%)		Other Tests
					20	40	20	40	
	0			<p align="center">COLLUVIUM</p> <p>0-0.5'-Sample. Recovered 0.5/0.5'=100%. CLAY: dark yellowish brown (10YR 4/2) and moderate yellowish brown (10YR 5/4); micaceous; silty; trace granitic pebbles; poorly sorted; unconsolidated; damp.</p> <p>0.5-4.9'-Sample. Recovered 4.4/4.4'=100%. CLAY: Same as above; damp to moist.</p> <p>4.9-7.0'-Sample. Recovered 2.1/2.1'=100%. CLAY: Same as above; moist.</p> <p>7.0-8.0'-Sample. Recovered 1.0/1.0'=100%. CLAY: Same as above; moist.</p> <p>8.0-10.0'-Sample. Recovered 2.0/2.0'=100%. CLAY: Same as above with some granitic cobbles; moist.</p> <p>10.0-11.0'-Sample. Recovered 0.0/1.0'=0%.</p> <p>11.0-12.5'-Split Spoon. Recovered 1.0/1.5'=67%. GRAVEL: light brown (5YR 5/6) and dark yellowish orange (10YR 6/6); granitic pebbles and cobbles; clayey; poorly sorted; unconsolidated; wet.</p> <p>12.5-13.3'-Split Spoon. Recovered 0.8/0.8'=100%. GRAVEL: Same as above; wet.</p> <p align="center">ARAPAHOE FORMATION</p> <p>13.3-17.5'-Sample. Recovered 4.2/4.2'=100%. CLAYSTONE: light olive gray (5Y 6/1) and dark yellowish orange; consolidated; moist.</p> <p>TOTAL DEPTH: 17.5'</p>					

Remarks

Logged by: L. Pivonka

Checked by: *[Signature]*

Project No.
106P06222

Hydro-Search, Inc.

Page 1 of 1

AQUIFER TEST DATA WELL 69-86

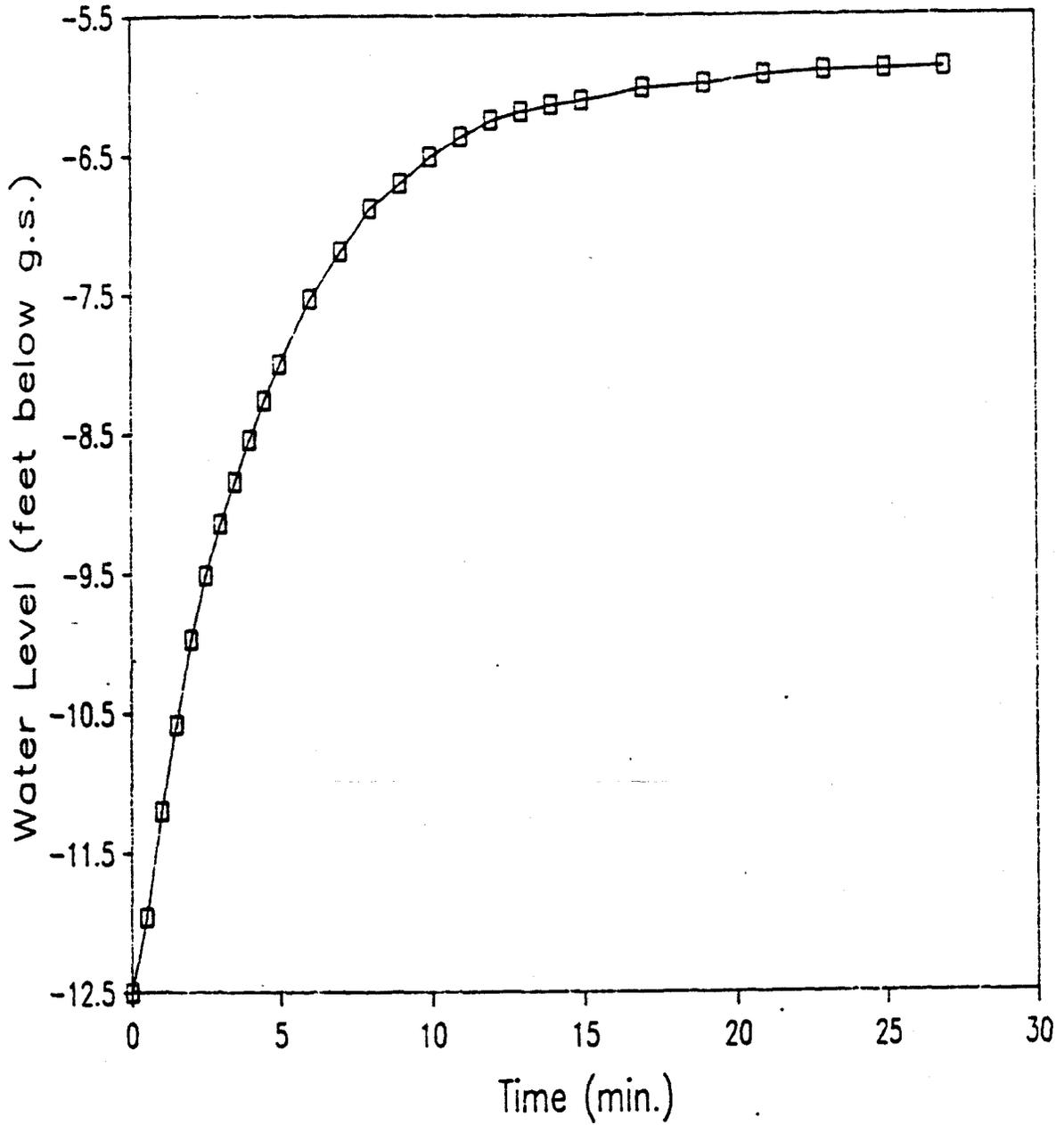
Type of Aquifer Test: Bail down - Recovery Project No.: 106P06222
 How Q Measured: 4.5 gallon bucket Location: Rocky Flats Plant
 How W.L.'s Measured: Olympic Well Sounder Personnel: J. Pearce, M. Bergaan
 Measuring Point for W.L.'s: Top of Casing
 Elevation of Measuring Point:

Depth of pump/airline:
 Start bailing: Time: 1130:00
 Stop bailing: Time: 1145:00
 Duration of Aquifer Test: 42 minutes

TIME		WATER LEVEL DATA		COMMENTS
t = 15 min	at t' = 0	Static Water Level: 5.70'		
t	t'	Water Level	Draw-down	
0	0			Begin bailing
15.0	0	12.50	6.80	Stop bailing
15.5	.5	11.96	6.26	
16.0	1.0	11.20	5.50	
16.5	1.5	10.58	4.88	
17.0	2.0	9.97	4.27	
17.5	2.5	9.51	3.81	
18.0	3.0	9.14	3.44	
18.5	3.5	8.84	3.14	
19.0	4.0	8.54	2.84	
19.5	4.5	8.26	2.56	
20.0	5.0	8.00	2.30	
21.0	6.0	7.53	1.83	
22.0	7.0	7.19	1.49	
23.0	8.0	6.88	1.18	
24.0	9.0	6.70	1.00	
25.0	10.0	6.51	.81	
26.0	11.0	6.37	.67	90% Recovered at
27.0	12.0	6.25	.55	6.38'
28.0	13.0	6.19	.49	
29.0	14.0	6.14	.44	
30.0	15.0	6.11	.41	
32.0	17.0	6.02	.32	
34.0	19.0	5.99	.29	
36.0	21.0	5.93	.23	
38.0	23.0	5.90	.20	
40.0	25.0	5.89	.19	
42.0	27.0	5.88	.18	

AQUIFER TEST DATA

WELL 69-86



WATER LEVEL DATA
69-86

<u>Elevation of Top of Inner Casing (feet)</u>	<u>Date</u>	<u>Time</u>	<u>Depth Water to Water (feet)</u>	<u>Water Elevation (feet)</u>	<u>Comments</u>
(no data)	09/30/86	1555	7.31		Airlifted, TD = 15.60
	10/02/86	1315	7.39		Purged
	10/03/86	1330	7.37		Purged
	10/06/86	830	7.44		Bail-down test
	10/08/86	845	7.45		Sampled
	10/13/86	1255	6.83		
	01/--/87	-	5.00		
	05/07/87	1103	1.44		Labeled 59-86 in notes
	06/24/87	-	2.70		

INDEX OF DATA

Boring No.: 1-87

Completed as well? Yes

Data in File

<u> X </u>	Log of Borehole
<u> X </u>	Well Construction Summaries
<u> X </u>	Well Development Summaries
<u> </u>	Hydraulic Conductivity Test Data and Results
<u> </u>	Packer Test Data and Results
<u> x </u>	Water Level Data

LOG OF BOREHOLE

Location Rocky Flats Plant; 881 Hillside
 Coordinates N35145.6 E20540.6
 Total Depth 14.87'

Borehole/Well No. 1-87
 Ground Surface Elevation 5992.35'
 Water Level Encountered 11.75'
 Static 5981.29' (6/24/87)

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

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

Comments _____

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<u>VALLEY FILL ALLUVIUM</u>	
			0.0-4.0' - Sample. Recovered 1.65/4.0' = 41%. CLAY: dark yellowish brown (10YR 4/2); occasional quartzite cobbles and gravel; unconsolidated; damp to moist.	HNu Background = 0.3ppm. No OVA readings. No readings above background.
5			4.0-7.5' - Sample. Recovered 3.0/3.5' = 86%. CLAY: same as above; dark yellowish orange (10YR 6/6) stains common; damp to moist.	
10			7.5-12.5' - Sample. Recovered 1.15/5.0' = 23%. 6.85-7.35': CLAY: same as above 7.35-7.50': Lost core. 7.50-8.20': CLAY: same as above; trace sand (2.0-1.5φ); very pale orange (10YR 5/4); subrounded; moderate reddish brown (10R 4/6) stains; moist. 8.20-8.70': CLAY: moderate brown (5YR 4/6) to moderate yellowish brown (10YR 5/4); weathered; unconsolidated; moist.	
15			8.70': COBBLE; quartzite; dusky yellowish brown (10YR 2/2); clay matrix. 8.70'-11.75': Lost core. 11.75-11.87': CLAY: dusky yellowish brown (10YR 2/2); weathered; moist to wet.	
20				

LOG OF BOREHOLE

Location _____
 Coordinates _____
 Total Depth _____

Borehole/Well No. 1-87 (cont'd.)
 Ground Surface Elevation _____
 Water Level Encountered _____
 Static _____

Drilling Company _____
 Date Drilled _____
 Drilling Method _____
 Logged By _____
Geologist

Driller _____
 Helper _____
 Drilling Fluid _____
 Checked By [Signature]
Site Manager
[Signature]
CEARP Manager

Comments _____

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20			<u>ARAPAHOE FORMATION</u>	
			11.87': SANDSTONE: pale yellowish orange (10YR 8/6); weathered.	
			11.87-12.50': CLAYSTONE: light olive gray (5Y 5/2); weathered; trace of iron staining; moist to wet.	
25			12.0-15.0' - Sample. Recovered 3.25/2.0' = 108%. CLAYSTONE: light olive brown (5Y 5/6); trace caliche; trace dark yellowish orange iron staining (10YR 6/6); weathered; moist to wet.	
			TOTAL DEPTH: 14.87'	
30				
35				
40				

WELL COMPLETION INFORMATION

Location ROCKY FLATS PLANT 881 HILLSIDE
 Coordinates N35145.5971 E20540.5926
 Total Depth: Well 12.08'
 Borehole 14.87'

Well No. 1-87
 Elevation: Ground Surface 5992.35'
 Top of Casing 5994.23'

Formation of Completion ROCKY FLATS ALLUVIUM

Casing Material SCH. 5, TYPE 316, TEJ STAINLESS Casing Diameter 2" ID

Screen Material 0.010" WIRE WRAP, TYPE STEEL Surface Casing Diameter 5" ID

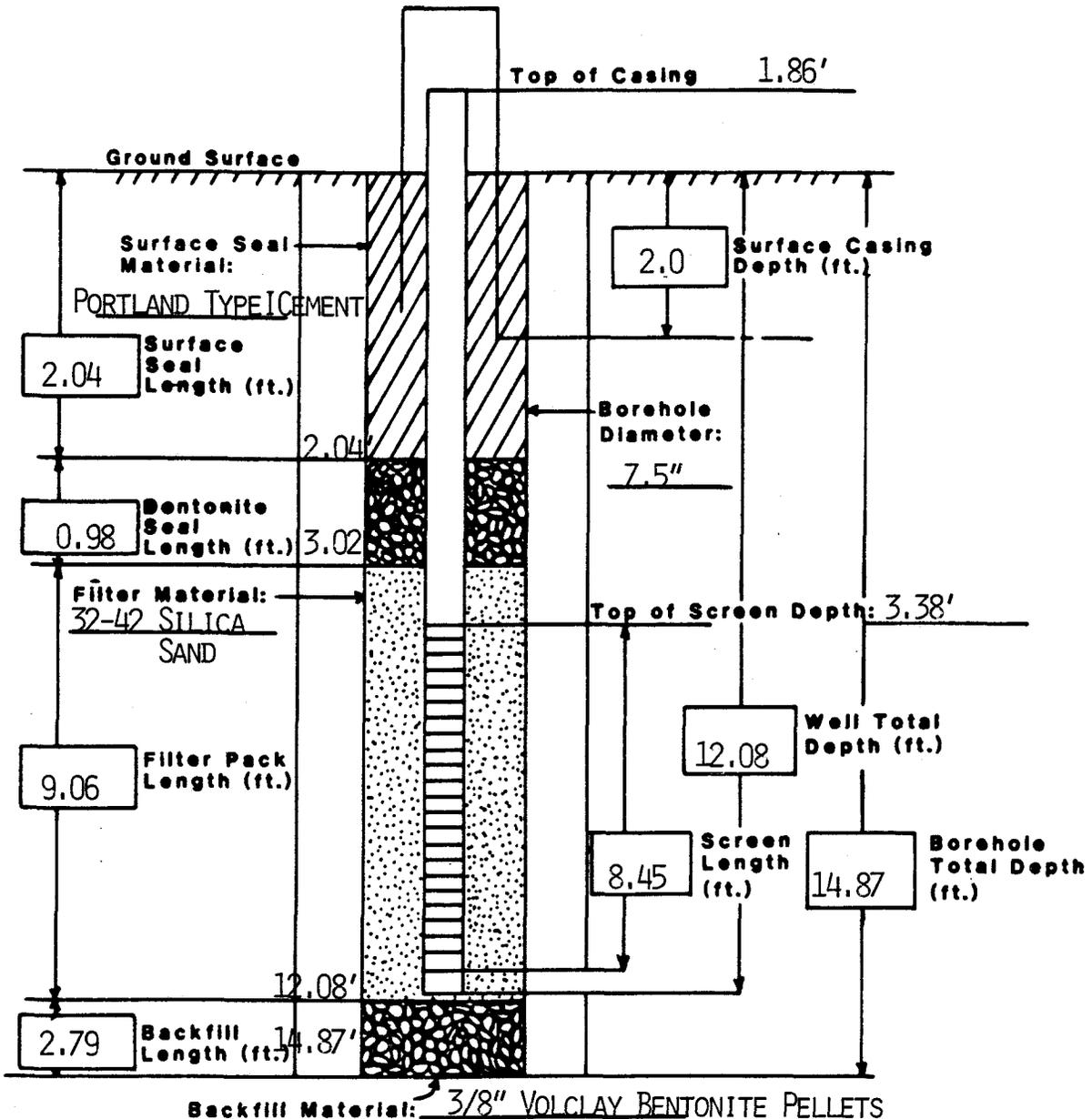
Date Installed MAY 8, 1987 316, STAINLESS Approved By [Signature]

Installed By K.D. HOLLWAY STEEL Site Manager

Geologist

CEARP Manager

Comments _____



WATER LEVEL DATA
1-87

<u>Elevation of Top of Inner Casing (feet)</u>	<u>Date</u>	<u>Time</u>	<u>Depth Water to Water (feet)</u>	<u>Water Elevation (feet)</u>	<u>Comments</u>
5,994.23	06/24/87	-	12.94	5,981.29	

INDEX OF DATA

Boring No.: 2-87/BH3-87

Completed as well? Yes

Data in File

<u>X</u>	Log of Borehole
<u>X</u>	Well Construction Summaries
<u>X</u>	Well Development Summaries
<u>X</u>	Hydraulic Conductivity Test Data and Results
<u> </u>	Packer Test Data and Results
<u>X</u>	Water Level Data

LOG OF BOREHOLE

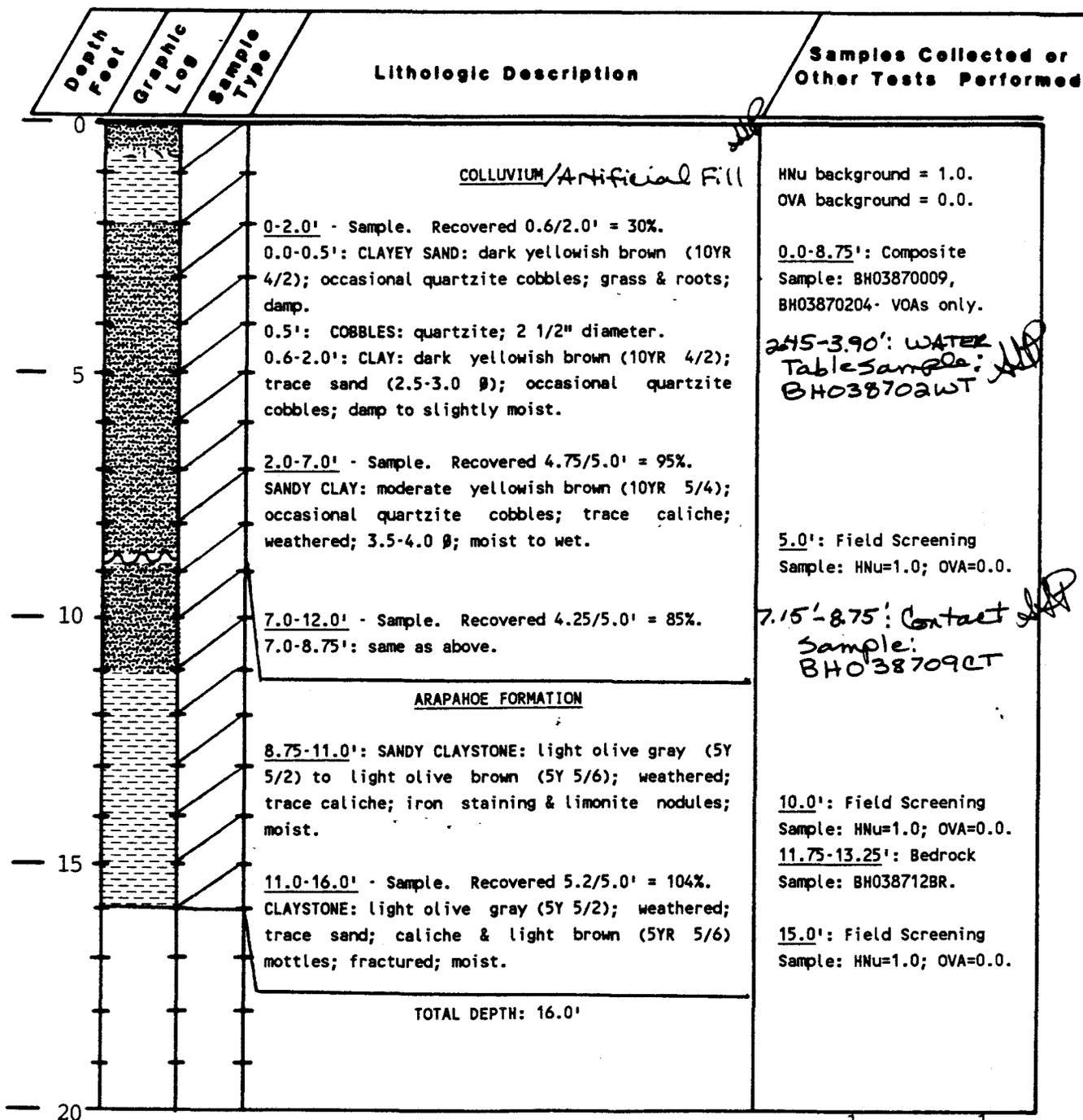
Location Rocky Flats Plant; 881 Hillside
 Coordinates N34725.8 E20819.7
 Total Depth 16.0'

Borehole/Well No. 2-87/BH3-87
 Ground Surface Elevation 5930.56
 Water Level Encountered 2.45'
 Static 5929.59' (6/24/87) *JSP*

Drilling Company Boyles Bros.
 Date Drilled May 19, 1987
 Drilling Method Hollow Stem Auger
 Logged By K. D. Holliday
 Geologist

Driller A. Shade
 Helper T. Merritt
 Drilling Fluid None
 Checked By J. Paschke
 Site Manager
T. Merritt
 CEARP Manager

Comments _____



WELL COMPLETION INFORMATION

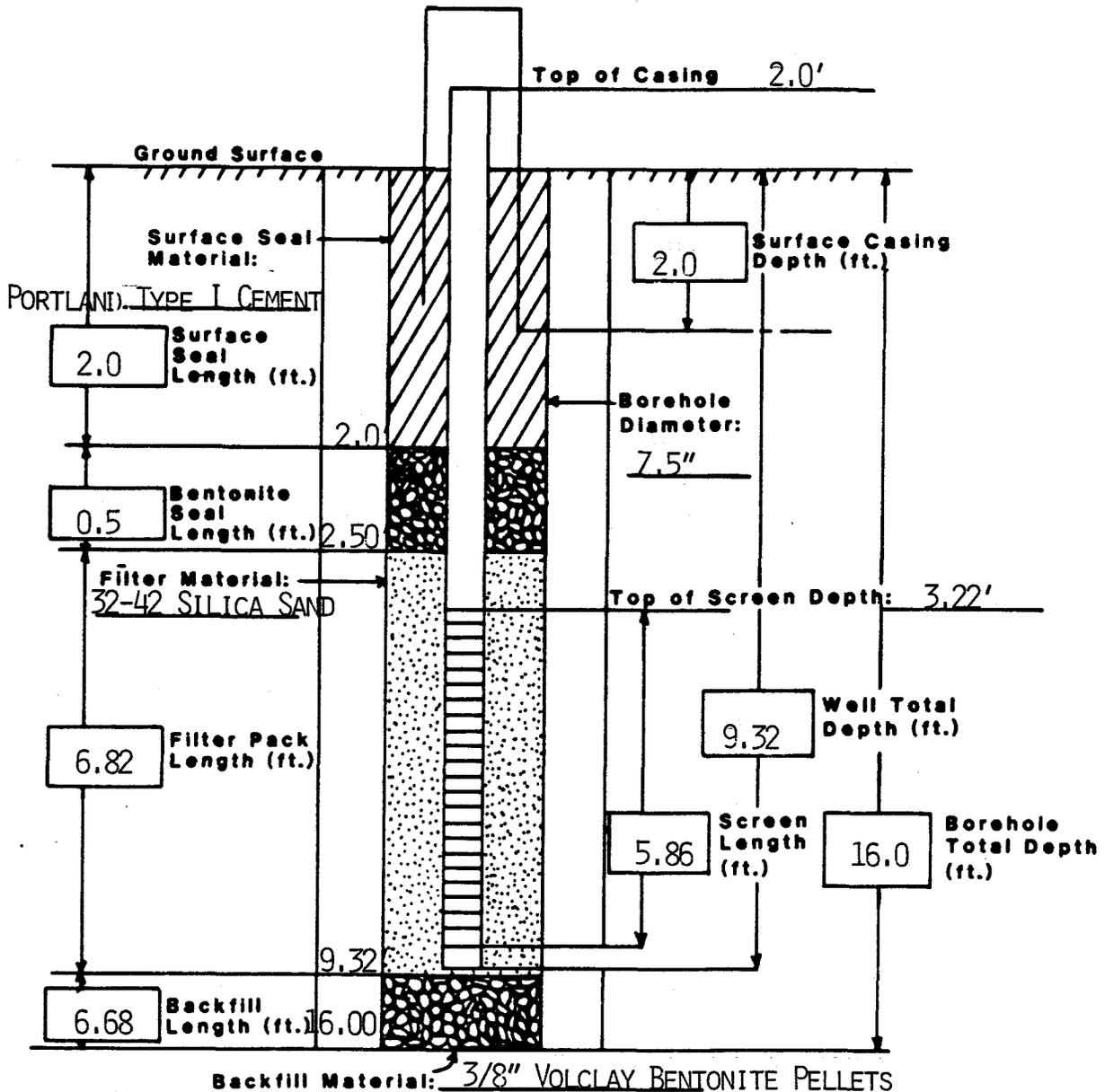
Location ROCKY FLATS PLANT 881 HILLSIDE
 Coordinates N34725.7568 E20819.7497
 Total Depth: Well 9.32'
 Borehole 16.0'

Well No. 2-87
 Elevation: Ground Surface 5930.56'
 Top of Casing 5932.63'

Formation of Completion COLLUVIUM

Casing Material SCH. 5, TYPE 316, TFI STAINLESS Casing Diameter 2" ID
 Screen Material 0.010" WIRE WRAP, TYPE STEEL Surface Casing Diameter 5" ID
 Date Installed MAY 20, 1987 316, STAINLESS Approved By [Signature]
 Installed By K.D. HOLLWAY Geologist STEEL Site Manager
 CEARP Manager

Comments _____

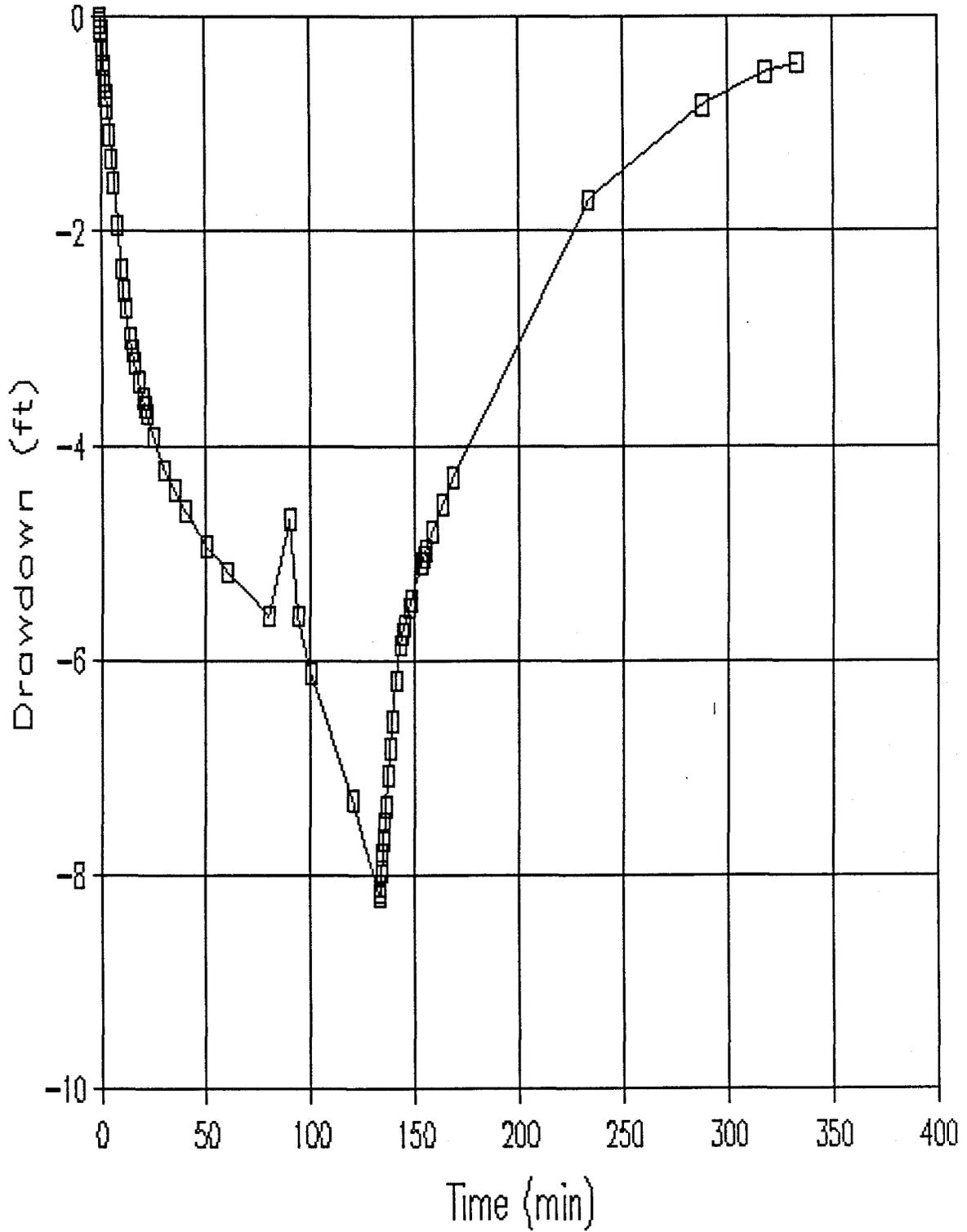


2-87 P-test
6-15-87

Time (min)	Recovery Time (min)	Depth to Water (feet)	Draw- down (feet)
0		3.41	.00
.25		3.46	.05
.5		3.54	.13
1		3.71	.30
1.5		3.86	.45
2		4.00	.59
2.5		4.14	.73
3		4.26	.85
4		4.51	1.10
5		4.73	1.32
6		4.95	1.54
8		5.35	1.94
10		5.76	2.35
11		5.96	2.55
12		6.13	2.72
14		6.41	3.00
15		6.53	3.12
16		6.64	3.23
18		6.81	3.40
20		6.97	3.56
21		7.05	3.64
22		7.12	3.71
25		7.33	3.92
30		7.64	4.23
35		7.83	4.42
40		8.02	4.61
50		8.35	4.94
60		8.59	5.18
80		9.00	5.59
90		8.10	4.69
94		9.00	5.59
100		9.53	6.12
120		10.71	7.30
133	0	11.61	8.20
133.25	.25	11.58	8.17
133.5	.5	11.51	8.10
134	1	11.37	7.96
134.5	1.5	11.22	7.81
135	2	11.08	7.67
135.5	2.5	10.92	7.51
136	3	10.77	7.36
137	4	10.49	7.08
138	5	10.23	6.82
139	6	9.98	6.57
141	8	9.60	6.19
143	10	9.27	5.86
145	12	9.09	5.68
147	14	8.92	5.51
148	15	8.85	5.44
153	20	8.50	5.09
155	22	8.39	4.98
158	25	8.21	4.80
163	30	7.96	4.55
168	35	7.71	4.30
233	100	5.12	1.71

2-87

6-15-87



WATER LEVEL DATA
2-87

<u>Elevation of Top of Inner Casing (feet)</u>	<u>Date</u>	<u>Time</u>	<u>Depth Water to Water (feet)</u>	<u>Water Elevation (feet)</u>	<u>Comments</u>
5,932.63	06/15/87	-	3.41	5,929.22	
	06/24/87	-	3.04	5,929.59	

INDEX OF DATA

Boring No.: 3-87BR

Completed as well? Yes

Data in File

<u>X</u>	Log of Borehole
<u>X</u>	Well Construction Summaries
<u>X</u>	Well Development Summaries
<u>X</u>	Hydraulic Conductivity Test Data and Results
<u>X</u>	Packer Test Data and Results
<u>X</u>	Water Level Data

LOG OF BOREHOLE

Location Rocky Flats Plant; 881 Hillside
 Coordinates N34723.3 E20847.6
 Total Depth 117.0'

Borehole/Well No. 3-87BR
 Ground Surface Elevation 5930.58'
 Water Level Encountered 6.5', 16.1', 19.8'
 Static 5851.09'

Drilling Company Bovles Bros.
 Date Drilled May 15, June 1, and June 2, 1987
 Drilling Method 0.0-50.6': Hollow Stem Auger
50.6-117.0': Rotary Core
 Logged By K. D. Holliday; J. B. Bergman
 Geologist

Driller A. Shade; P. Bushkovski
 Helper D. Jarvie; M. Depew
 Drilling Fluid 0.0-50.6': None; 50.6-117.0':
 Checked By [Signature] Water
 Site Manager
 CEARP Manager

Comments Surface casing set to 52.75' on May 15, 1987 by K. D. Holliday.

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<u>Colluvium/Artificial Fill</u> <u>VALLEY FILL ALLUVIUM</u> <i>ANP</i>	
0-2.0'			0.0-2.0' - Sample. Recovered 2.2/2.0' = 110%. CLAY: dark yellowish brown (10YR 4/2) to grayish brown (5YR 3/2); unconsolidated; trace quartzite cobbles; grasses and roots; damp to moist.	HNU background = 0.2. No OVA readings. No readings above background.
2.0-6.0'			2.0-6.0' - Sample. Recovered 4.15/4.0' = 104%. CLAY: same as above; no vegetation; trace caliche; trace sand; damp to moist.	
6.0-11.0'			6.0-11.0' - Sample. Recovered 4.95/5.0' = 99%. 6.15-9.45': CLAY: same as above; sandy (2.0-2.5 Ø); grayish orange (10YR 7/4). 9.45-11.0': CLAY: moderate yellowish brown (10YR 5/4); trace dark yellowish orange (10YR 6/6) stains; trace quartzite cobbles; (1/4' diameter); subrounded. Fe nodule at 10.6'; dusky brown (5YR 2/2).	
11.0-16.0'			11.0-16.0' - Sample. Recovered 5.1/5.0' = 102%. SANDY CLAY: moderate yellowish brown (10YR 5/4) with dark yellowish brown iron (10YR 6/6) stains; some quartzite pebbles throughout; damp.	
16.1-21.1'			16.1-21.1' - Sample. Recovered 5.1/5.0' = 102%. 16.1-20.0': CLAY: grayish orange (10YR 7/4); trace sand and occasional quartzite cobbles; trace caliche; moist & wet.	
15				
20				

LOG OF BOREHOLE

Location _____
 Coordinates _____
 Total Depth _____

Borehole/Well No. 3-87BR (cont'd.)
 Ground Surface Elevation _____
 Water Level Encountered _____
 Static _____

Drilling Company _____
 Date Drilled _____
 Drilling Method _____
 Logged By _____
Geologist

Driller _____
 Helper _____
 Drilling Fluid _____
 Checked By [Signature]
Site Manager
[Signature]
CEARP Manager

Comments _____

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20			<u>ARAPAHOE FORMATION</u>	
			20.0-21.2': CLAYSTONE: light olive gray (5Y 5/2); trace caliche; weathered; reworked bedrock; moist to wet.	
			21.1-26.1' - Sample. Recovered 1.9/4.9' = 39%.	
25			24.2-26.1': SANDY CLAY: dark yellowish brown (5Y 5/2) with light brown (5YR 5/6) stains; sand 3.5-30 Ø; weathered; dry.	
			26.1-31.1' - Sample. Recovered 5.0/5.0' = 100%	
			26.1-28.0': CLAYEY SAND; grayish brown (5YR 3/2) with light brown (5YR 5/6) stains; weathered; slightly damp.	
30			28.0-28.1': SAND: Grayish orange (10YR 7/4); trace iron stains; 3.5-3.0 Ø; weathered lens; slightly damp.	
			28.1-30.2': CLAYEY SAND: dark yellowish orange (10YR 6/6) to light olive gray (5Y 5/2); to light olive gray (5Y 5/2); very fine-grained sand; weathered; slightly damp. Clay lens at 29.1-29.3; olive gray (5Y 3/2) with 30% dark yellowish orange (10YR 6/6) stains; weathered.	
35			30.2-31.1': SAND: grayish orange (10YR 7/4); trace clay w/iron stains; 3.0-2.5Ø; consolidated; weathered; slightly damp.	
			31.1-35.1' - Sample. Recovered 3.61/4.0' = 90%.	
			CLAYSTONE: dark yellowish orange (10YR 6/6) with light brown (5YR 5/6) stains; limonite nodules - grayish brown (5YR 3/2); weathered; damp.	
40				

LOG OF BOREHOLE

Location _____
 Coordinates _____
 Total Depth _____

Borehole/Well No. 3-87BR (cont'd.)
 Ground Surface Elevation _____
 Water Level Encountered _____
 Static _____

Drilling Company _____
 Date Drilled _____
 Drilling Method _____
 Logged By _____
Geologist

Driller _____
 Helper _____
 Drilling Fluid _____
 Checked By [Signature]
Site Manager
[Signature]
CEARP Manager

Comments _____

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
40			<p><u>35.1-40.1</u> - Sample. Recovered 2.3/5.0' = 46%. 35.1-36.1: CLAYSTONE: olive gray (5Y 3/2); some light brown (5YR 5/6) stains; weathered; wet. 36.1-36.9: CLAYSTONE: light olive gray (5Y 5/2); weathered; dry. 36.9-38.4: CLAYEY SAND: light olive gray (5Y 5/2); some iron stains; weathered; dry.</p>	
45			<p><u>41.1-46.1</u> - Sample. Recovered 5.0/5.0' = 100%. 41.1-44.1': SANDY CLAY: olive gray (5Y 4/1) with 30% iron stains light brown (5YR 5/6) in fractures; grading to claystone; weathered; very fine-grained sand; dry to slightly damp. 44.1-46.1: CLAYSTONE/SILTSTONE: dusky yellowish brown (10YR 2/2) to olive gray (5Y 3/2); iron stains (20-30%); dry to slightly damp.</p>	
50			<p><u>46.1-51.1</u> - Sample. Recovered 5.3/5.0' = 106%. 46.1-47.0: CLAYSTONE/SILTSTONE: same as above. 46.2-46.35': SILTY CLAY LENS: moderate yellowish brown (10YR 5/4); iron staining. 47.0-51.1': CLAYSTONE: olive black (5Y 2/1) with trace iron stains.</p>	
55			<p><u>52.0-56.0</u>': Sample. Recovered 0.0/4.0' = 0%.</p>	
60			<p><u>56.0-57.0</u>' - Sample. Recovered 4.75/1.0' = 475%. RQD = 4.75/4.75 = 100%. CLAYSTONE: olive gray (5Y 3/2); unweathered; no stains; consolidated; homogenous; dry.</p>	

LOG OF BOREHOLE

Location _____
 Coordinates _____
 Total Depth _____

Borehole/Well No. 3-87BR (cont'd.)
 Ground Surface Elevation _____
 Water Level Encountered _____
 Static _____

Drilling Company _____
 Date Drilled _____
 Drilling Method _____
 Logged By _____
Geologist

Driller _____
 Helper _____
 Drilling Fluid _____
 Checked By J. Paschke
Site Manager
T. C. ...
CEARP Manager

Comments _____

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed	
60			<p><u>57.0-61.0'</u> - Sample. Recovered 4.0/4.0 = 100%. RQD=4.0/4.0 = 100%. CLAYSTONE: same as above; moist.</p>		
			<p><u>61.0-66.0'</u> - Sample. Recovered 2.2/5.0' = 44%. RQD=2.2/2.2' = 100%. CLAYSTONE: same as above.</p>	Packer Test Interval #5: 63.90'-72.55'	
65			<p><u>66.0-69.0'</u> - Sample. Recovered 3.0/3.0' = 100%. RQD=2.8/3.0 = 93%. 66.0-68.8 - CLAYSTONE: same as above. 68.8-69.0: SILTSTONE: grayish brown (5YR3/2); dense; angular cobbles and gravels; unsorted; wet to moist.</p>		
				<p><u>69.0-73.0'</u> - Sample. Recovered 4.0/4.0' = 100%. RQD=2.3/4.0 = 58%. 69.0-70.0': SILTSTONE: same as above with few calcareous pockets; damp . 70-73.0': CLAYSTONE: olive gray (5Y 3/2), some organics; unweathered; consolidated; moist.</p>	
70				<p><u>73.0-77.0'</u> - Sample. Recovered 4.0/4.0' = 100%. RQD=2.65/4.0 = 66%. 73.0-73.9': CLAYSTONE: same as above. 73.9-74.8': SILTSTONE: grayish brown (5YR 3/2); dense; angular; well sorted; moist. 74.8-77.0': CLAYSTONE: same as (73.0-73.9') claystone.</p>	Packer Test Interval #4: 74.55'-84.20'
75				<p><u>77.0-81.0'</u> - Sample. Recovered 4.7/4.0' = 118%. RQD=3.1/4.7 = 66%. CLAYSTONE: same as above.</p>	
80					

LOG OF BOREHOLE

Location _____
 Coordinates _____
 Total Depth _____

Borehole/Well No. 3-87BR (cont'd.)
 Ground Surface Elevation _____
 Water Level Encountered _____
 Static _____

Drilling Company _____
 Date Drilled _____
 Drilling Method _____
 Logged By _____
Geologist

Driller _____
 Helper _____
 Drilling Fluid _____
 Checked By [Signature]
Site Manager
CEARP Manager

Comments _____

Depth Foot	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed	
80			<p><u>81.0-85.0'</u> - Sample. Recovered 2.85/4.0' = 71%. RQD=2.85/2.85' = 100%. CLAYSTONE: same as above.</p>		
85			<p><u>85.0-89.0'</u> - Sample. Recovered 4.3/4.0' = 108%. RQD=4.3/4.3' = 100%. CLAYSTONE: same as above; lignite bed at 87.55-88.10'; black; horizontal breaks; moist.</p>		
			<p><u>89.0-93.0'</u> - Sample. Recovered 0.04/4.0' = 0%.</p>		
90			<p><u>93.0-94.0'</u> - Sample. Recovered 4.85/1.0' = 485%. RQD=3.9/4.85' = 80%. CLAYSTONE: olive gray (5Y 3/2); organics; unweathered; consolidated, wet.</p>	Packer Test Interval #3: 88.20'-97.85'	
			<p><u>94.0-97.0'</u> - Sample. Recovered 2.8/3.0' = 93%. RQD=2.8/2.8' = 100%. CLAYSTONE: same as above; moist.</p>		
95			<p><u>97.0-101.5'</u> - Sample. Recovered 2.1/4.5' = 47%. RQD=1.3/2.1' = 62%. CLAYSTONE: same as above.</p>	Packer Test Interval #2: 97.85'-107.50'	
			<p><u>101.5-105.0'</u> - Sample. Recovered 4.7/3.5' = 134%. RQD=4.0/4.7' = 85%.</p>		
			<p>101.5-103.1: CLAYSTONE: same as above. 103.1-105.0: SANDSTONE: pale olive (10Y 6/2); very fine-grained; well sorted rounded; salt & pepper look; silty; moist to wet.</p>		
100					

WELL COMPLETION INFORMATION

Location ROCKY FLATS PLANT; 881 HILLSIDE
 Coordinates N34723.3325 E20847.5829
 Total Depth: Well 108.00'
 Borehole 117.0'

Well No. 3-87 BR
 Elevation: Ground Surface 5930.58'
 Top of Casing 5932.44'

Formation of Completion ARAPAHOE FORMATION

Casing Material SCH. 5, TYPE 316, TEJ STAINLESS

Casing Diameter 2" ID

Screen Material 0.010" WIRE WRAP, TYPE 316 STEEL

Surface Casing Diameter 5" ID

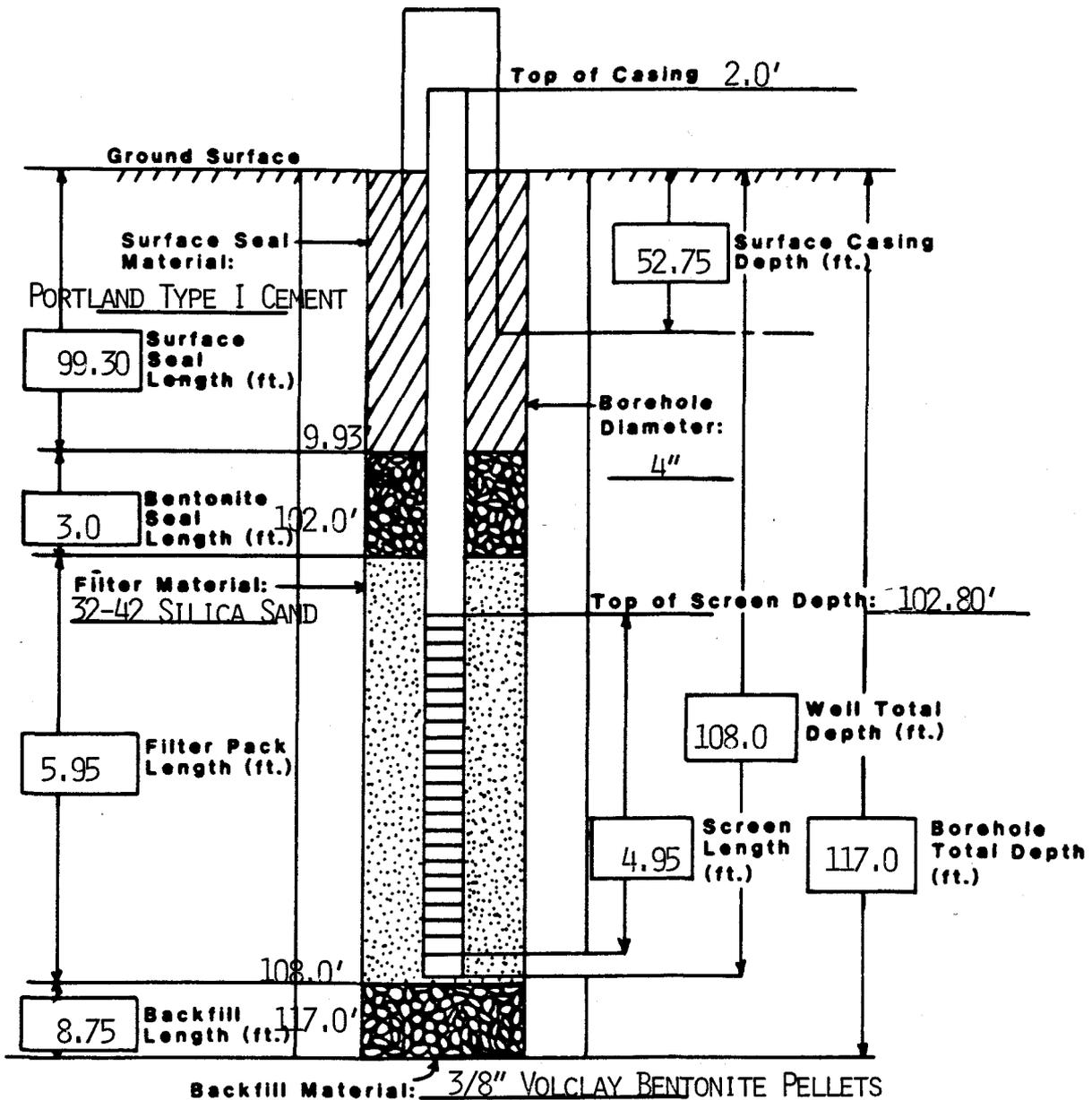
Date Installed JUNE 4, 1987 STAINLESS STEEL

Approved By [Signature]

Installed By J. BERGMAN
 Geologist

[Signature]
 Site Manager
[Signature]
 CEARP Manager

Comments _____

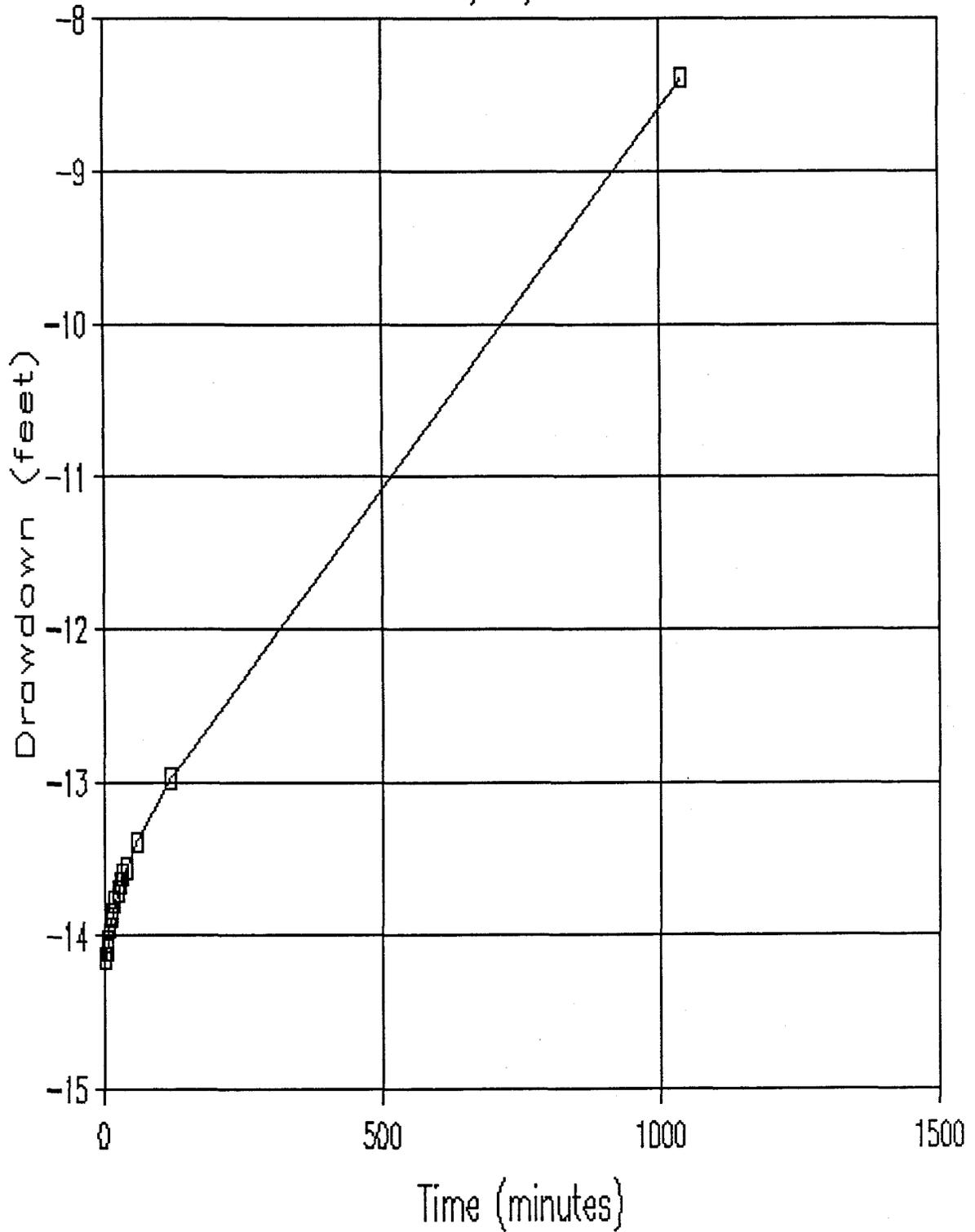


3-87BR
06/18/87
Q = 11 lit/21 min

Recovery Time (min)	Depth to Water (feet)	Draw- down (feet)
static	95.67	
5	109.82	14.15
6	109.76	14.09
8	109.71	14.04
10	109.62	13.95
13	109.55	13.88
15	109.53	13.86
20	109.45	13.78
25	109.38	13.71
30	109.33	13.66
35	109.28	13.61
40	109.23	13.56
60	109.06	13.39
120	108.64	12.97
1040	104.05	8.38

3-87BR

06/18/87



PACKER TEST ANALYSIS

WELL NO. 3-87BR

ROCKY FLATS PLANT: 881 HILLSIDE JOB NO. 2029-17-02

DATE TESTED: 6/4/87 BY: J.B. BERGMAN

TEST INTERVAL (FEET BELOW G.S.): 62.90 - 72.55

MATERIAL TESTED: ARAPAHOE CLAYSTONE

DEPTH TO WATER (FEET BELOW G.S.): 79.35

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

1ST P1/3 TEST

Q = INJECTION RATE = 0.00001448 (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)
 = 67.73 + 9.02 + 0.00 * 2.31 = 76.75
 R = BOREHOLE RADIUS = 0.31 FEET

K = HYDRAULIC CONDUCTIVITY = 0.00000001 FT/MIN
 K = 0.00000001 CM/SEC

P2/3 TEST

Q = INJECTION RATE = 0.00115844 (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)
 = 67.73 + 5.20 + 12.50 * 2.31 = 101.80
 R = BOREHOLE RADIUS = 0.31 FEET

K = HYDRAULIC CONDUCTIVITY = 0.00000064 FT/MIN
 K = 0.00000033 CM/SEC

2ND P1/3 TEST

Q = INJECTION RATE = 0.00004344 (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)
 = 67.73 + 8.93 + 0.00 * 2.31 = 76.66
 R = BOREHOLE RADIUS = 0.31 FEET

K = HYDRAULIC CONDUCTIVITY = 0.00000003 FT/MIN
 K = 0.00000002 CM/SEC

PACKER TEST ANALYSIS

WELL NO. 3-87BR

ROCKY FLATS PLANT: 881 HILLSIDE JOB NO. 2029-17-02

DATE TESTED: 6/4/87 BY: J.B. BERGMAN

TEST INTERVAL (FEET BELOW G.S.): 74.55 - 84.20

MATERIAL TESTED: ARAPAHOE CLAYSTONE

DEPTH TO WATER (FEET BELOW G.S.): 79.35

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

1ST P1/3 TEST

Q = INJECTION RATE = 0.00000145 (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)

= 79.37 + 8.21 + 0.00 * 2.31 = 87.58

R = BOREHOLE RADIUS = 0.31 FEET

K = HYDRAULIC CONDUCTIVITY = 0.00000000 FT/MIN

K = 0.00000000 CM/SEC

P2/3 TEST

Q = INJECTION RATE = 0.00020997 (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)

= 79.37 + 5.20 + 15.00 * 2.31 = 119.22

R = BOREHOLE RADIUS = 0.31 FEET

K = HYDRAULIC CONDUCTIVITY = 0.00000010 FT/MIN

K = 0.00000005 CM/SEC

2ND P1/3 TEST

Q = INJECTION RATE = 0.00010860 (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)

= 79.37 + 8.56 + 0.00 * 2.31 = 87.93

R = BOREHOLE RADIUS = 0.31 FEET

K = HYDRAULIC CONDUCTIVITY = 0.00000007 FT/MIN

K = 0.00000004 CM/SEC

PACKER TEST ANALYSIS

WELL NO. 3-87BR

ROCKY FLATS PLANT; 881 HILLSIDE JOB NO. 2029-17-02

DATE TESTED: 6/4/87 BY: J.B. BERGMAN

TEST INTERVAL (FEET BELOW G.S.): 88.20 - 97.85

MATERIAL TESTED: ARAPAHOE CLAYSTONE

DEPTH TO WATER (FEET BELOW G.S.): 79.35

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

1ST P1/3 TEST

Q = INJECTION RATE = 0.00001448 (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)
 = 79.35 + 8.57 + 0.00 * 2.31 = 87.92
 R = BOREHOLE RADIUS = 0.31 FEET

K = HYDRAULIC CONDUCTIVITY = 0.00000001 FT/MIN
 K = 0.00000000 CM/SEC

P2/3 TEST

Q = INJECTION RATE = 0.00199107 (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)
 = 79.35 + 5.20 + 19.00 * 2.31 = 128.44
 R = BOREHOLE RADIUS = 0.31 FEET

K = HYDRAULIC CONDUCTIVITY = 0.00000088 FT/MIN
 K = 0.00000045 CM/SEC

2ND P1/3 TEST

Q = INJECTION RATE = 0.00000145 (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)
 = 79.35 + 8.21 + 0.00 * 2.31 = 87.56
 R = BOREHOLE RADIUS = 0.31 FEET

K = HYDRAULIC CONDUCTIVITY = 0.00000000 FT/MIN
 K = 0.00000000 CM/SEC

PACKER TEST ANALYSIS

WELL NO. 3-B7BR

ROCKY FLATS PLANT: 881 HILLSIDE JOB NO. 2029-17-02

DATE TESTED: 6/4/87 BY: J.B. BERGMAN

TEST INTERVAL (FEET BELOW G.S.): 97.85 - 107.50

MATERIAL TESTED: ARAPAHOE SANDSTONE

DEPTH TO WATER (FEET BELOW G.S.): 79.35

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

1ST P1/3 TEST

Q = INJECTION RATE = 0.00023169 (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)
 = 79.35 + 9.02 + 0.00 * 2.31 = 88.37
 R = BOREHOLE RADIUS = 0.31 FEET

 K = HYDRAULIC CONDUCTIVITY = 0.00000015 FT/MIN
 K = 0.00000008 CM/SEC

P2/3 TEST

Q = INJECTION RATE = 0.00203451 (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)
 = 79.35 + 5.20 + 20.50 * 2.31 = 131.90
 R = BOREHOLE RADIUS = 0.31 FEET

 K = HYDRAULIC CONDUCTIVITY = 0.00000087 FT/MIN
 K = 0.00000044 CM/SEC

2ND P1/3 TEST

Q = INJECTION RATE = 0.00014480 (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)
 = 79.35 + 8.28 + 0.00 * 2.31 = 87.63
 R = BOREHOLE RADIUS = 0.31 FEET

 K = HYDRAULIC CONDUCTIVITY = 0.00000009 FT/MIN
 K = 0.00000005 CM/SEC

PACKER TEST ANALYSIS

WELL NO. 3-87BR

ROCKY FLATS PLANT: 881 HILLSIDE JOB NO. 2029-17-02

DATE TESTED: 6/4/87 BY: J.B. BERGMAN

TEST INTERVAL (FEET BELOW G.S.): 101.26 - 110.91

MATERIAL TESTED: ARAPAHOE SANDSTONE

DEPTH TO WATER (FEET BELOW G.S.): 79.35

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

1ST P1/3 TEST

Q = INJECTION RATE = 0.00000145 (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)
 = 79.35 + 8.40 + 0.00 * 2.31 = 87.75
 R = BOREHOLE RADIUS = 0.31 FEET

K = HYDRAULIC CONDUCTIVITY = 0.00000000 FT/MIN
 K = 0.00000000 CM/SEC

P2/3 TEST TEST ABORTED

Q = INJECTION RATE = 0.00000000 (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)
 = 79.35 + 5.20 + 0.00 * 2.31 = 84.55
 R = BOREHOLE RADIUS = 0.31 FEET

K = HYDRAULIC CONDUCTIVITY = 0.00000000 FT/MIN
 K = 0.00000000 CM/SEC

2ND P1/3 TEST

Q = INJECTION RATE = 0.00000145 (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)
 = 79.35 + 8.64 + 0.00 * 2.31 = 87.99
 R = BOREHOLE RADIUS = 0.31 FEET

K = HYDRAULIC CONDUCTIVITY = 0.00000000 FT/MIN
 K = 0.00000000 CM/SEC

WATER LEVEL DATA
3-87BR

<u>Elevation of Top of Inner Casing (feet)</u>	<u>Date</u>	<u>Time</u>	<u>Depth Water to Water (feet)</u>	<u>Water Elevation (feet)</u>	<u>Comments</u>
5,932.44	06/18/87	1312	95.67	5,836.77	
	06/24/87	-	81.35	5,851.09	

INDEX OF DATA

Boring No.: 4-87

Completed as well? Yes

Data in File

<u> X </u>	Log of Borehole
<u> X </u>	Well Construction Summaries
<u> X </u>	Well Development Summaries
<u> X </u>	Hydraulic Conductivity Test Data and Results
<u> </u>	Packer Test Data and Results
<u> X </u>	Water Level Data

LOG OF BOREHOLE

Location Rocky Flats Plant; 881 Hillside

Coordinates N34957.4 E21774.1

Total Depth 23.0'

Borehole/Well No. 4-87

Ground Surface Elevation 5909.79'

Water Level Encountered 5.0', 20.4'

Static 5904.17'

Drilling Company Boyles Bros.

Date Drilled May 11, 1987

Drilling Method Hollow Stem Auger

Logged By K. D. Holliday
Geologist

Driller R. Sharp

Helper A. Shade

Drilling Fluid None

Checked By [Signature]
Site Manager
[Signature]
CEARP Manager

Comments _____

Depth Foot	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<u>COLLUVIUM</u>	
			0-2.5' - Sample. Recovered 2.33/2.5' = 93%. CLAY: moderate brown (5YR 2/2); grass; very fine grained (4.0-3.5 ϕ) sand; occasional quartzite cobbles; moist to damp.	Hnu background =2.2. No OVA readings. No readings above background.
5			2.5-5.0' - Sample. Recovered 2.1/2.5' = 84%. CLAY: dusky yellowish brown (10YR 2/2); to dark yellowish brown (10YR 4/2); grass; small (up to 2") quartzite cobbles; fine-grained sand (3.5-3.0 ϕ); moist to damp.	
10			5.0-10.0' - Sample. Recovered 4.28/5.0' = 86%. SAND AND GRAVEL: moderate yellowish brown (10YR 5/4) to dark yellowish brown (10YR 4/2); some sand; fine-grained (2.0-4.0 ϕ); clay-rich; some quartzite cobbles and pebbles; subrounded to subangular; caliche (8.28-8.36') very pale orange (10YR 8/2) to grayish orange (10YR 7/4); moist to wet.	
15			10.0-13.0' - Sample. Recovered 2.44/3.0 = 81%. 10.0-11.0 SANDY CLAY: moderate yellowish brown (10YR 5/4); fine grained sand (2.0-4.0 ϕ); occasional quartzite cobbles and pebbles; subrounded to subangular; clayey; moist to wet. 11.0-11.52: SAND AND GRAVEL: light brown (5YR 5/6); sand (2.5-2.0 ϕ); quartzite cobbles; subrounded; moist to wet.	
20				

LOG OF BOREHOLE

Location _____

Coordinates _____

Total Depth _____

Drilling Company _____

Date Drilled _____

Drilling Method _____

Logged By _____

Geologist

Borehole/Well No. 4-87 (cont'd.)

Ground Surface Elevation _____

Water Level Encountered _____

Static _____

Driller _____

Helper _____

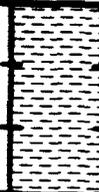
Drilling Fluid _____

Checked By J. Paschke

Site Manager

T. [Signature]
CEARP Manager

Comments _____

Depth Foot	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20			<p>11.52-12.38 CLAY: light olive gray (5Y 5/2) with patches of dark yellowish orange (10YR 6/6) iron staining; quartzite cobble at 12.38; moist.</p>	
25			<p>13.0-16.0' - Sample. Recovered 3.1/3.0' = 103%. 13.0-14.1; GRAVEL: dark yellowish orange (10YR 6/6); quartzite; angular; brown; sandy; clayey; wet. 14.1-14.6: CLAY: dark yellowish orange (10YR 6/6) and light olive gray (5Y 5/2); quartzite cobble at 14.6; subrounded; moist to damp. 14.6-16.0; SANDY CLAY: moderate yellowish brown (10YR 5/4); quartzite cobbles and pebbles; sand (2.0-2.50); moist to damp.</p>	
30			<p>16.0-18.0' - Sample. Recovered 1.95/2.0 = 98%. SANDY CLAY: moderate yellowish brown (10YR 5/4); quartzite cobbles and pebbles; subangular; sand (2.0-2.5 0); moist to slightly damp.</p>	
35			<p>18.0-20.5; - Sample. Recovered 2.1/2.5 = 81%. 18.0-19.5; SANDY CLAY: dark yellowish orange (10YR 6/6); sand (1.5-2.0 0); quartzite cobbles and pebbles; damp to moist.</p> <p style="text-align: center;"><u>ARAPAHOE FORMATION</u></p>	
40			<p>19.5-20.4': CLAYSTONE: light olive gray (5Y 5/2); disturbed; weathered; slightly damp.</p>	

WELL COMPLETION INFORMATION

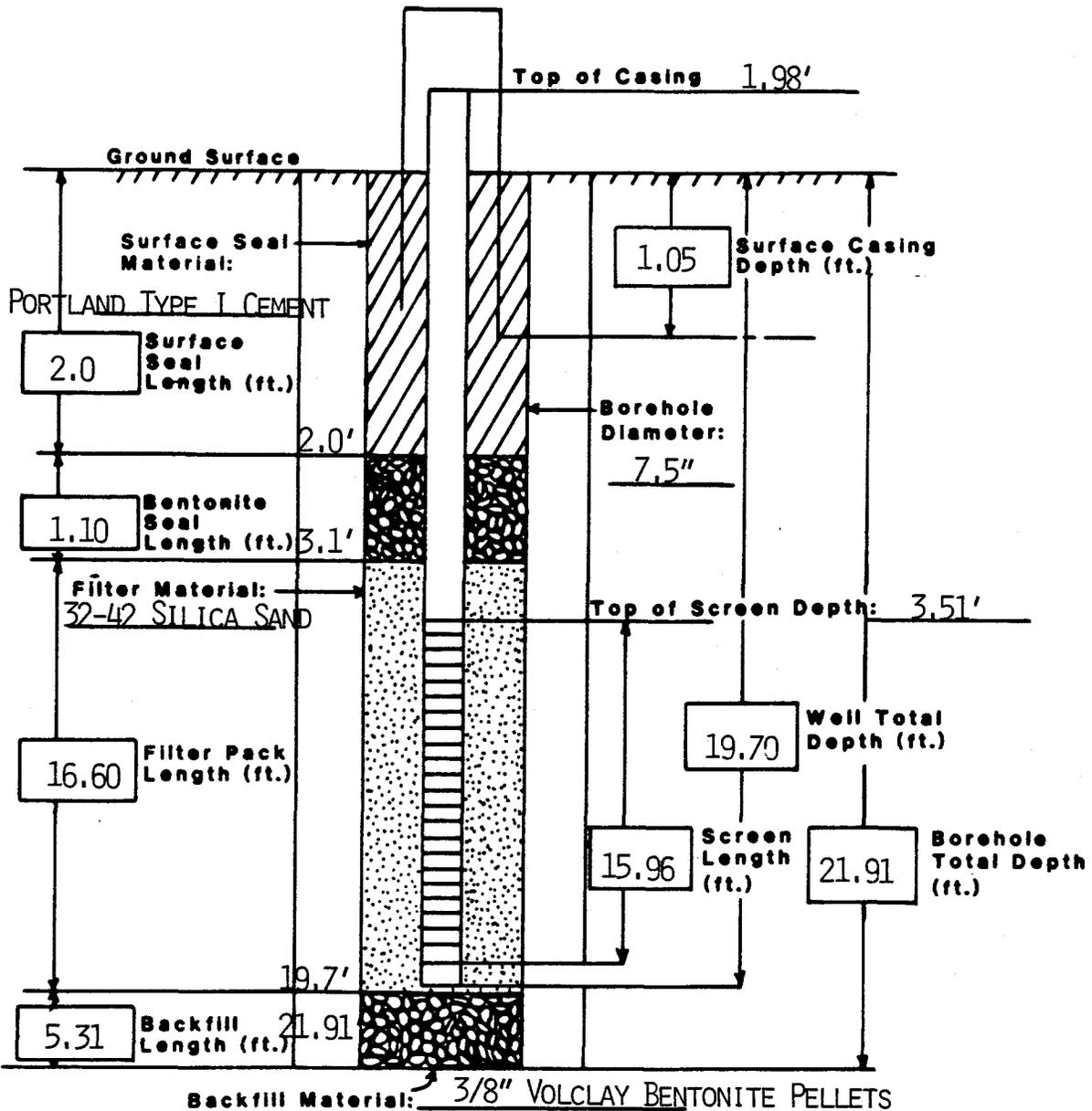
Location ROCKY FLATS PLANT; 881 HILLSIDE
 Coordinates N34957.4079 E21774.116
 Total Depth: Well 19.70'
 Borehole 21.91'

Well No. 4-87
 Elevation: Ground Surface 5909.79'
 Top of Casing 5911.81

Formation of Completion COLLUVIUM
 Casing Material SCH. 5, TYPE 316, TEJ STAINLESS STEEL
 Screen Material 0.010" WIRE WRAP, TYPE 316 STAINLESS STEEL
 Date Installed MAY 12, 1987
 Installed By K.D. HOLLIFAY
 Geologist

Casing Diameter 2" ID
 Surface Casing Diameter 5" ID
 Approved By [Signature]
 Site Manager
 CEARP Manager

Comments CENTRALIZER FROM 8.32-9.57'

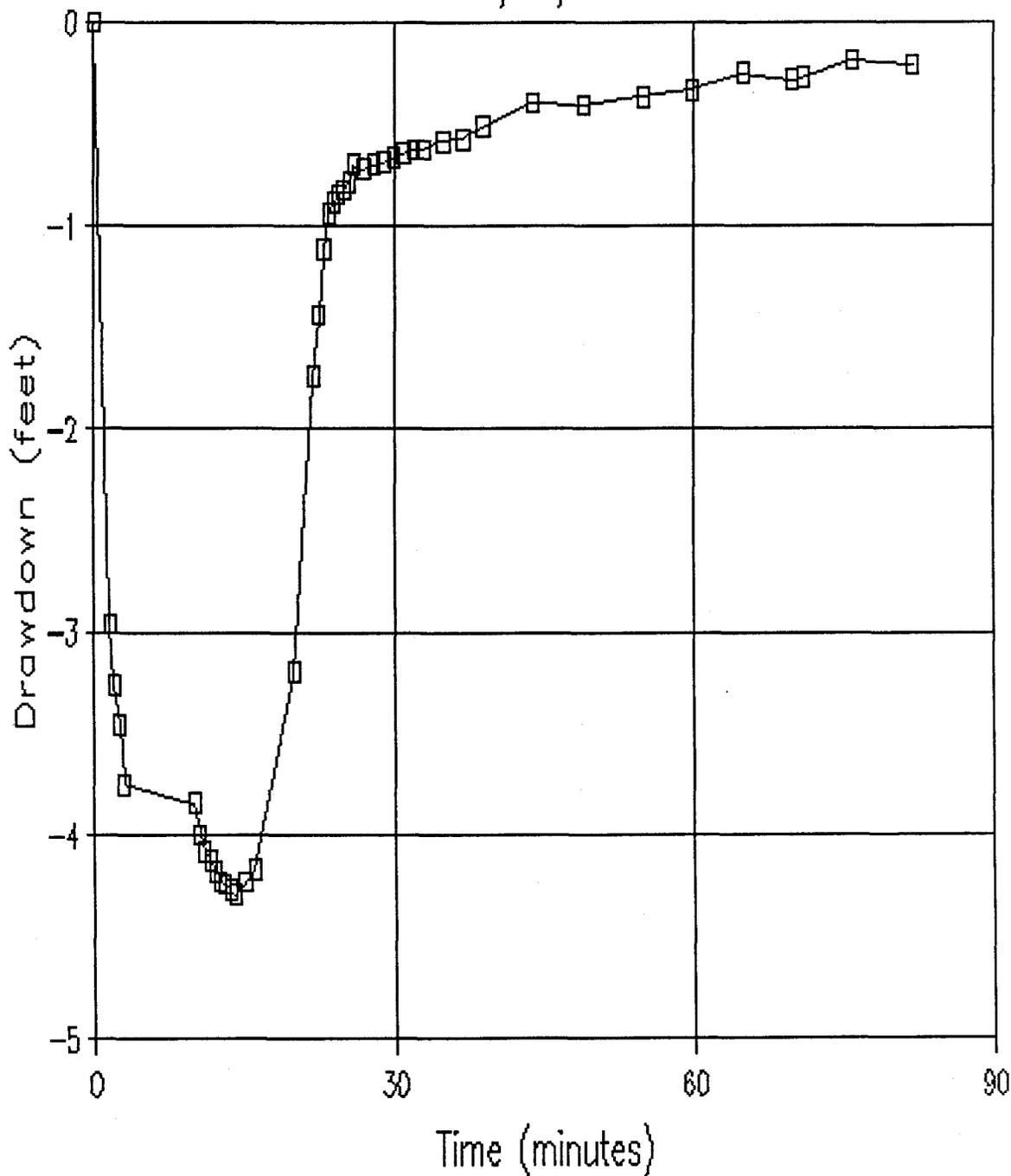


4-87 P-Test
06/02/87

Time (min)	Recovery Time (min)	Depth to Water (feet)	Draw- down (feet)
0		15.13	.00
1.5		17.63	2.96
2		32.25	3.26
2.5		34.63	3.46
3		38.13	3.75
10		39.25	3.84
10.5		41.13	4.00
11		42.13	4.08
11.5		42.63	4.13
12		43.25	4.18
12.5		43.88	4.23
13		44.00	4.24
13.5		44.38	4.27
14		44.63	4.29
15		43.88	4.23
16		43.13	4.17
20	3	31.50	3.20
22	5	14.00	1.74
22.5	5.5	10.38	1.44
23	6	6.50	1.11
23.5	6.5	4.38	.94
24	7	3.75	.89
24.5	7.5	3.25	.84
25	8	3.00	.82
25.5	8.5	2.50	.78
26	9	1.50	.70
27	10	1.75	.72
28	11	1.50	.70
29	12	1.38	.69
30	13	1.13	.67
31	14	.88	.65
32	15	.63	.63
33	16	.63	.63
35	18	.13	.58
37	20	.00	.57
39	22	-.75	.51
44	27	-2.13	.40
49	32	-2.00	.41
55	38	-2.50	.36
60	43	-2.88	.33
65	48	-3.88	.25
70	53	-3.50	.28
71	54	-3.63	.27
76	59	-4.63	.19
82	65	-4.38	.21

P-TEST OF 4-87

06/02/87



WATER LEVEL DATA
4-87

<u>Elevation of Top of Inner Casing (feet)</u>	<u>Date</u>	<u>Time</u>	<u>Depth Water to Water (feet)</u>	<u>Water Elevation (feet)</u>	<u>Comments</u>
5,911.81	06/24/87	-	7.64	5,904.17	

INDEX OF DATA

Boring No.: 5-87BR

Completed as well? Yes

Data in File

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

**LOG
OF
BOREHOLE**

Location Rocky Flats Plant; 881 Hillside
 Coordinates N35095.3 E21736.5
 Total Depth 61.0'

Borehole/Well No. 5-87BR
 Ground Surface Elevation 5927.76'
 Water Level Encountered None
 Static 5883.60' (6/26/87)
 Driller D. Jarvie; P. Bushkovski
 Helper T. Merritt; K. Martin
 Drilling Fluid 0.0-23.0': None; 23.0-61.0': Water
 Checked By [Signature]
 Site Manager
 CEARP Manager

Drilling Company Boyles Bros.
 Date Drilled May 22 and 27, 1987
 Drilling Method 0.00-23.0': Hollow Stem Auger
23.0-61.0': Rotary Core
 Logged By M. D. Gard; J. B. Bergman
 Geologist

Comments Surface casing set to 23.3' on May 22, 1987 by M. D. Gard.

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<u>COLLUVIUM/ARTIFICIAL FILL</u>	
0.0-2.0'			0.0-2.0' - Sample. Recovered 1.2/2.0' = 60%.	
0.0-0.8'			0.0-0.8': TOPSOIL: moderate brown (5YR 4/4); clay; sandy; abundant organics; moist.	
0.8-2.0'			0.8-2.0': CLAY: dark yellowish brown (10YR 4/2); trace sand; some quartzite pebbles; weathered; moist.	
2.0-4.0'			2.0-4.0' - Sample. Recovered 2.0/2.0' = 100%.	
2.0-3.9'			2.0-3.9': CLAY: same as above.	
3.9-4.0'			3.9-4.0': CLAY: moderate yellowish brown (10YR 5/4); silty; moist.	
4.0-8.0'			4.0-8.0' - Sample. Recovered 4.0/4.0' = 100%.	
4.0-5.7'			4.0-5.7': CLAY: same as above.	
5.7-8.0'			5.7-8.0': CLAY: moderate yellowish brown (10YR 5/4) abundant quartzite pebbles; silty; trace sand; moist.	
8.0-13.0'			8.0-13.0' - Sample. Recovered 3.0/5.0' = 60%.	
8.0-10.0'			8.0-10.0': CLAY: same as above.	
10.0-12.2'			10.0-12.2: SAND: light brown (5YR 5/6): 1.0-1.5 φ; gravelly; moist.	
			<u>ARAPAHOE FORMATION</u>	
12.2-13.0'			12.2-13.0': CLAYSTONE: olive gray (5Y 3/2); abundant limonite stains; fractured; moist.	
15				
20				

LOG OF BOREHOLE

Location _____

Coordinates _____

Total Depth _____

Drilling Company _____

Date Drilled _____

Drilling Method _____

Logged By _____

Geologist

Borehole/Well No. 5-87BR (cont'd.)

Ground Surface Elevation _____

Water Level Encountered _____

Static _____

Driller _____

Helper _____

Drilling Fluid _____

Checked By J. Pasalle

Site Manager

CEARP Manager

Comments _____

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
40	[Hatched pattern]		<p><u>38.5-40.2'</u> - Sample. Recovered 1.7/1.7' = 100%. RQD = 1.7/1.7' = 100%. CLAYSTONE: moderate olive brown (5Y 4/4) with abundant light olive brown (5Y 5/6) mottles; homogenous; damp.</p>	
			<p><u>40.2-41.5'</u> - Sample. Recovered 0/1.3' = 0%.</p>	
45	[Dotted pattern]		<p><u>41.5-44.5'</u> - Sample. Recovered 3.0/3.0' = 100%. RQD = 3.0/3.0' = 100%. CLAYSTONE: dusky yellow (5Y 6/4); abundant FeO stains moderate brown (5YR 4/4); some very fine-grained sand; sorted; large fracture from 42.3 to 43.3' (vertical); slightly damp.</p>	<p>Packer Test Internal #1: 45.70'-55.35'.</p>
50	[Dotted pattern]		<p><u>44.5-48.0'</u> - Sample. Recovered 3.8/3.5' = 109%. RQD = 3.6/3.8' = 95%.</p> <p>44.5-45.7: CLAYSTONE: dusky yellow (5Y 6/4) with abundant moderate brown (5YR 4/4) stains; 2-45° fractures at 44.7' and 45.5'; damp.</p> <p>45.7-47.7': SANDSTONE: moderate yellowish brown (10YR 5/4); very fine-grained; well sorted; clayey; abundant moderate brown (5YR 4/4) stains; damp.</p>	
55	[Hatched pattern]		<p><u>48.0-52.5'</u> - Sample. Recovered 4.5/4.5' = 100%. RQD = 3.7/4.5' = 82%.</p> <p>48.0-51.3': SANDSTONE: same as above.</p> <p>51.3-52.5': CLAYSTONE: olive gray (5Y 3/2); dense; homogenous; unweathered; damp.</p>	
60				

LOG OF BOREHOLE

Location _____

Coordinates _____

Total Depth _____

Drilling Company _____

Date Drilled _____

Drilling Method _____

Logged By _____

Geologist

Borehole/Well No. 5-87BR (cont'd.)

Ground Surface Elevation _____

Water Level Encountered _____

Static _____

Driller _____

Helper _____

Drilling Fluid _____

Checked By [Signature]

Site Manager

CEARP Manager

Comments _____

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
60	[Hatched Pattern]		<p><u>52.5-57.0'</u> - Sample. Recovered 4.8/4.5' = 107%. RQD = 1.8/4.8' = 38%. CLAYSTONE: olive gray (5Y 3/2); abundant light brown (5Y 5/6) stains; consolidated; homogenous, fractured; moist.</p> <p><u>57.0-61.0'</u> - Sample. Recovered 4.1/4.0' = 103%. RQD = 4.1/4.1' = 100%. CLAYSTONE: same as above.</p>	
65			Total Depth: 61.0'	
70				
75				
80				

WELL COMPLETION INFORMATION

Location ROCKY FLATS PLANT, 881 HILLSIDE

Well No. 5-87BR

Coordinates N35095.2666 E21736.4836

Elevation: Ground Surface 5927.76'

Total Depth: Well 51.50'

Top of Casing 5930.16'

Borehole 61.00'

Formation of Completion ARAPAHOE FORMATION

Casing Material SCH. 5, TYPE 316, TEJ STAINLESS Casing Diameter 2" ID

Screen Material 0.010' WIRE WRAP, TYPE 316 STAIN Surface Casing Diameter 5" ID

Date Installed MAY 29, 1987

LESS STEEL Approved By *[Signature]*

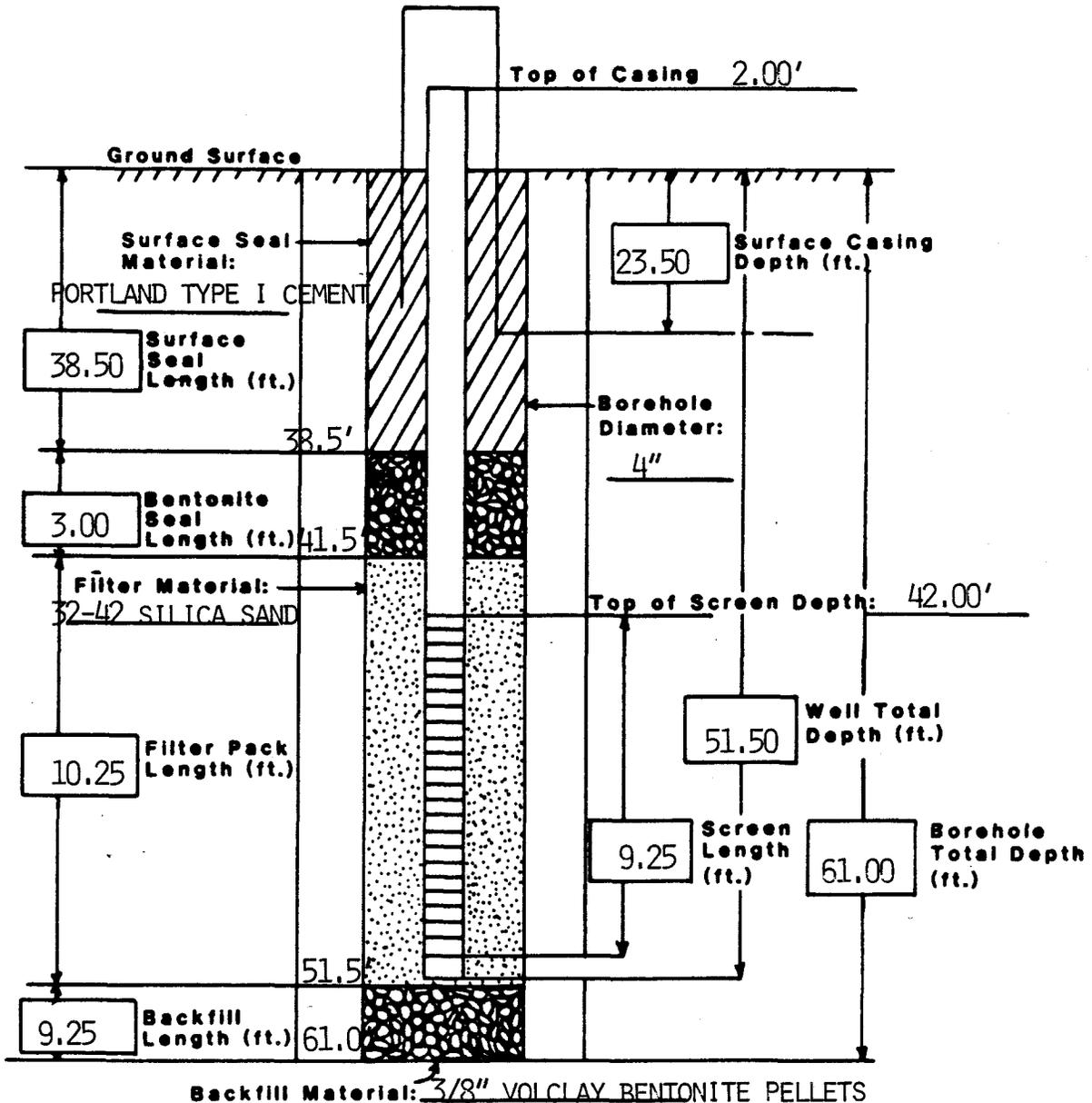
Installed By J.B. BERGMAN

Geologist

Site Manager

CEARP Manager

Comments _____

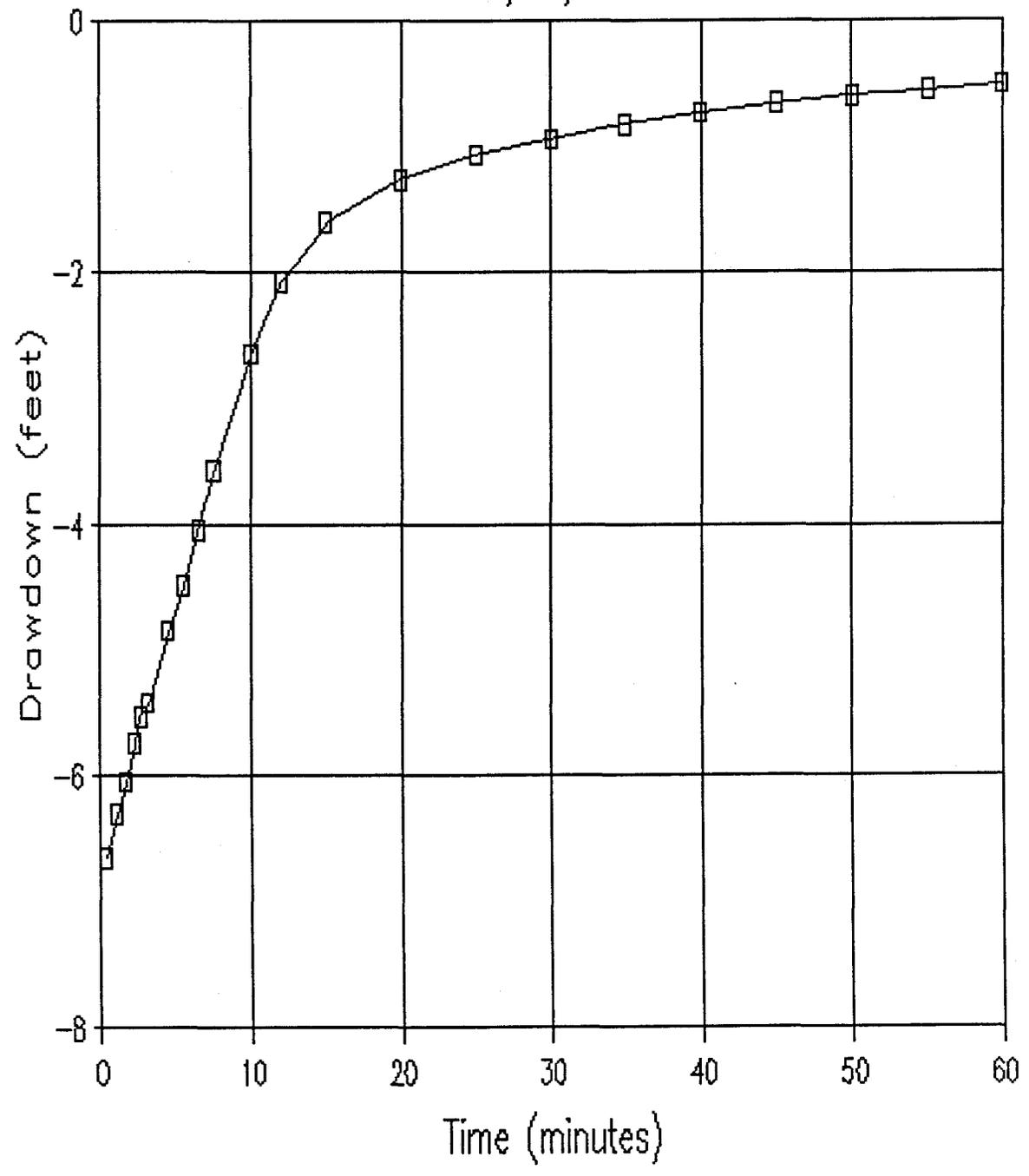


5-87BR
06/16/87
Bailed 8.3 liters in 10 minutes

Time (min)	Recovery Time (min)	Depth to Water (feet)	Draw- down (feet)
0		46.87	
10	0		
10.33	.33	53.52	6.65
11.12	1.12	53.17	6.30
11.67	1.67	52.92	6.05
12.25	2.25	52.61	5.74
12.67	2.67	52.40	5.53
13.17	3.17	52.29	5.42
14.5	4.5	51.71	4.84
15.5	5.5	51.35	4.48
16.5	6.5	50.91	4.04
17.5	7.5	50.44	3.57
20	10	49.52	2.65
22	12	48.95	2.08
25	15	48.48	1.61
30	20	48.14	1.27
35	25	47.94	1.07
40	30	47.82	.95
45	35	47.70	.83
50	40	47.61	.74
55	45	47.53	.66
60	50	47.47	.60
65	55	47.43	.56
70	60	47.38	.51

5-87BR

06/16/87



PACKER TEST ANALYSIS

WELL NO. 5-87BR

ROCKY FLATS PLANT; 881 HILLSIDE JOB NO. 2029-17-02

DATE TESTED: 5/28/87 BY: J.B. BERGMAN

TEST INTERVAL (FEET BELOW G.S.): 26.40 - 36.05

MATERIAL TESTED: ARAPAHOE CLAYSTONE

DEPTH TO WATER (FEET BELOW G.S.): 44.56

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

1ST P1/3 TEST

Q = INJECTION RATE = 0.00264993 (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)
 = 31.22 + 9.22 + 0.00 * 2.31 = 40.44
 R = BOREHOLE RADIUS = 0.31 FEET

K = HYDRAULIC CONDUCTIVITY = 0.00000371 FT/MIN
 K = 0.00000188 CM/SEC

P2/3 TEST

TEST ABORTED
 Q = INJECTION RATE = 0.00000000 (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)
 = 31.22 + 5.20 + 0.00 * 2.31 = 36.42
 R = BOREHOLE RADIUS = 0.31 FEET

K = HYDRAULIC CONDUCTIVITY = 0.00000000 FT/MIN
 K = 0.00000000 CM/SEC

2ND P1/3 TEST

Q = INJECTION RATE = 0.00000145 (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)
 = 31.22 + 9.55 + 0.00 * 2.31 = 40.77
 R = BOREHOLE RADIUS = 0.31 FEET

K = HYDRAULIC CONDUCTIVITY = 0.00000000 FT/MIN
 K = 0.00000000 CM/SEC

PACKER TEST ANALYSIS

WELL NO. 5-87BR

ROCKY FLATS PLANT: 881 HILLSIDE JOB NO. 2029-17-02

DATE TESTED: 5/28/87 BY: J.B. BERGMAN

TEST INTERVAL (FEET BELOW G.S.): 36.05 - 45.70

MATERIAL TESTED: ARAFAHOE CLAYSTONE

DEPTH TO WATER (FEET BELOW G.S.): 44.56

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

1ST P1/3 TEST

Q = INJECTION RATE = 0.00202727 (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)

= 40.87 + 9.84 + 0.00 * 2.31 = 50.72

R = BOREHOLE RADIUS = 0.31 FEET

K = HYDRAULIC CONDUCTIVITY = 0.00000226 FT/MIN

K = 0.00000115 CM/SEC

P2/3 TEST

TEST ABORTED

Q = INJECTION RATE = 0.00000000 (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)

= 40.87 + 5.20 + 0.00 * 2.31 = 46.08

R = BOREHOLE RADIUS = 0.31 FEET

K = HYDRAULIC CONDUCTIVITY = 0.00000000 FT/MIN

K = 0.00000000 CM/SEC

2ND P1/3 TEST

Q = INJECTION RATE = 0.00034753 (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)

= 40.87 + 9.86 + 0.00 * 2.31 = 50.74

R = BOREHOLE RADIUS = 0.31 FEET

K = HYDRAULIC CONDUCTIVITY = 0.00000039 FT/MIN

K = 0.00000020 CM/SEC

WATER LEVEL DATA
5-87BR

<u>Elevation of Top of Inner Casing (feet)</u>	<u>Date</u>	<u>Time</u>	<u>Depth Water to Water (feet)</u>	<u>Elevation (feet)</u>	<u>Comments</u>
5,930.16	06/16/87	-	46.87	5,883.29	
	06/24/87	-	45.56	5,884.60	

INDEX OF DATA

Boring No.: 6-87

Completed as well? Yes

Data in File

<u> X </u>	Log of Borehole
<u> X </u>	Well Construction Summaries
<u> X </u>	Well Development Summaries
<u> </u>	Hydraulic Conductivity Test Data and Results
<u> </u>	Packer Test Data and Results
<u> X </u>	Water Level Data

LOG OF BOREHOLE

Location Rocky Flats Plant; 881 Hillside

Coordinates N35016.0 E22021.3

Total Depth 15.5'

Drilling Company Boyles Bros.

Date Drilled May 14, 1987

Drilling Method Hollow Stem Auger

Logged By K. D. Holliday
Geologist

Borehole/Well No. 6-87

Ground Surface Elevation 5904.53'

Water Level Encountered 4.2'

Static 5900.7 (6/24/87)

Driller A. Shade

Helper D. Jarvie

Drilling Fluid None

Checked By J. Pasche
Site Manager

CEARP Manager

Comments _____

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<u>COLLUVIUM</u>	
			0-2.0' - Sample. Recovered 2.0/2.0' = 100%. CLAY: dusky yellowish brown (10YR 2/2); grasses and roots; occasional quartzite cobbles/pebbles; damp to moist.	
5			2.0-5.5' - Sample. Recovered 3.9/3.5' = 111%. 2.0-4.2': CLAY: dusky yellowish brown (10YR 2/2) to dark yellowish brown (10YR 4/2); roots; occasional quartzite cobble; disturbed; unconsolidated; damp to moist. 4.2': COBBLE: quartzite in clay matrix; 3' diameter; moist. 4.2-5.50': CLAY: dark yellowish orange (10YR 6/6) with light olive gray (5Y 5/2) stains; weathered; unconsolidated; damp to moist.	
10			5.5-10.5' - Sample. Recovered 3.5/5.0' = 70%. 5.50-5.90': CLAY: dark yellowish orange (10YR 6/6) and yellowish gray (5Y 7/2); weathered; damp. 5.90-6.10': SAND: light brown (5YR 5/6); coarse-grained (1.0-0.5 ϕ and 2.0-2.5 ϕ); quartzite cobbles; clay matrix; unconsolidated; damp to moist. 6.1-6.50': CLAY: grayish orange (10YR 7/4) with yellowish gray (5Y 7/2); quartzite cobble; weathered; damp to moist.	
15				
20				

HNu background = 0.8.
No readings above background.

LOG OF BOREHOLE

Location _____

Borehole/Well No. 6-87 (cont'd.)

Coordinates _____

Ground Surface Elevation _____

Total Depth _____

Water Level Encountered _____

Static _____

Drilling Company _____

Driller _____

Date Drilled _____

Helper _____

Drilling Method _____

Drilling Fluid _____

Logged By _____

Checked By [Signature]

Geologist

Site Manager

CEARP Manager

Comments _____

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			<u>ARAPAHOE FORMATION</u>	
			6.50-9.0': CLAYSTONE: light olive gray (5Y 5/2) with dark yellowish orange (10YR 6/6) stains; unconsolidated; weathered; damp to slightly moist.	
			10.5-15.5' - Sample. Recovered 5.3/5.0' = 106%. CLAYSTONE: olive gray (5Y 3/2) with dark yellowish orange (10YR 6/6) stains; trace caliche; fractured; trace sand (3.5-4.0 #); weathered; damp to dry.	
			TOTAL DEPTH: 15.50'	

WELL COMPLETION INFORMATION

Location ROCKY FLATS PLANT; 881 HILLSIDE

Coordinates N35016.0238 E22021.2950

Total Depth: Well 7.06'

Borehole 15.1'

Formation of Completion COLLUVIUM

Casing Material SCH. 5, TYPE 316, TFJ STAINLESS STEEL Casing Diameter 2" ID

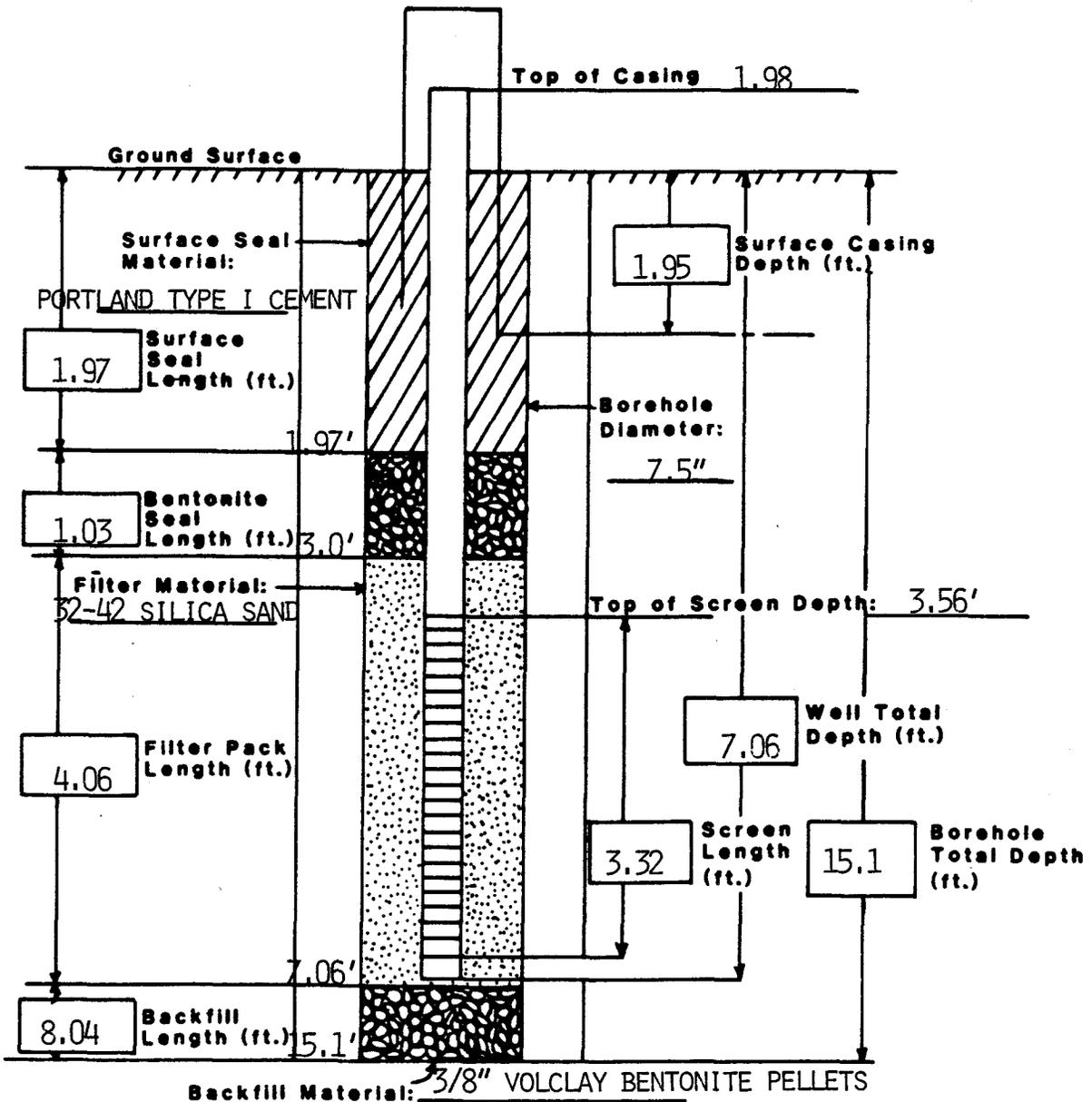
Screen Material 0.010" WIRE WRAP, TYPE 316 Surface Casing Diameter 5" ID

Date Installed MAY 14, 1987 STAINLESS STEEL Approved By [Signature]

Installed By K.D. HOLLIWAY Geologist Site Manager

CEARP Manager

Comments _____



WATER LEVEL DATA
6-87

<u>Elevation of Top of Inner Casing (feet)</u>	<u>Date</u>	<u>Time</u>	<u>Depth Water to Water (feet)</u>	<u>Elevation (feet)</u>	<u>Comments</u>
5,906.42	06/24/87	-	5.67	5,900.75	

INDEX OF DATA

Boring No.: 6-87A

Completed as well? No

Data in File

- X 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; 881 Hillside
 Coordinates * N34980 E22455
 Total Depth 32.0'

Borehole/Well No. 6-87A
 Ground Surface Elevation * 5890.0'
 Water Level Encountered None
 Static N/A

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

Driller A. Shade
 Helper D. Jarvie
 Drilling Fluid None
 Checked By [Signature]
 Site Manager
[Signature]
 CEARP Manager

Comments Abandoned hole at 32.0'. Plugged with Portland Type I cement.
 * Estimated values from topographic map.

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<u>COLLUVIUM</u> <u>VALLEY FILL ALLUVIUM</u>	
0.0-5.0'			0.0-5.0' - Sample. Recovered 1.4/5.0' = 28%. CLAY: dusky yellowish brown; (10YR 2/2); occasional quartzite cobbles/pebbles; grasses & roots; damp.	HNU background = 2.8. No OVA readings. No HNU readings above background.
5.0-9.0'			5.0-9.0' - Sample. Recovered 4.0/4.0 = 100%. 5.0-6.5': CLAY: same as above; coarse-grained sandstone and quartzite cobbles; unconsolidated.	
			<u>ARAPAHOE FORMATION</u>	
6.5-9.0'			6.5-9.0': CLAYSTONE: light olive gray (5Y 5/2); dark yellowish orange (10YR 6/6) stains; unconsolidated; weathered; damp.	
9.0-14.0'			9.0-14.0' - Sample. Recovered 5.0/5.0' = 100%. CLAYSTONE: olive gray (5Y 3/2); dark yellowish orange (10YR 6/6) stains; weathered; trace sand (3.5-4.0 φ); trace caliche; damp to dry.	
14.0-17.6'			14.0-17.6' - Sample. Recovered 4.3/3.6' = 119%. CLAYEY SANDSTONE: grayish orange (10YR 7/4) 2.50-3.0 φ to 2.5 0-2.0 φ; quartzose and feldspathic; subrounded; claystone interbeds; damp.	
17.6-22.6'			17.6-22.6' - Sample. Recovered 1.0/5.0' = 20%. SANDSTONE: grayish orange (10YR 7/4): coarse- grained; dark yellowish orange (10YR 6/6) stains; poorly sorted; subrounded to subangular; dry.	
20				

LOG OF BOREHOLE

Location _____

Coordinates _____

Total Depth _____

Drilling Company _____

Date Drilled _____

Drilling Method _____

Logged By _____

Geologist

Borehole/Well No. 6-87A (cont'd.)

Ground Surface Elevation _____

Water Level Encountered _____

Static _____

Driller _____

Helper _____

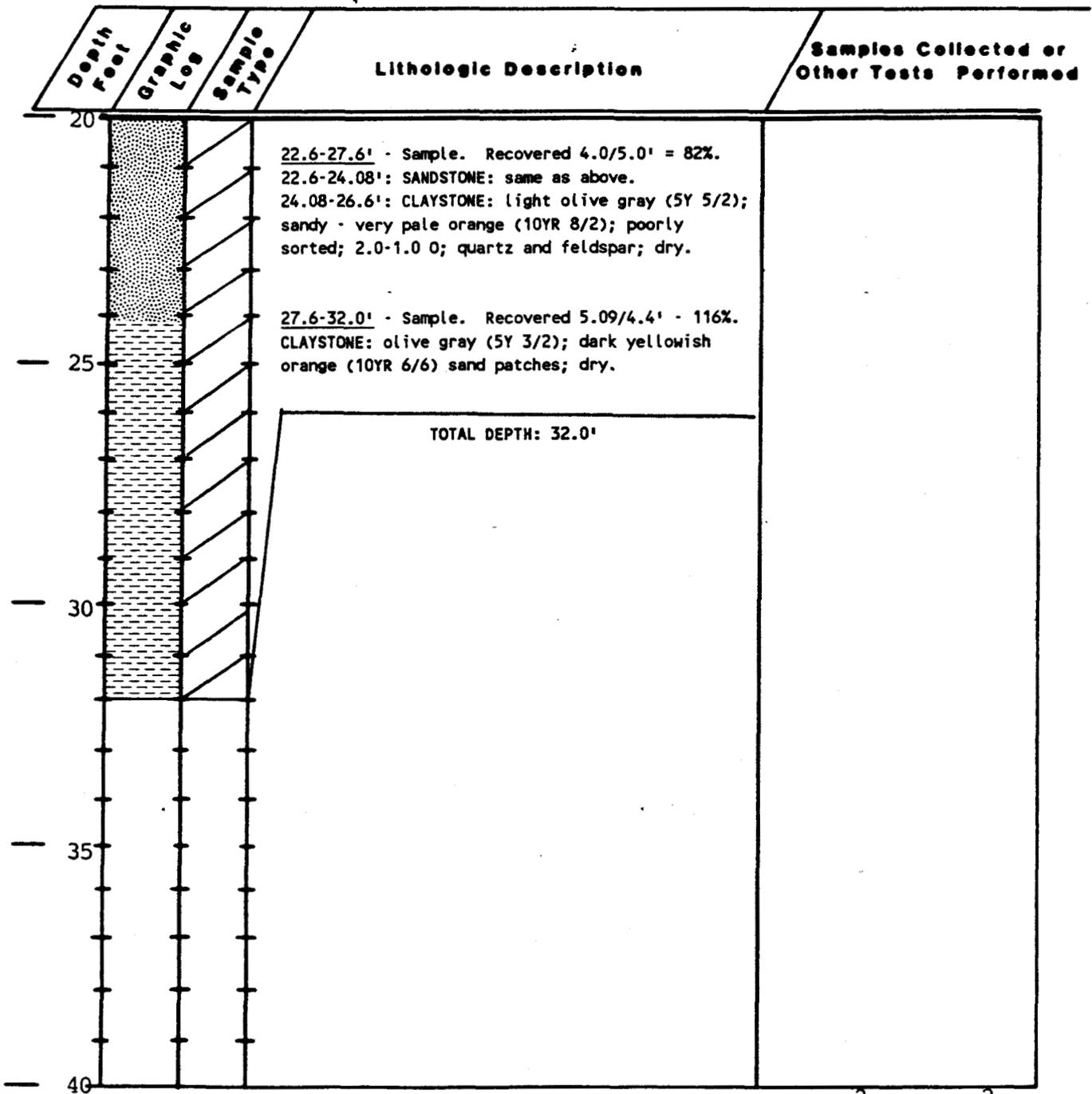
Drilling Fluid _____

Checked By [Signature]

Site Manager

CEARP Manager

Comments _____



INDEX OF DATA

Boring No.: 7-87BRA

Completed as well? No

Data in File

<u> X </u>	Log of Borehole
<u> </u>	Well Construction Summaries
<u> </u>	Well Development Summaries
<u> </u>	Hydraulic Conductivity Test Data and Results
<u> </u>	Packer Test Data and Results
<u> </u>	Water Level Data

LOG OF BOREHOLE

Location Rocky Flats Plant; 881 Hillside

Coordinates * N35070 E21209

Total Depth 57.50'

Drilling Company Boyles Bros.

Date Drilled June 4, 5, and 6, 1987

Drilling Method Hollow Stem Auger

Logged By K. D. Holliway; J. B. Bergman
Geologist

Borehole/Well No. 7-87BRA

Ground Surface Elevation * 5926.0'

Water Level Encountered None

Static N/A

Driller A. Shade

Helper T. Merritt

Drilling Fluid None

Checked By [Signature]
Site Manager

[Signature]
CEARP Manager

Comments No water encountered. Borehole plugged with Portland Type I cement.
* Estimated values from topographic map.

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<u>COLLUVIUM HP</u> <u>VALLEY FILL ALLUVIUM</u>	HNu background = 0.2. OVA background = 3.2. No readings above background.
0.0-0.55'			0.0-0.55' - Sample. Recovered 0.55/0.55' = 100%. CLAYEY SAND: grayish brown (5YR 3/2); abundant quartzite cobbles; subangular; grass and roots; (3.5-4.0 Ø); dry.	
1.0-2.5'			1.0-2.5' - Sample. Recovered 1.50'/2.0' = 75%. CLAYEY SAND: moderate yellowish brown (10YR 5/4); subrounded to subangular quartzite cobbles; sand (3.5-4.0 Ø); fracture with iron nodule at 1.15'; dry.	
2.5-5.5'			2.5-5.5' - Sample. Recovered 3.0/3.0 = 100%. SANDY CLAY: moderate yellowish brown (10YR 5/4); quartzite cobbles; subrounded to subangular (-1.0 Ø to .25" diameter); sand (3.5-4.0 Ø); dry to slightly damp.	
5.5-10.5'			5.5-10.5' - Sample. Recovered 5.0/5.0' = 100%. 5.5-5.7': CLAYEY SAND: moderate brown (5YR 4/4); quartzite gravel; subangular to subrounded; sand (2.0-1.5 Ø); dry. 5.7-6.3': CLAY: light olive gray (5Y 5/2); prominent dark yellowish orange (10YR 6/6) stains; weathered; dry.	
10				
15				
20				

LOG OF BOREHOLE

Location _____

Coordinates _____

Total Depth _____

Drilling Company _____

Date Drilled _____

Drilling Method _____

Logged By _____

Geologist

Borehole/Well No. 7-87BRA (cont'd.)

Ground Surface Elevation _____

Water Level Encountered _____

Static _____

Driller _____

Helper _____

Drilling Fluid _____

Checked By J. P. [Signature]

Site Manager

CEARP Manager

Comments _____

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20			<u>ARAPAHOE FORMATION</u>	
			6.3-10.5': CLAYSTONE: light olive gray (5Y 5/2); iron staining dark yellowish orange (10YR 6/6); caliche stringers; fractures; trace sand (3.5-4.0 ϕ).	
— 25			<u>10.5-15.5'</u> - Sample. Recovered 4.4/5.0' = 88%. CLAYSTONE: olive gray (5Y 4/1); dark yellowish orange (10YR 6/6) stains; weathered; trace sand; dry to damp.	
			<u>15.5-20.5'</u> - Sample. Recovered 5.1/5.0' = 102%. CLAYSTONE: same as above; fractures from 15.5-18.0' and vertical fracture 16.1-17.2'; dry to slightly damp.	
— 30			<u>20.5-25.5'</u> - Sample. Recovered 5.0/5.0' = 100%. 20.5-21.6': CLAYEY SAND: olive black (5Y 2/1); weathered; small fractures; caliche; dry. 21.6-25.5': CLAYEY SAND: same as above; sand (3.5-4.0 ϕ); dry.	
			<u>25.5-30.5'</u> - Sample. Recovered 5.0/5.0' = 100%. CLAYSTONE: olive gray (5Y 4/1); dusky red (10R 2/2) iron nodules; light brown (5YR5/6) mottles; trace sand (3.5-4.0 ϕ); unweathered; dry.	
— 35			<u>30.5-35.5'</u> - Sample. Recovered 5.0/5.0' = 100%. CLAYSTONE: same as above.	
— 40				

LOG OF BOREHOLE

Location _____
 Coordinates _____
 Total Depth _____

Borehole/Well No. 7-87BRA (cont'd.)
 Ground Surface Elevation _____
 Water Level Encountered _____
 Static _____

Drilling Company _____
 Date Drilled _____
 Drilling Method _____
 Logged By _____
Geologist

Driller _____
 Helper _____
 Drilling Fluid _____
 Checked By [Signature]
Site Manager
[Signature]
CEARP Manager

Comments _____

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
40			<u>35.8-39.8'</u> - Sample. Recovered 4.65/4.0' = 116%. <u>35.8-38.6'</u> : CLAYSTONE: light olive gray (5Y 5/2); abundant light olive brown (5Y 5/6) mottles; consolidated; slightly damp. <u>38.6-39.8'</u> : SANDSTONE: yellowish gray (5Y 7/2); very fine-grained; silty; well sorted; rounded; abundant light brown (5YR 5/6) stains; dry.	
45			<u>40.0-45.0'</u> - Sample. Recovered 1.0/5.0' = 20%. SANDSTONE: same as above.	
50			<u>46.0-51.0'</u> - Sample. Recovered 1.5/5.0' = 30%. SANDSTONE: pale yellowish brown (10Y 5/4); very fine-grained; silty; brittle; dry.	
			<u>51.0-55.0'</u> - Sample. Recovered 0/4.0' = 0%.	
			<u>55.0-57.5'</u> - Sample. Recovered 0/2.5 = 0%.	
			TOTAL DEPTH: 57.5'	
55				
60				

INDEX OF DATA

Boring No.: 8-87BR

Completed as well? Yes

Data in File

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

LOG OF BOREHOLE

Location Rocky Flats Plant; 881 Hillside
 Coordinates N34774.3 E21180.7
 Total Depth 106.0'

Borehole/Well No. 8-87BR
 Ground Surface Elevation 5919.7'
 Water Level Encountered None
 Static 5840.13' (6/24/87)

Drilling Company Boyles Bros.
 Date Drilled Sept. 19-22, 1986 and May 13-15, 1987
 Drilling Method 0.0-37.7': Hollow Stem Auger
 37.7-106.0': Rotary Core
 Logged By L. J. Pivonka; J. B. Bergman
 Geologist

Driller J. Horn; R. Sharp
 Helper K. Martin
 Drilling Fluid 0.0-37.7': None; 37.7-106.0': Water
 Checked By J. Pivonka
 Site Manager
T. [Signature]
 CEARP Manager

Comments Surface casing set to 37.7' on September 22, 1986 by L. J. Pivonka.

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<u>COLLUVIUM</u>	
			<p><u>0-0.5'</u> - Sample. Recovered 0.5/0.5' = 100%. CLAY: dusky yellowish brown (10YR 2/2); silty; some granitic pebbles; poorly sorted; unconsolidated; damp.</p>	<p>MNu background = 0.2. No OVA readings. No readings above background.</p>
5			<p><u>0.5-5.0'</u> - Sample. Recovered 3.9/4.5' = 87%. CLAY: dark yellowish brown (10YR 2/2) to moderate yellowish brown (10YR 5/4); micaceous clay with trace of granitic pebbles and cobbles; poorly sorted; unconsolidated; damp to moist.</p>	
			<p><u>5.0-7.7'</u> - Sample. Recovered 2.3/2.7' = 85%. CLAY: same as above.</p>	
10			<p><u>7.7-8.7'</u> - Sample. Recovered 1.0/1.0' = 100%. CLAY: same as above.</p>	
			<u>ARAPAHOE FORMATION</u>	
			<p><u>8.7-10.2'</u> - Sample. Recovered 2.5/2.5' = 100%. CLAYSTONE: dark yellowish orange (10YR 6/6) and light olive gray (5Y 6/1); heavy iron staining; consolidated; moist.</p>	<p><i>moderate yellowish brown (10YR 5/4); granitic pebbles + cobbles, poor sort, damp to moist</i></p>
15			<p><u>10.2-13.4'</u> - Sample. Recovered 2.4/3.2' = 75%. CLAYSTONE: same as above; moist.</p>	
			<p><u>13.4-15.2'</u> - Sample. Recovered 1.8/1.8' = 100%. CLAYSTONE: light olive gray (5Y 6/1); heavy iron staining; consolidated; moist.</p>	
20				

LOG OF BOREHOLE

Location _____
 Coordinates _____
 Total Depth _____

Borehole/Well No. 8-87BR (cont'd.)
 Ground Surface Elevation _____
 Water Level Encountered _____
 Static _____

Drilling Company _____
 Date Drilled _____
 Drilling Method _____
 Logged By _____
Geologist

Driller _____
 Helper _____
 Drilling Fluid _____
 Checked By [Signature]
Site Manager
CEARP Manager

Comments _____

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20			<p><u>15.2-17.7'</u> - Sample. Recovered 2.3/2.5' = 92%. CLAYSTONE: same as above; moist.</p> <p><u>17.7-18.9'</u> - Sample. Recovered 1.2/1.2' = 100%. CLAYSTONE: same as above; moist.</p> <p><u>18.9-20.3'</u> - Sample. Recovered 0.8/1.3' = 61%. SANDSTONE: light olive gray (5Y 6/1); clayey; some iron staining; well sorted; moderately well cemented; damp.</p> <p><u>20.3-22.7'</u> - Sample. Recovered 2.4/2.4' = 100%. SANDSTONE: same as above; damp.</p> <p><u>22.7-25.2'</u> - Sample. Recovered 2.5/2.5' = 100%. SANDSTONE: same as above; damp.</p> <p><u>25.2-27.7'</u> - Sample. Recovered 2.5/2.5' = 100%. SANDSTONE: same as above; iron concretions in lower section; damp.</p> <p><u>27.7-30.2'</u> - Sample. Recovered 2.5/2.5' = 100%. SANDSTONE: same as above; damp.</p> <p><u>30.2-31.2'</u> - Sample. Recovered 1.0/1.0' = 100%. SANDSTONE: same as above; damp.</p> <p><u>31.2-32.7'</u> - Sample. Recovered 1.0/1.5' = 67%. CLAYSTONE: medium gray (N 5); blocky texture; some iron stained stringers; consolidated; moist.</p>	
25				
30				
35				
40				

LOG OF BOREHOLE

Location _____

Coordinates _____

Total Depth _____

Drilling Company _____

Date Drilled _____

Drilling Method _____

Logged By _____

Geologist

Borehole/Well No. 8-87BR (cont'd.)

Ground Surface Elevation _____

Water Level Encountered _____

Static _____

Driller _____

Helper _____

Drilling Fluid _____

Checked By St. Pasche

Site Manager

CEARP Manager

Comments _____

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
40			<p><u>32.7-35.2'</u> - Sample. Recovered 2.5/2.5' = 100%. CLAYSTONE: medium gray (N 5); silty; blocky texture; iron stained stringers; consolidated; moist.</p>	
45			<p><u>35.2-37.7'</u> - Sample. Recovered 2.5/2.5' = 100%. CLAYSTONE: medium gray (N 5) to light olive gray (5Y 6/1); blocky texture; iron stained stringers; trace organic fragments; consolidated; moist.</p>	
50			<p><u>43.0-46.0'</u> - Sample. Recovered 2.5/3.0' = 83%. RQD=1.7/2.5' = 68%. CLAYSTONE: pale brown (5YR 5/2) with trace light brown (5YR 5/6) mottles; mottles frequency decreases with depth; damp.</p>	
55			<p><u>46.0-50.0'</u> - Sample. Recovered 3.7/4.0' = 93%. RQD=1.8/3.7' = 49%. CLAYSTONE: pale brown (5YR 5/2); trace organic fragments; no stains; consolidated; homogenous, damp.</p>	
60			<p><u>50.0-55.0'</u> - Sample. Recovered 5.0/5.0 = 100%. RQD=3.4/5.0' = 68%. CLAYSTONE: light olive gray (5Y 5/2) with abundant light brown (5YR 5/6) mottles; 45° fracture at 53.6'; abundant organic fragments, damp.</p>	

LOG OF BOREHOLE

Location _____
 Coordinates _____
 Total Depth _____
 Drilling Company _____
 Date Drilled _____
 Drilling Method _____
 Logged By _____
 Geologist

Borehole/Well No. 8-87BR (cont'd.)
 Ground Surface Elevation _____
 Water Level Encountered _____
 Static _____
 Driller _____
 Helper _____
 Drilling Fluid _____
 Checked By [Signature]
 Site Manager
 [Signature]
 CEARP Manager

Comments _____

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
60			<p><u>55.0-59.0'</u> - Sample. Recovered 3.5/4.0' = 88%. RQD=1.2/3.5' = 34%. CLAYSTONE: light olive gray (5Y 5/2) with abundant light brown (5YR 5/6) mottles; weathered; light olive gray (5Y 5/2) modules of siltstone at 55.0-55.8'; weathered; damp.</p>	Packer Test Interval #2: 62.61-72.26'.
65			<p><u>59.0-63.0'</u> - Sample. Recovered 3.2/4.0' = 80%. RQD=25/3.2' = 78%. CLAYSTONE: dusky yellowish brown (10YR 2/2); abundant moderate yellowish brown (10YR 5/4) mottles; consolidated; moist.</p>	
70			<p><u>63.0-67.0'</u> - Sample. Recovered 3.5/4.0 = 87%. RQD= 1.75/3.5' = 50%. CLAYSTONE: olive gray (5Y 3/2); caliche at 64.0' reacts strongly with HCL; homogenous; dense; moist.</p>	
75			<p><u>67.0-71.0'</u> - Sample. Recovered 2.2/4.0' = 55%. RQD=1.0/2.2' = 45%. CLAYSTONE: olive gray (5Y 3/2); some organic fragments; consolidated; moist.</p>	
78			<p><u>71.0-73.0'</u> - Sample. Recovered 2.9/2.0' = 145%. RQD=2.9/2.9 = 100%. CLAYSTONE: same as above.</p>	
80			<p><u>73.0-77.0'</u> - Sample. Recovered 3.2/4.0' = 80%. RQD=1.8/3.2' = 56%. CLAYSTONE: same as above.</p>	

LOG OF BOREHOLE

Location _____

Coordinates _____

Total Depth _____

Drilling Company _____

Date Drilled _____

Drilling Method _____

Logged By _____

Geologist

Borehole/Well No. 8-87BR (cont'd.)

Ground Surface Elevation _____

Water Level Encountered _____

Static _____

Driller _____

Helper _____

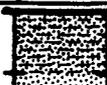
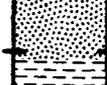
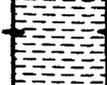
Drilling Fluid _____

Checked By J. Pascho

Site Manager

CEARP Manager

Comments _____

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
80			<u>77.0-81.0'</u> - Sample. Recovered 4.0/4.0 = 100%. RQD=4.0/4.0' = 100%. Interbedded SANDSTONE/ CLAYSTONE: olive gray (5Y 3/2); few organic fragments; sand percent increases with depth; sandstone is well sorted and rounded; very fine-grained; moist.	Packer Test Interval #1: 83.48-93.08'.
85	 		<u>81.0-85.0'</u> - Sample. Recovered 4.0/4.0' = 100%. RQD=3.6/4.0' = 90%. <u>81.0-82.1'</u> : SANDSTONE: olive gray (5Y 3/2); clay-rich; well sorted; subrounded; very fine-grained; consolidated; moist. <u>82.1-85.0'</u> : CLAYSTONE: olive black (5Y 2/1); organic-rich; consolidated; homogenous; moist.	
90			<u>85.0-88.0'</u> - Sample. Recovered 3.0/3.0 = 100%. RQD=0.5/3.0'=17%. LIGNITE: black (N 1/0); consolidated; moist to wet; dense; homogenous.	
95	 		<u>88.0-93.0'</u> - Sample. Recovered 5.0/5.0 = 100%. RQD=4.0/5.0'=80%. CLAYSTONE: olive gray (5Y 3/2); organic-rich; consolidated; abundant fractures; moist to wet.	
95	 		<u>93.0-98.0'</u> - Sample. Recovered 5.0/5.0' = 100%. RQD=4.1/5.0'=82%. <u>93.0-97.2'</u> : CLAYSTONE: olive gray (5Y 3/2); abundant light olive brown (5Y 5/6) siltstone nodules; some organic fragments; consolidated; moist. <u>97.2-98.0'</u> : SANDSTONE: grayish olive (10Y 4/2); clayey; rounded; very fine-grained; well sorted; consolidated; moist to wet.	
100				

LOG OF BOREHOLE

Location _____

Coordinates _____

Total Depth _____

Drilling Company _____

Date Drilled _____

Drilling Method _____

Logged By _____

Geologist

Borehole/Well No. 8-87BR (cont'd.)

Ground Surface Elevation _____

Water Level Encountered _____

Static _____

Driller _____

Helper _____

Drilling Fluid _____

Checked By _____

J. Paschke
Site Manager
T. [unclear]
CEARP Manager

Comments _____

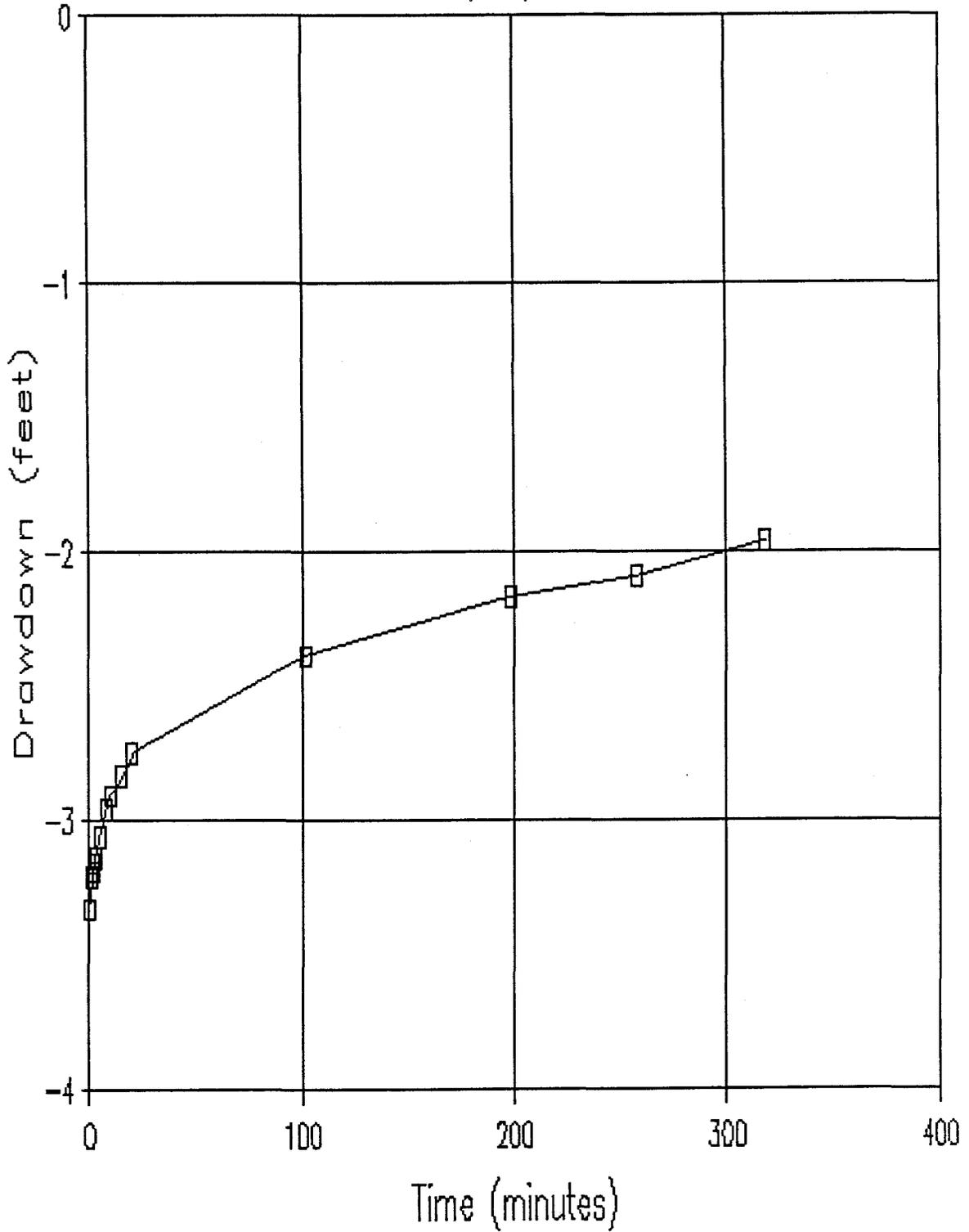
Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
100			<p><u>98.0-102.0'</u> - Sample. Recovered 4.0/4.0 = 100%. RQD=0.7/4.0'=18%.</p> <p>98.0-98.7': CLAYSTONE: olive gray (5Y 3/2); organic-rich; dense; wet.</p> <p>98.7-100.4': SANDSTONE: grayish olive (10Y 4/2); very fine-grained; well sorted; clayey; rounded; moist.</p> <p>100.4-102.0': SANDSTONE/CLAYSTONE: grayish olive (10Y 4/2); interbedded; unconsolidated; moist.</p>	
105			<p><u>102.0-106.0'</u> - Sample. Recovered 4.0/4.0 = 100%. RQD=3.8/4.0'=95%. CLAYSTONE/SANDSTONE: grayish olive (10Y 4/2); interbedded; very fine-grained silty sand; well sorted; moist.</p>	
110			TOTAL DEPTH: 106.0'	
115				
120				

8-87BR
06/19/87
Bail-Down/Recovery Test
Q = 2.1 lit/4 min

Time (min)	Recovery Time (min)	Depth to Water (feet)	Draw- down (feet)
0		87.97	
4	0	91.30	3.33
5.25	1.25	91.18	3.21
6	2	91.16	3.19
6.4	2.4	91.13	3.16
7	3	91.11	3.14
9	5	91.03	3.06
12	8	90.93	2.96
14	10	90.88	2.91
19	15	90.81	2.84
24	20	90.72	2.75
106	102	90.36	2.39
202	198	90.14	2.17
262	258	90.06	2.09
322	318	89.93	1.96

8-87BR

06/19/87



PACKER TEST ANALYSIS

WELL NO. 8-87BR

ROCKY FLATS PLANT; 881 HILLSIDE JOB NO. 2029-17-02

DATE TESTED: 5/20/87 BY: J.B. BERGMAN

TEST INTERVAL (FEET BELOW G.S.): 62.61 - 72.26

MATERIAL TESTED: ARAPAHOE CLAYSTONE

DEPTH TO WATER (FEET BELOW G.S.): 77.69

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

1ST P1/3 TEST

Q = INJECTION RATE = 0.00000000 (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)

= 67.43 + 9.47 + 0.00 * 2.31 = 76.90

R = BOREHOLE RADIUS = 0.31 FEET

K = HYDRAULIC CONDUCTIVITY = 0.00000000 FT/MIN

K = 0.00000000 CM/SEC

P2/3 TEST

Q = INJECTION RATE = 0.00250368 (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)

= 67.43 + 5.10 + 13.00 * 2.31 = 102.56

R = BOREHOLE RADIUS = 0.31 FEET

K = HYDRAULIC CONDUCTIVITY = 0.00000138 FT/MIN

K = 0.00000070 CM/SEC

2ND P1/3 TEST GAINED WATER IN TUBE; INVALID TEST

PACKER TEST ANALYSIS

WELL NO. 8-87BR

ROCKY FLATS PLANT; 881 HILLSIDE JOB NO. 2029-17-02

DATE TESTED: 5/20/87 BY: J.B. BERGMAN

TEST INTERVAL (FEET BELOW G.S.): 83.43 - 93.08

MATERIAL TESTED: ARAPAHOE LIGNITE

DEPTH TO WATER (FEET BELOW G.S.): 77.69

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

1ST P1/3 TEST

Q = INJECTION RATE = 0.00026065 (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)

= 77.69 + 9.02 + 0.00 * 2.31 = 86.71

R = BOREHOLE RADIUS = 0.31 FEET

K = HYDRAULIC CONDUCTIVITY = 0.00000017 FT/MIN

K = 0.00000009 CM/SEC

P2/3 TEST

Q = INJECTION RATE = 0.00002462 (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)

= 77.69 + 5.10 + 17.00 * 2.31 = 122.06

R = BOREHOLE RADIUS = 0.31 FEET

K = HYDRAULIC CONDUCTIVITY = 0.00000001 FT/MIN

K = 0.00000001 CM/SEC

2ND P1/3 TEST GAINED WATER IN TUBE; INVALID TEST

WATER LEVEL DATA
8-87BR

<u>Elevation of Top of Inner Casing (feet)</u>	<u>Date</u>	<u>Time</u>	<u>Depth Water to Water (feet)</u>	<u>Water Elevation (feet)</u>	<u>Comments</u>
5,919.82	06/19/87	650	87.97	5,831.85	
	06/24/87	-	79.69	5,840.13	

INDEX OF DATA

Boring No.: BH 1-87

Completed as well? No

Data in File

- X 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

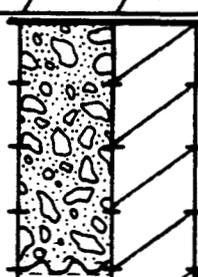
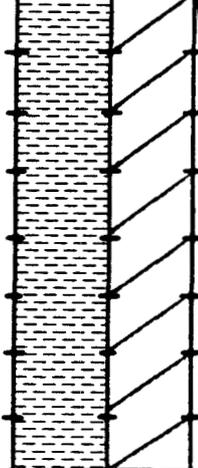
Location Rocky Flats Plant; 881 Hillside
 Coordinates N35065.7 E20744.9
 Total Depth 12.0'

Borehole/Well No. BH1-87
 Ground Surface Elevation * 5965.0'
 Water Level Encountered 0.2'
 Static N/A

Drilling Company Boyles Bros.
 Date Drilled June 4, 1987
 Drilling Method Hollow Stem Auger
 Logged By M. D. Gard
 Geologist

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

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

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<u>COLLUVIUM/ARTIFICIAL FILL</u>	
			0.0-2.0' - Sample. Recovered 1.2/2.0' = 60%. 0.0-0.2': GRAVEL: moderate yellowish brown (5YR 4/4); asphalt; sandy; cobbles of quartzite; subrounded, wet at 0.2'.	HNu background = 3.0. OVA background = 3.0. 0.2-1.4': Water table Sample: BH018701WT.
5			2.0-4.0' - Sample. Recovered 2.0/2.0' = 100%. GRAVEL: same as above; wet.	2.0': OVA=75 on core.
			<u>ARAPHAOE FORMATION</u>	
			4.0-7.4' - Sample. Recovered 2.89/3.4' = 85%. CLAYSTONE: olive gray (5Y 3/2); limonite stains; moist.	4.5-5.7': Waste Sample/ Contact Sample: BH018704WS.
10			7.4-9.6' - Sample. Recovered 2.2/2.2' = 100%. CLAYSTONE: same as above.	5.0': Field Screening Sample: OVA=20; HNu=3.0.
			9.6-12.0' - Sample. Recovered 4.4/4.4' = 100%. CLAYSTONE: same as above.	5.0': OVA=70 on core. 4.0-7.0': OVA=100 downhole.
			TOTAL DEPTH: 12.0'	10.0-11.5': Waste Sample/ Bedrock Sample: BH018710WS. 10.0': OVA=70 on core.
15				
20				

INDEX OF DATA

Boring No.: BH 2-87

Completed as well? No

Data in File

- X 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; 881 Hillside
 Coordinates N34768.9 E20678.8
 Total Depth 20.4'

Borehole/Well No. BH2-87
 Ground Surface Elevation * 5936.0'
 Water Level Encountered None
 Static N/A

Drilling Company Boyles Bros.
 Date Drilled May 27, 1987
 Drilling Method Hollow Stem Auger
 Logged By K. D. Holliday
 Geologist

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

Comments No water encountered during drilling. Borehole backfilled with Portland type I cement.

* Estimated value from topographic map.

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<u>COLLUVIUM</u>	
5			<p><u>0.0-3.40'</u> - Sample. Recovered 3.4/3.4 = 100%. SANDY CLAY: moderate yellowish brown (10YR 5/4) and dark yellowish brown (10YR 4/2) with some dark yellowish orange iron staining; occasional cobbles of quartzite from - 1.0 ϕ to 1" diameter; caliche <10%; damp</p>	<p>HNu background = 0.8. No OVA readings.</p> <p><u>0.0-11.80'</u>: Composite Sample: BH02870012.</p>
10			<p><u>3.40-8.0'</u> - Sample. Recovered 4.0/4.6' = 87%. <u>3.40-6.40'</u>: SANDY CLAY: moderate yellowish brown (10YR 5/4) with some dark yellowish orange (10YR 6/6) and light brown (5YR 5/6) iron staining; occasional cobbles of quartzite; caliche <10%; damp. <u>6.40-7.40'</u>: SANDY CLAY: dark yellowish brown (10YR 4/2); occasional quartzite cobbles; damp to slightly moist.</p>	<p><u>5.0'</u>: Field Screening Sample: HNu = 1.4.</p>
15			<p><u>8.0-13.0</u> - Sample. Recovered 1.2/5.0 = 24%. <u>7.40-11.80'</u>: Lost core. <u>11.80-13.0'</u>: SANDY CLAY: dark yellowish brown (10YR 5/4); occasional quartzite cobbles; caliche in fractures; damp.</p>	<p><u>11.8'</u>: Field Screening Sample: HNu = 1.4. <u>11.8-14.3'</u>: Composite Sample: BH02871214.</p>
20			<p><u>13.0-15.0'</u> - Sample. Recovered 1.13/2.0 = 56%. <u>13.0-13.87'</u>: Lost core. <u>13.87-14.3'</u>: CLAY: dark yellowish brown (10YR 5/4) weathered; trace very fine-grained sand and small quartzite pebbles, caliche in fractures (10%); damp.</p>	<p><u>12.0-14.3'</u>: Contact Sample: BH028714CT.</p>

LOG OF BOREHOLE

Location _____

Coordinates _____

Total Depth _____

Drilling Company _____

Date Drilled _____

Drilling Method _____

Logged By _____

Geologist

Borehole/Well No. BH2 -87 (cont'd.)

Ground Surface Elevation _____

Water Level Encountered _____

Static _____

Driller _____

Helper _____

Drilling Fluid _____

Checked By J.P. Pasche

Site Manager

CEARB Manager

Comments _____

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20			<u>ARAPAHOE FORMATION</u>	
			14.3-14.70': CLAYSTONE: dark yellowish orange (10YR 6/6) iron staining (30%) and light olive gray (5Y 5/2); weathered, caliche (10-15%); damp.	14.3-20.4'. Composite Sample: BH02871420.
— 25			15.0-18.0' - Sample. Recovered 2.45/3.0 = 81%. CLAYSTONE: light olive gray (5Y 5/2) to olive gray (5Y 5/2) TO OLIVE GRAY (5Y 4/1); weathered; caliche (10%); iron staining (20%); damp to dry.	15.15', Field Screening Sample: HNu - 1.3.
			18.0-20.4' - Sample. Recovered 2.8/2.4 = 116% CLAYSTONE: same as above.	17.9-18.6'. Bedrock Sample: BH028718BR.
— 30			TOTAL DEPTH: 20.4'	20.0'. Field Screening Sample: HNu - 1.4.
— 35				
— 40				

INDEX OF DATA

Boring No.: BH 3-87

Completed as well? No

Data in File

- X 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

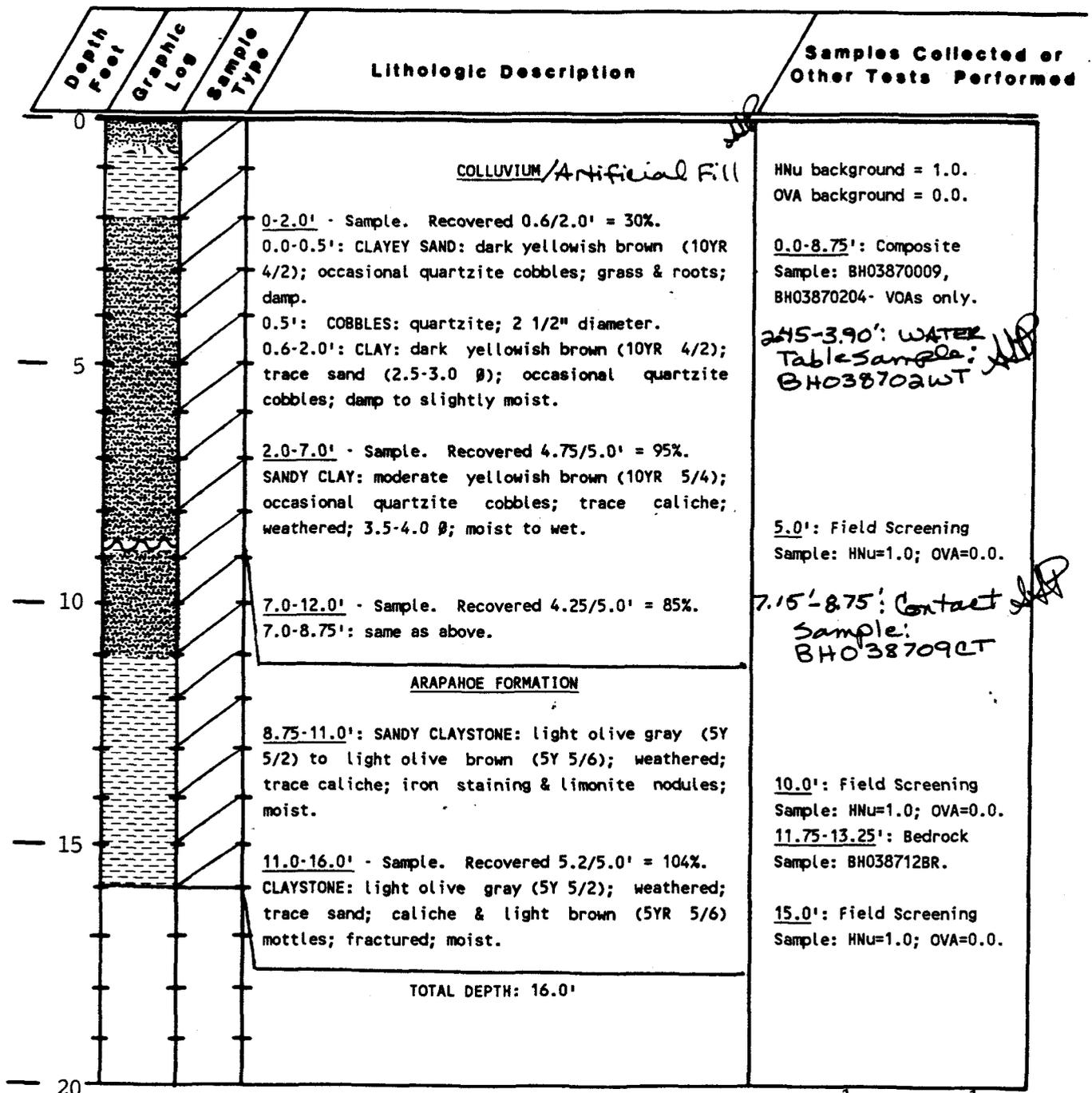
Location Rocky Flats Plant; 881 Hillside
 Coordinates N34725.8 E20819.7
 Total Depth 16.0'

Borehole/Well No. 2-87/BH3-87
 Ground Surface Elevation 5930.56
 Water Level Encountered 2.45'
 Static 5929.59' (6/24/87) *JHP*

Drilling Company Boyles Bros.
 Date Drilled May 19, 1987
 Drilling Method Hollow Stem Auger
 Logged By K. D. Holliday
 Geologist

Driller A. Shade
 Helper T. Merritt
 Drilling Fluid None
 Checked By J. Pascha
 Site Manager
T. Merritt
 CEARP Manager

Comments _____



INDEX OF DATA

Boring No.: BH 4-87

Completed as well? No

Data in File

<u>X</u>	Log of Borehole
<u> </u>	Well Construction Summaries
<u> </u>	Well Development Summaries
<u> </u>	Hydraulic Conductivity Test Data and Results
<u> </u>	Packer Test Data and Results
<u> </u>	Water Level Data

LOG OF BOREHOLE

Location Rocky Flats Plant; 881 Hillside
 Coordinates N34993.7 E20920.7
 Total Depth 20.3'

Borehole/Well No. BH4-87
 Ground Surface Elevation * 5967.0'
 Water Level Encountered 10.3'
 Static N/A

Drilling Company Boyles Bros.
 Date Drilled June 5, 1987
 Drilling Method Hollow Stem Auger
 Logged By M. D. Gard
 Geologist

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

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

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<u>COLLUVIUM/ARTIFICIAL FILL</u>	
			<u>0.0-1.7'</u> - Sample. Recovered 1.53/1.7' = 90%. SAND AND GRAVEL: light olive brown (5Y 5/6); quartz and quartzite cobbles; subangular; clay; moist.	HNu background = 2.0. OVA background = 3.0.
5			<u>1.7-2.0'</u> - Sample. Recovered 0/0.3' = 0%.	
			<u>2.0-3.1'</u> - Sample. Recovered 1.1/1.1' = 100%. SAND AND GRAVEL: same as above.	
			<u>3.1-6.0'</u> - Sample. Recovered 1.45'/2.9' = 50%. SAND AND GRAVEL: same as above.	
10			<u>6.0-7.8'</u> - Sample. Recovered 1.26/1.8' = 70%. SAND AND GRAVEL: same as above.	<u>5.0'</u> : Field Screening Sample: HNu=2; OVA=3.
			<u>7.8-10.3'</u> - Sample. Recovered 2.13/2.5' = 85%. SAND AND GRAVEL: same as above.	
			<u>10.3-12.8'</u> - Sample. Recovered 2.3/2.5' = 90%. SAND AND GRAVEL: same as above; wet.	<u>10.0'</u> : Field Screening Sample: HNu=2; OVA=8.
15			<u>12.8-15.3'</u> - Sample. Recovered 2.13/2.5' = 85%. SAND AND GRAVEL: same as above.	<u>10.3-12.8'</u> : Water Table Sample: BH048710WT.
			<u>15.3-17.8'</u> - Sample. Recovered 2.0/2.5' = 80%. <u>15.3-15.7'</u> : same as above.	<u>15.0'</u> : Field Screening Sample: HNu=2; OVA=3.
20			<u>15.3-15.7'</u> : Contact Sample: BH048715CT.	

**LOG
OF
BOREHOLE**

Location _____
 Coordinates _____
 Total Depth _____

Borehole/Well No. BH4-87 (cont)
 Ground Surface Elevation _____
 Water Level Encountered _____
 Static _____

Drilling Company _____
 Date Drilled _____
 Drilling Method _____
 Logged By _____
Geologist

Driller _____
 Helper _____
 Drilling Fluid _____
 Checked By [Signature]
Site Manager
CEARP Manager

Comments _____

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20			<u>ARAPAHOE FORMATION</u>	
			15.7-17.8': CLAYSTONE: moderate olive brown (5Y 4/4); moist.	20.0': Field Screening Sample: HNu=2; OVA=3.
			17.8-20.3' - Sample. Recovered 2.5/2.5' = 100%. CLAYSTONE: same as above.	19.3-20.3': Bedrock Sample: BH048719BR.
25			TOTAL DEPTH: 20.3'	
30				
35				
40				

INDEX OF DATA

Boring No.: BH 5-87

Completed as well? No

Data in File

- X 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; 881 Hillside
 Coordinates N34993.7 E20920.7
 Total Depth 11.8'

Borehole/Well No. BH5-87
 Ground Surface Elevation * 5954.2'
 Water Level Encountered None
 Static N/A

Drilling Company Boyles Bros.
 Date Drilled May 19, 1987
 Drilling Method Hollow Stem Auger
 Logged By M. D. Gard
 Geologist

Driller D. Jarvie
 Helper P. Bushkovski
 Drilling Fluid None
 Checked By [Signature]
 Site Manager
 CEARP Manager

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

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<u>COLLUVIUM/ARTIFICIAL FILL</u>	
			0.0-2.0' - Sample. Recovered 2.0/2.0' = 100%. CLAY: yellowish brown (5YR 4/4); sandy; some gravels and cobbles up to 3" diameter; some roots, moist.	HNu background = 2.0. OVA background = 3.0. 0.0-4.5': Composite Sample: BH05870005.
5			2.0-4.0' - Sample. Recovered 2.0/2.0' = 100%. 2.0-28.5': CLAY: same as above. 2.85-4.0': CLAY: olive brown (5Y 5/6); some sand; occasional pebbles; moist.	2.0-4.5': Contact Sample: BH058705CT.
			4.0-5.0' - Sample. Recovered 1.0/1.0' = 100%. 4.0-4.5': CLAY: same as above.	5.0': Field Screening Sample: HNu=2; OVA=3.
10			<u>ARAPAHOE FORMATION</u>	
			4.5-5.0': CLAYSTONE: dark yellowish orange (10YR 6/6); moist.	
			5.0-8.0' - Sample. Recovered 3.0/3.0' = 100%. CLAYSTONE: medium light gray (N6); abundant limonite stains; fractured; moist.	7.5-9.3': Bedrock Sample: BH058708BR.
			8.0-13.0' - Sample. Recovered 3.8/5.0' = 76%. CLAYSTONE: same as above.	10.0': Field Screening Sample. HNu=2; OVA=3.
			TOTAL DEPTH: <u>11.8'</u> <u>13.0' SUP</u>	
20				

INDEX OF DATA

Boring No.: BH 6-87

Completed as well? No

Data in File

- X 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; 881 Hillside
 Coordinates N34819.3 E20980.8
 Total Depth 30.0'

Borehole/Well No. BH6-87
 Ground Surface Elevation * 5935.9'
 Water Level Encountered None
 Static N/A

Drilling Company Boyles Bros.
 Date Drilled May 20, 1987
 Drilling Method Hollow Stem Auger
 Logged By M. D. Gard
Geologist

Driller D. Jarvie
 Helper T. Merritt
 Drilling Fluid None
 Checked By J. Pasche
Site Manager

CEARP Manager

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

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<u>COLLUVIUM/ARTIFICIAL FILL</u>	HNu background = 2.0. OVA background = 3.0.
			<u>0.0-2.0'</u> - Sample. Recovered 1.7/2.0 = 85%. <u>0.0-0.8'</u> : TOPSOIL: moderate brown (5YR 4/4); clay-rich; sandy; abundant organics; moist. <u>0.8-2.0'</u> : CLAY: moderate yellowish brown (10YR 5/4); gravels; cobbles up to 3"; moist.	<u>0.0-10.0'</u> : Composite Sample: BH06870010.
5			<u>2.0-4.0'</u> - Sample. Recovered 0.7/2.0' = 35%. CLAY: same as above.	
			<u>4.0-8.0'</u> - Sample. Recovered 3.8/4.0' = 95%. <u>4.0-4.5'</u> : CLAY: same as above. <u>4.5-7.75'</u> : CLAY: dusky yellowish brown (10YR 2/2); silty; peat at top; moist. <u>7.75-8.0'</u> : CLAY: moderate yellowish brown (10YR 4/2); silty; sandy; cobbles up to 2"; grades to light brown (5YR 5/6); moist.	<u>5.0'</u> : Field Screening Sample: HNu=2; OVA=3.
10			<u>8.0-13.0'</u> - Sample. Recovered 4.5/5.0' = 90%. CLAY: same as above.	<u>10.0'</u> : Field Screening Sample: HNu=2; OVA=3. <u>10.0-20.0'</u> : Composite Sample: BH06871020.
			<u>13.0-18.0'</u> - Sample. Recovered 4.5/5.0' = 90%. <u>13.0-14.3'</u> : CLAY: same as above. <u>14.3-18.0'</u> : CLAY: moderate yellowish brown (10YR 4/2); abundant gravel; cobbles up to 4"; quartzite; subangular; moist.	<u>15.0'</u> : Field Screening Sample: HNu=2; OVA=3.
15			<u>18.0-23.0'</u> - Sample. Recovered 1.0/5.0' = 20%. CLAY: same as above.	<u>20.0'</u> : Field Screening Sample: HNu=2; OVA=3.
			<u>23.0-28.0'</u> : Sample. Recovered 5.0/5.0 = 100%. <u>23.0-25.5'</u> : CLAY: same as above.	<u>24.1-25.5'</u> : Contact Sample: BH068726CT.
20				

LOG OF BOREHOLE

Location _____

Coordinates _____

Total Depth _____

Drilling Company _____

Date Drilled _____

Drilling Method _____

Logged By _____

Geologist

Borehole/Well No. BH6-87 (cont'd.)

Ground Surface Elevation _____

Water Level Encountered _____

Static _____

Driller _____

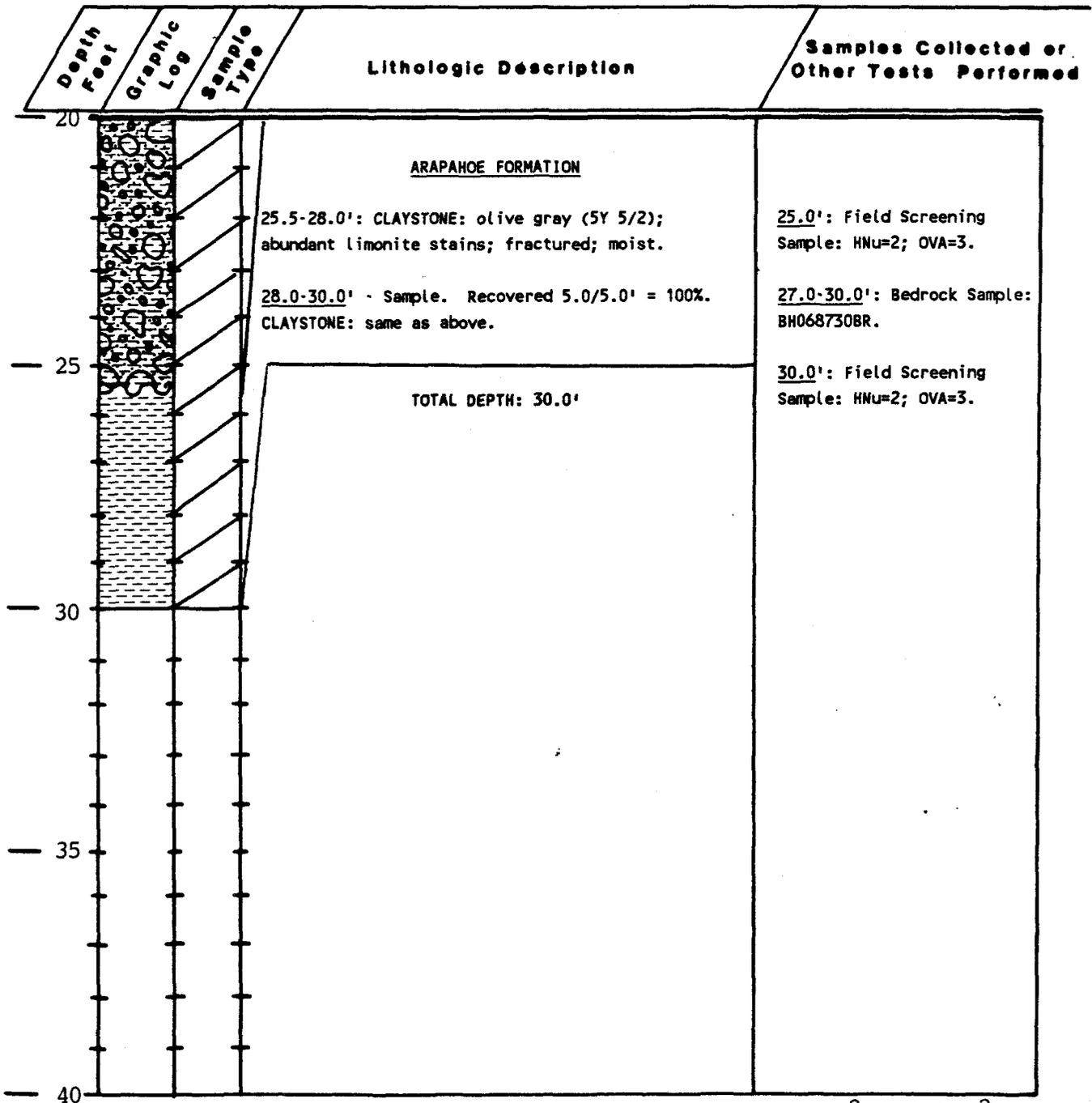
Helper _____

Drilling Fluid _____

Checked By _____

J. Paschke
Site Manager
[Signature]
CEARP Manager

Comments _____



INDEX OF DATA

Boring No.: BH 7-87

Completed as well? No

Data in File

- X **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; 881 Hillside
 Coordinates N35304.9 E21214.4
 Total Depth 13.0'

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

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

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

Comments No water encountered during drilling. Borehole backfilled with Portland Type I cement.

* Estimated value from topographic map.

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<u>COLLUVIUM/ARTIFICIAL FILL</u>	
			0.0-1.3' - Sample. Recovered 1.2/1.3 = 92%. CLAYEY SAND: dusky brown (5YR 2/2); quartzite gravel, quartzite cobble at @ 0.8'; grass & roots; damp.	HNu background = 1.0-1.2. No OVA readings. 0.0-10.0': Composite Sample: BH0780010.
5			2.0-5.0' - Sample. Recovered 1.78/3.0 = 59%. 2.0-3.1': Lost core; 3.10-4.80': CLAY: moderate brown (5YR 4/4); sandy to gravelly (quartzite) gravel; subangular; sand 2.5-2.0 φ; damp to slightly moist.	4.3-4.8': Contact Sample: BH078705CT. 5.0': Field Screening Sample: HNu=1.2.
			<u>ARAPAHOE FORMATION</u>	
			5.0' ^{HP} 4.8-8.0' - Sample. Recovery 3.2/ 3.2 = 100%. 4.80-6.60': CLAYSTONE: light olive gray (5Y 5/2) with dark yellowish orange (10YR 6/6) iron staining in fractures; damp.	5.0-10.0': Composite Sample: BH07870510. 7.8-9.68': Bedrock Sample: BH078708BR.
10			6.5-7.5' CLAYSTONE: light olive gray (5Y 7/2) weathered; slightly damp. 7.5-8.0' CLAYSTONE: moderate olive brown (5Y 4/4) with dark yellowish orange (10YR 6/6) iron staining; weathered; dry to slightly damp.	
15			8.0-13.0' - Sample. Recovery 5.0/5.0' = 100%. CLAYSTONE: olive gray (5Y 4/1) to olive black (5Y 2/1) with iron staining weathered; slight damp.	9.68-10.35': Waste Sample: BH078710WS 10.0': Field Screening Sample: HNu=1.3. 10.35-13.0': Composite Sample: BH07871013.
			TOTAL DEPTH: 13.0'	
20				

INDEX OF DATA

Boring No.: BH 8-87

Completed as well? No

Data in File

- X **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; 881 Hillside

Coordinates N35299.6 E21937.4

Total Depth 15.0'

Borehole/Well No. BH8-87

Ground Surface Elevation * 5951.5'

Water Level Encountered None

Static N/A

Drilling Company Boyles Bros.

Date Drilled June 3, 1987

Drilling Method Hollow Stem Auger

Logged By K. D. Holliday
Geologist

Driller R. Sharp

Helper A. Bodav

Drilling Fluid None

Checked By [Signature]
Site Manager

CEARP Manager

Comments No water encountered during drilling. Borehole backfilled with Portland Type I cement.

* Estimated value from topographic map.

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<u>COLLUVIUM/ARTIFICIAL FILL</u>	
			<p><u>0-2.0'</u> - Sample. Recovered 1.2/2.0' = 60%. SAND AND GRAVEL: moderate brown (5YR 4/4); clay-rich; quartzite gravel; grass and roots; sand 3.0-2.5 ϕ; angular; dry.</p>	<p>HNu background = 0.2. OVA background = 0.2.</p> <p><u>0.0-6.1'</u>: Composite Sample: BH08870007.</p>
5			<p><u>2.0-4.0'</u> - Sample. Recovered 1.2/2.0' = 60%. SAND AND GRAVEL: moderate brown (5YR 4/4), (5YR 3/4); quartzite gravel; 3.0-2.5 ϕ; subangular.</p>	
			<p><u>4.0-7.0'</u> - Sample. Recovered 2.8/3.0' = 93%. 4.0-4.7: SAND AND GRAVEL: same as above. 4.7-6.8: SAND/CLAY: moderate yellowish brown (10YR 5/4); light brown (5YR 5/6) stains in fractures; occasional quartzite cobbles (4.0 ϕ to 4' diameter); sand; fine-grained (3.5-4.0 ϕ); trace caliche; damp to dry.</p>	<p><u>5.0'</u>: Field Screening Sample: HNu=0.2; OVA=0.2.</p>
10			<p><u>7.0-9.5'</u>: Sample. Recovered 3.0/2.5' = 120%. 7.0-7.2': same as above.</p>	<p><u>6.1-7.0'</u>: Contact Sample: BH088707CT.</p>
			<u>ARAPAHOE FORMATION</u>	
			<p><u>7.2-9.5'</u>: CLAYSTONE: light olive gray (5Y 5/2); trace sand 3.5-4.0 ϕ; trace caliche; dark yellowish orange (10YR 6/6) stains; small fractures; weathered; damp to dry.</p>	<p><u>10.0'</u>: Field Screening Sample: HNu=0.2; OVA=0.1.</p>
15			<p><u>9.5-12.0'</u> - Sample. Recovered 2.4/2.5' = 96%. CLAYSTONE: same as above.</p>	<p><u>10.2-12.1'</u>: Bedrock Sample: BH088710BR.</p>
20				

LOG OF BOREHOLE

Location _____
 Coordinates _____
 Total Depth _____

Borehole/Well No. BH8-87 (cont'd.)
 Ground Surface Elevation _____
 Water Level Encountered _____
 Static _____

Drilling Company _____
 Date Drilled _____
 Drilling Method _____
 Logged By _____
Geologist

Driller _____
 Helper _____
 Drilling Fluid _____
 Checked By [Signature]
Site Manager
[Signature]
CEARP Manager

Comments _____

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20			<u>12.0-15.0'</u> - Sample. Recovered 3.2/3.0' = 107%. CLAYSTONE: same as above. TOTAL DEPTH: 15.0'	<u>15.0'</u> : Field Screening Sample: HNu=0.2; OVA=0.2.
— 25				
— 30				
— 35				
— 40				

INDEX OF DATA

Boring No.: BH 9-87

Completed as well? No

Data in File

- X 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; 881 Hillside

Coordinates N35292.4 E21587.7

Total Depth 15.0'

Borehole/Well No. BH9-87

Ground Surface Elevation * 5966.0'

Water Level Encountered 6.03'

Static N/A

Drilling Company Boyles Bros.

Date Drilled May 29, 1987

Drilling Method Hollow Stem Auger

Logged By K. D. Holliday
Geologist

Driller R. Sharp

Helper A. Boday

Drilling Fluid None

Checked By J. Pasella

TC
Site Manager
CEARD Manager

Comments Borehole backfilled with Portland Type I cement.

* Estimated value from topographic map.

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<u>COLLUVIUM</u>	
			0.0-2.0' - Sample. Recovered 1.2/2.0 = 60%.	
			0-0.85: SANDY CLAY: moderate yellowish brown (10YR 5/4); some quartzite cobbles; some grass and roots; damp.	0.0-10.0': Composite Sample: BH09870010.
5			0.85-1.2': SANDY GRAVEL: light brown (5YR 5/6); clayey matrix; unconsolidated; trace caliche; quartzite pebbles and cobbles; damp.	
			2.0-4.0' - Sample. Recovered 1.8/2.0 = 90%.	
			SANDY CLAY: dark yellowish brown (10YR 4/2) with grayish orange iron staining (10YR 7/4); quartzite cobbles; trace caliche; damp to dry.	
10			4.0-8.0' - Sample. Recovered 3.2/4.0 = 80%.	
			3.0-4.40': CLAY: dark yellowish brown (10YR 4/2) with pale yellowish brown (10YR 6/2) and dark yellowish orange (10YR 6/6) iron staining; some quartzite cobbles; damp.	5.0': Field Screening Sample: HNu=1.1; OVA=0.0
			4.40-5.30': CLAY: light olive gray (5Y 5/2) with dark yellowish orange (10YR 6/6) iron staining; 35% caliche; damp.	
			5.30-6.03': CLAY: light olive gray (5Y 5/2) with 70% dark yellowish orange (10YR 6/6) iron staining; quartzite cobbles - 1.0 to 1" diameter; damp.	
15			6.03-7.0': SANDY CLAY: dusky yellowish brown (10YR 2/2); trace quartzite cobbles; moist to wet.	6.03-6.60': Water Table Sample: BH098706WT.
			7.0-7.25': CLAY: dark yellowish brown (10YR 4/2); trace quartzite cobbles - 1.0 to 1/2" diameter; trace caliche; damp.	
20				

LOG OF BOREHOLE

Location _____
 Coordinates _____
 Total Depth _____

Borehole/Well No. BH9-87 (cont'd.)
 Ground Surface Elevation _____
 Water Level Encountered _____
 Static _____

Drilling Company _____
 Date Drilled _____
 Drilling Method _____
 Logged By _____
Geologist

Driller _____
 Helper _____
 Drilling Fluid _____
 Checked By [Signature]
Site Manager
CEARP Manager

Comments _____

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20			<p>8.0-11.0' - Sample. Recovered 3.0/3.0 = 100%. 8.45-11.0': CLAY: light olive gray (5Y 5/2) with dark yellowish orange (10YR 6/6) iron staining; trace quartzite cobbles - 1.0 to 1/2" diameter; trace caliche; damp.</p> <p>11.0-15.0' - Sample. Recovered 4.0/4.0 = 100%. 11.0-11.3: CLAY: light olive gray (5Y 5/2) with quartzite cobbles, trace caliche; damp.</p> <p style="text-align: center;"><u>ARAPAHOE FORMATION</u></p> <p>11.3-15.0': CLAYSTONE: light olive brown (5YR 5/6) weathered, caliche and iron staining in small fractures; damp to dry.</p>	<p>10.0': Field Screening Sample: HNu=1.0; OVA=0.1.</p> <p>10.08-11.3': Contact Sample: BH098711CT</p> <p>14.3-14.75': Bedrock Sample: BH098714BR.</p> <p>15.0': Field Screening Sample: HNu=1.0; OVA=0.1.</p>
25				
30			TOTAL DEPTH: 15.0' 15.1'	
35				
40				

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Boring No.: BH 10-87

Completed as well? No

Data in File

- X 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; 881 Hillside
 Coordinates N35110.9 E21375.4
 Total Depth ~~25.5'~~ 25.4' JLP

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

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

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

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

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

LOG OF BOREHOLE

Location _____

Coordinates _____

Total Depth _____

Drilling Company _____

Date Drilled _____

Drilling Method _____

Logged By _____

Geologist

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

Ground Surface Elevation _____

Water Level Encountered _____

Static _____

Driller _____

Helper _____

Drilling Fluid _____

Checked By [Signature]

Site Manager

CEARA Manager

Comments _____

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

INDEX OF DATA

Boring No.: BH 11-87

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; 881 Hillside
 Coordinates N35213.6 E21340.4
 Total Depth 19.40'

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

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

Static N/A
 Driller R. Sharp
 Helper A. Boday
 Drilling Fluid None
 Checked By [Signature]
 Site Manager
 CEARP Manager

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

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

LOG OF BOREHOLE

Location _____
 Coordinates _____
 Total Depth _____

Borehole/Well No. BH11-87 (cont'd.)
 Ground Surface Elevation _____
 Water Level Encountered _____
 Static _____

Drilling Company _____
 Date Drilled _____
 Drilling Method _____
 Logged By _____
Geologist

Driller _____
 Helper _____
 Drilling Fluid _____
 Checked By J. Pasche
Site Manager
[Signature]
CEARP Manager

Comments _____

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

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Boring No.: BH 12-87

Completed as well? No

Data in File

- X **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; 881 Hillside

Coordinates N35123 2 E21643 1

Total Depth 17.0'

Borehole/Well No. BH12-87

Ground Surface Elevation * 5934.8'

Water Level Encountered None
Static N/A

Drilling Company Boyles Bros.

Date Drilled May 27, 1987

Drilling Method Hollow Stem Auger

Logged By M. D. Gard
Geologist

Driller A. Shade

Helper T. Merritt

Drilling Fluid None

Checked By [Signature]
Site Manager

CEARP Manager

Comments No water encountered during drilling. Borehole backfilled with Portland Type I cement.

* Estimated value from topographic map.

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<u>COLLUVIUM/ARTIFICIAL FILL</u>	
			0.0-2.0' - Sample. Recovered 1.9/2.0 = 95%. SANDY CLAY: moderate brown (5YR 4/4); sand 2.0-2.5 ø; subangular; moist.	HNu background = 2.0. OVA background = 3.6. Gamma background = 0.09 counts/minute. No readings above background.
5			2.0-4.0' - Sample. Recovered 2.0/2.0 = 100%. 2.0-3.35 CLAY: dark yellowish brown (10YR 4/2); moist.	0.0-2.25': Contact Sample: BH128702CT
			<u>ARAPAHOE FORMATION</u>	
			3.35-4.0: CLAYSTONE: olive gray (5Y 3/2); limonite stains; moist.	
10			4.0-7.0' - Sample. Recovered 2.49/3.0 = 83%. CLAYSTONE: same as above; moist.	
			7.0-12.0' - Sample. Recovered 5.0/5.0 = 100%. 7.0-10.0': same as above; moist. 10.0-10.5': SANDY CLAYSTONE: olive gray (5Y 3/2); sand 3.5-3.0 ø; very moist. 10.5-12.0': CLAYSTONE: olive gray (5Y 3/2); fractured; numerous limonite stains; moist.	5.25-6.5': Bedrock Sample: BH128705BR.
15			12.0-17.0' - Sample. Recovered 5.0/5.0 = 100%. CLAYSTONE: same as above; moist.	
			TOTAL DEPTH: 17.0'	
20				

INDEX OF DATA

Boring No.: BH 13-87

Completed as well? No

Data in File

<u>X</u>	Log of Borehole
<u> </u>	Well Construction Summaries
<u> </u>	Well Development Summaries
<u> </u>	Hydraulic Conductivity Test Data and Results
<u> </u>	Packer Test Data and Results
<u> </u>	Water Level Data

LOG OF BOREHOLE

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

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

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

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

[Signature]
 CEARR Manager

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

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

LOG OF BOREHOLE

Location _____
 Coordinates _____
 Total Depth _____

Borehole/Well No. BH13-87 (cont'd.)
 Ground Surface Elevation _____
 Water Level Encountered _____
 Static _____

Drilling Company _____
 Date Drilled _____
 Drilling Method _____
 Logged By _____
Geologist

Driller _____
 Helper _____
 Drilling Fluid _____
 Checked By [Signature]
Site Manager
[Signature]
CEARP Manager

Comments _____

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

INDEX OF DATA

Boring No.: BH 14-87

Completed as well? No

Data in File

- X **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; 881 Hillside
 Coordinates N35304.9 E21214.4
 Total Depth 16.7'

Borehole/Well No. BH14-87
 Ground Surface Elevation * 5928.0'
 Water Level Encountered None
 Static N/A

Drilling Company Boyles Bros.
 Date Drilled May 28, 1987
 Drilling Method Hollow Stem Auger
 Logged By M. D. Gard
 Geologist

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

CEARR Manager

Comments No water encountered during drilling. Borehole backfilled with Portland Type I cement.

* Estimated value from topographic map.

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<u>COLLUVIUM</u>	
			0.0-2.0' - Sample. Recovered 1.1/2.0 = 55%. CLAY: dusky brown (5YR 2/2); silty; large cobbles; topsoil; moist.	HNu background = 0.2. OVA background = 3.0. Alpha background = 0.1 counts/minute.
5			2.0-4.0' - Sample. Recovered 2.0/2.0 = 100%. 2.0-3.3: SANDY GRAVEL; dusky brown (5YR 2/2); large cobbles; moist.	2.0': HNu=2.0 on core.
			3.3-4.0: SANDY CLAY: dusky brown (5YR 2/2); moist.	2.0-2.9': Waste Sample: BH148703W5. W1. JLP
			4.0-7.0' - Sample. Recovered 2.91/3.0 = 97%. 4.0-6.5: SANDY GRAVEL: dark yellowish orange (10YR 6/6); gravel; sandy; large cobbles; interbedded clay; moist.	
10			<u>ARAPAHOE FORMATION</u>	5.5-6.5': Contact Sample: BH148706CT.
			6.5-7.0': CLAYSTONE: olive gray (5Y 3/2); moist.	
			7.0-12.0' - Sample. Recovered 2.0/5.0 = 40%. CLAYSTONE: same as above; moist.	8.0': HNu=1.0 on core.
15			12.0-17.0 - Sample. Recovered 4.7/5.0 = 94%. CLAYSTONE: same as above; moist.	7.75-8.0': Waste Sample BH148703W2. (Doubled as bedrock sample.)
			TOTAL Depth: 16.7'	6.5-9.0': Bedrock Sample: BH148709BR
20				

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Boring No.: BH 15-87

Completed as well? No

Data in File

- X **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; 881 Hillside
 Coordinates N35421.2 E21822.2
 Total Depth 25.5'

Borehole/Well No. BH15-87
 Ground Surface Elevation * 5985.0'
 Water Level Encountered None
 Static N/A

Drilling Company Boyles Bros.
 Date Drilled June 3, 1987
 Drilling Method Hollow Stem Auger
 Logged By M. D. Gard
Geologist

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

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

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<u>COLLUVIUM/ARTIFICIAL FILL</u>	HNu background = 0.2. OVA background = 1.0. Gamma background = 0.05 counts/minute. 0.0-5.0': Composite Sample: BH15870005.
			0.0-2.0' - Sample. Recovered 2.0/2.0 = 100%. SANDY CLAY: moderate yellowish brown (10YR 5/4); gravelly; some cobbles; moist.	
			2.0-4.0' - Sample. Recovered 2.0/2.0 = 100%. SANDY CLAY: same as above; moist.	
			4.0-7.0' - Sample. Recovered 1.5/3.0 = 50%. SANDY CLAY: same as above; moist.	
			7.0-12.0' - Sample. Recovered 3.8/5.0 = 76%. 7.0-9.5': same as above; moist. 9.5-12.0': SANDY CLAY: moderate reddish brown (10YR 4/6); very sandy; numerous iron nodules; moist.	
5			12.0-17.0' - Sample. Recovered 0.0/5.0 = 0%. SANDY CLAY: dark yellowish brown (10YR 4/2); cuttings clay, sandy, gravelly; moist.	
			17.0-19.0' - Sample. Recovered 0.8/2.0 = 40%. SANDY CLAY: same as above; moist.	
10				
15			<u>ARAPAHOE FORMATION</u>	Insufficient recovery to sample contact.
		19.0-24.0' - Sample. Recovered 2.0/5.0 = 40%. CLAYSTONE: olive gray (5Y 3/2); moist.		
20				

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Boring No.: BH 16-87

Completed as well? No

Data in File

<u>X</u>	Log of Borehole
<u> </u>	Well Construction Summaries
<u> </u>	Well Development Summaries
<u> </u>	Hydraulic Conductivity Test Data and Results
<u> </u>	Packer Test Data and Results
<u> </u>	Water Level Data

LOG OF BOREHOLE

Location Rocky Flats Plant; 881 Hillside
 Coordinates N35299.8 E22180.3
 Total Depth 12.0'

Borehole/Well No. BH16-87
 Ground Surface Elevation * 5950.0'
 Water Level Encountered None
 Static N/A

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

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

Comments No water encountered during drilling. Borehole backfilled with Portland Type I cement.

* Estimated value from topographic map

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			<u>COLLUVIUM/ARTIFICIAL FILL</u>	
			0.0-2.0' - Sample. Recovered 1.0/2.0 = 50%. CLA YEY SAND: dusky brown (5YR 2/2); topsoil; clay; sand; gravelly; moist.	HNu background = 0.8. OVA background = 1.0. 0.0-1.8': Contact Sample: BH168702CT.
5			<u>ARAPAHOE FORMATION</u>	2.0-6.0': Composite Sample: BH16870206.
			2.0-4.0' - Sample. Recovered 2.0/2.0 = 100%. 2.0-2.5': CLAY: light olive brown (5Y 5/6); fill; moist. <i>STONE</i>	
			2.5-3.3': SANDY CLAY: dark yellowish brown (10YR 4/2); buried topsoil; moist.	
			3.3-4.0': CLAY: light olive brown (5Y 5/6); moist. <i>STONE</i>	
10			4.0-7.0' - Sample. Recovered 2.4/3.0 = 82%. <i>STONE</i>	
			4.0-5.0': CLAY: light olive brown (5Y 5/5); moist.	
			5.0-7.0': CLAY: olive gray (5Y 3/2). <i>STONE</i>	6.0-6.5': Bedrock Sample: BH1687068R.
			7.0-12.0' - Sample. Recovered 5.0/5.0 = 100%. <i>STONE</i>	
			7.0-9.9': CLAY: olive gray (5Y 3/2); moist.	
			9.9-11.0': CLAY: light olive gray (5Y 5/2); very moist. <i>STONE</i>	
15			11.0-12.0': CLAY: olive gray (5Y 3/2); moist. <i>STONE</i>	
			TOTAL DEPTH: 12.0'	
20				

INDEX OF DATA

Boring No.: BH 17-87

Completed as well? No

Data in File

- X **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; 881 Hillside
 Coordinates N35359.5 E22121.2
 Total Depth 11.9'

Borehole/Well No. BH17-87
 Ground Surface Elevation * 5956.0'
 Water Level Encountered None
 Static N/A

Drilling Company Boyles Bros.
 Date Drilled June 3, 1987
 Drilling Method Hollow Stem Auger
 Logged By K. D. Holliday
 Geologist

Driller R. Sharp
 Helper A. Boday
 Drilling Fluid None
 Checked By J. Pasakley
 Site Manager
CEARP Manager

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

