NOTICE!

ALL DRAWINGS
ARE LOCATED
AT THE END OF
THE DOCUMENT

Draft Final

Phase I RFI/RI Work Plan

Rocky Flats Plant
Present Landfill IHSS 114 and
Inactive Hazardous Waste Storage Area IHSS 203
(Operable Unit No. 7)

Department of Energy
Rocky Flats Plant
Golden, Colorado

Environmental Restoration Program

August 1991

Appendix

ADMIN RECORD

A-OU07-000045

Draft Final

Phase I RFI/RI Work Plan

Rocky Flats Plant
Present Landfill IHSS 114 and
Inactive Hazardous Waste Storage Area IHSS 203
(Operable Unit No. 7)

Department of Energy
Rocky Flats Plant
Golden, Colorado

Environemental Resortation Program

August 1991

Appendix

ADMIN RECORD

REVIEWED FOR CLASS FICATION/UCNI
By F J Curran
Date 8-16-91

APPENDIX A

As-Built Drawings for 1974 and

1982 Remedial Construction

APPENDIX B

Real-Time Soil-Gas Survey,

September 1987

Chen & Associates
Consulting Geotechnical Engineers

96 South Zuni
Denver Colorado 80223
303/744-7105

Casper
Colorado Springs
Ft Collins
Glenwood Springs
Phoenix
Rock Springs
Salt Lake City
San Antonio

June 25, 1987

Subject: Soil-Gas Survey, 881 Hillside Site,
Rocky Flats Plant, Golden, Colorado

Job No. 6 011 87

Mr. Tom Greengard
Rockwell International
North American Space Operations
Rocky Flats Plant
P.O. Box 464
Golden, Colorado 80402-0474

Dear Mr. Greengard:

As part of the quality assurance, quality control program for the soil-gas survey at the Hillside study site, blanks and sample duplicates were collected and analyzed alongside the regular soil-gas samples. For sample numbers 1 through 120 at the 881 Hillside area, there were two blanks and 13 sets of duplicate samples taken. The results of the blank and duplication data are shown on the attached tables. The numbering on these samples reflects the sequential numbering starting at 1 and going through 120 at the 881 Hillside site. The numbers above 120 and in parenthesis were numbers given by the lab to the duplicate wire and should not be confused with identical numbering given later to samples at other sites.

The blank samples showed no sign of contamination from either the lab preparation or the sample handling procedures. No detectable levels of DCE, TCA, CTC, TCE and PCE were found in either of the two blanks.

None of the thirteen duplicate sets for DCE, TCA or CTC show detectable ions. Duplicate deviations for PCE ranged from 0 to 1006 ion counts averaging 182. Nine of thirteen PCE duplicates had identical results of 0 or no ions detected. Duplicate deviations for TCE ranged from 0 to 352 averaging 27. Twelve of thirteen TCE duplicates had indentification values of zero ions detected. When plotted, the duplicate data shown on the data maps is averaged.

It is difficult to draw any significant conclusions about the duplicate samples due to the small size of the sample set. The results appear to indicate some scatter of values when high concentrations are detected.

If you have any questions on any of the QA/QC data, please give me a call.

Sincerely,

CHEN & ASSOCIATES, INC.

By_____
Kit Nielsen
Environmental Engineer

KN/eac
Rev. By: DRG
Encs.

ROCKY FLATS SOIL-GAS SURVEY
QA/QC RESULTS
HILLSIDE SITE SAMPLE # 1-120

DUPLICATE SAMPLES

SAMPLE #	DCE	TCA	CTC	TCE	PCE
32	0	0	0	0	965
(130)	0	0	0	0	209
50	0	0	0	0	0
(119)	0	0	0	0	0
65	0	0	0	0	0
(120)	0	0	0	0	0
77	0	0	0	0	0
78	0	0	0	0	0
93	0	0	0	0	0
(121)	0	0	0	0	0
98	0	0	0	0	0
(122)	0	0	0	0	0
101	0	0	0	0	0
(123)	0	0	0	0	0
104	0	0	0	0	0
(124)	0	0	0	0	0
107	0	0	0	0	0
(125)	0	0	0	0	0
110	0	0	0	0	155
(126)	0	0	0	0	455
114	0	0	0	0	0
(127)	0	0	0	0	0
115	0	0	0	0	1,006
(128)	0	0	0	0	0
116	0	0	0	0	968
(129)	0	0	0	352	1,271

(###) DENOTES LAB NUMBERING ON DUPLICATE SAMPLES

ROCKY FLATS SOIL-GAS SURVEY
QA/QC RESULTS
HILLSIDE SITE SAMPLE # 1 - 120

BLANK SAMPLES

SAMPLE #	DCE	TCA	CTC	TCE	PCE
17	0	0	0	0	0
44	0	0	0	0	0

Chen & Associates
Consulting Geotechnical Engineers

96 South Zuni
Denver Colorado 80223
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Casper
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Glenwood Springs
Rock Springs
Salt Lake City
San Antonio

July 22, 1987

Subject: Soil-Gas Survey, 903 Pad, Mound, Fence Area, Rocky Flats Plant, Golden, Colorado

Job No. 6 011 87

Mr. Tom Greengard
Rockwell International
North American Space Operations
Rocky Flats Plant
P.O. Box 464
Golden, Colorado 80402-0474

Dear Mr. Greengard:

As part of the quality assurance, quality control program for the soil-gas survey at the 903 Pad, Mound and Fence Area study sites, blank and sample duplicates were collected and analyzed alongside the regular soil-gas samples. For sample location numbers 120 through 658 at the subject area, there were seven blanks and 41 duplicate samples taken. The results of the blank and duplication data are shown on the attached tables. The numbering on these samples reflects the sequential numbering staring at 120 and going through 658 at the subject site. The numbers in parenthesis were numbers given by the lab to the duplicate wire and should not be confused with identical numbering given to samples at other locations.

The blank samples showed no sign of contamination from either the lab preparation or the sample handling procedures. No detectable levels of DCE, TCA, CTC, TCE, and PCE were found in any of the seven blank samples.

None of the 41 duplicate sets showed detectable ions for either DCE or TCA. Nineteen of the duplicate sets showed no detectable presence of any of the five compounds analyzed. For the 22 duplicate sets of samples in which laboratory analysis detected either one or more of the compounds CTC, TCE or PCE, there are a total of 40 individual duplicate sets that are compared for the single compounds within the sample sets. The following table summarizes the deviation in the ion count when the individual duplicate sets are compared.

Deviation Magnitude	Number of Sets
0-100	4
100-200	8
200-500	11
500-1000	4
1000-5000	7
>5000	6

When plotted, the duplicate data shown on the data maps is averaged.

The amount of deviation observed in the samples generally is related to the magnitude of the compound concentration in the samples. The high concentration sample sets, 10,000 plus, vary at that magnitude. And likewise as the concentration decrease to lower magnitudes, the variance in the duplicates appears to occur at these magnitudes.

If you have any questions on any of the QA/QC data, please give me a call.

Sincerely,

CHEN & ASSOCIATES, INC.

By_____
Kit F. Nielsen
Environmental Engineer

KFN/eac
Rev. By: DRG
Encs.

ROCKY FLATS SOIL-GAS SURVEY
QA/QC RESULTS
903 PAD, MOUND, AND FENCE AREA
SAMPLE # 120 - 658

DUPLICATE SAMPLES

SAMPLE NUMBER	DCE	TCA	CTC	TCE	PCE
120	0	0	0	0	0
(314)	0	0	0	408	0
128	0	0	0	107	176
(332)	0	0	0	322	306
138	0	0	0	0	0
(315)	0	0	0	0	0
153	0	0	0	0	0
(333)	0	0	0	0	0
168	0	0	0	0	0
(317)	0	0	0	0	0
174	0	0	0	0	0
(318)	0	0	0	0	0
179	0	0	0	0	0
(319)	0	0	0	0	0
199	0	0	406	156	165
(320)	0	0	380	397	105
203	0	0	1,848	2,708	1,856
(321)	0	0	1,738	3,253	2,048
214	0	0	0	0	0
(322)	0	0	0	0	0
223	0	0	0	0	0
(323)	0	0	0	0	0
228	0	0	568	0	0
(324)	0	0	850	0	0
244	0	0	0	0	0
(325)	0	0	0	0	0
247	0	0	0	380	0
(326)	0	0	0	237	0

ROCKY FLATS SOIL-GAS SURVEY
QA/QC RESULTS
903 PAD, MOUND, AND FENCE AREA
SAMPLE # 120 - 658

DUPLICATE SAMPLES

SAMPLE NUMBER	DCE	TCA	CTC	TCE	PCE
259	0	0	800	23,546	37,706
(327)	0	0	587	17,158	32,102
264	0	0	0	0	0
(328)	0	0	0	0	0
290	0	0	539	2,124	25,094
(329)	0	0	3,156	6,201	73,030
292	0	0	594	196	6,580
(330)	0	0	1,572	847	14,749
306	0	0	408	0	4,466
(331)	0	0	967	0	9,776
320	0	0	0	0	0
(468)	0	0	0	0	0
322	0	0	0	863	0
(469)	0	0	0	0	0
343	0	0	1,724	732	23,564
(471)	0	0	390	116	5,540
358	0	0	1,811	819	16,679
(472)	0	0	2,634	1,024	21,882
384	0	0	0	0	0
(474)	0	0	0	0	0
406	0	0	0	196	12,318
(475)	0	0	0	337	9,546
414	0	0	0	389	0
(476)	0	0	0	326	0
416	0	0	0	754	155
(477)	0	0	0	1,484	122
422	0	0	0	1,008	0
423	0	0	0	13,636	0
426	0	0	0	0	0
(478)	0	0	0	0	0

ROCKY FLATS SOIL-GAS SURVEY
QA/QC RESULTS
903 PAD, MOUND, AND FENCE AREA
SAMPLE # 120 - 658

DUPLICATE SAMPLES

SAMPLE NUMBER	DCE	TCA	CTC	TCE	PCE
429	0	0	754	0	0
(479)	0	0	803	0	0
458	0	0	0	0	52,912
459	0	0	0	0	25,284
466	0	0	0	0	0
(480)	0	0	0	0	342
486	0	0	0	0	760
(650)	0	0	0	0	375
506	0	0	0	0	2,950
(651)	0	0	0	0	3,626
525	0	0	0	0	0
(652)	0	0	0	0	0
537	0	0	0	0	0
(653)	0	0	0	0	0
569	0	0	0	0	0
(654)	0	0	0	0	0
572	0	0	0	0	0
(655)	0	0	0	0	0
603	0	0	0	0	0
(656)	0	0	0	0	0
631	0	0	0	0	0
(657)	0	0	0	0	0
632	0	0	0	0	0
(658)	0	0	0	0	0

(###) LAB NUMBERING OF DUPLICATE SAMPLE

ROCKY FLATS SOIL-GAS SURVEY
QA/QC RESULTS
903 PAD, MOUND, AND FENCE AREA
SAMPLE # 120 - 658

FIELD BLANK DATA

SAMPLE NUMBER	DCE	TCA	CTC	TCE	PCE
308	0	0	0	0	0
314	0	0	0	0	0
360	0	0	0	0	0
395	0	0	0	0	0
442	0	0	0	0	0
507	0	0	0	0	0
565	0	0	0	0	0

Chen & Associates
Consulting Geotechnical Engineers

96 South Zuni
Denver, Colorado 80223
303/744-7105

Casper
Colorado Springs
Fort Collins
Glenwood Springs
Rock Springs
Salt Lake City
San Antonio

August 3, 1987

Subject: Estimated Cost for Additional Soil-Gas Installation Points and Slug Tests on Environmental Wells

Job No. 6 011 87

Rockwell International
Rocky Flats Plant
North American Space Operations
P.O. Box 464
Golden, Colorado 80402-0464

Attention: P.M. Backes, Subcontract Administrator

Gentlemen:

Chen & Associates is pleased to respond to your requisition of July 20, 1987, requesting 600 additional soil-gas sampling points and 40 slug tests.

The fee for installation, retrieval and analysis of 600 soil-gas sampling points for the compounds TCE, TCA, CCL_4, PCE, and DCE will be $90.00 per tube resulting in a total fee of $27,000.

The fee for conducting 40 slug tests and analyzing the data for transmissivity will be $9,823. This fee includes labor charges of approximately $8,000 for conducting the slug tests, and preparing and producing a letter report. The remainder of the fee, approximately $1,800, is for rental of slug test equipment, personal protective equipment and our environmental sampling van. Two important assumptions have been made in preparing our cost estimate for slug tests. First, the work will be conducted in a Level C or D protective clothing. Second, a sufficient number of wells can be tested to full 8-hour work days.

The total estimated fee for the items discussed above is $63,823. If you have any questions concerning this cost estimate breakdown, please feel free to contact me.

Sincerely,

CHEN & ASSOCIATES, INC.

By _____
David M. Jubenville, P.E.
Vice President and Manager
Waste Management Division

DMJ/eac

Chen & Associates
Consulting Geotechnical Engineers

96 South Zuni
Denver, Colorado 80223
303/744-7105

Casper
Colorado Springs
Ft Collins
Glenwood Springs
Phoenix
Rock Springs
Salt Lake City
San Antonio

September 10, 1987

Subject: Real Time Soil-Gas, Rocky Flats Landfill, Rocky Flats Plant, Golden, Colorado

Job No. 6 011 87

Rockwell International
Rocky Flats Plant
North American Space Operations
P.O. Box 464
Golden, Colorado 80402-0464

Attention: Mr. Tom Greengard

As requested, Chen & Associates conducted a real time soil-gas survey at the Rocky Flats landfill on September 1 and 2, 1987. Twenty points were measured in the landfill for methane and hydrogen sulfide. The location of those points are shown on Figure 1.

Methane was analyzed by a Century OVA 128 flame ionization detector in the gas chromatography mode. Hydrogen sulfide was analyzed by a Photovac 10S50 gas chromatograph with a photoionization detector. The summary of the analyzed compounds are shown in Table I. All sample and QA/QC Photovac 10S50 chromatograms are shown in Attachment 1.

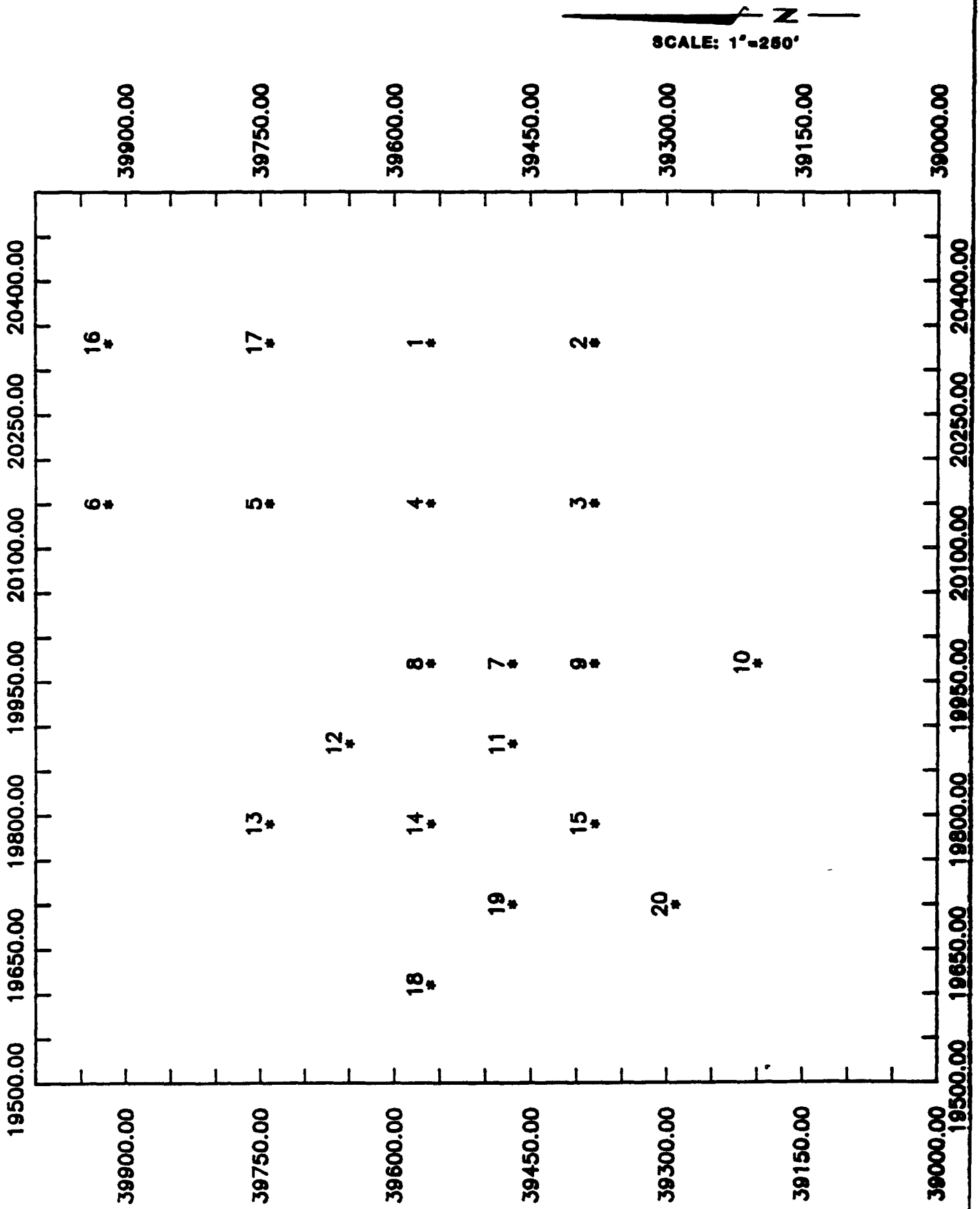
If you have any questions or if we may be of further service, please do not hesitate to contact us.

Sincerely,

CHEN & ASSOCIATES, INC.

By_____
David C. Constant

DCC/eac
Rev. By: DRG
Encs.



6 011 87	Chen & Associates	SOIL GAS SAMPLING POINTS	Fig. 1

TABLE I

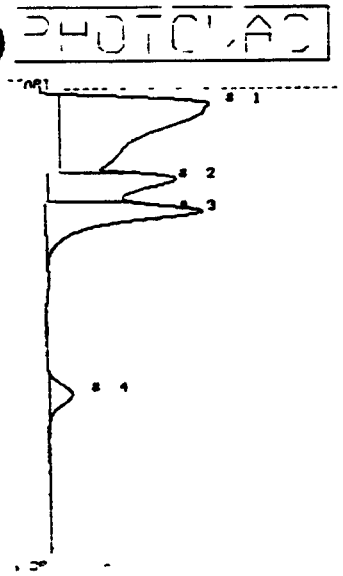
SUMMARY OF HYDROGEN SULFIDE AND METHANE RESULTS

Soil-Gas Sampling Point	Location	Hydrogen Sulfide Value (ppm)	Methane Value (ppm)
1	N39560 E20330	0	0
2	N39380 E20330	0	0.2
3	N39380 E20150	0	0
4	N39560 E20150	0	0
5	N39740 E20150	0	0.4
6	N39920 E20150	0	0
7	N39740 E19970	0	0
8	N39560 E19970	0	0
9	N39380 E19970	0	0
10	N39200 E19970	0	0
11	N39470 E19880	0	0
12	N39650 E19880	0	0
13	N39740 E19790	0	0
14	N39560 E19790	0	0

TABLE I (cont.)

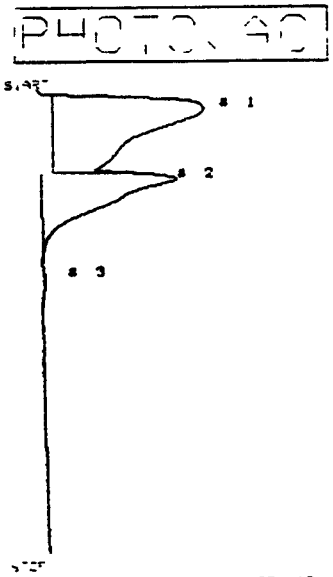
SUMMARY OF HYDROGEN SULFIDE AND METHANE RESULTS

Soil-Gas Sampling Point	Location	Hydrogen Sulfide Value (ppm)	Methane Value (ppm)
15	N39380 E19790	0	0
16	N39920 E20330	0	0
17	N39740 E20330	0	0
18	N39560 E19610	0	0
19	N39470 E19700	0	0
20	N39290 E19700	0	0



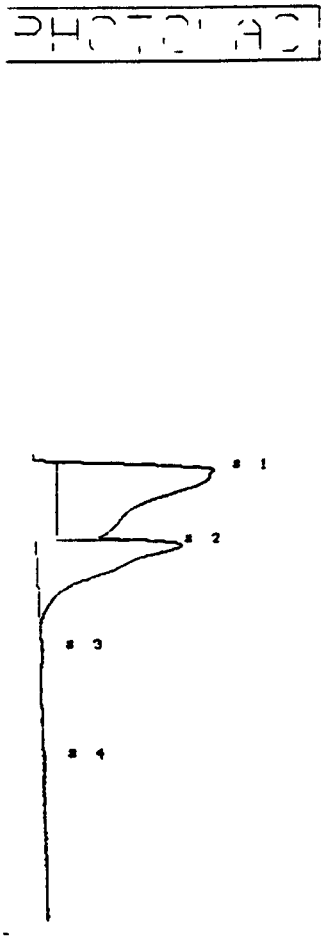
SAMPLE RUN SEP 1 1987 10 4
ANALYSIS # 27 ROCKY FLATS
TEMPERATURE 24 KMM DCC
GAIN 100 621187

PPM



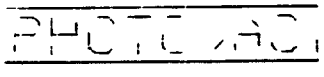
SAMPLE RUN SEP 1 1987 10 7
ANALYSIS # 29 ROCKY FLATS
TEMPERATURE 24 KMM DCC
GAIN 100 621187

Air Check



SAMPLE RUN SEP 1 1987 10 8
ANALYSIS # 23 ROCKY FLATS
TEMPERATURE 23 KMM DCC
GAIN 100 621187

Sample Equipment Check

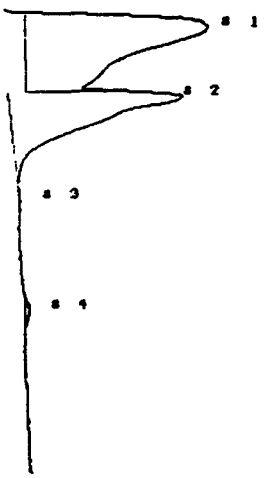


CALIBRATED PEAK 3.H2S

SAMPLE RUN SEP 1 1987 10 5
ANALYSIS # 27 ROCKY FLATS
TEMPERATURE 24 KMM DCC
GAIN 100 621187

PPM

H_2S Calibration



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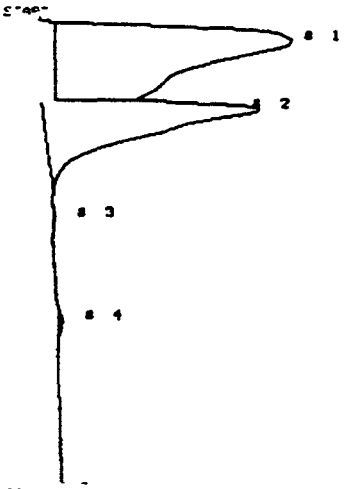
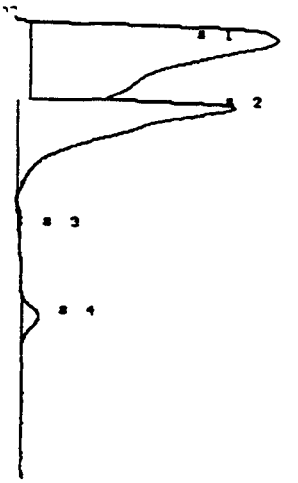
ANALYSIS # 31 ROCKY FLATS
TEMPERATURE 24 KMM DCC
GAIN 100 681 87

1



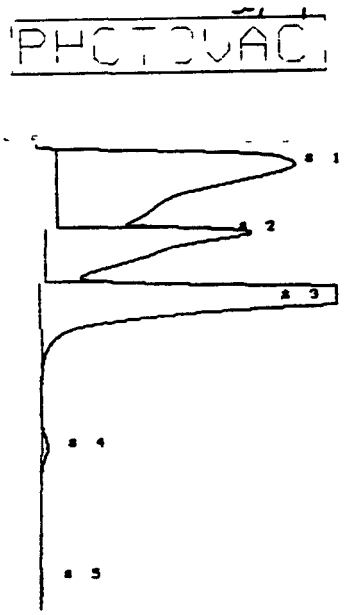
SAMPLE RUN SEP 1 1987 10 29
ANALYSIS # 32 ROCKY FLATS
TEMPERATURE 24 KMM DCC
GAIN 100 681187

2

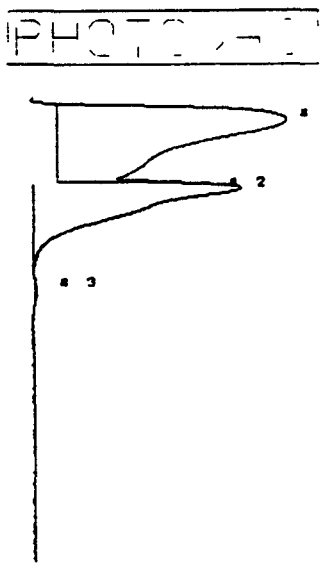


SAMPLE RUN SEP 1 1987 10 33
ANALYSIS # 33 ROCKY FLATS
TEMPERATURE 23 KMM DCC
GAIN 100 681187

3



SAMPLE RUN SEP 1 1987 10 42
ANALYSIS # 36 ROCKY FLATS
TEMPERATURE 24 KMT DCC
GAIN 100 60 187



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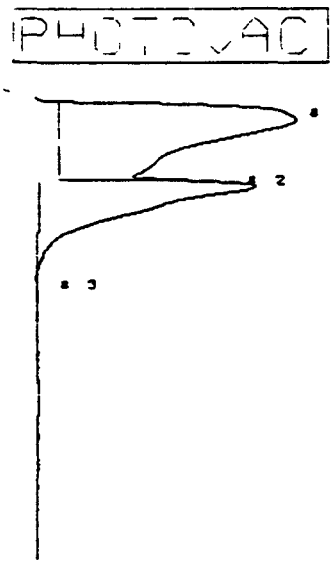
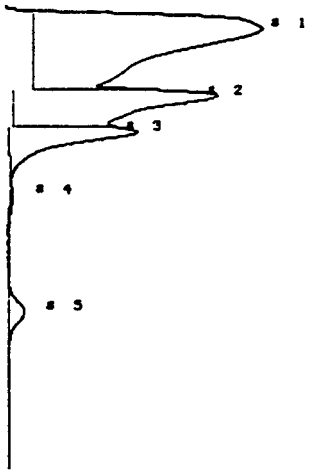
ANALYSIS # 37 ROCKY FLATS
TEMPERATURE 24 KMT DCC
GAIN 100 621187



SAMPLE RUN SEP 1 1987 10 52
ANALYSIS # 38 ROCKY FLATS
TEMPERATURE 24 KMT DCC
GAIN 100 621187

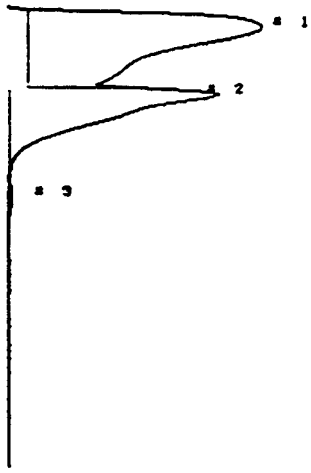
Air Check

PHOTOVAC



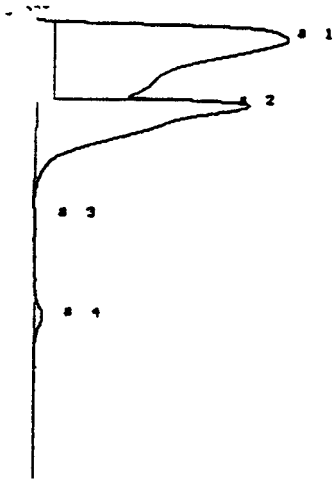
SAMPLE RUN SEP 1 1987 0 54
ANALYS S # 39 ROCKY FLATS
TEMPERATURE 25 KPH DCC
GAIN 80 601187

PHOTOVAC



SAMPLE RUN SEP 1 1987 10 57
ANALYS'S # 40 ROCKY FLATS
TEMPERATURE 21 KPH DCC
GAIN 100 601187

PHOTOVAC



SAMPLE RUN SEP 1 1987 11 4
ANALYSIS # 41 ROCKY FLATS
TEMPERATURE 24 KPH DCC
GAIN 100 601187

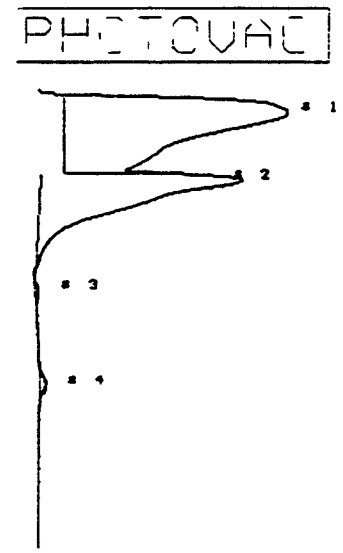
Air Check

6

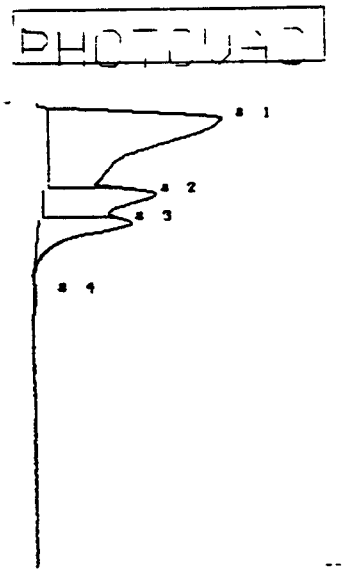
CALIBRATED PEAK 3,H2S

SAMPLE RUN SEP 1987 0 45
ANALYS S # 33 ROCKY FLATS
TEMPERATURE 21 KPH DCC
GAIN 100 63 187

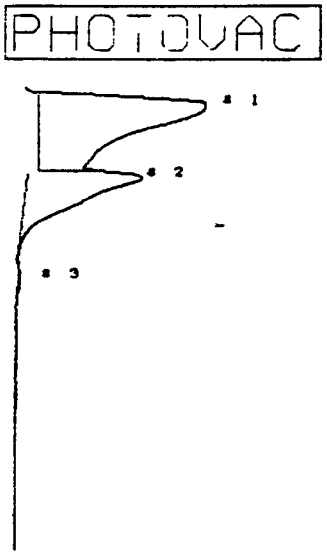
H_2S Calibration



SAMPLE RUN SEP 1 1987 11 14
ANALYSIS # 43 ROCKY FLATS
TEMPERATURE 25 KMM DCC
GAIN 00 601187

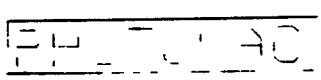


SAMPLE RUN SEP 2 1987 8 56
ANALYSIS # 6 ROCKY FLATS
TEMPERATURE [illegible] KMM DCC
GAIN 33 60 97



SAMPLE RUN SEP 2 1987 8 52
ANALYSIS # 5 ROCKY FLATS
TEMPERATURE 21 KMM DCC
GAIN 100 601187

7



CALIBRATED PEAK 3 H2S

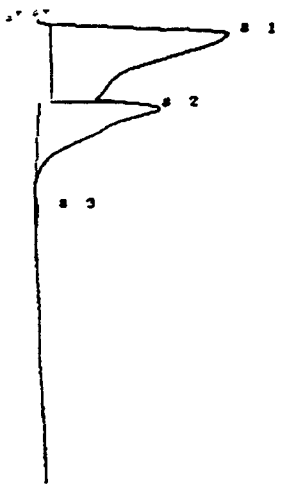
SAMPLE RUN SEP 2 1987 8 56
ANALYSIS # 6 ROCKY FLATS
TEMPERATURE 2 KMM DCC
GAIN 100 601187

Air Check

H_2S Calibration

PHOTOVAC

START



GAIN 100 681187

COMPOUND

PHOTOVAC

START

STOP 9 40 0
SAMPLE RUN SEP 2 1987 10:44
ANALYSIS # 2 ROCKY FLATS
TEMPERATURE 27 KMM OCC
GAIN 100 681187

COMPOUND NAME	PEAK	R T	AREA/PPM
UNKNOWN	1	3 2	4 5 US
UNKNOWN	2	12 0	2 4 US

PHOTOVAC

START

STOP 6 60 0
SAMPLE RUN SEP 2 1987 10:47
ANALYSIS # 28 ROCKY FLATS
GAIN 100 681187

COMPOUND NAME	PEAK	R T	AREA/PPM
UNKNOWN	1	3 4	4 6 US
UNKNOWN	2	12 0	1.9 US
H2S	3	16 1	13.58 PPM
UNKNOWN	4	25 0	13 7 mVS

PHOTOVAC

SAMPLE RUN SEP 2 1987 10:48
ANALYSIS # 3 ROCKY FLATS
TEMPERATURE 28 KMM OCC
GAIN 100 681187

COMPOUND NAME	PEAK	R T	AREA/PPM
UNKNOWN	1	3 4	4 6 US
UNKNOWN	2	12 0	1 9 US
H2S	3	16 1	9 555 PPM
UNKNOWN	4	25 0	13 7 mVS

Sampling Equipment Check

Air Check

START

STOP 0 60 0
SAMPLE RUN SEP 2 1987 11 0
ANALYSIS # 5 ROCKY FLATS
TEMPERATURE 30 KM DCC
GAIN 100 081187

COMPOUND NAME	PEAK	R T	AREA/PPM
UNKNOWN	1	3 3	5 5 US
UNKNOWN	2	12 0	3 0 US
UNKNOWN	3	25 8	16 0 mUS
UNKNOWN	4	35 7	142 4 mUS

8

START

STOP 0 60 0
SAMPLE RUN SEP 2 1987 10 50
ANALYSIS # 4 ROCKY FLATS
TEMPERATURE 30 KM DCC
GAIN 100 081187

COMPOUND NAME	PEAK	R T	AREA/PPM
UNKNOWN	1	3 3	5 2 US
UNKNOWN	2	12 0	2 1 US
UNKNOWN	3	25 3	16 7 mUS
UNKNOWN	4	36 5	31 5 mUS

9

START

STOP 0 60 0
SAMPLE RUN SEP 2 1987 11 6
ANALYSIS # 6 ROCKY FLATS
TEMPERATURE 32 KM DCC
GAIN 100 081187

COMPOUND NAME	PEAK	R T	AREA/PPM
UNKNOWN	1	3 3	6 2 US
UNKNOWN	2	12 0	3 2 US
UNKNOWN	3	28 2	9 2 US
UNKNOWN	4	35 5	1 2 US

10

PHOTOVAC

START

STOP 0 60 0
SAMPLE RUN SEP 2 1987 11 11
ANALYSIS # 8 ROCKY FLATS
TEMPERATURE 33 KMM DCC
GAIN 100 601187

COMPOUND NAME	PEAK	R T	AREA/PPM
UNKNOWN	1	3 1	7 1 US
UNKNOWN	2	12 0	3 7 US
UNKNOWN	3	25 7	25 9 mUS
UNKNOWN	4	35 2	14 1 mUS

11

PHOTOVAC

START

STOP 0 60 0
SAMPLE RUN 9 SEBCKZ FB07S 11 17
TEMPERATURE 35 KMM DCC
GAIN 100 601187

COMPOUND NAME	PEAK	R T	AREA/PPM
UNKNOWN	1	3 2	10 7 US
UNKNOWN	2	11 8	4 5 US
UNKNOWN	3	5 5	15 1 mUS
UNKNOWN	9	94 9	10 2 mUS

12

START

STOP 0 60 0
SAMPLE RUN SEP 2 1987 11: 9
ANALYSIS # 7 ROCKY FLATS
TEMPERATURE 32 KMM DCC
GAIN 100 601187

COMPOUND NAME	PEAK	R T	AREA/PPM
UNKNOWN	1	2 9	6 3 US
UNKNOWN	2	12 0	3 4 US
UNKNOWN	3	25 3	19 1 mUS

Air Check

PHOTOVAC

START

STOP 0 60 0
SAMPLE RUN SEP 2 1987 11 22
ANALYSIS # 18 ROCKY FLATS
TEMPERATURE 37 KMM DCC
GAIN 100 681187

COMPOUND NAME	PEAK	R T	AREA/PPM
UNKNOWN	1	3 4	13 1 US
UNKNOWN	2	11 3	5 0 US
UNKNOWN	3	25 4	38 3 mUS
UNKNOWN	4	33 6	55 9 mUS

13

PHOTOVAC

START

STOP 0 60 0
SAMPLE RUN SEP 2 1987 11 43
ANALYSIS # 18 ROCKY FLATS
TEMPERATURE 37 KMM DCC
GAIN 100 681187

COMPOUND NAME	PEAK	R T	AREA/PPM
UNKNOWN	2	2 8	2 8 US
UNKNOWN	3	12 1	1 3 US
UNKNOWN	4	14 4	2 2 US
UNKNOWN	5	25 7	30 3 mUS
UNKNOWN	6	34 4	65 1 mUS

14

PHOTOVAC

START

STOP 0 60 0
SAMPLE RUN SEP 2 1987 11 37

ANALYSIS # 17 ROCKY FLATS
TEMPERATURE 38 KMM DCC
GAIN 100 681187

COMPOUND NAME	PEAK	R T	AREA/PPM
UNKNOWN	2	9 8	9 0 US
UNKNOWN	3	12 0	1 3 US
H2S	4	14 4	11 41 ppm
H2S	5	16 9	14 31 ppm
UNKNOWN	6	25 1	20 7 mUS
UNKNOWN	7	34 3	45 7 mUS

PHOTOVAC

CAL S ..

SAMPLE RUN SEP 2 1987 11 30
ANALYSIS # 17 ROCKY FLATS
TEMPERATURE 37 KMM DCC
GAIN 100 681187

COMPOUND NAME	PEAK	R T	AREA/PPM
UNKNOWN	1	3 5	4 4 US
UNKNOWN	2	8 6	2 0 US
UNKNOWN	3	12 0	1 3 US
UNKNOWN	4	14 4	1 2 US
H2S	5	16 6	10 00 ppm
UNKNOWN	6	25 1	20 7 mUS
UNKNOWN	7	34 3	45 7 mUS

Air Check

START

STOP 0 60 0
SAMPLE RUN SEP 2 1987 12 11
ANALYSIS # 21 ROCKY FLATS
TEMPERATURE 35 KNM OCC
GAIN 100 601187

COMPOUND NAME	PEAK	R T	AREA/PPM
UNKNOWN		3 3	6 1 US
UNKNOWN	2	2 0	3 1 US
UNKNOWN	3	22 6	75 5 mUS
UNKNOWN	4	35 5	176 6 mUS

15

START

STOP 0 60 0
SAMPLE RUN SEP 2 1987 12 19
ANALYSIS # 22 ROCKY FLATS
TEMPERATURE 36 KNM OCC
GAIN 100 601187

COMPOUND NAME	PEAK	R T	AREA/PPM
UNKNOWN	1	3 3	6 0 US
UNKNOWN	2	12 1	3 7 US
UNKNOWN	3	26 4	30 1 mUS
UNKNOWN	4	35 0	33 3 mUS
UNKNOWN	5	57 3	17 1 mUS

16

START

STOP 0 60 0
SAMPLE RUN SEP 2 1987 12 26
ANALYSIS # 23 ROCKY FLATS
TEMPERATURE 37 KNM OCC
GAIN 100 601187

COMPOUND NAME	PEAK	R T	AREA/PPM
UNKNOWN	1	3 0	6 4 US
UNKNOWN	2	12 1	3 5 US
UNKNOWN	3	[illegible] 5	6 US
UNKNOWN	4	34 4	[illegible] 2 mUS

17

START

STOP 0 60 0
SAMPLE RUN SEP 2 1987 12 28
ANALYSIS # 24 ROCKY FLATS
TEMPERATURE 38 KMM DCC
GAIN 100 601187

COMPOUND NAME	PEAK	R T	AREA/PPM
UNKNOWN	1	3 0	6 6 US
UNKNOWN	2	12 0	3 2 US
H2S	3	16 8	7 253 PPM
UNKNOWN	4	25	5 5 mVS
UNKNOWN	5	34 6	36 6 mVS

START

STOP 0 60 0
SAMPLE RUN SEP 2 1987 12 31
ANALYSIS # 25 ROCKY FLATS
TEMPERATURE 39 KMM DCC
GAIN 100 601187

COMPOUND NAME	PEAK	R T	AREA/PPM
UNKNOWN	1	2 3	7 1 US
UNKNOWN	2	12 0	3 2 US
UNKNOWN	3	25 6	8 4 mVS

START

STOP 0 60 0
SAMPLE RUN SEP 2 1987 12.35
ANALYSIS # 26 ROCKY FLATS
TEMPERATURE 40 KMM DCC
GAIN 100 601187

COMPOUND NAME	PEAK	R T	AREA/PPM
UNKNOWN		3 2	8 4 US
UNKNOWN	2	12 0	3 8 US
UNKNOWN	3	23 3	9 US
UNKNOWN	4	33 7	300 3 mVS

SAMPLE RUN SEP 2 1987 12 29
ANALYSIS # 24 ROCKY FLATS
TEMPERATURE 38 KMM DCC
GAIN 100 601187

COMPOUND NAME	PEAK	R T	AREA/PPM
UNKNOWN	1	3 0	6 6 US
UNKNOWN	2	12 0	3 2 US
H2S	3	16 8	9 999 PPM
UNKNOWN	4	25 1	5 5 US
UNKNOWN	5	34 6	36 6 mVS

Air Check

18

H_2S Calibration

START

STOP # [illegible]
SAMPLE RUN SEP 2 1987 12 40
ANALYSIS # 28 ROCKY FLATS
TEMPERATURE 41 KMM DCC
GAIN 100 601187

COMPOUND NAME	PEAK	R T	AREA/PPM
UNKNOWN	1	3 1	3 4 US
UNKNOWN	2	12 6	14 30 [illegible]
H2S	3	[illegible]	[illegible]
UNKNOWN	4	[illegible]	[illegible]
UNKNOWN	5	[illegible]	[illegible]

ANALYSIS # 28 ROCKY FLATS 12 43
SAMPLE RUN SEP

TEMPERATURE 41 KMM DCC
GAIN 100 601187

COMPOUND NAME	PEAK	R T	AREA/PPM
UNKNOWN	1	3 1	3 4 US
UNKNOWN	2	12 6	14 30 [illegible]
H2S	3	6 6	13 00 [illegible]
UNKNOWN	4	25 4	84 9 mVS
UNKNOWN	5	34 0	16 2 mVS
UNKNOWN	6	57 3	28 9 mVS

START

STOP # 60 0
SAMPLE RUN SEP 2 1987 12 38
ANALYSIS # 27 ROCKY FLATS
TEMPERATURE 41 KMM DCC
GAIN 100 601187

COMPOUND NAME	PEAK	R T	AREA/PPM
UNKNOWN	1	3 0	3 3 US
UNKNOWN	2	12 0	4 2 US
UNKNOWN	3	25 6	42 7 mVS
UNKNOWN	4	34 0	25 8 mVS

19

START

STOP # 60 0
SAMPLE RUN SEP 2 1987 12 40
ANALYSIS # 29 ROCKY FLATS
TEMPERATURE 41 KMM DCC
GAIN 100 601187

COMPOUND NAME	PEAK	R T	AREA/PPM
UNKNOWN	1	3 2	3 5 US
UNKNOWN	2	11.7	4 6 US
UNKNOWN	3	25.3	30 0 mVS
UNKNOWN	4	33.1	89 2 mVS

20

H_2S Calibration

Pump
~~Air~~ Check

PHOTOVAC

START

STOP # 60 0
SAMPLE RUN SEP 2 1987 12 48
ANALYSIS # 30 ROCKY FLATS
TEMPERATURE 41 KMM DCC
GAIN 100 601187

COMPOUND NAME	PEAK	R T	AREA/PPM
UNKNOWN	1	3 1	10 6 US
UNKNOWN	2	11 3	34 4 mUs
UNKNOWN	3	25 5	0 6 mUs
UNKNOWN	4	33 2	0 6 mUs

Pump Check

APPENDIX C

Tritium Investigation Documents

Internal Letter Rockwell International

Date · November 23, 1987 No ·

TO (Name, Organization, Internal Address)
· W. F. Weston/T. C. Greengard
· Plutonium Operations
· Building 111

FROM (Name Organization Internal Address Phone)
Frank J. Blaha
Env. Compliance
Bldng T452F
7041

SUBJECT· RADIOACTIVE SOURCES IN ROCKY FLATS SANITARY LANDFILL

IDENTIFICATION OF RADIOACTIVE PROBLEMS IN LANDFILL

On September 30, 1973 tritium and strontium were detected at the drainage of the Rocky Flats sanitary landfill by the Lawrence Livermore Laboratories (LLL). Because of this finding, monitoring wells (called at the time environmental test holes) were installed in the landfilled waste to try to identify the sources of tritium and strontium.

STRONTIUM STUDY RESULTS

From September through January of 1973 the results for strontium showed large variations in concentration. The LLL sample that had been thought to be greatly elevated in strontium (34 pCi/L) was re-evaluated and found to be less concentrated (16 pCi/L) but above background levels. Background levels are considered to be approximately 1 - 2.5 pCi/L for strontium in water, based upon water samples taken in that time period from Rock Creek. Samples of groundwater/leachate from boreholes in the landfill were analyzed for strontium, and only one sample (from TH-4) appeared elevated in strontium at 7 pCi/L. All other samples of groundwater/leachate had strontium concentrations of less than 1

pCi/L. The detection limits of the method used to analyze for strontium at the time was 0.1 pCi/L. Strontium was analyzed in the landill ponds, drainages, and groundwater intercept system, and generally found at background levels. A table of strontium results is attached with strontium results from the landfill ponds in the period of 1973 - 1984. The data do not appear to indicate a problem with migration of strontium.

TRITIUM STUDY RESULTS

Results for tritium were more consistent. Monitoring wells were installed a number of different times resulting in approximately 57 wells installed directly in the landfilled waste or directly below the saturated waste materials by the end of the investigation. Elevated tritium readings were followed until the source of tritium had been fairly well identified. The tritium concentrations in the water near the tritium source were as high as 301,609 pCi/L at (TH-46).

The location of this tritium source is approximate Rocky Flats coordinates E:20,015; N:39535. The depth of the tritium source, total activity, configuration, and container, if any, are unknown. It was estimated in 1974 that the volume of waste containing the tritium source was dumped in approximately 1970.

The wells nearing the eastern end of the landfill exhibited decreasing tritium concentrations. Seeps of leachate at the eastern end of the landfill had tritium concentrations of 5,000 - 7,000 pCi/L in 1973/1974.

The current Derived Concentration Guide (DCG) (based on a DOE August 5, 1985 memorandum using DOE dose limit of 0.1 rem/yr to members of the public from all pathways, dose conversion factors given in the memorandum, and intake rates of 2.0 L/dy for water) for tritium is 2,000,000 pCi/L. The current USEPA and Colorado standard for tritium in drinking water is 20,000 pCi/L, the proposed EPA drinking water standard (based on a Sept. 30, 1986 Advanced Notice of Proposed Rulemaking and a risk equal to that from a dose rate of 4 mrem/yr) is 90,000 pCi/L. These criteria indicate that the leachate that was found downgradient of the sanitary landfill never exceeded the drinking water standard. The leachate in the immediate area of the tritium source never exceeded the DCG. These tritium levels which are found in the immediate area of the tritium source do not appear to represent a threat to human health or the environment unless tritium is found migrating out of the landfill.

CORRECTIVE ACTIONS OF 1974 AND MONITORING RESULTS

A number of options were evaluated in late 1973 and early 1974 for correction of the identified problems, including excavation of the tritium source. The selected action was the construction of the groundwater intercept system (or the "horseshoe system") around the landfill. The purpose of this system was to isolate the tritium source from the surrounding environment, and to drain as much groundwater out of the landfill as possible. This was accomplished by the construction of a clay wall to prevent the migration of

uncontaminated groundwater into the landfill. This clay wall redirected the groundwater to a perforated pipe for collection. This pipe was provided with a slope, and at the eastern limits of the expected fill the pipe became a solid wall sewer pipe. There were three options, depending on which valves were open, for drainage of this intercepted groundwater: to drain the water into a western pond, to drain the water into an eastern pond, or to have the water daylight below the dam for the eastern pond. The eastern pond is the pond that still exists. The western pond was intended for the management of leachate or contaminated groundwater. The intercepted groundwater was found to not be contaminated with tritium in early 1974 (tritium concentrations of 500 - 1,000 pCi/L, compared to background values of approximately 500 pCi/L). This water was therefore allowed to daylight below the dam for the eastern pond. Extensive monitoring of this water continued from 1974 to 1981 and identified no migration of contaminants.

The leachate and runoff water collected in the western leachate pond was found to contain 1800 - 7922 pCi/L of tritium in 1974. The tritium concentrations in this pond decreased with time (922 - 1365 pCi/L in 1977 and 490 - 886 pCi/L in 1980). Table 2, attached, contains the tritium concentrations found in the western pond. The western landfill pond was removed for expansion of the landfill in May/June of 1981.

The above data indicated that the tritium source was effectively separated from the environment and causing no environmental degradation beyond the immediate area of the tritium source.

IMPLICATIONS FOR 1987 AND LANDFILL CLOSURE

It is suggested that the tritium source be left in place and that long-term monitoring and maintenance of the landfill be committed to in the Closure Plan. These long-term activities at the landfill would include the construction of a sloped low permeability landfill cap, a small leachate collection system, and groundwater monitoring activities.

No benefits can be identified from excavation and disposal offsite of the tritium source unless all other potential sources of radioactivity and hazardous waste were also removed. This would include the excavation of all portions of the landfill used from 1968 until November 1986. If this were accomplished then the landfill could conceivably be closed as a non-RCRA regulated landfill.

The removal of the tritium source would be most effective if all potential sources of radioactivity were also removed. The removal of all potential sources of radioactivity from the landfill would include excavation of large sections of the landfill. The sanitary landfill was never intended for disposal of radioactive substances, but the criteria for identification of these materials has changed through the passage of time. Levels of radioactivity that were essentially undetectable in the mid 1970's are now quantifiable with our improved technology. Current indications are that the 1000 kg of sanitary sewage sludge deposited in the landfill from

August 1968 through February 1970 would be considered radioactive by today's standard. This material and would also require excavation in an attempt to rid the landfill of all sources of radioactivity. These activities would also need to be supplemented with a leachate collection system to drain all leachate from the landfill and treat it since the leachate is also potentially radioactive. After the effort and cost associated with the above activities, the landfill portions used from 1970 through November 1986 would still require long-term monitoring and maintenance due to the presence of RCRA defined hazardous wastes. These long-term monitoring and maintenance activities would probably be no different for a strictly hazardous waste regulated landfill as they would be for a hazardous waste landfill with some radioactive sources contained in it.

Based on currently available data and information, there appears to be no technical problems for leaving the potential sources of radioactivity in place. To date no migration of radioactivity has been identified downgradient or laterally from the landfill. This indicates that the potential radioactive sources are effectively contained in the landfill and that the landfill groundwater intercept system is apparently effective. The degradation of water quality within the landfilled waste is typical of landfills and should not represent a technical or regulatory problem as long as migration of contaminated groundwater out of the landfill is not identified. The drilling program currently underway will identify any migration of contaminated groundwater out of the landfill and

will help determine the effectiveness of the landfill groundwater intercept system in redirecting uncontaminated groundwater around the landfill. It is suggested that during closure activities a leachate collection system of modest design be installed in the eastern portion of the landfill to collect leachate for removal and treatment. This leachate collection system will prevent the build-up of a leachate head in the landfill that would force leachate out of the landfill final cover or cause leachate contamination of groundwater.

SUMMARY

The Colorado Department of Health (CDH) is not currently aware of the tritium source in the landfill or of the potentially radioactive sewage sludge contained in the landfill. All closure activities will be contingent upon CDH's approval. It is suggested that all discussions and plans submitted to the CDH pursue leaving these materials in the landfill and long-term monitoring and maintanence. This solution to the landfill closure problem will protect human health and the environment and should be acceptable to CDH.

Frank J. Blaha

Frank J. Blaha

cc:Daryl Hornbacher
Alan Schubert
Kirk McKinley
John Marschall
Gilbert Brill
Nancy Daugherty
Brent Lewis

E 1

STRONTIUM IN LANDFILL PONDS

MO.	1984	1983	1982	1981	1980	1979	1978	1977	1976	1975	1974	1973
JAN.	n.a.[2]	0.5	<3	3.5 E 7.5 W	3.6 E <3 W	n.a.	n.a.	n.a.	n.a.			n.a.
FEB.	n.a.	<3	<3	<3 E <3 W	3.0 E 3.0 W	n.a. n.a.	n.a.	<3	n.a.			n.a.
MAR.	2.3	<3	n.a.	3.2 E 3.2 W	4.6 E <3 W	n.a.	7.2	<3	<3	NO DATA AVAILABLE	NO DATA AVAILABLE	n.a.
APR.	n.a.	2.4	n.a.	n.a.	<3 E <3 W	n.a.	5.7	<3	<3			n.a.
MAY	n.a.	n.a.	<3	<3	3.5 E <3 W	n.a.	n.a.	<3	3.5			n.a.
JUNE		n.a.	<3	4.2	4.3 E <3 W	n.a.	<3	<3	3.3			n.a.
JULY		n.a.	<3	<3	4.3 E <3 W	n.a.	3.3	<3	4			n.a.
AUG.		n.a.	<3	<3	3.5 E 2.1 W	3.2 E	<3	<3	4.5			n.a.
SEP.		n.a.	<3	<3	4.1 E 5.0 W	<3 E	n.a.	n.a.	3			n.a.
OCT.		7.9	<3	<3 3.4 W	4.4 E <3 W	4.3 E <3 W	<3	n.a.	3			16
NOV.		n.a.	<3	<3	3.6 E <3 W	5.8 E <3 W	3.6	n.a.	<10			16
DEC.		n.a.	0.6	<3	3.7 E <3 W	45 E <3 W	n.a.	n.a.	NS	3		n.a.

NOTES

(1) Results prior to April 1983 were for ^{89}Sr+ ^{90}Sr in most cases, exept for 1973 and units are pCi/l.
(2) n.a. means not analyzed.
(3) EPA Drinking Water Standard: ^{89}Sr=80pCi/l, ^{90}Sr=8pCi/l.
(4) Local Background for ^{90}Sr=2pCi/l.

TRITIUM IN WESTERN LANDFILL POND

MO.	1980	1979	1978	1977	1976	1975	1974	1973
JAN.	738	1316	1136	1365	1740	1143	n.a.	
FEB.	709	780	1368	922	1733	1429	n.a.	
MAR.	520	844	775	1303	1323	1837	7922	
APR.	886	886	944	1113	1431	924	n.a.	
MAY	639	805	956	818	1121	1445	n.a.	
JUNE	530	816	720	740	1172	984	5875	
JULY	546	694	953	856	1378	1520	4797	
AUG.	508	976	1022	983	1305	1258	3724	
SEP.	576	564	768	863	1143	1777	5056	34,000 39,000 57,000
OCT.	495	938	818	806	869	1762	3304	n.a.
NOV.	490	575	1033	812	1005	1553	1800	n.a.
DEC.	530	436	863	880	1067	1542	n.a.	n.a.

NOTES:
(1) Units are pCi/l.

TC6

ROCKY FLATS Environmental MASTER FILE

~~CM Lane~~
~~CH Dompier~~
~~Circulate Ecology~~
~~Council except Owen~~
~~MAT~~
~~GSW~~
~~ret to → SFW~~

ES-376-74-101

INTERIM REPORT ON CORING AND SAMPLING THE ROCKY FLATS LANDFILL

EM File
extra copy

R. R Gunning
M. A. Thompson

January 17, 1974

J. Seastone
J. B. Owen
M A. Thompson/EMF File
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Key Words
Sanitary landfill
Wells
Water control
Drainage
Tritium
Americium
Plutonium
Gunning RR
Thompson MA
ES-376-74-101
Frontium

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"REVIEWED FOR CLASSIFICATION
By [signature]
Date 4/18/91"

INTRODUCTION

On September 20, 1973, tritium was detected at the drainage of the Rocky Flats sanitary landfill by the Lawrence Livermore Laboratories. Above background concentrations of americium-241 were also detected by LLL on the same sample. Subsequent analyses of duplicate samples by other agencies confirmed these analyses.

A dam was constructed at the east base of the landfill to contain the seepage, and a sampling program was initiated.

The EPA-Nevada laboratories on October 5, 1973, detected strontium-90 at the same location. These results were later reconfirmed by the EPA-Nevada Laboratories and by other agencies. Table I is a summary of the results of the initial sampling.

On October 11, 1973, the RFAO, USAEC requested that the seepage collected at the Landfill dam be analyzed on a daily basis for tritium, strontium-90[1], americium-241 (by gamma scan), plutonium-239, -240, a gamma scan and total long-lived alpha In addition, coring of the landfill was initiated to determine concentrations of tritium, strontium-90, and americium-241 within the landfill and to possibly locate their source.

RESULTS

1. Landfill Pond – where is this?

   Only two significant strontium-90 results were detected at the landfill pond. They were 9.26 pCi/l on the composite sample for the week of November 26 through November 30, 1973, and 7.66 pCi/l for the week of December 10 through December 14, 1973.

   Figure I shows the monthly averages of daily analysis for tritium in the landfill pond from September 1, 1973, through December 31, 1973 The analysis for plutonium, americium, and total long-lived alpha during the period of October 15, 1973 through December 28, 1973, showed no results above background.[2]

2. Landfill Survey

   Twenty test holes designated TH-1 through TH-20 (Figure 2) were drilled through the landfill to a depth of 10 feet into the natural soil. Slotted plastic pipe was then placed in the test holes and water samples were taken The analytical results on water samples from these locations for tritium, strontium-90, plutonium and a gamma scan are listed in Table II.

TABLE I

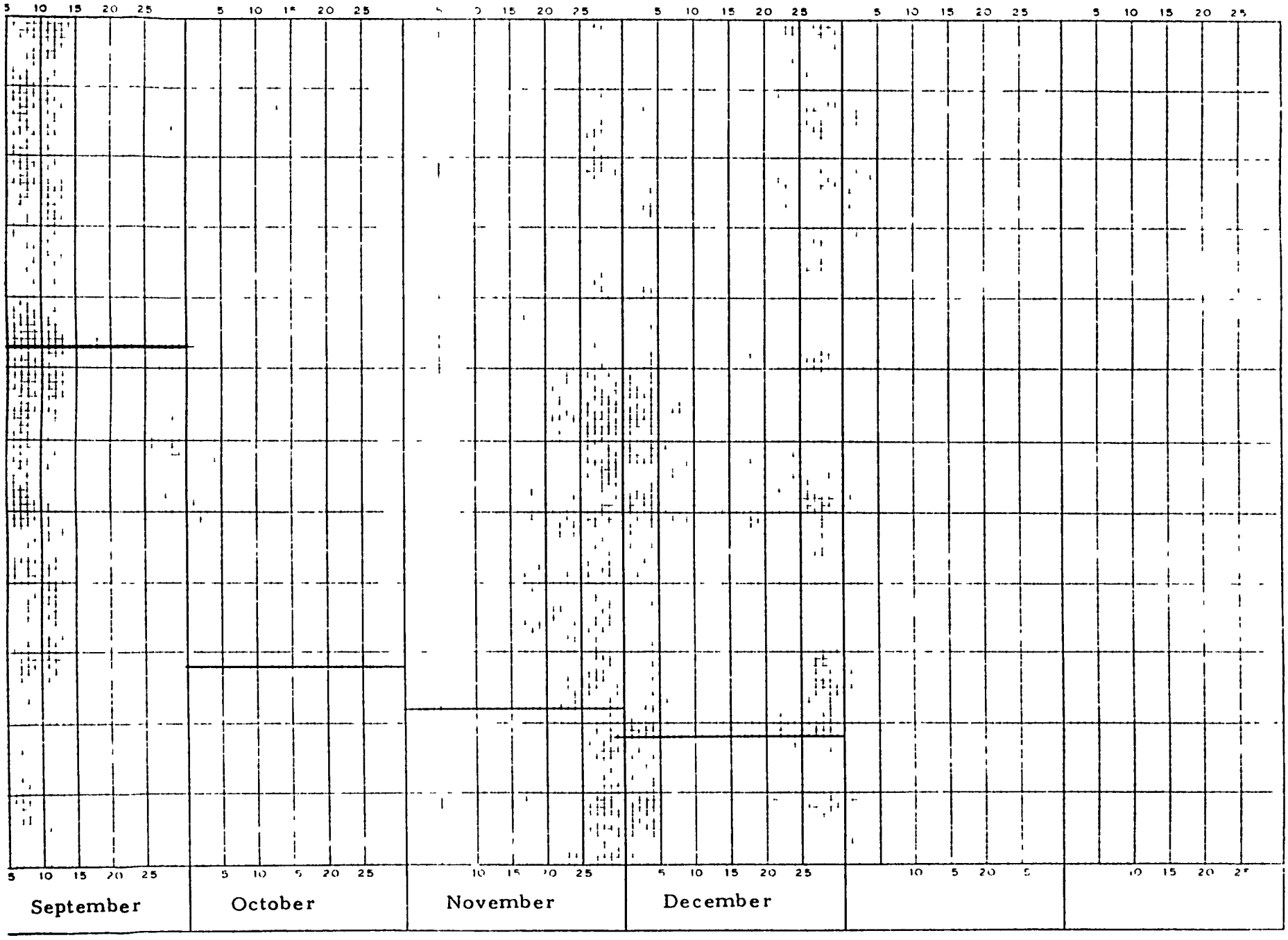
ANALYSIS OF NORTH LANDFILL DRAINAGE

(Sampled 9/20/73)

Date Results Received	Laboratory	Tritium (pCi/l)	Sr^{90} (pCi/l)	Am^{241} (pCi/l)
9/20/73	LLL	39,000		
	Sandia	57,900		
	LASL	34,900		
10/5/73	EPA		25.0	
10/18/73	EPA		7.8	
10/31/73	LLL			735(γ scan) 935 (wet chem.)
11/7/73	RF			122 (γ scan)
11/15/73	LLL		16.0	

6 MONTH BY A 358 139
X 120 DI

FIGURE I. Average Tritium Concentration in Landfill Pond



Test holes TH-1, -3, -4, -5, -8, and -11 indicated tritium concentrations above background The analyses of water samples from the remaining fourteen test holes showed no result above background An additional 25 test holes (TH-21 through TH-34 and TH-45 through TH-55) were drilled in the general location of the high tritium and sampled for tritium only. These results are also shown in Table II. Concentrations as high as 301,609 pCi/l were detected in well TH-46. Limited resampling of wells in the area of high tritium concentrations has been completed and tritium appears to be moving as indicated by decreasing concentrations in TH-46 and apparent increasing concentrations in TH-2, -9, -10, and -12. These results are shown in Table III.

Listed in Table IV are the phenol and elemental analyses (by emission spectroscopy) results from the original 20 test holes Due to insufficient sample, phenol was analyzed at only ten locations and elemental analyses were run on samples from only 18 of the original test holes.

Phenol concentrations above background were detected at all locations. where sampled Emission spectroscopy detected above background concentrations of elements such as Al, Ca, Fe, Mg, Na and Si at most locations.

Because above background strontium and americium values were detected in the drainage from the northeast side of the landfill, two additional wells (TH-2A and TH-2B) were drilled in the northeast section of the landfill and sampled In addition, the north drainage was resampled Analyses for strontium are not yet complete; however, an initial gamma scan (Table V) indicates a high americium concentration in well TH-2A

CONCLUSIONS AND RECOMMENDATIONS

Results to date of the sampling and analysis program suggest that a localized tritium source may exist in the landfill. The high concentrations appear to be in an area of the landfill used during 1970 Sufficient data is not available to speculate on the nature, origin, or type of source Results from the north landfill drainage suggest the possibility of the presence of strontium and americium. The presence of americium can be explained by the past practice of burying sanitary sewage sludge containing small amounts of americium and plutonium in the landfill It is somewhat surprising that above background amounts of plutonium and/or americium were not located in some of the landfill wells. The presence of strontium cannot yet be explained. The results are inconsistent in that strontium is sometimes

TABI E II

LANDFILI SAMPLES

nple cation	1973 Date Sampled	^3H pCi/l	Pu pCi/l	Sr-90 pCi/l	Gamma Scan - Counts/Sec >Bkg ± 2 σ keV 0-1885	59-81*	96-121	173-217	600-732	1104-1218	1266-1380
-1	11/15	11,600	< MDA	1 5	0 33	--	--	--	--	0 02	0 02
-2	11/15	<MDA	< MDA	<3 0	0 49	--	--	0 04	--	0 02	0 01
-3	11/16	6,028	< MDA	<MDA	0 40	--	0 02	0 01	0 09	--	0 03
-4	11/16	34,074	< 0 10	<MDA	0 40	--	0 06	--	0 05	0 02	0 01
-5	11/15	17,428	< MDA	3 0	0 36	--	0 05	0 03	0 02	--	0 01
-6	11/20	1,976	< MDA	1 2	0 20	0 01	--	--	0 02	0 02	0 02
-7	11/20	2,800	0 63	Lost	0 13	--	0 01	--	0 09	0 01	0 03
-8	11/29	28,215	< MDA	<MDA	<MDA	0 17	0 05	--	--	--	0 02
-9	11/20	2,134	0 06	<MDA	0 37 ± 0 23	< MDA	< MDA	< MDA	< MDA	< MDA	< MDA
10	11/20	666	< MDA	<MDA	0 11 ± 0 22	< MDA	< MDA	< MDA	< MDA	< MDA	< MDA
1-11	11/26	6,081	< MDA	0 13	0 85	0 05	0 08	0 02	0 05	0 01	--
1-12	11/20	1,034	< MDA	<MDA	0 51 ± 0 23	0 11±0 08	<MDA	< MDA	< MDA	< MDA	<MDA
1-13	11/29	708	< MDA	<MDA	0 61	--	0 04	0 13	0 04	--	--
1-14	11/20	3,123	0 48	<MDA	0 33	--	0 09	--	0 01	--	0 02
1-15	11/29	1,930	< MDA	<MDA	0 54	--	0 02	0 11	0 08	0 02	--
-16	11/29	1,075	< MDA	<MDA	0 51	--	0 08	0 05	0 07	0 01	0 01
-17	11 20	370	< MDA	<MDA	0 14	0 02	--	--	--	0 02	--
-18	11/29	3,225	< MDA	1 72	0 72	--	0 08	0 08	0 06	0 02	0 02
-19	11/29	1,940	< MDA	<MDA	0 57	--	--	0,08	0 06	0 04	--
-20	11/15	1,915	< MDA	2 4	1 02	--	0 08	0 07	0 13	0 05	0 03
-21	11/29	886									
-22	11/30	164,150									
-23	11/29	30,597									
-24	11/29	4,644									
25	11/25	14,599									
-26	11/29	6,675									
-27	11/29	17,128									
-28	11/29	28,213									
-29	11/29	7,964									

mericium concentrations as determined by gamma scan were less than MDA for all samples analyzed except for TH-12 which showe

TABLE II
(Continued)

ample ocation	1973 Date Sampled	^3H pCi/l	Pu pCi/l	Sr-90 pCi/l	Gamma scan - Counts/Sec >Bkg ± 2σ keV 0-1885	59-81	96-121	173-217	600-732	1104-1218	1266-1380
H-30	11/30	15,222									
H-31	11/30	34,209									
H-32	11/29	36,020									
H-33	11/30	28,732									
H-34	11/30	27,870									
H-45	12/6	201,678									
H-46	12/6	301,609									
H-47	12/6	73,405									
H-48	12/6	11,678									
H-49	12/18	258,499									
H-50	12/14	254,453									
H-51	12/14	215,264									
H-52	12/14	193,651									
H-53	12/14	73,097									
H-54	12/14	124,123									
H-55	12/18	219,367									

TABLE III

TRITIUM CONCENTRATION CHANGES

Sample Location	Date Sampled	Tritium pCi/l
TH-2	11/15/73	<MDA
TH-2	1/3/74	7540
TH-9	11/20/73	2134
TH-9	1/3/74	2638
TH-10	11/20/73	666
TH-10	1/3/74	910
TH-12	11/20/73	1034
TH-12	1/3/74	1695
TH-46	12/6/73	301,609
TH-46	1/3/74	214,199
TH-46	1/9/74	211,374
TH-46	1/15/74	208,611

TABLE IV

PHENOL CONCENTRATIONS AND
ELEMENTAL ANALYSIS OF WATER
FROM ROCKY FLATS LANDFILL

Lab No. M73-1666

TABLE IV

Page -1-

Date 11/30/73

DOW CHEMICAL U.S.A.
Rocky Flats Division
_____ Laboratory

ANALYSIS REPORT

To Dr. Gunning Bldg 123 Charge 317

cc: File Dept

Ext.

Sample Description:

Sanitary Landfill samples

Results of Analyses or Tests:

Sample I. D.	Phenol (ppb)
TH-6	3
TH-8	340
TH-17	27
TH-14	150

Analysis By RLJ

Reported By

Lab. No N73-1651

TABLE IV
Page -2-

Date 11/30/73

DOW CHEMICAL U.S.A.
Rocky Flats Division
_____ Laboratory

ANALYSIS REPORT

To R. Gunning Bldg 123 Charge 317

cc: _____ Dept _____

File Ext _____

Sample Description.

Sanitary Landfill samples

Results of Analyses or Tests.

Sample I. D.	Phenol (ppb)
TH-1	3500
TH-2	2000
TH-3	1900
TH-4	4400
TH-5	310
TH-20	10

Analyzed By _____ Reported By _____

TABLE IV
Page -3-

THE DOW CHEMICAL COMPANY
POLYMER PRODUCTS DIVISION

Distribution _____ Date 12/12/75

Water Samples- Well Waters
Month _____ Year _____

WATER ANALYSIS REPORT 81 GENERAL LABORATORY

REPORTED IN PPM

Element	TH 1	TH 2	TH 3
Ag	< 0.04	< 0.02	< 0.01
Al	> 500	170	1.9
As	< 2	< 0.9	< 0.7
B	0.8	5	4
Ba	8	5	4
Be	< 0.04	0.09	< 0.01
Bi	< 0.2	< 0.09	< 0.07
Ca	> 500	> 220	> 180
Cd	< 2	< 0.9	< 0.7
Ce	< 40	< 17	< 14
Co	0.8	0.3	0.3
Cr	0.8	0.2	0.1
Cs	20	< 2	< 1
Cu	2	0.2	0.1
Fe	> 500	> 220	> 180
Ge	< 0.2	< 0.09	< 0.07
Hg	< 0.4	< 0.2	< 0.1
K	500	220	120
Li	8	2	3
Mg	500	> 220	> 180
Mn	16	17	30
Mo	< 0.04	< 0.02	< 0.01
Na	500	> 220	> 180
Nb	< 0.2	< 0.9	< 0.7
Ni	0.4	0.5	0.1
P	< 2	< 0.9	< 0.7
Pb	1	0.2	0.7
Rb	8	0.9	< 1
Sb	< 0.4	< 0.2	< 0.1
Si	> 500	> 220	> 180
Sn	< 0.4	0.3	0.3
Sr	4	5	6
Ta	1	0.2	0.1
Te	< 4	< 2	< 1
Th	< 0.4	< 0.2	< 0.1
Ti	80	10	10
Tl	< 0.2	< 0.09	< 0.07
U	< 20	< 9	< 7
V	2	< 0.2	< 0.1
W	< 20	< 9	< 7
Zn	30	2	3
Zr	3	0.2	1

TABLE IV
Page -4-

M73-1061

Date [illegible] [illegible] Date 12/12/73

[illegible]

Water [illegible]

WATER ANALYSIS REPORT [illegible] GENERAL LABORATORY

REPORTED IN PPM

Element	TH 4	TH 5	TH 20
Ag	<0.03	<0.003	<0.01
Al	> 420	75	> 150
As	<2	<0.1	<0.6
B	7	0.6	0.5
Ba	16	0.6	5
Be	0.03	<0.003	<0.01
Bi	<0.2	<0.01	<0.06
Ca	> 420	> 40	150
Cd	<2	<0.1	<0.6
Ce	<30	<3	<11
Co	0.7	<0.01	0.2
Cr	1	0.03	0.5
Cs	3	<0.3	6
Cu	1	0.03	0.5
Fe	> 420	> 40	> 150
Ge	<0.2	<0.01	<0.06
Hg	<0.3	<0.03	<0.1
K	290	40	150
Li	13	0.3	1
Mg	> 420	> 140	100
Mn	30	3	11
Mo	<0.03	<0.003	0.6
Na	> 420	> 140	100
Nb	<2	<0.1	<0.6
Ni	<0.3	<0.03	0.3
P	<2	<0.1	0.6
Pb	0.2	0.03	0.3
Rb	7	0.3	3
Sb	<0.3	<0.03	<0.1
Si	> 420	> 140	> 150
Sn	3	0.1	0.2
Sr	7	0.6	<0.1
Ta	<0.3	0.06	0.3
Te	<3	<0.3	<1
Th	<0.3	<0.03	<0.1
Ti	30	1	34
Tl	<0.2	<0.01	<0.06
U	<16	<1	<6
V	1	<0.03	1
W	<16	<1	<6
Zn	13	0.6	10
Zr	3	0.2	0.9

TABLE IV
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Distribution [illegible] — [illegible] — 12/12/75

[illegible] Well Waters

[illegible] Date [illegible] Year [illegible] [illegible] LABORATORY

RESULTS REPORTED IN PPM

Element	TH 6	TH 8	TH 11	TH 17
Ag	<0.03	<0.003	<0.003	<0.003
Al	>10	>10	>10	12
As	<0.2	0.1	<0.1	[illegible]
B	0.3	0.3	0.5	0.7
Ba	0.9	1	0.9	0.9
Be	<0.003	<0.003	<0.003	<0.003
Bi	<0.02	<0.01	<0.01	<0.009
Ca	19	>10	>40	>20
Cd	<0.2	<0.1	<0.1	<0.09
Ce	<3	<3	<3	<2
Co	<0.02	<0.01	0.06	0.05
Cr	0.06	0.06	0.06	0.02
Cs	2	<0.3	0.3	<2
Cu	0.6	0.03	0.1	0.2
Fe	>40	>40	>40	>20
Ge	<0.02	<0.01	<0.01	<0.009
Hg	<0.03	<0.03	<0.03	<0.02
K	40	36	30	16
La	0.6	0.3	0.3	0.1
Mg	40	>40	>10	>20
Mn	0.3	3	5	9
Mo	<0.003	<0.003	<0.003	<0.002
Na	30	36	40	20
Nb	<0.2	<0.1	<0.1	<0.09
Ni	0.03	<0.03	<0.03	<0.02
P	<0.2	<0.01	<0.1	<0.09
Pb	0.3	0.2	0.2	0.2
Rb	0.9	0.3	0.3	0.2
Sb	<0.03	<0.03	<0.03	<0.02
Si	>40	>40	>40	>20
Sn	0.2	0.06	0.2	0.2
Sr	0.2	0.08	0.06	0.5
Ta	<0.03	0.06	0.05	0.07
Te	<0.03	<0.03	<0.03	<0.02
Th	<0.03	<0.03	<0.03	<0.02
Ti	6	2	3	1
Tl	<0.02	<0.01	<0.01	<0.009
U	<2	<1	<1	<0.9
V	0.3	<0.03	0.1	0.02
W	<2	<1	<1	<0.9
Zn	3	0.3	1	[illegible]
Zr	0.2	0.2	0.2	0.1

TABLE IV
Page -6-

D[illegible] _____ [illegible] _____ [illegible]/73 _____

[illegible]

[illegible]

WATER ANALYSIS REPORT [illegible] GENERAL LABORATORY

Month _____ [illegible] _____

REPORTED IN PPM

Element	TH 10	TH 12	TH 7	TH 9
Ag	< 0.003	< 0.006	< 0.01	< 0.01
Al	< 30	[illegible]	[illegible]	[illegible]
As	< 0.1	< 0.[illegible]	[illegible]	[illegible]
B	0.1	0.5	2	0.1
Ba	1	3	6	5
Be	< 0.003	< 0.006	< 0.01	< 0.01
Bi	< 0.01	< 0.03	< 0.06	< 0.06
Ca	30	45	140	160
Cd	< 0.1	< 0.3	< 0.6	< 0.6
Ce	< 3	< 6	< 11	< 13
Co	< 0.01	0.2	< 0.06	< 0.06
Cr	0.05	0.01	0.1	0.3
Cs	0.5	1	1	1
Cu	0.3	0.6	0.06	0.9
Fe	> 30	70	> 140	> 160
Ge	< 0.01	< 0.03	< 0.06	< 0.06
Hg	< 0.03	< 0.06	< 0.1	< 0.1
K	33	70	100	160
Li	0.5	1	0.6	3
Mg	5	17	> 140	> 160
Mn	1	6	55	6
Mo	0.01	0.05	0.06	< 16
Na	20	50	> 140	113
Nb	< 0.1	< 0.3	< 6	< 0.6
Ni	0.05	0.2	< 0.1	0.4
P	0.2	0.4	< 6	0.6
Pb	1	0.4	0.7	0.5
Rb	0.8	2	< 1	4
Sb	< 0.03	< 0.06	0.1	< 0.1
Si	> 30	> 70	140	> 160
Sn	0.05	0.1	0.2	0.3
Sr	0.1	0.3	22	0.4
Ta	0.03	0.06	< 0.01	< 0.1
Te	< 0.03	< 0.06	< 0.01	< 0.1
Th	< 0.03	< 0.06	< 0.01	< 0.1
Ti	8	23	1	40
Tl	< 0.01	< 0.03	< 0.06	< 0.06
U	< 1	< 3	< 6	< 6
V	0.2	0.5	0.1	1
W	< 1	< 3	6	6
Zn	2	5	1	10
Zr	0.3	0.6	0.8	4

Water Samples- Well Water Samples

WATER ANALYSIS REPORT

81 GENERAL LABORATORY

Month _____ Year _____

REPORTED IN PPM

[illegible]	TH 11	TH 16	TH 18	TH 19
Ag	< 0.004	< 0 001	< 0 02	< 0 002
Al	> 50	> 14	> 270	> 20
As	< 0.2	< 0 06	< 1.0	< 0 07
B	0.04	0.03	0 4	0.06
Ba	3.0	0 6	10.0	0.3
Be	< 0.004	< 0.001	< 0 02	< 0.002
Bi	< 0 02	< 0 006	< 0 1	< 0 007
Ca	> 50	14	130	> 20
Cd	< 0.2	< 0 06	< 1.0	< 0.07
Ce	< 4	< 1	< 20	< 2
Co	< 0.02	0 006	0 1	0.007
Cr	0.02	0.006	0 4	0.006
Cs	0.4	0 1	20	2
Cu	0.4	0 3	6.0	0.3
Fe	> 50	> 14	> 270	> 20
Ge	< 0.02	< 0.006	< 0.1	< 0.007
Hg	< 0.04	< 0.001	< 0.2	< 0.02
K	50	14	270	20
Li	0.8	2 0	4 0	0.2
Mg	> 50	> 14	210	> 20
Mn	2.0	0.3	10.0	2.0
Mo	0.01	< 0.001	0.2	0.002
Na	> 50	> 14	270	20
Nb	< 0.004	< 0 001	< 0.02	< 0 002
Ni	< 0.04	< 0.01	0.6	< 0.02
P	< 0.2	< 0 06	< 1 0	< 0 007
Pb	0.2	0.05	0.8	0.06
Rb	8 0	0.1	6.0	0.2
Sb	< 0 04	< 0.01	< 0 2	< 0 02
Si	> 50	> 14	270	> 20
Sn	0.08	0.01	0.2	0.3
Sr	0.8	0.06	1.0	0.2
Ta	< 0.04	< 0.01	< 0.2	0.02
Te	< 0.4	< 0.1	< 2.0	0.2
Th	< 0.04	< 0 01	0 2	< 0 02
Ti	4 0	2.0	80	2
Tl	< 0 02	< 0 006	< 0 1	< 0.0007
U	< 2 0	< 0 6	< 10 0	< 8 0
V	0.1	0.06	4.0	0.06
W	< 2.0	< 0.6	< 10.0	< 0.7
Zn	2.0	< 0 8	20	0.7
Zr	0.4	0.1	4.0	0.1

TABLE V

LANDFILL SAMPLES

Sample Location	Date Sampled	^3H pCi/l	Gamma Scan - Counts/Sec Bkg ± 2σ keV 0-1885	59-81	96-121	173-217	600-732	1104-1218	1266-1380
North TH-2A	1/3/74	≤1572	4.61 ±0.26	0.17 ±0.08	0.36 ±0.08	0.40 ±0.08	0.39 ±0.06	0.07 ±0.03	0.09 ±0.0
South TH-2B	1/3/74	≤1163	0.46 ±0.23	--	--	0.16 ±0.07	0.10 ±0.05	--	0.03 ±0.0
North Drainage	1/3/74	≤2607	0.36 ±0.23	--	--	0.10 ±0.07	0.08 ±0.05	--	--

PART QUAN

ISSUE	DESCRIPTION	LOC	DATE	BY	APPR'D	CLASSIFIER	JOB NO
A	ORIGINAL S		1-2-74	[illegible]	CAG	SEL	440527

TOLERANCES		BY	DATE
FRACT ±	DESIGNED	DAVIS	12/19/73
ANGLE ±	DRAWN	DAVIS	12/20/73
DEC ±	CHECKED	CAG	1-2-74
UNLESS NOTED OTHERWISE	APPROVED	CA Gunderson	1-2-74
REMOVE BURRS AND SHARP EDGES			
NEXT ASSEMBLY	SUBMITTED		
	REC'M'DED		
SCALE: 1" = 50'-0	APP'D (AEC)		

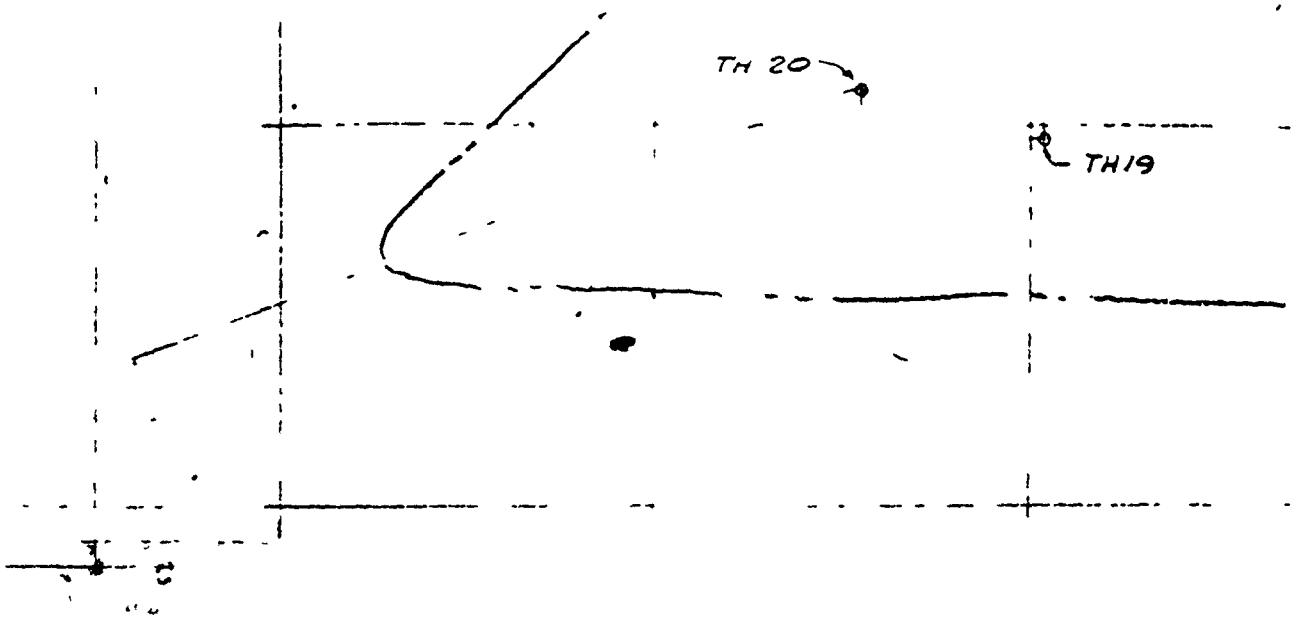
U S ATOMIC ENERGY COMMISSION
ROCKY FLATS AREA OFFICE GOLDEN COLORADO

THE DOW CHEMICAL COMPANY

AEC CONTRACT AT (29 1) 1106
ROCKY FLATS DIVISION GOLDEN COLORADO

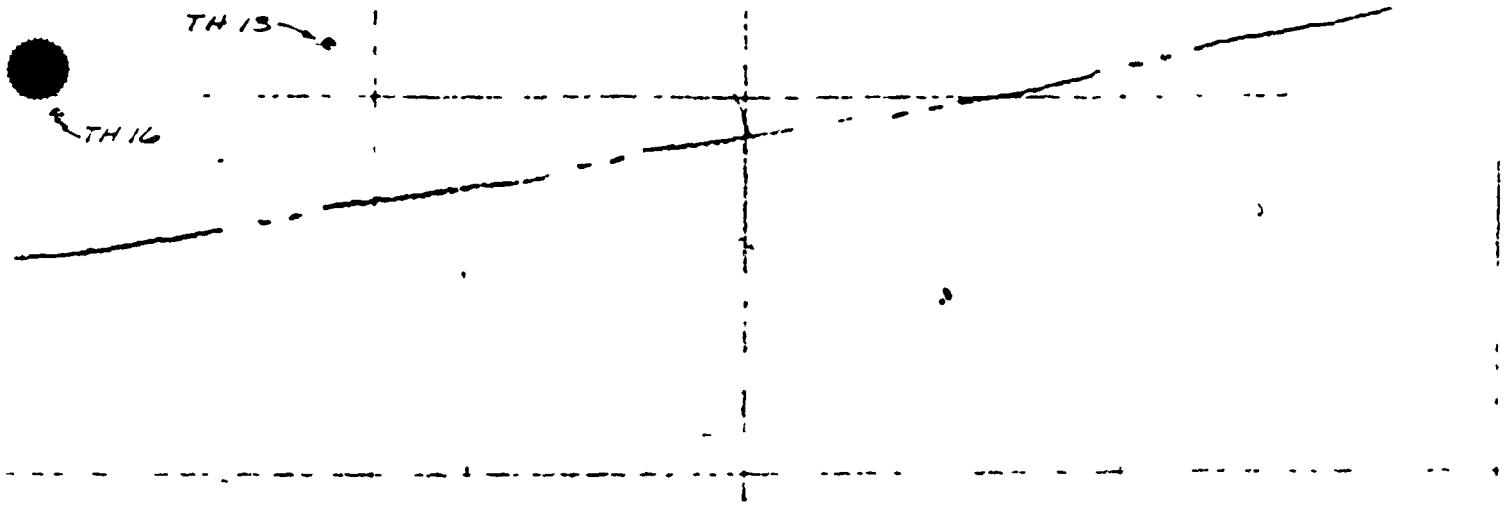
SITE SOIL INVESTIGATION-
SANITARY LANDFILL
TEST HOLE LOCATIONS

SIZE	DRAWING NUMBER	ISSUE	SHEET
D	27239 - 2	A	2 OF 2



TEST HOLE DATA

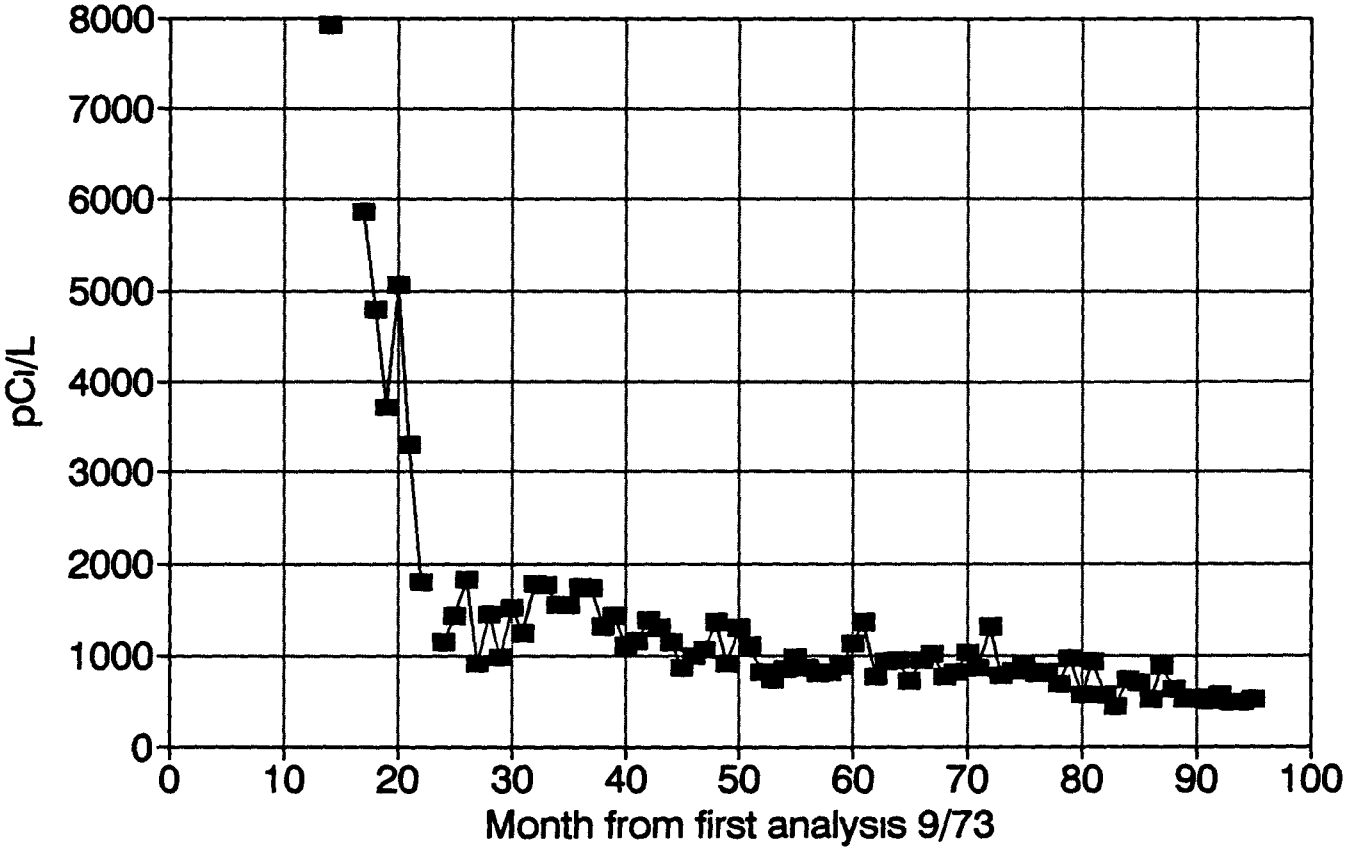
TEST HOLE NUMBER	PLANT COORDINATES	GRADE ELEV.
1	N39,599 - E20,172	5983.06
2	N39,697 - E20,214	5981.64
2-A	N39,741 - E20,191	5982.22
2-B	N39,666 - E20,229	5981.20
3	N39,554 - E20,278	5979.39
4	N39,508 - E20,186	5983.81
5	N39,580 - E20,112	5984.19
6	N39,708 - E20,125	5983.59
7	N39,488 - E20,088	5984.77
8	N39,548 - E20,015	5985.08
9	N39,640 - E20,041	5983.98
10	N39,454 - E20,003	5986.89
11	N39,516 - E19,924	5986.74
12	N39,605 - E19,942	5984.99
13	N39,414 - E19,888	5988.44
14	N39,471 - E19,835	5988.92
15	N39,547 - E19,847	5986.85
16	N39,395 - E19,815	5988.46
17	N39,441 - E19,750	5989.42
18	N39,489 - E19,775	5987.76
19	N39,397 - E19,704	5990.72
20	N39,408 - E19,654	5991.07
21	N39,468 - E19,692	5989.30
22	N39,531 - E19,976	5985.98
23	N39,511 - E20,028	5985.44
24	N39,588 - E20,002	5984.53
25	N39,565 - E20,063	5984.59
26	N39,502 - E20,142	5984.42
27	N39,527 - E20,129	5984.13
28	N39,622 - E20,115	5983.66
29	N39,586 - E20,149	5983.62
30	N39,637 - E20,177	[illegible]



TEST HOLE DATA (CONT.)

TEST HOLE NUMBER	PLANT COORDINATES	GRADE ELEV.
34	N39,487 - E20,213	5983.62
45	N39,540 - E19,971	5985 97
46	N39,532 - E19,984	5985.42
47	N39,521 - E19,979	5985 89
48	N39,527 - E19,965	5985.59
49	N39,539 - E19,984	5985.40
50	N39.545 - E19,982	5985.55
51	N39,537.5 - E19,978	5985.70
52	N39,541 - E19,988	5985.28
53	N39,535 - E19,989	5985 40
54	N39,536 - E19,995	5985.17
55	N39.550 - E19,994	5985 22

Tritium in Western Landfill Pond
1973 to 1980



INTERIM REPORT ON CORING AND SAMPLING
THE ROCKY FLATS LANDFILL
ES-376-74-101

LOCATION AND ELEVATION OF TEST HOLES DRILLED
TO LOCATE TRITIUM IN PRESENT LANDFILL
(* represent estimates taken from map)
(Rocky Flats Plant Coordinates)

	ID No	NORTHING	EASTING	ELEVATION
1	1	39559	20172	5983 06
2	2	39697	20214	5981 64
3	2A	39741	20191	5982 22
4	2B	39666	20229	5981 20
5	3	39554	20278	5979 39
6	4	39508	20186	5988 81
7	5	39580	20112	5984 19
8	6	39708	20125	5983 59
9	7	39488	20088	5984 77
10	8	39548	20015	5985 08
11	9	39640	20041	5983 98
12	10	39454	20003	5986 89
13	11	39516	19924	5986 74
14	12	39605	19942	5984 99
15	13	39414	19888	5988 44
16	14	39471	19835	5988 92
17	15	39547	19847	5986 85
18	16	39395	19815	5988 46
19	17	39441	19750	5989 42
20	18	39489	19775	5987 76
21	19	39397	19704	5990 72
22	20	39408	19654	5991 07
23	21	39468	19692	5989 30
24	22	39531	19976	5985 98
25	23	39511	20028	5985 44
26	24	39588	20002	5984 53
27	25	39565	20063	5984 59
28	26	39502	20142	5984 42
29	27	39527	20129	5984 13
30	28	39622	20115	5983 66
31	29	39586	20149	5983 62
32	30	39637	20177	5983 44
33	31*	39562	20191	5983 18
34	32*	39615	20209	5982 08
35	33*	39527	20228	5982 6
36	34	39487	20213	5983 62
37	45	39540	19971	5985 97
38	46	39532	19984	5985 42
39	47	39521	19979	5985 89
40	48	39527	19965	5985 59
41	49	39539	19984	5985 40
42	50	39545	19982	5985 55
43	51	39537 5	19978	5985 70
44	52	39541	19988	5985 28
45	53	39535	19989	5985 40
46	54	39536	19995	5985 17
47	55	39550	19994	5985 22

APPENDIX D

Borehole Logs for

Present Landfill Monitoring Wells

Project:	Rocky Flats Plant	LOG OF BORING NO.	4-86
Date Drilled	4/24/86	Coordinates	
Boring Method	Hollow Stem Auger	Ground Surface Elevation	5645

Elev. (feet)	Depth (feet)	Sample Type	Graphic Log	Material Description	Penetration Resistance (Blows/inch) 20 40	Water Content (%) 20 40	Other Tests
	0			VALLEY FILL ALLUVIUM 0-0.7'. CLAY: dark brown; silty; trace granitic pebbles; moist. 0.7-1.5'. CLAY· medium to dark brown; some very fine-grained sand; moist. 1 5-2.7'. SAND: medium to dark brown; poorly sorted; fine to coarse; quartz and feldspar; silty clay partings, moist.			
	3			2.7-3.0'. CLAY. dark grayish brown; iron stains and trace granitic pebbles; silty; moist to wet. 3.0-8.0'-Sample. Recovered 1.7/5.0'=34% 3 0-4.0' CLAY: Same as above; moist to wet. 6 3-8.0'. CLAY· dark grayish brown; silty; iron stains and trace granitic pebbles, moist to wet.			
	6			8.0-10 5'-Sample. Recovered 0.7/2.5'=28%. 8.0-8 7' CLAY dark brown, silty, trace grading to some granitic cobbles; moist. 10.5-13.0'-Sample. Recovered 1.3/2.5'=52%.			
	9			11.7-12.2'. CLAY: medium to dark brown; some granitic pebbles and cobbles; sandy to gravelly; moist. Wet at 12.0'. 12.2-13.0' CLAY: medium brown to medium gray; sandy to gravelly; some granitic pebbles and cobbles; iron staining; wet.			
	12						

Remarks Logged by S Paschke Checked by _____

Project No. 106P06222

Hydro-Search, Inc.

Project:	Rocky Flats Plant	LOG OF BORING NO.	4-86
Date Drilled	4/21/86	Coordinates	
Boring Method	Hollow Stem Auger	Ground Surface Elevation	5645

Elev. (feet)	Depth (feet)	Sample Type	Graphic Log	Material Description	Penetration Resistance (Blows/Inch) 20 40	Water Content (%) 20 40	Other Tests
	12			13.0-15.5'-Sample. Recovered 2.1/2.5'=84%. 13.0-14.7' CLAY: medium gray; some fine to coarse sand and some granitic pebbles; iron staining; wet. 14 7-14.9' CLAY· medium gray; some fine to coarse sand and granitic pebbles. iron staining; wet.			
	15			ARAPAHOE FORMATION 15.5-18.0'-Sample. Recovered 2.5/2.5'=100%. CLAYSTONE: medium gray; slightly sandy; moist.			
	18			TOTAL DEPTH: 18.0'			
	21						
	24						

Remarks Logged by S Paschke Checked by

Project No. 106P06222

Hydro-Search, Inc.

Project: Rocky Flats Plant

LOG OF BORING NO. 5-86

Date Drilled 9/4/86 **Coordinates**

Boring Method Hollow Stem Auger **Ground Surface Elevation** 5723

Elev. (feet)	Depth (feet)	Sample Type	Graphic Log	Material Description	Penetration Resistance (Blows/Inch) 20 40	Water Content (%) 20 40	Other Tests
	0			VALLEY FILL ALLUVIUM 0-2.0'-Sample. Recovered 2.0/2.0'=100% GRAVEL: grayish red (10R 4/2) with very fine-grained sand; roots and grasses; poorly sorted; subangular, unconsolidate, weathered; dry. 2.0-4.0'-Sample. Recovered 0.8/2.0'=40%. GRAVEL grayish red (10R 4/2) gravel and sand; quartzite and granite pebbles and cobbles; poorly sorted; angular; unconsolidate, dry.			
	2			4.5-6.0'-Sample. Recovered 1 5/2.0'=75%. 4.5-5.7'- SAND: dark yellowish brown (10YR 4/2) very fine-grained sand with some gray quartzite pebbles and cobbles; some light brown (5YR 5/6) areas, poorly sorted; sub-angular, unconsolidated; dry.			
	4			5.7-6 0'- CLAY moderate yellowish brown (10YR 5/4) with several gray quartzite pebbles and cobbles; several white calcareous laminations; strong reaction with HCL, dry.			
	6			6.0-8.0'-Sample. Recovered 2.0/2.0'=100%. GRAVEL: several gray quartzite gravels and pebbles in a moderate yellowish brown (10YR 5/4) clay matrix; angular; poorly sorted, weathered, dry.			
	8						

Remarks Logged by J. Ferguson Checked by _____

Project No. 106P06222

Hydro-Search, Inc.

Project:	Rocky Flats Plant	LOG OF BORING NO.	5-86
Date Drilled	4/21/86	Coordinates	
Boring Method	Hollow Stem Auger	Ground Surface Elevation	5723

Elev. (feet)	Depth (feet)	Sample Type	Graphic Log	Material Description	Penetration Resistance (Blows/inch) 20 40	Water Content (%) 20 40	Other Tests
	8			8.0-9.0'-Sample. Recovered 0.6/2.0'=30%. CLAY: dark yellowish brown (10YR 4/2) and moderate yellowish brown (10YR 5/4) clay; few gravels (subrounded); unconsolidated; dry.			
				ARAPAHOE FORMATION			
	10			9.0 -10.0'-Sample. CLAYSTONE: Dark yellowish brown (10YR 4/2) and moderate yellowish brown (10YR 5/4) mottles; poorly consolidated; dry.			
				10.0-12.0'-Sample. Recovered 0.9/2.0'=45%. CLAYSTONE: dark yellowish brown (10YR 4/2) with abundant moderate yellowish brown (10YR 5/4) and light brown (5YR 5/6) mottles, no pebbles or inclusions; weathered; dry			
	12			12.0-14.0'-Sample from augers. CLAYSTONE: light olive gray (5Y 5/2) and light brown (5YR 5/6) mottled clay; several iron stains, dry.			
	14			TOTAL DEPTH: 14.0'			
	16						

Remarks Logged by J Bergman Checked by

Project No. 106P06222

Hydro-Search, Inc.

Project: Rocky Flats Plant

LOG OF BORING NO. 6-86

Date Drilled 9/4/86 **Coordinates** N 40588.1 E 23577.5

Boring Method Hollow Stem Auger **Ground Surface Elevation** 5806.10

Elev. (feet)	Depth (feet)	Sample Type	Graphic Log	Material Description	Penetration Resistance (Blows/inch) 20 40	Water Content (%) 20 40	Other Tests
	0			VALLEY FILL ALLUVIUM			
				0.0-2.0'-Sample. Recovered 0.4/2.0'=20%.			
				0-0.3'-Sample. TOPSOIL: grayish brown (5YR 3/2) fine- to coarse-grained sandy soil; contains grass and roots; poorly sorted; dry.			
				0.3-0.4'-Sample. GRAVEL: grayish brown (5YR 3/2) fine- to coarse-grained sand and gravel; friable; few quartzite pebbles; moderately well sorted; subrounded; unconsolidated; dry.			
	2.5						
				2.0-4.0'-Sample. Recovered 1.7/2.0'=85%. GRAVEL: pale brown (5YR 5/2) fine- to medium-grained sand and gravel; abundant quartzite pebbles and cobbles; poorly sorted; angular to subrounded; unconsolidated; dry.			
	5						
				4.0-6.0'. Recovered 0.2/2.0'=10%. (Shoe sample) GRAVEL: pale brown (5YR 5/2) sand and gravel; common quartzite cobbles and pebbles, poorly sorted; subangular; unconsolidated; dry.			
				6.0-8.0'-Sample. Recovered 0.4/2.0'=20%. CLAY: dark yellowish brown (10YR 4/2); very fine-grained with some quartzite grains; unconsolidated; slightly damp.			
	7.5						
				ARAPAHOE FORMATION		▽	
				8.0-10.0'-Sample from bit. Recovered 0.2/2.0'=20%. CLAYSTONE: pale brown (5YR 5/2) with some light brown (5YR 5/6) staining; very fine-grained; dry.			
	10						

Remarks Logged by: J. Bergman Checked by

Project No. 106P06222

Hydro-Search, Inc.

Project:	Rocky Flats Plant	LOG OF BORING NO. 6-86

Date Drilled 9/4/86 **Coordinates** N 40588.1 E 23577.5

Boring Method Hollow Stem Auger **Ground Surface Elevation** 5806.10

Elev. (feet)	Depth (feet)	Sample Type	Graphic Log	Material Description	Penetration Resistance (Blows/Inch) 20 40	Water Content (%) 20 40	Other Tests
	10			10.0-12.0'-Sample. Recovered 0.8/2.0'=40%. CLAYSTONE: dark yellowish brown (10YR 4/2) with few light brown (5YR 5/6) mottles; unweathered; dry.			
				12.0-14.0'-Sample. Recovered 1.6/2 0'=80%. CLAYSTONE: grayish brown (5YR 3/2) with few light brown (5YR 5/6) mottles; homogenous; dry.			
	12 5						
				TOTAL DEPTH: 14.0'			
	15						
	17 5						
	20						

Remarks Logged by J. Bergman Checked by

Project No. 106P06222

Hydro-Search, Inc.

Project: Rocky Flats Plant

LOG OF BORING NO. 7-86

Date Drilled 9/23/86
Boring Method Hollow Stem Auger

Coordinates N 39869.8 E 20892.8
Ground Surface Elevation

Elev. (feet)	Depth (feet)	Sample Type	Graphic Log	Material Description	Penetration Resistance (Blows/inch) 20 40	Water Content (%) 20 40	Other Tests
	0			VALLEY FILL ALLUVIUM 0-2.0'-Sample. Recovered 1.4/2.0'=70%. CLAY: grayish brown (5YR 3/2) with granitic pebbles; poorly sorted; subangular to subrounded; roots and organics common; damp. 2.0-4.0'-Sample. Recovered 0.2/2.0'=10%. GRAVEL: granitic pebbles in a grayish brown (5YR 3/2) clay matrix; poorly sorted; subangular to subrounded; few roots; unconsolidated; damp.			
	2			4.0-6.0'-Sample. Recovered 2.0/2.0'=100%. 4.0-5.0'. GRAVEL: quartzite and granite pebbles in a grayish brown (5YR 3/2) clay matrix; poorly sorted; subangular to subrounded; unconsolidated; damp.			
	4			ARAPAHOE FORMATION 5.0-6.0'-Sample. CLAYSTONE: light olive gray (5Y 5/2) with limonite staining and few willow roots; very fine-grained; damp.			
	6			6.0-8.0'-Sample. Recovered 2.3/2.0'=115%. CLAYSTONE: light olive gray (5Y 5/2) with dark yellowish orange (10YR 6/6) mottling occurring as bands (1/4" laminae); rare silty laminae; becomes more silt rich at base; rare dusky blue (5PB 3/2) swirl; poorly consolidated; damp.			
	8						

Remarks Logged by C. Walker

Checked by

Project No. 106P06222

Hydro-Search, Inc.

Project: Rocky Flats Plant

LOG OF BORING NO. 7-86

Date Drilled 9/23/86 **Coordinates** N 39869.8 E 20892.8

Boring Method Hollow Stem Auger **Ground Surface Elevation**

Elev. (feet)	Depth (feet)	Sample Type	Graphic Log	Material Description	Penetration Resistance (Blows/inch) 20 40	Water Content (%) 20 40	Other Tests
	8			8.0-10.0'-Sample. Recovered 2.3/2.0'=115%. CLAYSTONE: light olive gray (5Y 5/2) with dark yellowish orange (10YR 6/6) mottling occurring as bands (1/4" laminae); common black organic particles throughout sample, sample is swirled with natural bedding disturbed; limonite (very dusky purple 5P 2/2) to 50% in lower 1.5'.			
	10			TOTAL DEPTH: 10.0'			
	12						
	14						
	16						

Remarks Logged by C. Walker Checked by:

Project No. 106P06222

Hydro-Search, Inc.

Project: Rocky Flats Plant

LOG OF BORING NO. 8-86

Date Drilled 9/23/86, 10/20/86 - 10/23/86 **Coordinates** N 39859 2 E 20916.7

Boring Method Hollow Stem Auger/NC Core **Ground Surface Elevation**

Elev. (feet)	Depth (feet)	Sample Type	Graphic Log	Material Description	Penetration Resistance (Blows/inch) 20 40	Water Content (%) 20 40	Other Tests
	0			**VALLEY FILL ALLUVIUM** 0-2.0'-Sample. Recovered 1.9/2.0'95%. 0.0-0.9'. GRAVEL: coarse grained sand to pebble sized grains in moderate brown to light brown (5YR 5/6) clay; roots; poorly sorted; unconsolidated; dry.			
	5			**ARAPAHOE FORMATION** 0.9 to 2.0'. CLAYSTONE: light olive gray (5Y5/2) with organics and some limonite staining; poorly consolidated; damp. 2.0-4.0'-Sample. Recovered 2.3/2.0'=115%. CLAYSTONE: light olive gray (5Y 5/2); silty; poorly consolidated; weathered; damp. 4.0-5.0'-Sample. Recovered 1.3/1.0'=130%. CLAYSTONE: light olive gray (5Y 5/2); approximately 30-40% limonite; poorly consolidated; weathered; damp. 5.0-7.0'-Sample. Recovered 2.0/2.0'=100%. CLAYSTONE: light olive gray (5Y 5/2) containing very little limonite; limonite percents decrease from 5.0 to 6.5' - at 6.5' core becomes less limonitic with incipient parting; blocky; slightly weathered; dry. 7.0-9.0'-Sample. Recovered 2.0/2.0'=100%. CLAYSTONE: light olive gray (5Y 5/2); weathered with 30-35% limonite; crumbly texture; dry.			
	10						
	15						
	20						

Remarks Logged by: C. Walker & L. Pivonka Checked by

Project No. 106P06222

Hydro-Search, Inc.

Project: Rocky Flats Plant

LOG OF BORING NO. 8-86

Date Drilled 9/23/86, 10-20-86 - 10/23/86 **Coordinates** N 39859.2 E 20916.7

Boring Method Hollow Stem Auger/NC Core **Ground Surface Elevation**

Elev. (feet)	Depth (feet)	Sample Type	Graphic Log	Material Description	Penetration Resistance (Blows/Inch) 20 40	Water Content (%) 20 40	Other Tests
	20			9.0-11.0'-Sample. Recovered 2.2/2.0'=110%. CLAYSTONE: light olive gray (5Y 5/2) with 20-40% limonite; crumbly from 9.0-9.3'; 9.3-11 0' sample is fairly consolidated with rare black organics; rare incipient parting; damp.			
	25			11.0-13.0'-Sample. Recovered 2.3/2.0'=115%. CLAYSTONE: light olive gray (5Y 5/2); up to 50% limonite; organics up to 10% with dusky blue (5PB 3/2) patches and bands; damp.			
	30			13.0-15.0'-Sample. Recovered 2.2/2.0'=110%. 13.0-13.8'. CLAYSTONE: light olive gray (5Y 5/2); up to 50% limonite. 13.8-15.0'. SHALE: grayish black (N/2); high black organic content with discontinuous coal seams (up to 1/8" thick); rare limonite laminae along parting; poorly consolidated; slightly damp.			
	35			15.0-17.0'-Sample. Recovered 2.3/2.0'=115%. CLAYSTONE: grayish black to black (N/2 to N/1) coaly shale and claystone; poorly and irregularly developed; poorly consolidated; up to 30% coal; organic percent decreases from 16.0-17.0' to dark gray claystone with 0.0-5.0% organics; dry.			
	40			17.0-19.0'-Sample. Recovered 2.3/2.0'=115%. CLAYSTONE: medium dark gray (N4); no reaction with HCL; poorly consolidated; dry.			

Remarks Logged by C. Walker & L Pivonka Checked by:

Project No. 106P06222

Hydro-Search, Inc.

Project.	Rocky Flats Plant	LOG OF BORING NO. 8-86
Date Drilled	9/24/86, 10/20/86 - 10/23/86	Coordinates N 39859.2 E 20916.7
Boring Method	Hollow Stem Auger/NC Core	Ground Surface Elevation

Elev (feet)	Depth (feet)	Sample Type	Graphic Log	Material Description	Penetration Resistance (Blows/Foot) 20 40	Water Content (%) 20 40	Other Tests
	40			19.0-21.5'-Sample. Recovered 0.3/1.5'=20%. CLAYSTONE: medium dark gray (N 4/0); unweathered; some fine silt; wet.			
				21.5-26.5'-Sample. Recovered 3.8/5.0'=76%. CLAYSTONE: medium dark gray (N 4/0); unweathered; greasy; wet.			
	45			26.5-31.5'-Sample. Recovered 5.0/5.0'=100%. SANDY CLAYSTONE:medium dark gray (N 4/0); some very fine grained sand; trace of organic carbonaceous plant fossils; trace grayish orange (10YR 7/4) concretions (0.2-2.0 cm in diameter); wet			
	50			31.5-36.5'-Sample. Recovered 5.0/5.0'=100%. CLAYSTONE: medium gray (N 5/0) to black (N 1/0); greasy; organic rich layers; wet.			
				36.5-41.5'-Sample. Recovered 4.5/5.0'=90%. SILTY CLAYSTONE: medium dark gray (N 4/0); blocky; some silt; wet.			
	55			41.5-46.5' -Sample. Recovered 2.0/5.0'=40%. CLAYSTONE: dark gray (N 3/0); blocky, greasy; trace carbonaceous plant fossils; wet.			
				46.5-51.5'-Sample. Recovered 5.0/5.0'=100% SILTY CLAYSTONE: dark gray (N 3/0); blocky; some silt; trace carbonaceous plant fossils; wet.			
	60						

Remarks Logged by C. Walker & L. Pivonka Checked by: LHP

Project No. 106P06222	Hydro-Search, Inc.	Page 3 of 4

Project	Rocky Flats Plant	LOG OF BORING NO. 8-86
Date Drilled	9/24/86, 10/20/86 - 10/23/86	Coordinates N 39859.2 E 20916.7
Boring Method	Hollow Stem Auger/NC Core	Ground Surface Elevation

Elev (feet)	Depth (feet)	Sample Type	Graphic Log	Material Description	Penetration Resistance (Blows/Foot) 20 40	Water Content (%) 20 40	Other Tests
	60			51.5-53.5'-Sample. Recovered 2.0/2.0'=100%. SILTY CLAYSTONE: same as above; wet.			
				53.5-55.5'-Sample. Recovered 2.0/2.0'=100%. CLAYEY SANDSTONE: medium gray (N 5/0); fine-grained sandstone; wet.			
	65			55.5-56.5'-Sample. Recovered 1.0/1.0'=100% CLAYSTONE: grayish black (N 2/0); organic-rich; blocky; wet.			
				56.5-59.5'-Sample. Recovered 2.4/3.0'=80%. CLAYSTONE: same as above; wet.			
	70			59.5-61.5'- Sample. Recovered 2.0/2.0'=100%. SILTY SANDSTONE: medium gray (N 5/0); silty; fine-grained sandstone; some carbonaceous plant fossils; wet.			
				61.5-63.5'- Sample. Recovered 2.0/2.0'=100%. SILTY SANDSTONE: medium gray (N 4/0); silty, fine-grained; quartzose; wet.			
	75			63.5-66.5'-Sample. Recovered 3.0/3.0'=100%. SILTY CLAYSTONE: dark gray (N 3/0); blocky; some silt; wet.			
				66.5-71.5'- Sample. Recovered 3.5/5.0'=70% SILTY CLAYSTONE: same as above; wet.			
				TOTAL DEPTH: 71.5'			
	80						

Remarks Logged by C Walker & L. Pivonka Checked by: [illegible]

Project No 106P06222	Hydro-Search, Inc.	Page 4 of 4

Project:	Rocky Flats Plant	LOG OF BORING NO. 9-86
Date Drilled	9/24/86, 10/1/86, 10/2/86	Coordinates N 39246.2 E 19382.2
Boring Method	Casing Driver, Hollow Stem Auger; NC Core	Ground Surface Elevation

Elev. (feet)	Depth (feet)	Sample Type	Graphic Log	Material Description	Penetration Resistance (Blows/inch) 20 40	Water Content (%) 20 40	Other Tests
	0			**ROCKY FLATS ALLUVIUM** 0-4.5'-Cuttings. GRAVEL: yellowish gray (5Y 7/2) quartzite pebbles and cobbles with silty sand; fines less than 5.0%; poorly sorted; angular; unconsolidated; dry.			
				4.5-5.5'-Cuttings. SAND: yellowish gray (5Y 7/2); very fine- grained; silty; moderately sorted; subrounded; unconsolidated; damp.			
	5			5.5-7.0'-Cuttings. GRAVEL: yellowish gray (5Y 7/2) sandy quartzite gravel (70%); silty; poorly sorted; angular to subrounded; unconsolidated; damp. 7.0-8.0'-Cuttings. No sample obtained			
	10			8.0-15.0'-Cuttings. SAND: moderate brown (5YR 4/4); silty; fines 20-30%; poorly sorted; angular to subrounded, unconsolidated; damp.			
	15			15.0-20.0'-Cuttings. GRAVEL: moderate brown (5YR 4/4) with abundant quartzite; fines less than 5.0%; poorly sorted; unconsolidated; wet.			
	20						

Remarks Logged by: T. Murphy Checked by:

Project No. 106P06222

Hydro-Search, Inc.

Project:	Rocky Flats Plant	LOG OF BORING NO. 9-86
Date Drilled	9/24/86, 10/1/86, 10/2/86	Coordinates N 39246.2 E 19382.2
Boring Method	Casing Driver, Hollow Stem Auger, NC Core	Ground Surface Elevation

Elev. (feet)	Depth (feet)	Sample Type	Graphic Log	Material Description	Penetration Resistance (Blows/inch) 20 40	Water Content (%) 20 40	Other Tests
	20			20.0-21.0'-Cuttings. GRAVEL: light gray (N 7); fines <5%; poorly sorted; wet.			
				21.0-22.0'-Cuttings. SILT: yellowish gray (5Y 7/2) silt; unconsolidated; moist to wet.			
				ARAPAHOE FORMATION			
	25			22.0-27.0'-Cuttings. CLAYSTONE: light olive brown (5Y 5/6) and light olive gray (5Y 5/2); plastic; damp.			
				27.0-31.0'-Cuttings. SILTSTONE: light olive gray (5Y 5/2) clayey siltstone; semi-plastic; damp.			
	30			31.0-32.0'-Cuttings. CLAYSTONE: light olive gray (5Y 5/2) and light olive brown (5Y 5/6); semi-plastic; damp.			
				32.0-33.0'-Cuttings. CLAYSTONE: light olive gray (5Y 5/2); well laminated; semi-plastic; damp.			
				33 0-35.0'-Cuttings. CLAYSTONE: olive gray (5Y 3/2); laminated; semi-plastic; damp.			
	35						
				37.0-42.0'-Sample. Recovered 0.0/5.0'=0%.			
	40						

Remarks Logged by T Murphy Checked by:

Project No. 106P06222

Hydro-Search, Inc.

Project:	Rocky Flats Plant	LOG OF BORING NO. 9-86
Date Drilled	9/24/86, 10/1/86, 10/2/86	Coordinates N 39246.2 E 19382.2
Boring Method	Casing Driver, Hollow Stem Auger, NC Core	Ground Surface Elevation

Elev. (feet)	Depth (feet)	Sample Type	Graphic Log	Material Description	Penetration Resistance (Blows/inch) 20 40	Water Content (%) 20 40	Other Tests
	40						
				42.0-47.0'-Sample. Recovered 2.9/5.0'=58%. CLAYSTONE: yellowish gray (5Y 7/2); mottled with dark yellowish orange (10YR 6/6) stains; trace silt; carbonaceous material throughout; subvertical fracture at 2.6'; core lined with limonite; moderately soft; damp.			
	45			47.0-51.5'-Sample. Recovered 0.0/4.5'=0%.			
				51.5-56.5'-Sample. Recovered 0.7/5.0'=14%. RQD 0.7/0.7'=100%. CLAYSTONE: yellowish gray (5Y 7/2); mottled with dark yellowish orange (10YR 6/6) stains; trace silt; carbonaceous material throughout; subvertical fracture at 2.6'; core lined with limonite; moderately soft; damp.			
	50			56.5-58.5'-Sample. Recovered 1.9/2.0'=95%. RQD 0.5/1.9'=26%. CLAYSTONE: dark gray (N 3); some silt; subvertical to vertical fractures filled with dark yellowish orange (10YR 6/6) limonite stain; ironstone concretion at bottom of core; firm; damp.			
	55			58.5-60.5'-Sample. Recovered 1.2/2.0'=60%. RQD 0.6/1.2'=50%. CLAYSTONE: dark gray (N 3); some silt; subvertical to vertical fractures filled with dark yellowish orange (10YR 6/6) limonite stain; firm; damp.			
	60						

Remarks Logged by T Murphy Checked by

Project No. 106P06222

Hydro-Search, Inc.

Project:	Rocky Flats Plant	LOG OF BORING NO. 9-86
Date Drilled	9/24/86, 10/1/86, 10/2/86	Coordinates N 39246.2 E 19382.2
Boring Method	Casing Driver; Hollow Stem Auger; NC Core	Ground Surface Elevation

Elev. (feet)	Depth (feet)	Sample Type	Graphic Log	Material Description	Penetration Resistance (Blows/inch) 20 40	Water Content (%) 20 40	Other Tests
	60			60.5-65.5'-Sample. Recovered 2.6/5.0'=52%. RQD 2.6/2.6'=100%. CLAYSTONE: dark gray (N 3); silty; very fine-grained sand bed at 62.0'; hard; slightly calcareous; organic wood fragments throughout; firm; damp.			
	65			65.5-69.0'-Sample. Recovered 2.6/3.5'=74%. RQD 0.8/2.6'=31%. CLAYSTONE: dark gray (N 3); silty; firm; damp.		▽	
	70			69.0-74.0'-Sample. Recovered 3.0/5.0=60%. RQD 1.7/3.0'=57%. CLAYSTONE: dark gray (N 3); silty; organic wood fragments throughout; grades downward to dark greenish gray (5G 4/1) siltstone with very fine-grained sand laminations; firm; damp.			
	75			74.0-79.0'-Sample. Recovered 1.7/5.0'=34%. RQD 0.5/1.7'=29%. CLAYSTONE: dark gray (N 3) to dark greenish gray (5GY 4/1); interbedded silty claystone and claystone; beds are 0.2' thick; firm damp.			
	80						

Remarks Logged by T Murphy Checked by

Project:	Rocky Flats Plant	LOG OF BORING NO. 9-86
Date Drilled	9/24/86, 10 '/86, 10/2/86	Coordinates N 39246.2 E 19382.2
Boring Method	Casing Driver, Hollow Stem Auger; NC Core	Ground Surface Elevation

Elev. (feet)	Depth (feet)	Sample Type	Graphic Log	Material Description	Penetration Resistance (Blows/Inch) 20 40	Water Content (%) 20 40	Other Tests
	80			79.0-84.0'-Sample. Recovered 3.3/5.0'=66%. RQD 2.6/3.3'=79%. CLAYSTONE: dark gray (N 3) to dark greenish gray (5GY 4/1); trace of very fine-grained sand; silty; woody organics; occasional vertical fracture with slickensides; firm; damp.			
				84.0-89.0'-Sample. Recovered 4.2/5.0'=84%. RQD 1.2/4.2'=29%. CLAYSTONE: dark gray (N 3) to medium dark gray (N 4); silty; layers of brownish gray (5YR 4/1) silt; occasional concretions; hard; slightly calcareous; organic wood fragments throughout; firm; damp.			
	85						
				89.0-94.0'-Sample. Recovered 4.5/5.0'=90%. RQD 3.5/4.5'=78%. SILTSTONE: dark gray (N 3) to medium dark gray (N 4); clayey; trace very fine-grained sand; very carbonaceous with woody fragments; slightly calcareous bed in upper section; very firm; damp.			
	90						
				94.0-99.0'-Sample. Recovered 4.1/5.0'=82%. RQD 2.4/4.1'=47%. SILTSTONE: dark gray (N 3) to medium dark gray (N 4); clayey; trace very fine-grained sand; very carbonaceous with woody fragments; slightly calcareous bed in upper section; very firm; damp.			
	95						
	100						

Remarks Logged by: T. Murphy Checked by:

Project No. 106P06222	Hydro-Search, Inc.	Page 5 of 8

Project:	Rocky Flats Plant	LOG OF BORING NO. 9-86
Date Drilled	9/24/86, 10/1/86, 10/2/86	Coordinates N 39246.2 E 19382.2
Boring Method	Casing Driver; Hollow Stem Auger, NC Core	Ground Surface Elevation

Elev. (feet)	Depth (feet)	Sample Type	Graphic Log	Material Description	Penetration Resistance (Blows/inch) 20 40	Water Content (%) 20 40	Other Tests
	100			99.0-104.0'-Sample. Recovered 4.1/5.0'=82%. RQD 1.0/4.1'=24%. SILTSTONE: dark gray (N 3) to medium dark gray (N 4); clayey; trace very fine-grained sand; common concretions of pinkish gray (5YR 8/1) materials; very carbonaceous with woody fragments; slightly calcareous bed in upper section; laminations of siltstone with less clay; rip-ups; convoluted bedding; very firm; damp.			
	105			104.0-109.0'-Sample. Recovered 3.2/5 0'=64%. RQD 2.0/3.2'=62%. SILTSTONE: dark gray (N 3) to medium dark gray (N 4); clayey; trace very fine-grained sand; common concretions of pinkish gray (5YR 8/1) materials; very carbonaceous with woody fragments; slightly calcareous bed in upper section; laminations of siltstone with less clay; rip-ups; convoluted bedding, very firm; damp.			
	110			109.0-114.0'-Sample. Recovered 2.2/5.0'=44%. RQD 0/2.2'=0%. SILTSTONE: dark gray (N 3) to medium dark gray (N 4); clayey; trace very fine-grained sand; common concretions of pinkish gray (5YR 8/1) materials; very carbonaceous with woody fragments; non-calcarous rip-ups; convoluted bedding; very firm; damp.			
	115			114.0-119.0'-Sample. Recovered 4.6/5.0'=92%. RQD 3.4/4.6'=74%. SILTSTONE: dark gray (N 3); clayey; abundant carbonaceous material to 114.5'; greenish gray (5G 6/1); trace very fine-grained; firm to hard; damp.			
	120						

Remarks Logged by T Murphy Checked by

Project No. 106P06222

Hydro-Search, Inc.

Project:	Rocky Flats Plant	LOG OF BORING NO.	9-86
Date Drilled	9/24/86, 10/1/86, 10/2/86	Coordinates	N 39246.2 E 19382.2
Boring Method	Casing Driver, Hollow Stem Auger, NC Core	Ground Surface Elevation	

Elev. (feet)	Depth (feet)	Sample Type	Graphic Log	Material Description	Penetration Resistance (Blows/inch) 20 40	Water Content (%) 20 40	Other Tests
	120			119.0-124.0'-Sample. Recovered 4.6/5.0'=92%. RQD 0.6/4.6'=13%.			
				119.0-122.0'. SILTSTONE: dark gray (N 3); clayey; abundant carbonaceous material to 114.5'; greenish gray (5G 6/1); firm to hard; damp.			
				122.0-124.0'. SANDSTONE: greenish gray (5G 6/1); fine- to very fine-grained; silty; finely bedded; some carbonaceous material; moderately sorted; soft; wet.			
	125			124.0-129.0'-Sample. Recovered 4.5/5.0'=90%. RQD 0/4.5'=0%. SANDSTONE: medium gray (N 4); fine- to medium-grained silty sandstone; cross- bedded; carbonaceous laminations; sandstone alternates with sandy siltstone and clayey siltstone - 0.5' thick; moderately sorted; soft to moderately firm, wet.			
	130			129.0-134.0'-Sample. Recovered 2.5/5.0'=50%. RQD 1.3/2.5'=52%. SANDSTONE: medium gray (N 4); fine- to medium-grained; crossbedding; convoluted beds; well sorted; firm to hard;damp.			
				134.0-139.0'-Sample. Recovered 3.9/5.0'=78%. RQD 2.2/3.9'=56%.			
	135			134.0-136.1'. SANDSTONE: medium gray (N 4); fine- to medium-grained sand; convoluted beds; trace sand; well sorted; firm to hard; damp.			
				136.1-139.0'. SANDSTONE: medium gray (N 4); very fine-grained; silty; convoluted; cross-bedding; banded with carbonaceous laminations; moderately sorted; firm to hard; damp.			
	140						

Remarks: Logged by: T. Murphy

Checked by

Project No. 106P06222

Hydro-Search, Inc.

Project: Rocky Flats Plant

LOG OF BORING NO. 9-86

Date Drilled 9/24/86, 10/1/86, 10/2/86

Coordinates N 39246.2 E 19382.2

Boring Method Casing Driver, Hollow Stem Auger; NC Core

Ground Surface Elevation

Elev. (feet)	Depth (feet)	Sample Type	Graphic Log	Material Description	Penetration Resistance (Blows/inch) 20 40	Water Content (%) 20 40	Other Tests
	140			139.0-144.0'-Sample. Recovered 3.9/5.0'=78%. RQD 2.9/3.9'=74%. SILTSTONE: medium dark (N 3) to dark (N 4); clayey; few moderate brown (10YR 4/4) concretions; well sorted; firm; damp.			
				144.0-149.0'-Sample. Recovered 4.0/5.0'=80%. RQD 3.0/4.0'=75%. CLAYSTONE: dark gray (N 3); silty; carbonaceous; firm; damp.			
	145						
				TOTAL DEPTH: 149.2'			
	150						
	155						
	160						

Remarks Logged by T. Murphy

Checked by

Project No. 106P06222

Hydro-Search, Inc.

Project: Rocky Flats Plant

LOG OF BORING NO. 10-86

Date Drilled 9/24/86

Coordinates N 39223.9 E 19400.6

Boring Method Casing driver

Ground Surface Elevation

Elev. (feet)	Depth (feet)	Sample Type	Graphic Log	Material Description	Penetration Resistance (Blows/inch) 20 40	Water Content (%) 20 40	Other Tests
	0			ROCKY FLATS ALLUVIUM 0.0-10.0'-Cuttings. GRAVEL: granitic pebbles and cobbles; fines less than 1.0%; poorly sorted; unconsolidated; dry.			
	5						
	10			10.0-11.0'-Cuttings. SAND: light olive gray (5Y 5/2) and moderate reddish brown (10R 4/6) fine- to coarse-grained sand; poorly sorted; subrounded; unconsolidated; damp.		▼	
				11.0-15.0'-Cuttings. SILT: moderate yellowish brown (10YR 5/4) gravelly sandy silt; granitic gravel 10%; poorly sorted; unconsolidated; damp.		▽	
	15			15.0-17.0'-Cuttings. GRAVEL: moderate yellowish brown (10 YR 5/4) silty gravel; poorly sorted; unconsolidated; damp.			
				17.0-23.0'-Cuttings. SILT: moderate yellowish brown (10YR 5/4) gravelly sandy silt; gravel 10-20%; poorly sorted; unconsolidated; damp.			
	20						

Remarks Logged by T. Gulliver

Checked by: [illegible]

Project No. 106P06222

Hydro-Search, Inc.

Project: Rocky Flats Plant	LOG OF BORING NO. 10-86
Date Drilled 9/24/86	Coordinates N 39223.9 E 19400.6
Boring Method Casing driver	Ground Surface Elevation

Elev. (feet)	Depth (feet)	Sample Type	Graphic Log	Material Description	Penetration Resistance (Blows/inch) 20 40	Water Content (%) 20 40	Other Tests
	20						
				ARAPAHOE FORMATION 23.0-24.0'-Cuttings. SILTSTONE: light olive brown (5Y 5/6) sandy siltstone; well sorted; damp to moist.			
	25			24.0-27.0'-Cuttings. CLAYSTONE: light olive gray (5Y 5/2) and light olive brown (5Y 5/6) claystone; damp.			
				TOTAL DEPTH: 27 0'			
	30						
	35						
	40						

Remarks Logged by: T Gulliver Checked by:

Project No. 106P06222	Hydro-Search, Inc.	Page 2 of2

Project:	Rocky Flats Plant	LOG OF BORING NO.	45-86
Date Drilled	10/2/86	Coordinates	N 37396.4 E 16363.1
Boring Method	Casing Driver	Ground Surface Elevation	6035.00'

Elev. (feet)	Depth (feet)	Sample Type	Graphic Log	Material Description	Penetration Resistance (Blows/inch) 20 40	Water Content (%) 20 40	Other Tests
	0			ROCKY FLATS ALLUVIUM			
				0-3.0'-Cuttings. GRAVEL: moderate brown (10YR 4/4); ~60% granitic pebbles and cobbles; 40% sand and silt; poorly sorted, unconsolidated; damp.			
				3.0-8.0'-Cuttings. GRAVEL: moderate brown (10YR 4/4); granite and quartzite pebbles and cobbles; <5% sand and silt; poorly sorted, unconsolidated; damp.			
	5						
				8.0-10.0'-Cuttings. GRAVEL: Same as above; moist.			
	10			10.0-14.5'-Cuttings. GRAVEL: Same as above; moist.			
	15			14.5-19.0'-Cuttings. BOULDERS: quartzite cobbles and boulders; poorly sorted; unconsolidated; damp.			
	20						

Remarks Logged by T. Gulliver Checked by

Project No. 106P06222

Hydro-Search, Inc.

Project:	Rocky Flats Plant	LOG OF BORING NO.	45-86
Date Drilled	10/2/86	Coordinates	N 37396 4 E 16363.1
Boring Method	Casing Driver	Ground Surface Elevation	

Elev. (feet)	Depth (feet)	Sample Type	Graphic Log	Material Description	Penetration Resistance (Blows/inch) 20 40	Water Content (%) 20 40	Other Tests
	20			19.0-23.0'-Cuttings. GRAVEL. moderate brown (10YR 4/4); granitic pebbles and cobbles; sandy and silty; poorly sorted; unconsolidated; damp.			
				23.0-25.0'-Cuttings. GRAVEL: Same as above; damp.			
	25			25.0-28.0'-Cuttings. SAND: light olive gray (5Y 5/2); medium to coarse-grained; some granitic pebbles; poorly sorted; subrounded; unconsolidated; damp.			
				28.0-43.0'-Cuttings. GRAVEL: moderate brown (10YR 4/4); some silt and sand; poorly sorted; unconsolidated; wet.			
	30						
	35						
	40						

Remarks: Logged by T Gulliver

Checked by

Project No. 106P06222	Hydro-Search, Inc.	Page 2 of 3

Project:	Rocky Flats Plant	LOG OF BORING NO.	45-86
Date Drilled	10/2/86	Coordinates	N 37396.4 E 16363.1
Boring Method	Casing Driver	Ground Surface Elevation	

Elev. (feet)	Depth (feet)	Sample Type	Graphic Log	Material Description	Penetration Resistance (Blows/inch) 20 40	Water Content (%) 20 40	Other Tests
	40			43.0-47.0'-Cuttings. GRAVEL: moderate brown (10YR 4/4); 20-30% sand and silt; poorly sorted; unconsolidated; wet.			
	45			ARAPAHOE FORMATION 47.0-55.0'-Cuttings. SILTSTONE: light olive brown (5Y 5/6); well sorted; damp.			
	50						
	55			TOTAL DEPTH: 55.0'			
	60						

Remarks Logged by T Gulliver Checked by:

Project No. 106P06222

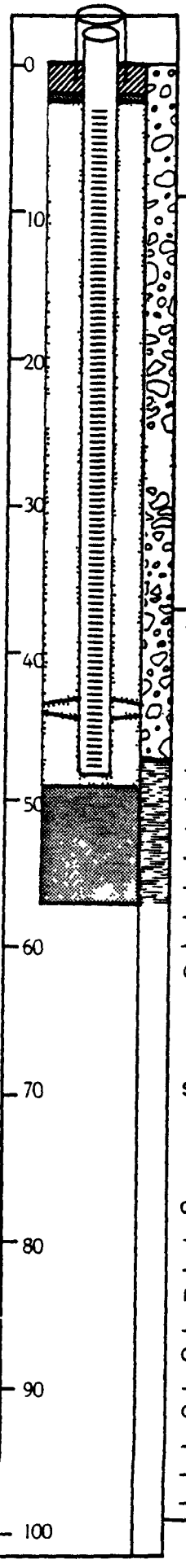
Hydro-Search, Inc.

WELL 45-86

WELL CONSTRUCTION SUMMARY

LOCATION or COORDS N 37396.4 E 16363.1

ELEVATION GROUND LEVEL 6035.00'
TOP OF CASING 6036.97'



LOCATION Golden, CO
PERSONNEL T. Gulliver
PROJECT 106P06222 Rocky Flats Plant

DRILLING SUMMARY

TOTAL DEPTH Well. 48.20' Hole 57.00'
BOREHOLE DIAMETER 5 5/8"

DRILLER Boyles Brothers Drilling Co.
15865 W. 5th Avenue, Golden, CO
(Subcontracted Arrow Drilling, Tom High)
RIG Casing Advancer
BIT(S) Down hole hammer

DRILLING FLUID None

SURFACE CASING 5" x 4.5' steel w/ locking cap

WELL DESIGN:

BASIS GEOLOGIC LOG X GEOPHYSICAL LOG ___

CASING STRING(S) C=CASING S=SCREEN

0.00'	2.99'	C1			
2.99'	48.20'	S1			

CASING C1 2" I.D. Sch. 5 type 316, stainless steel, threaded and flush jointed

SCREEN S1 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
43.47' - 44.70'

FILTER MATERIAL 32-42 silica sand
2.48' - 49.30'

CEMENT Portland Type I
0.00' - 1.80'

OTHER 3/8" bentonite pellets
1.80' - 2.48'
49.30' - 57.00'

CONSTRUCTION TIME LOG

TASK	START DATE 1986	START TIME	FINISH DATE 1986	FINISH TIME
DRILLING				
5 5/8" casing driver	10/2	0900	10/2	1515
GEOPHYS. LOGGING	—	—	—	—
CASING				
2" stainless	10/3	0950	10/3	1000
FILTER PLACEMENT	10/3	1000	10/3	1600
CEMENTING	10/3	1605	10/3	1620
DEVELOPMENT				
OTHER				
Bentonite	10/3	0935	10/3	0950
	10/3	1600	10/3	1605

WELL DEVELOPMENT

See Well Development Summary Sheet

COMMENTS:

No water encountered during drilling.

Top of stainless steel casing 1.97'

LOG OF BOREHOLE

Location Rocky Flats Plant, Landfill Area
Coordinates N 40158.03 E 21727.76
Total Depth 13 0'

Borehole Well No 40-87
Ground Surface Elevation 5882.69'
Water Level Encountered None
Static 3.30' (4/11/88)

Drilling Company Boyles Bros.
Date Drilled June 8, 1987
Drilling Method Hollow Stem Auger
Logged By J. Bergman
Geologist

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

CEARP Manager

Comments

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			**TOPSOIL** 0.0-2 0' SAMPLE. Recovered 0 6/2 0' = 30% TOP SOIL dark yellowish brown (10 YR 4/2), clayey, abundant roots and grasses, few moderate brown (5 YR 4/4) colorations, 2 gray quartzite pebbles, moist	HNu background=0 2 OVA background=15 No readings above background
5			**VALLEY FILL** 2.0-4.0' SAMPLE. Recovered 0 0/2 0' = 0% No recovery due to rocks Rock sound stopped at approximately 6' 4.0-8.0' SAMPLE. Recovered 3 5/4 0' = 88% 4 0-6 2' GRAVEL AND CLAY moderate yellowish brown (10 YR 5/4) clay, abundant gray quartzite pebbles and cobbles, angular, unsorted	
10			**ARAPAHOE FORMATION** 6 2-7 5' CLAYSTONE moderate yellowish brown (10 YR 5/4), few pale brown (5 YR 5/2) mottles, abundant caliche, strongly effervesces in HCl, organic rich, sandy (patches of sand throughout 6 5-7 5'), weathered, damp	
15				
20				

LOG OF BOREHOLE

Location- Rocky Flats Plant, Landfill Area
Coordinates N 40158.03 E 21727.76
Total Depth 13.0'

Borehole Well No 40-87
Ground Surface Elevation 5882.69'
Water Level Encountered None
Static 3.30' (4/11/88)

Drilling Company Boyles Bros.
Date Drilled June 8, 1987
Drilling Method Hollow Stem Auger
Logged By J. Bergman
Geologist

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

CEARP Manager

Comments

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			8.0-10.5' SAMPLE. Recovered 3 0/2 5' = 120%. CLAYSTONE: grayish brown (5 YR 3/2), abundant light brown (5 YR 5/6) mottles and FeO concretions, abundant black organic fragments; sandy patches yellowish gray (5 Y 7/2) very fine-grained; weathered; silty; abundant caliche, moist.	
			10.5-13.0' SAMPLE. Recovered 3 2/2 5' = 124% CLAYSTONE dark yellowish brown (10 YR 6/2), sandy, few dark yellowish orange (10 YR 6/6) mottles at 11 5', abundant black organic fragments in top 0 5', decrease in sand content to less than 20% over 12 0-13 0', weathered, damp	
			TOTAL DEPTH· 13 0'	

LOG OF BOREHOLE

Location: Rocky Flats Plant, Landfill Area
Coordinates: N 40133.61 E 21725.75
Total Depth: 110.00'

Borehole/Well No: 41-87BR
Ground Surface Elevation: 5882.78'
Water Level Encountered: None
Static: 41.83' (4/11/88)

Drilling Company: Boyles Bros.
Date Drilled: June 9 and July 28-29, 1987
Drilling Method: 0.0' - 17.0' Hollow Stem Auger; 17.0' - 110.0' NC Core
Logged By: J. Bergman; K.D. Holliway, Geologist

Driller: R. Sharp/ P. Bushkovski
Helper: T. Merritt/ K. Parker
Drilling Fluid: 0.0'-17.0' None; 17.0'-110.0' Water
Checked By: _____ Site Manager
_____ CEARP Manager

Comments: Surface casing set June 9, 1987 to 17.0 feet by J. Bergman

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			**VALLEY FILL ALLUVIUM**	HNu background = 0 2 OVA background = 15 No readings above background.
			0-2.0' SAMPLE. Recovered 1 3/2 0' = 65% CLAY dusky brown (5 YR 2/2) abundant roots and grasses, abundant gray quartzite pebbles and cobbles, trace light brown (5 YR 5/6) stains; damp to moist.	
5			2.0-4.0' SAMPLE. Recovered 2.0/2.0' = 100% CLAY pale yellowish brown (10 YR 6/2), abundant gray quartzite pebbles and cobbles, caliche in last 2", trace light brown (5 YR 6/4) mottles, moist.	
10			4.0-7.0' SAMPLE. Recovered 3 0/3.0' = 100% 4 0-4 5' CLAY pale brown (5 YR 5/2), abundant light brown (5 YR 5/6) mottles, quartzite gravels, some caliche, damp	
			ARAPAHOE FORMATION	
15			4 5-7 0' CLAYSTONE pale brown (5 YR 5/2), no cobbles; abundant light brown (5 YR 5/6) mottles, abundant organics, damp	
			7 0-9.5' SAMPLE. Recovered 2.5/2 5' = 100% CLAYSTONE pale brown (5 YR 5/2), abundant light brown (5 YR 5/6) mottles, consolidated, weathered, some caliche, abundant organics and FeO concretions; silty in bottom 0 5', slightly damp	
20				

LOG OF BOREHOLE

Location Rocky Flats Plant: Landfill Area

Borehole/Well No. 41-87BR (con't.)

Coordinates

Ground Surface Elevation

Total Depth

Water Level Encountered

Static

Drilling Company

Driller

Date Drilled

Helper

Drilling Method

Drilling Fluid

Logged By

Geologist

Checked By

Site Manager

CEARP Manager

Comments

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20			9.5-12.0' SAMPLE. Recovered 2.4/2.5' = 96% CLAYSTONE pale yellowish brown (10 YR 6/2), few dark yellowish orange (10 YR 6/6) mottles, organic-rich, silty layer @ 11 0'; few fractures; weathered, damp	20 85-30 50' Packer Test Interval # 8.
				22 85-32.50' Packer Test Interval # 7, failed.
25			12.0-14.5' SAMPLE. Recovered 2.8/2 5' = 115% 12 0-12.2: same as above 12 2-14 5' CLAYSTONE moderate olive brown (5 Y 4/4), no mottles, few organics, consolidated, unweathered, slightly damp	
			14.5-17.0' SAMPLE. Recovered 3 7/2.5' = 148% CLAYSTONE same as above but silty	
30			15.7-18.5' SAMPLE. Recovered 1 3' rubber plug.	32 50-42 15' Packer Test Interval # 6
			18.5-21.5' SAMPLE. Recovered 0 6/3 0 = 20% CLAYSTONE light olive gray (5 Y 5/2), trace silt, trace very fine-grained sand, trace iron staining in small fractures, indurated, weathered, damp	
35			21.5-25.0' SAMPLE. Recovered 3 0/3 5' = 86% CLAYSTONE same as above, but more fractures, dark yellowish orange (10 YR 6/6) staining in fractures, damp	
40				

LOG OF BOREHOLE

Location: Rocky Flats Plant, Landfill Area
Borehole/Well No: 41-87BR (con't.)
Coordinates:
Ground Surface Elevation:
Total Depth:
Water Level Encountered:
Static:
Drilling Company:
Driller:
Date Drilled:
Helper:
Drilling Method:
Drilling Fluid:
Logged By: Geologist
Checked By: Site Manager
CEARP Manager
Comments:

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
40			25.0-28.5' SAMPLE. Recovered 2.15/3 5 = 61 5%. 25 0-25 8' CLAYSTONE same as above 25-8-27 15'· CLAYSTONE dusky yellowish brown (10 YR 2/2), unweathered, indurated, trace very fine-grained sand, trace dark yellowish orange (10 YR 6/6) iron staining, slightly damp	41 55-51 20' Packer Test Interval # 5
45			28.5-32.5' SAMPLE. Recovered 0 7/4 0' = 18% CLAYSTONE olive black (5 Y 2/1); same as above, damp	
50			32.5-35.0' SAMPLE. Recovered 5 2/2 5 - 208% SANDSTONE. olive black (5 Y 2/1), very fine-grained, well sorted, consolidated, indurated, possible plant fossils from 33 5-35 0', some clay and silt, slightly damp	53 05-62.70' Packer Test Interval # 4
55			35.0-38.5' SAMPLE. Recovered 3 2/3 5 = 91% SANDSTONE olive black (5 Y 2/1), 3 5-4 0 Ø and finer-grained, fairly well sorted, consolidated; trace clay, some silt, possible plant fossils and imprints, slightly damp	
60			38.5-43.0' SAMPLE. Recovered 4 3/4 5' = 96% SANDSTONE same as above, but less clay and fewer possible fossils.	

LOG OF BOREHOLE

Location: Rocky Flats Plant: Landfill Area

Borehole/Well No 41-87BR (con't.)

Coordinates

Ground Surface Elevation

Total Depth

Water Level Encountered

Static

Drilling Company

Driller

Date Drilled

Helper

Drilling Method

Drilling Fluid

Logged By

Geologist

Checked By

Site Manager

CEARP Manager

Comments

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
60			43.0-47.5 SAMPLE. Recovered 1 9/4.5' = 42% 43 0-44 1' SANDSTONE same as above, but increased clay 44 1-44 9' SANDSTONE light gray (N 7/0) to trace olive black (5 Y 2/1), 3 5-4 0 phi to very fine-grained; fracture with black slightly glossy organics at 44 5'	62 70-72.35' Packer Test Interval # 3
65			47.5-50.5' SAMPLE. Recovered 1 9/3 0' = 63% SANDSTONE olive black (5 Y 2/1), 3 4-4 0 Ø and smaller, few organics, trace clay, slightly damp	
70			50.5-53.0' SAMPLE. Recovered 2 5/2 5' = 100% SANDSTONE olive black (5 Y 2/1), some clay, some silt, becoming claystone with silt and sand from 51 2-52 3' and 52 4-53 0', damp	72 35-82 00' Packer Test Interval # 2
			53.0-57.0' SAMPLE. Recovered 3 2/4 0' = 80% CLAYSTONE medium dark gray (N 4/0), trace very fine-grained sand, dry	
75			57.0-61.0' SAMPLE. Recovered 0.9/4 0' = 23% RQD = 0/4 0 = 0% CLAYSTONE. dark gray (N 3/0), indurated, trace silt, damp	
80				

LOG OF BOREHOLE

Location Rocky Flats Plant; Landfill Area

Borehole/Well No 41-87BR (con't.)

Coordinates

Ground Surface Elevation

Total Depth

Water Level Encountered

Static

Drilling Company

Driller

Date Drilled

Helper

Drilling Method

Drilling Fluid

Logged By

Geologist

Checked By

Site Manager

CEARP Manager

Comments

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
80			61.0-63.0' SAMPLE. Recovered 5 0/2.0' = 250% RQD = 4 48/5 0 = 89 6% CLAYSTONE. medium dark gray (N 4/0) to dark gray (N 3/0), trace silt, upper 3' mottled, damp	82 0-91 65' Packer Test Interval # 1
85			63.0-67.0' SAMPLE. Recovered 4 0/4 0 = 100% RQD = 3 07/4 0 = 76 8% 63 0-64 7' CLAYSTONE dark gray (N 3/0) to dusky yellowish brown (10 YR 2/2). very fine-grained, trace silt, some plant leaf and stem fossils, damp 64 7-67 0' SANDSTONE. medium gray (N 5/0) to medium dark gray (N 4/0), sand grades from very fine to 3 5-3 0 phi to 2.5-2 0 phi prominent at 66 50 to 67 0', subangular to subrounded, fairly well sorted, some organics present to 66 50', then decreasing; some to no clays, damp to slightly moist	
90			67.0-71.0' SAMPLE. Recovered 4 0/4 0 = 100% RQD = 3 61/4 0 = 90 25% 67 0-68 35' SANDSTONE medium light gray (N 6/0); 2 0-3 0 phi, subrounded to subangular, fairly well sorted; trace clay, some silt; damp to slightly moist 68 35-68 85' SANDSTONE. same as above but olive black (5 Y 2/1), 3 5-4 0 phi some clay, some silt, lens of clay and plant organics (fossils) from 68 35-68 45', damp 68 85-70 25' SANDSTONE. same as above, moist.	
95				
100				

LOG OF BOREHOLE

Location Rocky Flats Plant, Landfill Area

Borehole/Well No. 41-87BR (con't.)

Coordinates

Ground Surface Elevation

Total Depth

Water Level Encountered

Static

Drilling Company

Driller

Date Drilled

Helper

Drilling Method

Drilling Fluid

Logged By

Geologist

Checked By

Site Manager

CEARP Manager

Comments

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
100			70 25-71 0' SANDSTONE. olive black (5 Y 2/1) to medium dark gray (N 4/0), some organics, clay, 3 5-4 0 phi and very fine-grained.	
			71.0-73.5' SAMPLE. Recovered 0 0/2.5 = 0%	
105			73.5-75.0' SAMPLE. Recovered 2.3/1 5' = 153% RQD = 1 6/2 3 = 69 56%. CLAYSTONE AND SANDSTONE medium dark gray (N 5/0) to dark gray (N 3/0), very fine-grained sand, occasional fossils (plant leaves and stems), some silt, damp	
110			75.0-79.0' SAMPLE. Recovered 3 3/4 0' = 82 5% RQD = 2 4/3 3' = 72 7% CLAYSTONE medium dark gray (N 5/0) to olive black (5 Y 2/1), very fine-grained sand, occasional fossils (plant leaves and stems), also a marine fossil at 76 0', damp	
115			79.0-82.0' SAMPLE. Recovered 3 0/3 0' = 100% RQD = 2 20/3 0 = 73 3% 79 0-79 6' CLAYSTONE same as above, damp 79 6-82.0' SANDSTONE, medium dark gray (N 5/0) to dark gray (N 3/0), trace clay, small lenses of claystone, sand 2 5-2.0 phi, fairly well sorted, damp	
120				

LOG OF BOREHOLE

Location Rocky Flats Plant, Landfill Area

Borehole Well No 41-87BR (con't)

Coordinates

Ground Surface Elevation

Total Depth

Water Level Encountered

Static

Drilling Company

Driller

Date Drilled

Helper

Drilling Method

Drilling Fluid

Logged By

Geologist

Checked By

Site Manager

CEARP Manager

Comments

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			82.0-86.0' SAMPLE. Recovered 4 0/4 0' = 100% RQD = 4 0/4 0' = 100% SANDSTONE same as above except less clay, subangular to subrounded sand, occasional organics (plant fossils) throughout, damp to slightly moist	
			86.0-90.0' SAMPLE. Recovered 4 0/4 0' = 100% RQD = 4 0/4 0' = 100% SANDSTONE medium dark gray (N 5/0) to dark gray (N 3/0), 1 0-2 0 phi (fine to very fine), fairly well sorted, subrounded, mostly quartzose, trace feldspathic, occasional fossils (plant leaves and stems), damp to slightly moist	
			90.0-94.0' SAMPLE. Recovered 3 56/4 0' = 90% RQD 3 3/3 6 = 91 67% SANDSTONE same as above, damp to slightly moist	
			94.0-98.0' SAMPLE. Recovered 4 4/4 0 = 110% RQD = 4 24/4 4 = 96 36% 94 0-96 5' CLAYSTONE, SANDSTONE AND SILTSTONE same as above but very fine-grained sand, damp 96 5-98 0 SANDSTONE same as above, except fine-grained, damp	

LOG OF BOREHOLE

Location Rocky Flats Plant, Landfill Area

Borehole/Well No 41-87BR (con't)

Coordinates

Ground Surface Elevation

Total Depth

Water Level Encountered

Static

Drilling Company

Driller

Date Drilled

Helper

Drilling Method

Drilling Fluid

Logged By

Geologist

Checked By

Site Manager

CEARP Manager

Comments

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			98.0-102.0' SAMPLE. Recovered 3 0/4 0' = 75% RQD = 2.97/3 0 = 99% 98 0-101 0' SANDSTONE same as above, damp 101 0-102.0' CLAYSTONE, SANDSTONE, SILTSTONE. medium dark gray (N 5/0), very fine-grained sand, damp	
			102.0-106.0' SAMPLE. Recovered 5 0/4 0' = 125% RQD = 4 0/5 0' = 80% 102.0-106 0' CLAYSTONE, SANDSTONE, SILTSTONE medium dark gray (N 5/0) to olive black (5 Y 2/1), very fine-grained sand	
			106.0-110.0' SAMPLE. Recovered 4 4/4 0' = 110% RQD = 1 31/4 4' = 42.05% CLAYSTONE, SANDSTONE, SILTSTONE same as above, damp	
			TOTAL DEPTH 110 0'	

LOG OF BOREHOLE

Location: Rocky Flats Plant, Landfill Area
Coordinates: N 40355.10 E 22430.99
Total Depth: 12.40'

Borehole Well No: 42-87
Ground Surface Elevation: 5854.05'
Water Level Encountered: 2.0'
Static: 1.62' (4/11/88)

Drilling Company: Boyles Bros.
Date Drilled: June 10, 1987
Drilling Method: Hollow Stem Auger
Logged By: J.B. Bergman
Geologist

Driller: R. Sharp
Helper: T. Merritt
Drilling Fluid: None
Checked By: _____
Site Manager

_____
CEARP Manager

Comments: _____

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			**TOPSOIL**	
			0 0-2.0' SAMPLE. Recovered 0 5/2 0' = 25% TOP SOIL dark yellowish brown (10 YR 4/2), clay rich, abundant roots and grasses, large gray quartzite cobbles and pebbles, moist	HNu background = 0 6-0 4 No readings above background
5			**VALLEY FILL ALLUVIUM**	
			2 0-4.0' SAMPLE Recovered 0 9/2 0' = 45% CLAY same as above, no vegetation, wet	
			4 0-7.4' SAMPLE. Recovered 2 9/3 4 = 85% 4 0-6 1' CLAY AND GRAVEL grayish orange pink (5 YR 7/2), abundant quartzite, granite, and schistose gravel, pebbles, and cobbles, unsorted, angular, wet	
10			**ARAPAHOE FORMATION**	
			6 1-6 9' CLAYSTONE moderate yellowish brown (10 YR 5/4), trace grayish brown (5 YR 3/2) stains, trace organics, damp	
15			7.4-9.9' SAMPLE Recovered 2 5/2 5 = 100% CLAYSTONE olive gray (5 YR 3/2), abundant moderate brown (5 YR 4/4) mottles, trace organics, consolidated, damp	
20				

LOG OF BOREHOLE

Location: Rocky Flats Plant, Landfill Area
Coordinates: N 40355.10 E 22430.99
Total Depth: 12 40'

Borehole Well No: 42-87
Ground Surface Elevation: 5854.05'
Water Level Encountered: 2.0'
Static: 1.62' (4/11/88)

Drilling Company: Boyles Bros.
Date Drilled: June 10, 1987
Drilling Method: Hollow Stem Auger
Logged By: J.B. Bergman
Geologist

Driller: R. Sharp
Helper: T. Merritt
Drilling Fluid: None
Checked By: _____
Site Manager

CEARP Manager

Comments: _____

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			9.9-12.4' SAMPLE. Recovered 2 5/2 5' = 100% CLAYSTONE same as above	
			TOTAL DEPTH 12 40'	

LOG OF BOREHOLE

Location: Rocky Flats Plant, Landfill Area
Coordinates: N 39257 05 E 19431.75
Total Depth: 32.0'

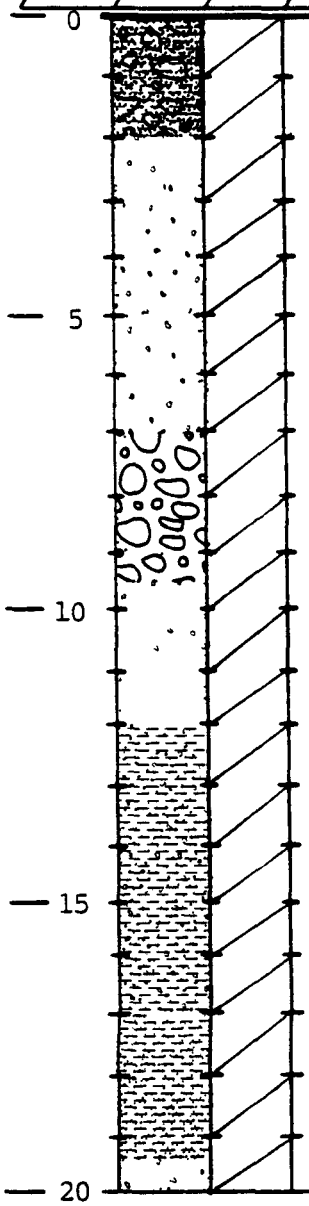
Borehole Well No: 58-87
Ground Surface Elevation: 5995.10'
Water Level Encountered: None
Static: 7 20' (4/11/88)

Drilling Company: Boyles Bros.
Date Drilled: November 17, 1987
Drilling Method: Hollow Stem Auger
Logged By: R. Treat
Geologist

Driller: T. High
Helper: B. Keeney
Drilling Fluid: None
Checked By: _____
Site Manager

_____
CEARP Manager

Comments: _____



Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			**TOPSOIL** 0.0-2 0' SAMPLE. Recovered 1 2/2 0' = 60% 0 0-0 25' TOP SOIL dusky brown (5 YR 2/2) silty sand (3 0-2 5 Ø), numerous roots, scattered gravel, weakly cemented, moist	HNu background=0 0 OVA background = 0 0 Ludlum background = 0
5			**ROCKY FLATS ALLUVIUM** 0 25-1 20' GRAVEL AND CLAYEY SAND moderate brown (5 YR 4/4) to light brown (5 YR 5/6) and moderate reddish brown (10 R 4/6), moderately cemented, gravel, 4 50 mm and as small as 0 55 mm, subrounded and rounded and subangular, noted cobbles, sand ranges (3 0-2 5 Ø) up to (0 5-0 0 Ø), well sorted, light, moist	
10			2.0-4.0' SAMPLE. Recovered 0 3/2 0' = 15% SAND AND GRAVEL light brown (5 YR 6/4) and light brown (5 YR 5/6) to moderate brown (5 YR 4/4), rounded, subrounded, and subangular, well sorted, 0 50 mm to 5 0 mm with scattered cobbles, moderately cemented to weakly cemented, moist	
15			4 0-7 0' SAMPLE. Recovered 0 4/3 0 = 13% SAND AND GRAVEL pale yellowish brown (10 YR 6/2) to light brown (5 YR 6/4), several cobbles, soils appearing as above, light moist	17.0-19.5' Readings on core HNu 112, OVA 2 1
20				

LOG OF BOREHOLE

Location Rocky Flats Plant, Landfill Area

Borehole/Well No 58-87 (con't.)

Coordinates

Ground Surface Elevation

Total Depth

Water Level Encountered

Static

Drilling Company

Driller

Date Drilled

Helper

Drilling Method

Drilling Fluid

Logged By

Geologist

Checked By

Site Manager

CEARP Manager

Comments

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20			7 0-9.5' SAMPLE. Recovered 0 2/2 5 = 8% GRAVEL one subangular, quartzite gravel	
			9.5-12.0' SAMPLE. Recovered 0 0/2 5 = 0% Cuttings indicate sand and gravel as noted in previous runs	
25			12.0-14.5' SAMPLE. Recovered 0 2/2 5 = 8% CLAYEY SAND AND GRAVEL light brown (5 YR 6/4) to (5 YR 5/6), fine-grained sand (2 5-2 0 Ø) weakly cemented, poorly sorted, subangular and subrounded gravel, moist	27.5-29.5' Readings on core HNu 5 5, OVA 0 0
30			14.5-17.0' SAMPLE. Recovered 0 4/2 5' = 16% CLAYEY SAND AND GRAVEL moderate brown (5 YR 6/4) to light brown (5 YR 5/6), poorly sorted sand, fine-grained (2 5-2 0 Ø) with small gravel and scattered, large (5 25 mm) cobbles, weakly to moderately cemented, moist	29.5-32.0' Readings in augers HNu 105, OVA 50
35			17.0-19.5' SAMPLE. Recovered 1 4/2 5 = 56% CLAYEY SAND varying brown as stated above, slightly clayey, weakly cemented, poorly sorted, fine- to medium-grained sands and gravel (ranging from 0 75 to 25 mm), subrounded, rounded with few subangular	
40				

LOG OF BOREHOLE

Location Rocky Flats Plant, Landfill Area

Borehole/Well No 58-87 (con't.)

Coordinates

Ground Surface Elevation

Total Depth

Water Level Encountered

Static

Drilling Company

Driller

Date Drilled

Helper

Drilling Method

Drilling Fluid

Logged By

Geologist

Checked By

Site Manager

CEARP Manager

Comments

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			19.5-22.0' SAMPLE. Recovered 1 5/2 5' = 60% 19 5-20 5' SAND AND GRAVEL light brown (5 YR 5/6) to moderate yellowish brown (10 YR 5/4), poorly sorted sand (2 0-2 5 Ø) to (0 5-0 0 Ø) with gravel ranging 0 75 mm to 2 75 mm, subrounded, rounded, weakly cemented, moist 20 5-21 0' SANDY CLAY light brown (5 YR 6/4), few scattered gravel, fine- and medium-grained sands, low plastic, moist	
			ARAPAHOE FORMATION	
			22.0-24.5' SAMPLE. Recovered 0 0/2 5 = 0% Cuttings indicate weathered sandy claystone with gray and brown fine-grained sand	
			24 5-27.0' SAMPLE. Recovered 0 0/2 5 = 0%	
			27.0-27.5' SAMPLE. Center bit drill	
			27.5-29.5' SAMPLE. Recovered 2 0/2 0 = 100% SANDY CLAYSTONE dark yellowish orange (10 YR 6/6) to moderate yellowish brown (10 YR 5/4) and light gray (N 7/0), fine-grained sand (3 0-2 5 Ø), low to medium plastic, massive, severely oxide (Fe) stained, moist	

LOG OF BOREHOLE

Location Rocky Flats Plant; Landfill Area

Borehole/Well No 58-87 (con't.)

Coordinates

Ground Surface Elevation

Total Depth

Water Level Encountered

Static

Drilling Company

Driller

Date Drilled

Helper

Drilling Method

Drilling Fluid

Logged By

Geologist

Checked By

Site Manager

CEARP Manager

Comments

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			29.5-32.0' SAMPLE. Recovered 2.5/2.5 = 100% CLAYEY SANDSTONE light gray (N 7/0) to medium light gray (N 6/0), slightly to moderately oxide (Fe) stained, massive, low plastic, weakly to moderately cemented, fine-grained sand (2.5-2.0 Ø), moist	
			TOTAL DEPTH 32.0'	

LOG OF BOREHOLE

Location Rocky Flats Plant; Landfill Area
Coordinates N 39257.06 E 19431.75
Total Depth 26.0'

Borehole/Well No 59-87
Ground Surface Elevation 5992.90'
Water Level Encountered None
Static 15.05' (4/11/88)

Drilling Company Boyles Bros.
Date Drilled November 20, 1987
Drilling Method Hollow Stem Auger
Logged By J. Bacchus
Geologist

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

_____
CEARP Manager

Comments _____

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			**ROCKY FLATS ALLUVIUM**	HNu background = 2 0-3 0 OVA background = 1 8
			0-2.0' SAMPLE. Recovered 1 4/2.0' = 70% CLAY dark yellowish brown (10 YR 4/2), large angular quartzite clasts, coarse-grained sand; pockets of caliche, moist	0.0-2.0' Readings on core HNu 1 6, OVA 40 0, Ludlum 0
5			2.0-4.0' SAMPLE. Recovered 1 1/2.0' = 55% CLAY same as above except wood in the shoe	2.0-4.0' Readings on core HNu 1 5, OVA 20 0, Ludlum 0
			4.0-5.0' SAMPLE. Recovered 0 4/1 0 = 40% WOOD dusky brown (5 YR 2/2), frayed	4.0-5.0' Readings on core HNu 1 3, OVA 0, Ludlum 0
10			5.0-8.0' SAMPLE. Recovered 0 0/3 0' = 0%	8.0-10.5' Readings on core OVA 29 0, Ludlum. 0
			8.0-10.5' SAMPLE. Recovered 1 3/2 5 = 52% 8 0-8 3' WOOD same as above 8 3-9 3' CLAY dusky yellowish brown (10 YR 4/2), caliche, wood, sand, moist	8.0-9.3' Readings in augers OVA off scale
15			10.5-13.0' SAMPLE. Recovered 1 3/2.5 = 52% 10 5-11 3' CLAY same as above except the sample contains small cobbles, moist 11 3-11 8' CLAY light olive gray (5 Y 5/2), mottled with dark yellowish orange (10 YR 6/6) large subrounded pebbles, moist.	10.5-11.8' Readings on core OVA 1 2, Ludlum 0 10.5-11.8' Readings in augers OVA off scale 12.8-14.9' Readings on core OVA. 40, Ludlum. 0
20			Total depth measured 12.8' Adjust depth	

LOG OF BOREHOLE

Location Rocky Flats Plant, Landfill Area

Borehole/Well No 59-87 (con't.)

Coordinates

Ground Surface Elevation

Total Depth

Water Level Encountered

Static

Drilling Company

Driller

Date Drilled

Helper

Drilling Method

Drilling Fluid

Logged By

Geologist

Checked By

Site Manager

CEARP Manager

Comments

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20			12.8-15.3' SAMPLE. Recovered 2 1/2.5' = 84% 12.8-13 0' SAND light olive gray (5 Y 5/2), large rounded pebbles, moist 13 0-14 9' SAND light brown (5 YR 5/6), coarse-grained, mottled with pale yellowish orange (10 YR 8/6) immature sand, high amount of k-feldspar and large angular quartz, small angular cobbles of quartzite, some clay, moist	15.3-17.8' Readings on core OVA. 13, Ludlum 2. 17.8-20.5' Readings on core OVA 1 8; Ludlum 5 20.5-23.0' Readings on core OVA 6 8; Ludlum 0 23.0-25.5' Readings on core OVA 3 8, Ludlum 0
25			15.3-17.8' SAMPLE. Recovered 1 8/2 5 = 72% SAND same as above	
			17.8-20.5' SAMPLE. Recovered 1 8/2.5' = 72% SAND, same as above	
30			ARAPAHOE FORMATION	
			20.5-23.0' SAMPLE. Recovered 3 5/2.5' = 140% CLAYSTONE light olive gray (5 Y 5/2) mottled with dark yellowish orange (10 YR 6/6), sandy, blocky structure	
35			23.0-25.5' SAMPLE. Recovered 2.8/2 5' = 112% CLAYSTONE same as above	
			TOTAL DEPTH 26 0'	
40				

LOG OF BOREHOLE

Location: Rocky Flats Plant, Landfill Area
Coordinates: N 39951.63 E 19938.52
Total Depth: 32.0'

Borehole Well No: 60-87
Ground Surface Elevation: 5984.03'
Water Level Encountered: 19.3'
Static: 8.30' (4/11/88)

Drilling Company: Boyles Bros.
Date Drilled: November 19, 1987
Drilling Method: Hollow Stem Auger
Logged By: R. Treat, Geologist

Driller: T. High
Helper: B. Keeney
Drilling Fluid: None
Checked By: _____ Site Manager
_____ CEARP Manager

Comments: _____

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			**ROCKY FLATS ALLUVIUM**	HNu background = 0 3 OVA background = 0 0 Ludlum background = 0 0
			0 0-2.5' SAMPLE. Recovered 1 2/1 5' = 48% GRAVEL AND SANDY CLAY dusky brown (5 YR 2/2) to dark yellowish brown (10 YR 4/2) and moderate brown (5 YR 3/4), gravel ranging 0 25 mm up to cobble size, angular, subangular, and sub-rounded, weakly cemented, moist	
5			2.5-4.0' Center bit drill	
			4.0-7.0' SAMPLE. Recovered 0 4/3 0' = 13% SAND AND GRAVEL light brown (5 YR 5/6), slightly silty, gravel to 4 75 mm, subrounded, subangular, much of quartzite composition, sand ranging (3 0-2 5 Ø) to scattered (2 0-1 5 Ø) weakly cemented, moist	10.5' Readings in augers OVA 3 5, HNu 210
10			7.0-9 5' SAMPLE. Recovered 0 0/2 5' = 100% Cuttings indicate same materials as above	
			9.5-10.5' SAMPLE. Recovered 0 6/1 0' = 60% SAND AND GRAVEL light brown (5 YR 6/4) to moderate brown (5 YR 4/4) with angular and subangular gravel, range 0 25 mm to 2 75 mm with well sorted sand (2 5-2 0 Ø) to (0 5-1 0 Ø), slightly clayey, weakly cemented, moist	
15				
20				

LOG OF BOREHOLE

Location Rocky Flats Plant; Landfill Area

Borehole/Well No 60-87 (cont'd.)

Coordinates

Ground Surface Elevation

Total Depth

Water Level Encountered

Static

Drilling Company

Driller

Date Drilled

Helper

Drilling Method

Drilling Fluid

Logged By

Geologist

Checked By

Site Manager

CEARP Manager

Comments

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20			10.5-12.0' SAMPLE. Recovered 0 7/1 5' = 47% SAND AND GRAVEL same as above	22.0' Readings in augers HNu = 3 2, OVA = 9 5
			12.0-14.5' SAMPLE. Recovered 1 2/2 5 = 48% SAND AND GRAVEL moderate brown (5 YR 4/4) to pale yellowish brown (10 YR 6/2) and light brown (5 YR 6/4), well sorted sand, poorly sorted gravel with 0 25 mm to 3 25 mm, slightly clayey, weakly cemented, very moist at 12 5' to light moist	
25			14 5-17 0' SAMPLE. Recovered 0 4/2 5' = 16% SAND AND GRAVEL same as above	
30			17.0-19.5' SAMPLE. Recovered 2 5/2 5' = 100% 17 0-18 6' CLAYEY SAND moderate yellowish brown (10 YR 5/4) to light gray (N 7/0), sand range (3 0-2 5 Ø) some coarser-grained., low plastic, moderately cemented, moist 18 6-19 5' SAND light brown (5 YR 5/6) fine to coarse-grained, slightly clayey, ranging (2 5-2 0 Ø to 0 5-1 0 Ø) with some small size scattered gravels, weakly cemented, very moist to wet at 19 3'	
35			19.5-22.0 SAMPLE. Recovered 0 7/2 5' = 34% SAND light brown (5 YR 6/6) with (1 0-0 5 Ø) and finer-grained, weakly to non-cemented, poorly sorted, wet	
40				

LOG OF BOREHOLE

Location Rocky Flats Plant, Landfill Area

Borehole Well No 60-87 (cont'd.)

Coordinates

Ground Surface Elevation

Total Depth

Water Level Encountered

Static

Drilling Company

Driller

Date Drilled

Helper

Drilling Method

Drilling Fluid

Logged By

Geologist

Checked By

Site Manager

CEARP Manager

Comments

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			22.0-24.5' SAMPLE. Recovered 2 5/2 5' = 100% 22 0-24 3 SAND light brown (5 YR 6/6) sand (2 0-1 5 Ø) with occasional scattered gravel, subangular, subrounded, non to weakly cemented, wet 24 3-24 5' CLAYEY SAND moderate brown (5 -YR 4/4) with (3 0-2 5 Ø) to scattered (2 0-1 5 Ø) moderately cemented poorly sorted, very moist	
			24.5-27.0' SAMPLE. Recovered 0 4/2 5' = 16% CLAY dark yellowish orange (10 YR 6/6) pale yellowish brown (10 YR 6/2) with blotches of dusky brown (5 YR 2/2) to medium gray (N 6/0) and light gray (N 7/0), sandy, low to medium plastic, sand (2 5-2 0 Ø) small quartzite gravel to 0 75 mm, moderately cemented, moist	
			27.0-29.0' SAMPLE. Recovered 1 1/2 0' = 55% 27 0-27 2' CLAY pale yellowish brown (10 YR 6/2) to dark yellowish brown (10 YR 4/2), slightly sandy, fine-grained sand sand (2 5-2 0 Ø) moderately (Fe) oxide stained, medium plastic, moderately cemented, moist	

LOG OF BOREHOLE

Location: Rocky Flats Plant, Landfill Area
Borehole Well No: 60-87 (cont'd)
Coordinates:
Ground Surface Elevation:
Total Depth:
Water Level Encountered:
Static:
Drilling Company:
Driller:
Date Drilled:
Helper:
Drilling Method:
Drilling Fluid:
Logged By: Geologist
Checked By: Site Manager
CEARP Manager
Comments:

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			ARAPAHOE FORMATION	
			27 2-28 1' CLAYSTONE light brown (5 YR 5/6) to predominantly light olive gray (5 Y 6/1), moderately oxide (Fe) stained, blocky and layered, massive, medium to highly plastic, fine-grained, slightly sandy, weathered, moist	
			29.0-31.0' SAMPLE. Recovered 0 0/2 0' = 0%	
			31.0-32.0 SAMPLE. Recovered 1 5/1 0' = 150% CLAYSTONE dark gray (N 3/0) with lignite seams, massive, moderately cemented, blocky, highly plastic, weathered, moist	
			TOTAL DEPTH 32 0'	

LOG OF BOREHOLE

Location Rocky Flats Plant, Landfill Area
Coordinates N 39881.26 E 19974.80
Total Depth 34.1'

Borehole Well No 61-87
Ground Surface Elevation 5984.00'
Water Level Encountered 19.3'; 21.3'
Static 10.95' (4/11/88)

Drilling Company Boyles Bros.
Date Drilled November 24, 1987
Drilling Method Hollow Stem Auger
Logged By J. Bacchus
Geologist

Driller S. Bradfield
Helper P. Mesa
Drilling Fluid None
Checked By _____
Site Manager

CEARP Manager

Comments _____

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			**ARTIFICIAL FILL/DISTURBED** 0.0-2.0' SAMPLE. Recovered 1 5/2 0' = 75% 0 0-1 1' CLAY dusky yellowish brown (10 YR 2/2), large angular clasts of quartzite, sand, roots, no HCl reaction, moist 1 1-1 5' CLAY same as above except dark reddish brown (10 YR 3/4), dry 2.0-4 0' SAMPLE. Recovered 1 8/2 0' = 90% 2 0-2 7' CLAY same as above 2 7-3 8' GRAVEL pale reddish brown (10 R 5/4), clasts are supported by fine- to coarse-grained sand, no HCl reaction, dry 4.0-6.0' SAMPLE. Recovered 1 9/2 0' = 95% GRAVEL same as above **ROCKY FLATS ALLUVIUM** 6 0-8.0' SAMPLE. Recovered 1 8/2 0' = 90% SAND light brown (5 YR 5/6), fine-grained, large angular pebbles, coarse sand, silt clay, no HCl reaction, slightly moist to dry 8.0-10.0' SAMPLE. Recovered 1 3/2 0' = 65% SAND same as above except moist	HNu Background=0 4 OVA Background=0 2 0.0-1.5' Readings on core HNu = 0 4, OVA = 0 2, Ludlum = 0 2.0-3.8' Readings on core HNu = 0 6, OVA = 0 4, Ludlum = 1 4 0-5.9 Readings on core HNu = 0 6, OVA = 3 0, Ludlum = 1 6 0' Readings in breathing zone Hnu = 0 6, OVA = 0 6 6.0' Readings in augers HNu = 4 0; OVA = 30 0 6.0-7.8' Readings on core HNu = 0 6, OVA = 0 8, Ludlum = 1 8.0-9 3 Readings on core HNu = 0 6, OVA = 0 5, Ludlum = 2
5				
10				
15				
20				

LOG OF BOREHOLE

Location Rocky Flats Plant, Landfill Area

Coordinates

Total Depth

Drilling Company

Date Drilled

Drilling Method

Logged By

Geologist

Borehole/Well No 61-87 (cont'd.)

Ground Surface Elevation

Water Level Encountered

Static

Driller

Helper

Drilling Fluid

Checked By

Site Manager

CEARP Manager

Comments

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20			10.0-12.0' SAMPLE. Recovered 0 8/2 0' = 40% SAND same as above	10.0-10.8' Readings on core HNu = 0 6, OVA = 0 2, Ludlum = 0
			12.0-14.0' SAMPLE. Recovered 2 2/2 0 = 110% SAND pale olive (10 Y 6/2) mottled dark yellowish brown (10 YR 4/2) and light brown (5 YR 5/6), small angular cobbles, angular pebbles coarse- and fine-grained sand, micaceous very slight HCl reaction moist	12.0-14.0' Readings on core HNu = 0 4, OVA = 0 6, Ludlum = 2
25			14 0-16.0' SAMPLE. Recovered 1 3/2 0' = 65% SAND light brown (5 YR 6/6), clay angular pebbles, small angular cobbles, no HCl reaction, slightly moist to dry	14 0-15.3' Readings on core HNu = 0 8, OVA = 1 0 Ludlum = 1
30			16.0-18.0' SAMPLE. Recovered 2 1/2 0' = 105% SAND AND SILT moderate brown (5 YR 4/4), fine-grained sand, coarse sand, angular pebbles, small angular cobbles, no HCl reaction, moist	16.0-18.0' Readings on core HNu = 0 4, OVA = 0 6, Ludlum = 0
				18.0-19.8' Readings on core HNu = 0 4, OVA = 0 6, Ludlum = 0
35			18.0-20.0' SAMPLE. Recovered 1 8/2 0 = 90% 18 0-19 3' SAND AND SILT same as above 19 3-19 8' SAND moderate brown (5 YR 4/4), grains are well rounded, some clay, some angular pebbles, wet	20.0-21.8 Readings on core HNu = 0 4, OVA = 1 2, Ludlum = 0
				22.0-22 6 Readings on core HNu = 0 4, OVA = 0 8, Ludlum = 1
40				

LOG OF BOREHOLE

Location: Rocky Flats Plant, Landfill Area
Borehole Well No: 61-87 (cont'd)
Coordinates:
Ground Surface Elevation:
Total Depth:
Water Level Encountered:
Static:
Drilling Company:
Driller:
Date Drilled:
Helper:
Drilling Method:
Drilling Fluid:
Logged By: Geologist
Checked By: Site Manager
CEARP Manager
Comments:

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			20.0-22.0' SAMPLE. Recovered 1 8/2 0' = 90% 20 0-21 3' CLAY light olive gray (5 Y 5/2), mottled with dark yellowish orange (10 YR 6/6), clay, moist 21 3-21 8' GRAVEL dark yellowish orange (10 YR 6/6), small angular cobbles, coarse sand, clay, wet	29.0-31.0' Readings on core HNu = 36, OVA = 0 8, Ludlum = 0
			22.0-24 0' SAMPLE. Recovered 0 6/2 0' = 30% GRAVEL same as above	31.1-33.1' Readings on core HNu = 120 0, OVA = 0 4, Ludlum = 0
			24.0-26.0' SAMPLE. No recovery	33.1-34.1' Readings on core HNu = 40, OVA = 0 4, Ludlum = 0
			26.0-28.0' SAMPLE. No recovery	
			ARAPAHOE FORMATION	
			28 0-29 0' SAMPLE. No recovery Drilled with center bit	
			29 0-31 0 SAMPLE Recovered 2 0/2 0 = 100% CLAYSTONE light olive gray (5 Y 5 2) stained with dark yellowish orange (10 YR 6/6), dense, moist	

LOG OF BOREHOLE

Location Rocky Flats Plant, Landfill Area

Borehole Well No 61-87 (cont'd)

Coordinates

Ground Surface Elevation

Total Depth

Water Level Encountered

Static

Drilling Company

Driller

Date Drilled

Helper

Drilling Method

Drilling Fluid

Logged By

Geologist

Checked By

Site Manager

CEARP Manager

Comments

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			Total depth measured 31 1' Adjust depth	
			31.1-33.1' SAMPLE.	
			Recovered 2 0/2 0' = 100%	
			CLAYSTONE same as above	
			33.1-34.1' SAMPLE	
			Recovered 1 0/1 0' = 100%	
			CLAYSTONE same as above	
			TOTAL DEPTH 34 1'	

LOG OF BOREHOLE

Location: Rocky Flats Plant, Landfill Area
Coordinates: N 39821.22 E 19999 70
Total Depth: 30.0'

Borehole Well No: 62-87
Ground Surface Elevation: 5984.16'
Water Level Encountered: 16.5'
Static: 11.50' (4/11/88)

Drilling Company: Boyles Bros.
Date Drilled: November 24, 1987
Drilling Method: Hollow Stem Auger
Logged By: R.T. Treat
Geologist

Driller: T. High
Helper: B. Keeney
Drilling Fluid: None
Checked By: _____
Site Manager

_____
CEARP Manager

Comments: _____

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			**ARTIFICIAL FILL/DISTURBED** 0.0-2.0' SAMPLE Recovered 1 3/2 0' = 65% CLAY light brown (5 YR 5/6) to moderate brown (5 YR 4/4) with grayish brown (5 YR 3/2) blotches, fine-grained sand (3 0-2 5 Ø), small size gravel subrounded and rounded, some minor fragments of claystone, low plastic, weakly cemented, moist 2.0-4.0' SAMPLE Recovered 0 3/2 0' = 15% CLAY AND GRAVEL slightly sandy, moderate brown (5 YR 3/4) to varying light brown (5 YR 5/6) to grayish brown (5 YR 3/2), sand ranging from 3 0-3 5 Ø to 1 0-0 5 Ø, rounded and subrounded gravel, subangular gravel of quartzite composition, scattered cobbles, weakly cemented, poorly sorted, low plastic, moist **ROCKY FLATS ALLUVIUM** 4.0-7.0' SAMPLE Recovered 0 0/3 0' = 0% SAND AND GRAVEL varying brown, slightly clayey, fine- to medium-grained sand, some scattered cobbles, poorly sorted, weakly cemented, moist Description based on cuttings 7.0-8.0' SAMPLE Center bit used	HNu Background=0 3 OVA Background=0 0 Ludlum background = 0 0 9.5' Readings in augers HNu = 75, OVA = 185 9.5-10.5' Readings on core HNu = 4 5, OVA = 12 5, Ludlum = 0 10.5-11.9' Readings on core HNu = 0, OVA = 8 5, Ludlum = 0 14.5' Readings in augers HNu = 0, OVA = 1,000+
5				
10				
15				
20				

LOG OF BOREHOLE

Location Rocky Flats Plant, Landfill Area

Borehole Well No 62-87 (cont'd.)

Coordinates

Ground Surface Elevation

Total Depth

Water Level Encountered

Static

Drilling Company

Driller

Date Drilled

Helper

Drilling Method

Drilling Fluid

Logged By

Geologist

Checked By

Site Manager

CEARP Manager

Comments

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20			8.0-9.5' SAMPLE Recovered 0 0/1 5' = 0% 9.5-10.5' SAMPLE Recovered 1 3/1 0' = 130% SAND AND GRAVEL light brown (5 YR 6/4 and 5 YR 5/6), quartzose gravel (0 2 mm to 2 75 mm), few cobbles, slightly calcareous sand (3 0-2 5 Ø to 1 0-0 5 Ø), weakly cemented moist	
25			10.5-12.0' SAMPLE Recovered 1 4/1 5' = 93% SAND AND GRAVEL slightly clayey, otherwise as stated in previous run	
30			12.0-14.5' SAMPLE Recovered 2 2/2 5' = 88% 12 0-12 4' CLAYEY SAND light gray (N 7/0) to varying light brown (5 YR 6/4), fine-grained sand (3 0-2 5 Ø), moderately cemented, moist 12 4-14 2' SAND AND GRAVEL moderate brown (5 YR 4/4) to varying lighter brown (5 YR 5/6 and 5 YR 6/4), sand ranging from 2 0-1 5 Ø to 0 0-0 5 Ø, gravel ranging 0 25 mm to 2 50 mm, gravel subrounded, subangular, with few angular, weakly cemented, well sorted, moist	30.0' Readings in augers HNu = 0, OVA = 75
35				
40				

LOG OF BOREHOLE

Location Rocky Flats Plant, Landfill Area

Coordinates

Total Depth

Drilling Company

Date Drilled

Drilling Method

Logged By

Geologist

Borehole Well No 62-87 (cont'd)

Ground Surface Elevation

Water Level Encountered

Static

Driller

Helper

Drilling Fluid

Checked By

Site Manager

CEARP Manager

Comments

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			14.5-17.0' SAMPLE Recovered 2.1/2.5' = 84% SAND moderate brown (5 YR 4/4) to some light brown (5 YR 5/6), slightly clayey, sand ranging from 3.0-2.5 Ø to scattered 1.5-1.0 Ø, some scattered gravel, weakly to non-cemented, very moist to wet at 16.5-16.7', then moist below	
			17.0-19.5' SAMPLE Recovered 2.5/2.5' = 100% SAND light brown (5 YR 5/6) to pale yellowish brown (10 YR 6/2) with light gray (N 7/0), fine-grained sand (3.0-2.5 Ø), non to weakly cemented, poorly sorted sand, rounded, slightly clayey to very clayey streaked, wet to very moist	
			19.5-22.0' SAMPLE Recovered 2.5/2.5' = 100% 19.5-21.0' CLAY light gray (N 7/0) with some pale yellowish browns (10 YR 6/2), highly plastic, moderately cemented slightly sandy (3.0-2.5 Ø), moist 21.0-22.0 SAND moderate brown (5 YR 4/6) scattered gravel fine- to medium-grained sand ranging from 2.5-2.0 Ø to 2.0-1.5 Ø weakly cemented very moist	

LOG OF BOREHOLE

Location: Rocky Flats Plant, Landfill Area
Borehole Well No: 62-87 (cont'd.)
Coordinates:
Ground Surface Elevation:
Total Depth:
Water Level Encountered:
Static:
Drilling Company:
Driller:
Date Drilled:
Helper:
Drilling Method:
Drilling Fluid:
Logged By: Geologist
Checked By: Site Manager
CERP Manager
Comments:

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			22.0-24.5' SAMPLE Recovered 2 5/2 5' = 100% 22 0-22 5' SAND AND GRAVEL light brown (5 YR 5/6), fine-, medium-, and coarse-grained sand ranging from 2 0-1 5 Ø to 0 5-1 0 Ø, small gravel (0 25 mm and to cobble size), weakly to non-cemented, well sorted sand and gravel, wet 22 5-24 5' SANDY CLAY light brown (5 YR 5/6) and light brownish gray (5 YR 6/1), fine-grained sand (3 0-2 5 Ø), moderately cemented, low to medium plastic, moist 24 5-26.5' SAMPLE Recovered 2 0/2 0' = 100% 24 5-26 3 SANDY CLAY varying brown with gray, fine-grained sand (3 5-3 0 Ø), moderately cemented, medium plastic, moist ARAPAHOE FORMATION 26 3-26 5' CLAYSTONE varying dark yellowish brown (10 YR 4/2) to light brown (5 YR 5/6), medium plastic, moderately cemented, weathered, moist 26.5-27.5' SAMPLE Recovered 1 5/1 0' = 150% CLAYSTONE varying brown and gray streaks, moderately oxide stained, moderately cemented, blocky, weathered, moist	

OF
BOREHOLE

Location Rocky Flats Plant, Landfill Area

Borehole Well No 62-87 (cont'd.)

Coordinates

Ground Surface Elevation

Total Depth

Water Level Encountered

Static

Drilling Company

Driller

Date Drilled

Helper

Drilling Method

Drilling Fluid

Logged By

Geologist

Checked By

Site Manager

CEARP Manager

Comments

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			27.5-28.5' SAMPLE Recovered 1.0/1.0' = 100% CLAYSTONE pale yellowish brown (10 YR 6/2) to pale brown (5 YR 5/2) and medium light gray (N 6/0), slightly sandy, fine-grained, moderately cemented highly plastic, blocky, weathered, moist	
			28.5-30.0' SAMPLE Recovered 1.5/1.5' = 100% CLAYSTONE gray and brown moderately to slightly oxide stained massive medium plastic blocky weathered moist	
			TOTAL DEPTH 30.0'	

LOG OF BOREHOLE

Location Rocky Flats Plant, Landfill Area
Coordinates N 39738 07 E 20040.50
Total Depth 30.0'

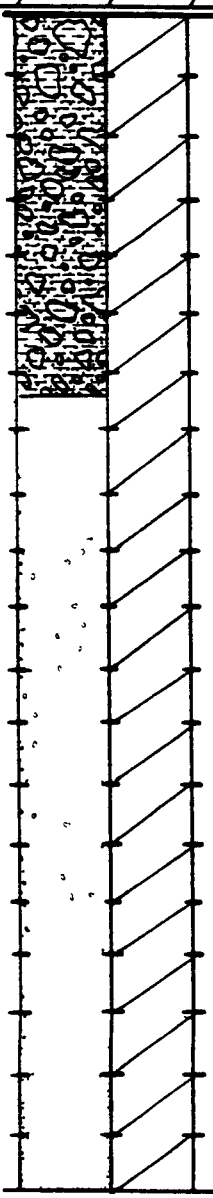
Borehole Well No 63-87
Ground Surface Elevation 5985.42'
Water Level Encountered 14.0'
Static 13.56' (4/11/88)

Drilling Company Boyles Bros.
Date Drilled November 30-December 1, 1987
Drilling Method Hollow Stem Auger
Logged By R.T. Treat
Geologist

Driller S. Bradfield
Helper P. Mesa
Drilling Fluid None
Checked By _____
Site Manager

_____
CEARP Manager

Comments _____

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0 5 10 15 20			**ARTIFICIAL FILL/DISTURBED** 0 0-2.0' SAMPLE Recovered 0 4/2 0' = 30% GRAVELLY CLAY dusky yellowish brown (10 YR 2/2) to light brown (5 YR 5/6), asphalt and cobbles on or near surface, slightly sandy gravel, gravel subrounded to rounded, 0 50 mm to cobble size, poorly sorted sand, weakly cemented, moist 2.0-4.0' SAMPLE Recovered 2 0/2 0' = 100% CLAY AND GRAVELS with small amount of claystone and small asphalt fragments noted, moderate brown (5 YR 3/4 and 5 YR 4/4) to light brown (5 YR 5/6 and 5 YR 6/4), gravel (3 75 mm) with scattered cobbles, poorly sorted sand and gravel, small amount of claystone, small amount asphalt fragments, moderately cemented, low to medium plastic, moist 4 0-6 0' SAMPLE Recovered 0 0/20 '=0% 6.0-8.0' SAMPLE Recovered 1 3/2 0' = 65% 6 0-6 5' CLAY AND GRAVEL same as above	HNu Background=0 4 OVA Background=0 0 Ludlum background = 0 0 0.0-0.4' Reading on core, Hnu = 0, OVA = 1 4, Ludlum = 0 2.0-4 0' Readings on core, HNu = 0, OVA = 0 8, Ludlum = 0 6.0-7.3' Readings on core Hnu = 0, OVA = 12 0, Ludlum = 0 8.0' Reading in augers HNu = 0, OVA = 1000+ 8.0-9.6 Readings on core HNu = 7 5, OVA = 52, Ludlum = 0 10.0-10.5 Readings on core HNu = 0, OVA = 5 5, Ludlum = 0 12 0-13.0' Readings on core HNu = 86, OVA = 28, Ludlum = 0

LOG OF BOREHOLE

Location Rocky Flats Plant; Landfill Area

Borehole/Well No 63-87 (cont'd.)

Coordinates

Ground Surface Elevation

Total Depth

Water Level Encountered

Static

Drilling Company

Driller

Date Drilled

Helper

Drilling Method

Drilling Fluid

Logged By

Geologist

Checked By

Site Manager

CEARP Manager

Comments

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20			**ROCKY FLATS ALLUVIUM**	14 0-15.2 Readings on core HNu = 14 5, OVA = 8 8, Ludlum = 0
			6 5-7 3' SAND AND GRAVEL light brown (5 YR 5/6 and 5 YR 6/4) to some moderate brown (5 YR 4/6) sand (2 5-2 0 Ø), rounded and poorly sorted, gravel (0 35 mm to 3 00 mm), angular and subangular, weakly cemented, moist	18.0-18.6' Readings on core HNu = 10 2, OVA = 5 5, Ludlum = 0
25			8 0-10.0' SAMPLE Recovered 1 6/2 0 = 80% SAND AND GRAVEL moderate brown (5 YR 4/4) to multi-colored browns ranging from moderate yellowish brown (10 YR 5/4) to light brown (5 YR 5 6 and 5 YR 6/4) angular and subangular gravel (0 25 mm to scattered cobbles) sand fine-grained (3 5-3 0 Ø) to scattered (0 5-00 Ø), weakly cemented, dense, light moist	19 0-20.2 Readings on core HNu = 0 OVA = 4 2 Ludlum = 0
30				21.0-21.7' Readings on core HNu = 0, OVA = 16, Ludlum = 0
			10.0-11.0' SAMPLE Recovered 0 5/1 0' = 50% SAND AND GRAVEL varying light brown (5 YR 5/6 and 5 YR 6/4), sand (3 0-2 5 Ø) with scattered larger grains and small cobbles, subangular, angular, and few rounded, poorly sorted, weakly to moderately cemented, light moist	23 0-25 0' Readings on core HNU = 0, OVA = 10, Ludlum = 0
35			11.0-12 0' SAMPLE Center bit used	
			12 0-14 0' SAMPLE Recovered 1 0/2 0' = 50% SAND AND GRAVEL same as above	
40				

LOG OF BOREHOLE

Location: Rocky Flats Plant, Landfill Area
Borehole Well No: 63-87 (cont'd)
Coordinates:
Ground Surface Elevation:
Total Depth:
Water Level Encountered:
Static:

Drilling Company:
Driller:
Date Drilled:
Helper:
Drilling Method:
Drilling Fluid:
Logged By: Geologist
Checked By: Site Manager
CEARP Manager

Comments:

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			14.0-16.0' SAMPLE Recovered 1 2/2 0' = 60% SAND AND GRAVEL moderate yellowish brown (10 YR 5/4) to varying light brown (5 YR 5/6) and moderate brown (5 YR 4/4), fine- to coarse-grained sand ranging from 2 5-2 0 Ø to scattered (0 5-0 0 Ø), rounded, scattered gravel (0 55 mm up to 2 25 mm), rounded and subrounded, slightly clayey, wet at 14 0' to very moist 16 0-18 0' SAMPLE Recovered 0 0/2 0' = 0% Cuttings appear as continuing sand and gravel deposits 18.0-19.0' SAMPLE Recovered 0 6/1 0' = 60% SAND moderate brown (5 YR 4/4) varying light brown (5 YR 5/6), medium- and coarse-grained sand (2 0-1 5 Ø to 0 5-0 06 Ø), small size scattered gravel, poorly sorted, very moist to moist 19 0-21.0' SAMPLE Recovered 1 2/2 0 = 60% SAND light brown (5 YR 5/6 and 5 YR 6/4) to medium brown (5 YR 4/4) slightly clayey to very clayey medium- and coarse-grained to fine-grained sand (2 5-2 0 Ø), moderately cemented very clayey very moist to moist	

LOG OF BOREHOLE

Location Rock. Flats Plant, Landfill Area

Borehole Well No 63-87 (cont'd.)

Coordinates

Ground Surface Elevation

Total Depth

Water Level Encountered

Static

Drilling Company

Driller

Date Drilled

Helper

Drilling Method

Drilling Fluid

Logged By

Geologist

Checked By

Site Manager

CEARP Manager

Comments

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			21 0-23.0' SAMPLE Recovered 0 7/2 0' = 35% CLAYEY SAND varying brown (5 YR 5/2), sand (2 5-2 0 Ø) with some scattered coarse-grained, small-size gravel (0 25 mm), low plastic, moderately cemented, moist	
			23 0-25.0' SAMPLE Recovered 2 0/2 0' = 100% SANDY CLAY varying with light brown (5 YR 5/6 and 5 YR 6/4) to moderate brown (5 YR 3/4), blotchy with dark yellowish orange (10 YR 6/6) to pale yellowish brown (10 YR 6/2), sand (3 0-2 5 Ø) with moist, coarse-grained (1 5-1 0 Ø), poorly sorted, moderately cemented, massive, low to medium plastic, stiff, moist	
			ARAPAHOE FORMATION	
			25 0-27 0 SAMPLE Recovered 2 0/2 0' = 100% CLAYSTONE moderately oxide (Fe) stained browns of moderate yellowish browns (10 YR 5/4) with dark yellowish orange (10 YR 6/5) to predominantly light grav (N 7/0) to medium light gray (N 5/0), medium to highly plastic moderately cemented, slightly calcareous streaked, massive, weathered, moist	

LOG OF BOREHOLE

Location Rocky Flats Plant, Landfill Area

Borehole Well No 63-87 (cont'd.)

Coordinates

Ground Surface Elevation

Total Depth

Water Level Encountered

Static

Drilling Company

Driller

Date Drilled

Helper

Drilling Method

Drilling Fluid

Logged By

Geologist

Checked By

Site Manager

CEARP Manager

Comments

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			27.0-29.0' SAMPLE Recovered 2.0/2.0' = 100% CLAYSTONE medium gray (N 5/0) to medium dark gray (N 4/0), blocky, massive, now only slightly oxide (Fe) stained in thin streaks, medium to highly plastic, weathered, moist 29.0-30.0' SAMPLE Recovered 0.0/1.0 = 0% CLAYSTONE based on pieces in hollow stem auger, weathered TOTAL DEPTH 30.0	

LOG OF BOREHOLE

Location Rocky Flats Plant, Landfill Area
Coordinates N 39349.01 E 20162.23
Total Depth 28.0'

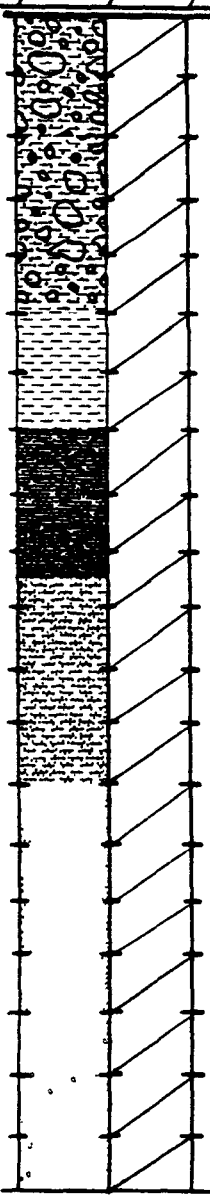
Borehole Well No 64-87
Ground Surface Elevation 5985.89'
Water Level Encountered 14.5'
Static 16.76' (4/11/88)

Drilling Company Boyles Bros.
Date Drilled December 2-4, 1987
Drilling Method Hollow Stem Auger
Logged By R.T. Treat
Geologist

Driller T. High
Helper B. Keeney
Drilling Fluid None
Checked By _____
Site Manager

CEARP Manager

Comments _____

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			**ARTIFICIAL FILL/DISTURBED** 0 0-2.0' SAMPLE. Recovered 0 0/2 0' = 0% Cuttings appeared as clay with gravel, sandy, some asphalt fragments 2.0-4 0' SAMPLE. Recovered 0 0/2 0' = 0% 4.0-5.0' SAMPLE. Center bit used 5.0-7.0' SAMPLE. Recovered 2 0/2 0' = 100% 5 0-6 0' CLAY moderate yellowish brown (10 YR 5/4), fine-grained sand with gravel grayish brown (5 YR 3/2) to dusky brown (5 YR 2/2), slightly clayey, fine-, medium- and coarse-grained sand (1 0-2 5 Ø to 0 5-1 00 Ø), gravel 0 15 mm up to 1 75 mm, subrounded, angular, and angular, weakly cemented, poorly sorted gravel, well sorted sand, few scattered asphalt fragments, light moist	HNu Background=0 2 OVA Background=0 0 Ludlum Background = 0 5.0-7.0' Readings on core HNu = 2 5, OVA = 11, Ludlum = 0 7 0-7.6' Readings on core HNu = 15 5, OVA = 310, Ludlum = 0 13.0-14 5' Readings on core HNu = 0, OVA = 38, Ludlum = 0 14.5-17 0' Readings on core HNu = 0, OVA = 12 5, Ludlum = 0 17 0-19.5 Readings on core HNu = 0, OVA = 11 4, Ludlum = 0 19 5-22 0' Readings on core HNu = 0, OVA = 13 5, Ludlum = 0
5				
10				
15				
20				

LOG OF BOREHOLE

Location: Rocky Flats Plant, Landfill Area
Borehole Well No: 64-87 (cont'd.)
Coordinates:
Ground Surface Elevation:
Total Depth:
Water Level Encountered:
Static:
Drilling Company:
Driller:
Date Drilled:
Helper:
Drilling Method:
Drilling Fluid:
Logged By: Geologist
Checked By: Site Manager
CEARP Manager
Comments:

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20			7.0-9.5' SAMPLE. Recovered 0 6/2 5' = 24% SILTY SAND WITH GRAVEL dusky brown (5 YR 2/2), sand ranging from 3 5-3 0 Ø to 2 0-1 5 Ø, weakly cemented, poorly sorted, gravel ranging from 0 25-0 75 mm, light moist SPECIAL NOTE During this run, most of the cuttings now appearing as a sanitary landfill deposit Consisting of wood particles, insulated wire fragments, construction ribbon, surgical gloves, saranex suits, and assorted plastics	22 0' Readings in augers HNu = 18 4, OVA = 1,000+
25				22.0-24 5' Readings on core HNu = 0, OVA = 13 2, Ludlum = 0
				24 5-25 5 Readings on core HNu = 0, OVA = 8 2, Ludlum = 0
			9.5-12.0' SAMPLE Recovered 0 0/2 5' = 0% Auger cuttings during this run now appearing as a CLAYEY SAND or a very SANDY CLAY, moderate olive brown (5 Y 4/4) to an olive gray (5 Y 3/2) fine-grained sand (3 0-2 5 Ø) scattered amounts of continued trash debris	25.5-27 0 Readings on core HNu = 0, OVA = 4 8, Ludlum = 0
30				
			12.0-13.0' SAMPLE. Center bit used	
			13.0-14 5' SAMPLE. Recovered 1 5/1 5' = 100% SAND moderate yellowish brown (10 YR 5/4) to dark yellowish orange (10 YR 6/6), well sorted sand ranging from 2 5-2 0 Ø to 0 0-0 5 Ø, rounded subrounded, and some angular, weakly cemented, slightly clayey, moist to very moist at end	
35				
40				

LOG OF BOREHOLE

Location Rocky Flats Plant, Landfill Area

Borehole Well No 64-87 (cont'd.)

Coordinates

Ground Surface Elevation

Total Depth

Water Level Encountered

Static

Drilling Company

Driller

Date Drilled

Helper

Drilling Method

Drilling Fluid

Logged By

Geologist

Checked By

Site Manager

CEARP Manager

Comments

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			14.5-17.0' SAMPLE. Recovered 2 5/2 5' = 100% SAND light brown (5 YR 5/6), moderate brown (5 YR 4/4) to pale yellowish brown (10 YR 6/2), and dark yellowish orange (10 YR 6/6), sand ranging from 3 5-3 0 Ø up to 2 0-2 5 Ø, weakly cemented, poorly sorted, clayey sand with coarse deposits noted from 16 5-17 0' and some scattered gravel below 16 5', saturated sand at 14 5' to otherwise moist deposits 17 0-19 5' SAMPLE. Recovered 2 5/2 5' = 100% SAND AND GRAVEL colors as stated in previous run, sand grain size as above and somewhat finer, poorly sorted, clayey to very clayey, scattered gravel ranging from 0 50 mm to a few 2 25 mm, weakly to moderately cemented, moist 19.5-22.0' SAMPLE. Recovered 2 5/2 5' = 100% 19 5-20 5' SAND AND GRAVEL as noted in previous run 20 5-22 0 SLIGHTLY SANDY CLAY pale yellowish brown (10 YR 6/2) to light gray (N 6/0), scattered sand (2 0-1 5 Ø), moderately cemented, low plastic moist	

LOG OF BOREHOLE

Location Rocky Flats Plant, Landfill Area

Borehole Well No 64-87 (cont'd.)

Coordinates

Ground Surface Elevation

Total Depth

Water Level Encountered

Static

Drilling Company

Driller

Date Drilled

Helper

Drilling Method

Drilling Fluid

Logged By

Geologist

Checked By

Site Manager

CEARP Manager

Comments

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			22.0-24.5 SAMPLE. Recovered 2 5/2 5 = 100% 22 0-23 3 CLAY moderate yellowish brown (10 YR 5/4) to dark yellowish orange (10 YR 6/6) with some light brown (5 YR 5/6), fine-grained sand (3 0-2 5 Ø), low to medium plastic, moderately cemented, moist	
			ARAPAHOE FORMATION	
			23 3-24 5' CLAYSTONE light brown (5 YR 6/4 to 5 YR 5/6) to moderate brown (5 YR 4/4), sandy to very sandy streaks, fine-grained sand (3 0-2 5 Ø), moderately cemented, severely oxide stained, low plastic, poorly sorted, highly weathered, moist	
			24 5-25.5' SAMPLE. Recovered 1 3/1 0' = 130% CLAYEY SANDSTONE dark yellowish orange (10 YR 6/6) to light brown (5 YR 5/6) and pale brown (5 YR 5/2), fine-grained sand (3 5-3 0 Ø to 3 0-2 5 Ø), severely oxide stained, weakly cemented, poorly sorted, weathered, moist	

LOG OF BOREHOLE

Location: Rock Flats Plant, Landfill Area

Borehole Well No: 64-87 (cont'd)

Coordinates:

Ground Surface Elevation:

Total Depth:

Water Level Encountered:

Static:

Drilling Company:

Driller:

Date Drilled:

Helper:

Drilling Method:

Drilling Fluid:

Logged By: Geologist

Checked By: Site Manager

CEARP Manager

Comments:

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			25.5-27.0' SAMPLE. Recovered 1 5/1 5' = 100% CLAYEY SANDSTONE yellowish orange (10 YR 6/6) to light brown (5 YR 5/6) with blotches of light gray (N 7/0), streaky, fine-grained sand (3 0-2 5 Ø to 2 5-2 0 Ø), weakly cemented, poorly sorted, massive, highly weathered, moist to very moist at bottom of run	
			27.0-28.0' SAMPLE. Recovered 1 0/1 0' = 100% CLAYEY SANDSTONE as noted in previous run	
			TOTAL DEPTH 28 0'	

LOG OF BOREHOLE

Location Rocky Flats Plant, Landfill Area
Coordinates N 39250.14 E 20200.22
Total Depth 27 0'

Borehole Well No 65-87
Ground Surface Elevation 5983.08'
Water Level Encountered 14.0'
Static 10.46' (4/11/88)

Drilling Company Boyles Bros.
Date Drilled December 8-9, 1987
Drilling Method Hollow Stem Auger
Logged By R.T. Treat
Geologist

Driller T. High
Helper B. Keeney
Drilling Fluid None
Checked By _____
Site Manager

CEARP Manager

Comments _____

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			**ARTIFICIAL FILL/DISTURBED** 0 0-2.0' SAMPLE. Recovered 1 4/2 0' = 70% CLAYEY SAND AND GRAVEL light brown (5 YR 5/6) to moderate brown (5 YR 4/4), ranging from 2 5-2 0 Ø to 0 0-0 5 Ø, rounded and subrounded gravel (0 50 mm to scattered cobbles), lower portion of sample is black (N 1/0) to dusky brown (5 YR 2/2), moist to damp 2.0-4.0' SAMPLE. Recovered 1 6/2 0' = 80% 2 0-2 5' CLAYEY SAND AND GRAVEL as noted in previous run 2 5-3 6' CLAY light brown (5 YR 5/6 and 5 YR 6/4) to pale yellowish brown (10 YR 6/2) and dark yellowish orange (10 YR 6/5) with blotches of dusky brown (5 YR 2/2), some claystone and sandstone fragments, scattered gravel to 3 25 mm, angular, subangular, moist 4.0-7 0' SAMPLE Recovered 2 2/3 0' = 73% CLAY colors as stated above sandy, little scattered gravel, more claystone fragments than above, low plastic, moderately cemented, moist	OVA Background=0 8 HNu Background=0 2 Ludlum Background = 0 0.0-1.4' Readings on core HNu = 0, OVA = 115 2.0-3.6' Readings on core HNu = 1 2, OVA = 210 4.0-6.2 Readings on core HNu = 1 4, OVA = 10 7.0-8.3' Readings on core HNu = 0 0, OVA = 95 9.5-11.6' Readings on core HNu = 0 0, OVA = 95 12.0' Readings in augers HNu = 0 0, OVA = 320, Gastech = 5% LEL 12.0-14 1' Readings on core HNu = 0 4, OVA = 92 14.5-16.3 Readings on core HNu = 0 0, OVA = 55
5				
10				
15				
20				

LOG OF BOREHOLE

Location Rocky Flats Plant, Landfill Area

Borehole/Well No 65-87 (cont'd.)

Coordinates

Ground Surface Elevation

Total Depth

Water Level Encountered

Static

Drilling Company

Driller

Date Drilled

Helper

Drilling Method

Drilling Fluid

Logged By

Geologist

Checked By

Site Manager

CEARP Manager

Comments

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20			7.0-9.5' SAMPLE. Recovered 1 3/2 5' = 52% 7 0-7 1' CLAY colors as noted above, moderately cemented, very sand, poorly sorted sand, moist 7 1-8 3' SAND AND GRAVEL pale yellowish brown (10 YR 6/2) to dark yellowish brown (10 YR 4/2), sand varying (2 0-1 5 Ø to scattered 0 5-1 0 Ø), poorly sorted gravel ranging from 0 25 mm to 1 75 mm, weakly to non-cemented very clayey at base, light moist	17.0-19.2' Readings on core HNu = 0 0, OVA = 9 5
25				19.5-22.0' Readings on core HNu = 0 0, OVA = 8 8
				22.0-24.0' Readings on core HNu = 2 2, OVA = 38
			ROCKY FLATS ALLUVIUM	24 0-25.0' Readings on core HNu = 0 0, OVA = 35
30			9.5-12.0' SAMPLE. Recovered 2 1/2 5' = 84% SAND moderate yellowish brown (10 YR 5/4) to varying light brown (5 YR 5/6) and (5 YR 6/4) to some mixed gray and light gray (N 6/0), severely oxide stained, weakly to moderately cemented, sand ranging (2 0-1 5 Ø with some scattered sand to 1 5-1 0 Ø), massive, slightly clayey to very clayey below 10 5', moist	25.0-26.0' Readings on core HNu = 0 0, OVA = 5 5
				26 0' Readings in augers HNu = 0 7, OVA = 750, Gastech = 10% LEL
35			12 0-14 5' SAMPLE. Recovered 2 1/2 5' = 84% CLAYEY SAND brown, continuing severely oxide stained, sand grading as above, moderately to weakly cemented, moist to very moist streak noted at 14 0'	
40				

LOG OF BOREHOLE

Location Rocky Flats Plant, Landfill Area

Borehole Well No 65-87 (cont'd.)

Coordinates

Ground Surface Elevation

Total Depth

Water Level Encountered

Static

Drilling Company

Driller

Date Drilled

Helper

Drilling Method

Drilling Fluid

Logged By

Geologist

Checked By

Site Manager

CEARP Manager

Comments

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			14.5-17.0' SAMPLE. Recovered 1 8/2 5' = 72% CLAYEY SAND light brown (5 YR 5/6) to moderate brown, yellowish (10 YR 5/4), severely oxide stained, medium-grained sand (3 0-2 5 Ø) to scattered (2 0-1 5 Ø), some subangular and subrounded gravel, weakly cemented, moist	
			17 0-19.5' SAMPLE. Recovered 2 2/2 5' = 88% CLAYEY SAND scattered gravel ranging to 2 75 mm, subrounded to subangular with few rounded gravel, poorly sorted sand, weakly cemented, moist to very moist below 18 0'	
			19 5-22.0' SAMPLE. Recovered 2 5/2 5' = 100% 19 5-21 0' CLAYEY SAND small amounts of scattered gravel, numerous sandstone fragments, highly to weakly cemented, severely oxide stained fine-grained sand, wet to saturated	
			ARAPAHOE FORMATION	
			21 0-22 0' SANDSTONE very light gray (N 8/0) to light gray (N 7/0), fine-grained sand (3 0-2 5 Ø) weakly cemented, poorly sorted, highly weathered, saturated	

LOG OF BOREHOLE

Location Rock. Flats Plant, Landfill Area

Borehole Well No 65-87 (cont'd.)

Coordinates

Ground Surface Elevation

Total Depth

Water Level Encountered

Static

Drilling Company

Driller

Date Drilled

Helper

Drilling Method

Drilling Fluid

Logged By

Geologist

Checked By

Site Manager

CEARP Manager

Comments

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			22.0-24.0' SAMPLE. Recovered 2 0/2 0' = 100% SANDSTONE medium light gray (N 6/0) to varying brown of moderate brown (5 YR 4/4) and pale yellowish brown (10 YR 6/2), slightly clayey to very clayey streaks, fine-grained sand (3 0-2 5 Ø) to (2 0-1 5 Ø), massive, moderately oxide stained, weakly cemented, highly weathered, very moist	
			24 0-25.0' SAMPLE. Recovered 1 0/1 0' = 100% 24 0-24 2' SANDSTONE same as above 24 2-25 0' SANDY CLAYSTONE oderate yellowish brown (10 YR 5/4) to light brown (5 YR 6/4 and 5 YR 5/6) to brownish gray (5 YR 4/1) to light gray (N 7/0), medium plastic, moderately cemented, blocky, moist	
			25.0-26.0' SAMPLE. Recovered 1 0/1 0' = 100% SANDY CLAYSTONE color as stated above, medium plastic, moderately cemented, moist	
			26 0-27.0' SAMPLE. Center bit used	
			TOTAL DEPTH 27 0'	

LOG OF BOREHOLE

Location: Rocky Flats Plant, Landfill Area
Coordinates: N 39170.27 E 20226.02
Total Depth: 23.0'

Borehole Well No: 66-87
Ground Surface Elevation: 5981.90'
Water Level Encountered: 15.5'
Static: 8 90' (4/11/88)

Drilling Company: Boyles Bros.
Date Drilled: November 23, 1987
Drilling Method: Hollow Stem Auger
Logged By: R. Treat
Geologist

Driller: T. High
Helper: B. Keeney
Drilling Fluid: None
Checked By: _____
Site Manager

CEARP Manager

Comments: _____

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			**TOPSOIL** 0 0-2.0' SAMPLE. Recovered 0 4/2 0' = 20% TOP SOIL silty sand with gravel, dusky brown (5 YR 2/2), 2 0-1 3 Ø to 0 5-0 0 Ø sized sand with 0 50 mm to 2 75 mm gravel and scattered cobbles, weakly cemented, poorly sorted, light moist	HNu Background = 0 5 OVA Background = 0 2 Ludlum Background = 0 No readings above background
5			**ROCKY FLATS ALLUVIUM** 2.0-4.0 SAMPLE. Recovered 1 8/2 0 = 90% 2 0-2 5' SANDY CLAY AND GRAVEL grayish brown (5 YR 3/2) with 1 5-1 0 Ø sand, gravel of subangular and angular with some subrounded to 3 25 mm, weakly cemented, moist 2 5-3 8' SAND AND GRAVEL light brown (5 YR 6/4) with (1 5-1 0 Ø) size sand and medium brown (5 YR 4/4) gravel ranging 0 25 mm to 2 75 mm with some cobbles, weakly cemented, light moist	
10				
15			4 0-7.0' SAMPLE. Recovered 0 7/3 0 = 23% SAND AND GRAVEL same as above with several small cobbles	
			7.0-9 5' SAMPLE. Recovered 0 0/2 5 = 0% Cuttings indicating a sand with gravel and slightly clayey to clayey, moist	
20			9.5'-10 0' Center bit drill	

LOG OF BOREHOLE

Location Rocky Flats Plant, Landfill Area

Borehole/Well No 66-87 (cont'd.)

Coordinates

Ground Surface Elevation

Total Depth

Water Level Encountered

Static

Drilling Company

Driller

Date Drilled

Helper

Drilling Method

Drilling Fluid

Logged By

Geologist

Checked By

Site Manager

CEARP Manager

Comments

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20			10.0-12.0' SAMPLE. Recovered 2.0/2.0' = 100% SAND moderate brown (5 YR 4/4) to light brown (5 YR 6/4) to some noticed light brownish gray (5 YR 6/1), very clayey with some scattered gravel, sand ranging (3.0-2.5 Ø) with scattered sand (1.0- 0.5 Ø), gravel consisting of 0.75 mm to scattered 2.50 mm subrounded subangular, weakly to moderately cemented moist	
25			12.0-14.5' SAMPLE. Recovered 2.5/2.5 = 100% SAND light brown (5 YR 5/6) and (5 YR 6/4), sand ranging (2.5-2.0 Ø) and (2.0-1.5 Ø) to (1.5-1.0 Ø) slightly clayey with some gravel, 3.00 mm gravel subangular, subrounded, moist to very moist	
30			14.5-17.0' SAMPLE. Recovered 2.5/2.5 = 100% 14.5-15.8' SAND moderate brown (5 YR 4/4) with sand (2.5-2.0 Ø), gravel 1.50 mm to 2.55 mm, clayey with scattered gravel, weakly cemented, very moist to wet at 15.5-15.7' 15.8-16.8' SANDY CLAY pale yellowish brown (10 YR 6/2) to brownish gray (5 YR 4/1) sand (3.0-2.5 Ø), poorly sorted, moderately cemented, moist 16.8-17.0' SAND moderate yellowish brown (10 YR 5/4) sand ranging (1.5-1.0 Ø) with some scattered larger particles, moist to very moist	
35				
40				

LOG OF BOREHOLE

Location Rocky Flats Plant, Landfill Area

Coordinates

Total Depth

Drilling Company

Date Drilled

Drilling Method

Logged By

Geologist

Borehole Well No 66-87 (cont'd.)

Ground Surface Elevation

Water Level Encountered

Static

Driller

Helper

Drilling Fluid

Checked By

Site Manager

CEARP Manager

Comments

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			17.0-18.0' SAMPLE. Recovered 10/10 = 100% 17.0-17.8' SAND pale yellowish brown (10 YR 6/2), fine-grained sand (3.0-2.5 Ø) slightly clayey, non-cemented, poorly sorted, wet	
			ARAPAHOE FORMATION	
			17.8-18' CLAYSTONE moderate yellowish brown (10 YR 5/4) to moderate brown (5 YR 4/4), severely oxide stained, fine-grained sand (3.5-3.0 Ø), moderately cemented, low plastic, weathered, very moist to moist	
			18.0-19.0' SAMPLE. Recovered 23/10 = 230% SANDY CLAYSTONE light brown (5 YR 5/6) to moderate brown (5 YR 4/4), fine grained sand (3.5-3.0 Ø) some noted light brownish gray (5 YR 6/1), medium plastic blocky and somewhat layered severely oxide stained weathered very moist to moist at 18.5	
			19.0-20.0 SAMPLE. Recovered 10/10 = 100% SANDY CLAYSTONE colors as noted in previous runs, fine-grained sand, blocky, medium plastic, remaining severely oxide stained, weathered, moist	

LOG OF BOREHOLE

Location Rocky Flats Plant, Landfill Area

Coordinates

Total Depth

Drilling Company

Date Drilled

Drilling Method

Logged By

Geologist

Borehole Well No 66-87 (cont'd)

Ground Surface Elevation

Water Level Encountered

Static

Driller

Helper

Drilling Fluid

Checked By

Site Manager

CEARP Manager

Comments

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			20.0-21.0' SAMPLE. Recovered 1 0/1 0 = 100% SANDY CLAYSTONE as noted in previous runs, moderately cemented, highly weathered, moist	
			21.0-22.0' SAMPLE. Recovered 1 3/1 0 = 130% SANDY CLAYSTONE light brown (5 YR 6/4) to pale yellowish brown (10 YR 6/2) to light gray (N 7/0) streaked, slightly sandy, fine-grained sand (3 5-3 0 Ø), moderately cemented, highly weathered, highly plastic, moist	
			22.0-23.0' SAMPLE. Recovered 1 2/1 0' = 120% CLAYSTONE slightly sandy, medium if not highly plastic, moderately cemented, blocky, highly weathered, moist	
			TOTAL DEPTH 23 0'	

LOG OF BOREHOLE

Location: Rocky Flats Plant, Landfill Area
Coordinates: N 40182.78 E 20678.79
Total Depth: 21.40'

Borehole/Well No: 67-87
Ground Surface Elevation: 5969.50'
Water Level Encountered: 12.1'
Static: 7.68' (4/11/88)

Drilling Company: Boyles Bros.
Date Drilled: December 3, 1987
Drilling Method: Hollow Stem Auger
Logged By: J. Bacchus
Geologist

Driller: S Bradfield
Helper: P Mesa
Drilling Fluid: None
Checked By: _____
Site Manager

_____
CEARP Manager

Comments: _____

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			**ROCKY FLATS ALLUVIUM** 0.0-2.0' SAMPLE. Recovered 0 5/2 0' = 25% CLAY dark yellowish brown (10 YR 4/2), slight HCl reaction; sandy, large subrounded pebbles, moist 2.0-4.0' SAMPLE. Recovered 1 1/2 0' = 55% 2 0-2 7 CLAY dark reddish brown (10 R 3/4), contains coarse-grained sand and large pebbles, no HCl reaction, moist 2 7-3 1' SAND moderate orange pink (10 R 7/4), fine to coarse-grained, large angular pebbles, no HCl reaction 4.0-6.0' SAMPLE. Recovered 1 6/2 0' = 80% 4 0-4 8' CLAYEY SAND reddish brown (10 R 6/4), angular pebbles, no HCl reaction, slightly moist 4 8-5 6' SAND moderate orange pink (10 R 7/4), no HCl reaction, angular cobbles and pebbles, dry 6.0-8.0' SAMPLE. Recovered 0 9/2 0' = 45% SILTY SAND grayish pink (5 R 8/2), small angular pebbles, no HCl reaction, dry	HNu background = 0 4 OVA background = 0 0 Ludlum background = 0 0.0-2.0' HNu 2 0, OVA 0 4 2.0-3.1' HNu 0 3, OVA 0 4 4.0-5.6' HNu 0 8, OVA 2 0 6.0-8.0' HNu 0 6, Ludlum 0 8.0-9.6' HNu 0 4 OVA background· 1 2 14.1-16.1' HNu. 0, OVA 1 2 16.1-17.0' HNu 0, OVA 1 0 17.8-18.8' HNu 0, OVA 1 0 18.8-19.8' HNu 0 2, OVA 0 8
5				
10				
15				
20				

LOG OF BOREHOLE

Location Rocky Flats Plant, Landfill Area
Coordinates N 40163.59 E 20680.82
Total Depth 20.0'

Borehole/Well No 68-87
Ground Surface Elevation 5968.48'
Water Level Encountered 11.15'
Static 6.37' (4/11/88)

Drilling Company Boyles Bros.
Date Drilled December 4, 1987
Drilling Method Hollow Stem Auger
Logged By J. Bacchus
Geologist

Driller S. Bradfield
Helper P. Mesa
Drilling Fluid None
Checked By
Site Manager

CEARP Manager

Comments

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			**ROCKY FLATS ALLUVIUM**	HNu background = 0 2 OVA background = 1 4-1 8 Ludlum background = 0
			0.0-2.0' SAMPLE. Recovered 1 8/2 0' = 90% 0 0-1 1' GRAVEL dark yellowish brown (10 YR 4/2) and dusky brown (10 YR 2/2), clay, silt, and sand, gravel is angular to subrounded, caliche, moist 1 1-1 8' CLAY moderate reddish brown (10 YR 4/6) with dark yellowish brown (10 YR 4/2), contains roots, angular pebbles, slight HCl reaction, dense, moist	0.0-1.8' HNu 0, OVA 1 7 2.0-2.8' HNu 2 1, OVA 1 5
5			2 0-4.0' SAMPLE. Recovered 0 8/2 0' = 40% CLAY same as above except no HCl reaction and more sandy	4.0-4.7' HNu 0, OVA 1 4 6.0-6.8' HNu 0 4, OVA 0 1
10			4 0-6.0 SAMPLE. Recovered 0 7/2 0' = 35% CLAY same as above except dry	7.8-9.1' HNu 0 2, OVA 1 8
			6.0-8.0' SAMPLE. Recovered 0 8/2 0' = 40% SAND light brown (5 YR 5/6), coarse, angular, pebbles and silt, no HCl reaction, dry, moist in shoe	9.8-11.8' HNu 0, OVA 7 0 12.0-13.0' HNu 0, OVA 1 0
15			Total depth measured 7 8' Adjust depth	14.0-15.8' HNu 0, OVA 1 2
			7 8-9 8' SAMPLE Recovered 1 3/2 0' = 65% SAND same as above except chunks of bedrock, moist to very moist at the bottom of the run	15.9-16.9' HNu 0, OVA 0 8 16.9-18.5' HNu 0, OVA 0 8
20				

LOG OF BOREHOLE

Location Rocky Flats Plant, Landfill Area

Borehole Well No 67-87 (cont'd.)

Coordinates

Ground Surface Elevation

Total Depth

Water Level Encountered

Static

Drilling Company

Driller

Date Drilled

Helper

Drilling Method

Drilling Fluid

Logged By

Geologist

Checked By

Site Manager

CEARP Manager

Comments

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
20			8.0-10.0' SAMPLE. Recovered 1 6/2 0' = 80% 8 0-9 1' SAND moderate yellowish brown (10 YR 5/4), coarse-grained to fine-grained, angular pebbles, no HCl reaction, moist. 9 1-9 6' CLAY pale olive (10 Y 6/2), dense; slightly sandy, no HCl reaction, slightly moist	
25			10.0-12.0 SAMPLE. Recovered 2 0/2 0' = 100% 10 0-11 5' CLAY same as above except pockets of caliche and slight oxidation, moist 11 5-12 0' CLAY moderate reddish orange (10 R 6/6), slightly more sandy then upper clay, moist	
30			Total depth measured at 12 1' Adjust depth.	
			12.1-14.1' SAMPLE. Recovered 2 2/2 0' = 110% SAND pale olive (10 Y 6/2) stained moderate yellowish brown (10 YR 5/4), some clay, wet	
35			14.1-16.1' SAMPLE. Recovered 1 3/2 0' = 65% SAND light bluish gray (5 B 7/1), stained with dark yellowish orange (10 YR 6/6), coarse-grained sand, high amount of clay, slightly moist	
			16.1-17.1' SAMPLE. Recovered 0.9/1 0' = 90% 16 1-16 4' SAND· same as above	
40				

LOG OF BOREHOLE

Location Rocky Flats Plant; Landfill Area

Borehole Well No 67-87 (cont'd.)

Coordinates

Ground Surface Elevation

Total Depth

Water Level Encountered

Static

Drilling Company

Driller

Date Drilled

Helper

Drilling Method

Drilling Fluid

Logged By
Geologist

Checked By
Site Manager

CEARP Manager

Comments

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			ARAPAHOE FORMATION	
			16 4-17 0' CLAYSTONE light gray (N 7/0), coal, dense, moist	
			Total depth measured 17 8' Adjust depth	
			17.8-18.8' SAMPLE. Recovered 1 8/1 0' = 180% CLAYSTONE same as above except stained with light brown (5 YR 5/6), blocky structure, moist to dry	
			18.8-19.8' SAMPLE. Recovered 0 4/1 0' = 40% CLAYSTONE. same as above	
			19.8-21 3' SAMPLE. Recovered 2 2/1 5' = 147% CLAYSTONE same as above	
			TOTAL DEPTH 21 4'	

LOG OF BOREHOLE

Location: Rocky Flats Plant, Landfill Area
Coordinates: N 39588.09 E 21098.79
Total Depth: 17.0'

Borehole/Well No: 70-87
Ground Surface Elevation: 5966.30'
Water Level Encountered: None
Static: 7.40' (4/11/88)

Drilling Company: Boyles Bros.
Date Drilled: December 14, 1987
Drilling Method: Hollow Stem Auger
Logged By: R. Treat
Geologist

Driller: S. Bradfield
Helper: K. Parker
Drilling Fluid: None
Checked By: _____
Site Manager

CEARP Manager

Comments: _____

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			**ROCKY FLATS ALLUVIUM** 0.0-2.0' SAMPLE. Recovered 0 9/2 0' = 45% CLAYEY GRAVEL dusky brown (5 YR 2/2) to moderate brown (5 YR 4/4), slightly sandy, cobbles, gravel 0 25 mm to 2 25 mm, angular and subangular, moderately cemented, dense, moist	HNU Background=1 0 OVA Background=0 2 Ludlum Background=0 No readings above background
5			2.0-4.0' SAMPLE. Recovered 1 8/2 0' = 90% 2 0-2 8' SANDY CLAYEY GRAVEL moderate brown (5 YR 4/4), fine and medium-grained sand ranging (2 5-2 0 Ø) up to (0 0-0 5 Ø) with 1 25 mm gravel, angular and subangular, scattered gravel, moderately cemented, poorly sorted, moist 2 8-3 8' SAND AND GRAVEL light brown (5 YR 6/4) to varying pale yellowish brown (10 YR 6/2), sand ranging (3 0-2 5 Ø) to (0 5-0 0 Ø), scattered gravel ranging 0 25 mm to 1 75 mm, gravel angular and subangular and few subrounded, poorly sorted, weakly cemented, light moist	
10				
15			4 0-6.0' SAMPLE. Recorded 0 8/2 0' = 40% GRAVELLY SAND light brown (5 YR 6/4) to varying moderate brown (5 YR 4/4), sand (3 0-2 5 Ø) to (0 0-0 5 Ø), 1 25 mm scattered gravel subangular, subrounded, and angular, poorly sorted, weakly cemented, light moist	
20				

LOG OF BOREHOLE

Location Rocky Flats Plant; Landfill Area

Borehole/Well No. 68-87 (cont'd.)

Coordinates

Ground Surface Elevation

Total Depth

Water Level Encountered

Static

Drilling Company

Driller

Date Drilled

Helper

Drilling Method

Drilling Fluid

Logged By

Geologist

Checked By

Site Manager

CEARP Manager

Comments

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			15.9-16.9' SAMPLE. Recovered 1 2/1 0' = 120% CLAYSTONE light olive gray (5 Y 5/2), stained with dark yellowish orange (10 YR 6/6) and light brown (5 YR 5/6), blocky structure, coal, moist	
			16.9-18.9' SAMPLE. Recovered 1 6/2 0' = 80% CLAYSTONE same as above	
			Total depth measured 19 0' Adjust depth	
			19.0-20 0' SAMPLE. Recovered 1 5/1 0' = 150% CLAYSTONE same as above but slightly sandy, moist	
			TOTAL DEPTH 20 0'	

LOG OF BOREHOLE

Location Rocky Flats Plant; Landfill Area

Borehole/Well No 68-87 (cont'd.)

Coordinates

Ground Surface Elevation

Total Depth

Water Level Encountered

Static

Drilling Company

Driller

Date Drilled

Helper

Drilling Method

Drilling Fluid

Logged By

Geologist

Checked By

Site Manager

CEARP Manager

Comments

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			9.8-11.8' SAMPLE. Recovered 2 2/2 0' = 110% 9 8-10 05' SAND same as above 10 05-11 15' SANDY CLAY pale olive (10 Y 6/2) stained with light brown (5 YR 5/6), mica, coal, quartzite, no HCl reaction, moist 11 5-11 8' SAND dark yellowish orange (10 YR 6/6) coarse angular quartzite cobbles sand grains are very angular feldspar wet	19.0-20.0' HNu 0; OVA 0 4
			Total depth measured 12 0' Adjust depth	
			12.0-14.0' SAMPLE. Recovered 1 0/2 0' = 50% SAND same as above	
			14.0-16.0' SAMPLE. Recovered 1 8/2 0' = 90% 14 0-15 3' SAND same as above	
			ARAPAHOE FORMATION	
			15 3-15 5' SANDSTONE light gray (N 7/0), some clay, subangular, clean sand, moist to wet 15 5-15 8' CLAYSTONE light gray (N 7/0) stained with dark yellowish orange (10 YR 6/6), blocky structure, slightly moist to dry	
			Total depth measured 15 9' Adjust depth	

LOG OF BOREHOLE

Location: Rocky Flats Plant, Landfill Area
Coordinates: N 40339.90 E 20991.74
Total Depth: 18.5'

Borehole Well No: 71-87
Ground Surface Elevation: 5963.39'
Water Level Encountered: 5.0'
Static: 4.62' (4/11/88)

Drilling Company: Boyles Bros.
Date Drilled: December 10, 1987
Drilling Method: Hollow Stem Auger
Logged By: J. Bacchus
Geologist

Driller: S. Bradfield
Helper: K. Parker
Drilling Fluid: None
Checked By: _____
Site Manager

_____
CEARP Manager

Comments: _____

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0			**ROCKY FLATS ALLUVIUM**	OVA background=0 7 HNu background=0 4 No readings above background
			0.0-2.0' SAMPLE Recovered 0 6/2.0' = 30% SOIL. grayish brown (5 YR 3/2), roots, angular pebbles; sand, caliche, moist	
5			2.0-4.0' SAMPLE Recovered 1 1/2.0' = 55% CLAYEY SAND yellowish gray (5 Y 7/2), high amount of caliche, angular pebbles of quartzite and igneous rock, contains chunks of clay bedrock, slightly moist to dry	
			4.0-5.0' SAMPLE Recovered 0 6/1 0' = 60% CLAYEY SAND same as above except less clay and much more caliche	
10			5.0-7.0' SAMPLE No recovery, drilled with center bit Total depth measured 6 5' Adjust depth	
			6.5-8.5' SAMPLE Recovered 1 5/2 0' = 75% CLAYEY SILTY SAND dark yellowish orange (10 YR 6/6), clasts of quartzite, no HCl reaction, wet on top of the run, very moist	
15			Total depth measured 9 0' Adjust depth	
20				

LOG OF BOREHOLE

Location Rocky Flats Plant: Landfill Area

Borehole/Well No. 70-87 (cont'd.)

Coordinates

Ground Surface Elevation

Total Depth

Water Level Encountered

Static

Drilling Company

Driller

Date Drilled

Helper

Drilling Method

Drilling Fluid

Logged By

Geologist

Checked By

Site Manager

CEARP Manager

Comments

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			6.0-8.0' SAMPLE. Recovered 0 7/2 0' = 35% SAND light brown (5 YR 6/4) sand ranging (2 5-2 0 Ø) to (0 5-1 0 Ø), scattered gravel 0 25 mm to 3 50 mm, angular and subangular, poorly sorted, weakly cemented, light, moist	
			8.0-10.0' SAMPLE. Recovered 0 0/2 0' = 0% Cuttings indicate clayey sand with some gravels	
			10.0-12.0' SAMPLE. Recovered 0 014/2 0 = 0 12% Sample retained as a large size gravel measuring 4 25 mm, subrounded	
			12.0-14.0' SAMPLE. Recovered 2 0/2 0 = 100% 12 0-13 5' CLAYEY SAND moderate brown (5 YR 4/4) to varying light brown of (5 YR 5/6) to (5 YR 6/4) sand, fine-grained (3 0-2 5 Ø) and (2 5-2 0 Ø), poorly sorted, weakly cemented, moist	
			ARAPAHOE FORMATION	
			13 5-14 0' CLAYEY SANDSTONE pale yellowish brown (10 YR 6/2) to dark yellowish orange (10 YR 6/6) to light gray (N 7/0) streaked, grain size (2 5-2 0 Ø), subrounded and rounded, severely oxide stained, massive, poorly sorted highly weathered, moist	

LOG OF BOREHOLE

Location Rocky Flats Plant, Landfill Area
Coordinates
Total Depth

Borehole/Well No. 70-87 (cont'd.)
Ground Surface Elevation
Water Level Encountered
Static

Drilling Company
Date Drilled
Drilling Method
Logged By
Geologist

Driller
Helper
Drilling Fluid
Checked By
Site Manager

CEARP Manager

Comments

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			14.0-16.0' SAMPLE. Recovered 2.0/2.0' = 100% CLAYEY SANDSTONE varying brown and gray as noted in previous run, continued severely oxide stained, fine-grained sand (2.5-2.0 Ø), massive, moderately cemented, moist	
			16.0-17.0 SAMPLE. Recovered 1.0/1.0' = 100% SANDY CLAYSTONE medium dark gray (N 4/0), slightly weathered, fine-grained sands, massive, low plastic, blocky moderately cemented, with thin oxide (Fe) streaks noted, moist	
			TOTAL DEPTH 17.0'	

LOG OF BOREHOLE

Location: Rocky Flats Plant, Landfill Area
Coordinates: N 39459 12 E 20855.24
Total Depth: 15.0'

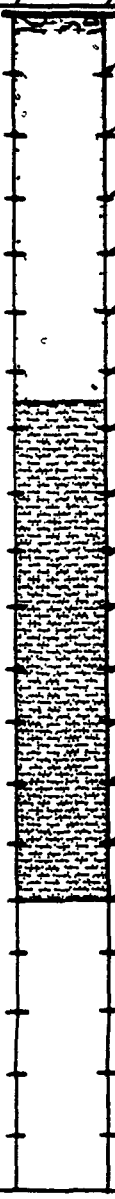
Borehole/Well No: 72-87
Ground Surface Elevation: 5969.11'
Water Level Encountered: 6.0'
Static: 2.13' (4/11/88)

Drilling Company: Boyles Bros.
Date Drilled: December 16, 1987
Drilling Method: Hollow Stem Auger
Logged By: R. Treat
Geologist

Driller: S. Bradfield
Helper: K. Parker
Drilling Fluid: None
Checked By: _____
Site Manager

CEARP Manager

Comments: _____

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
0 5 10 15 20			**ROCKY FLATS ALLUVIUM** 0.0-2.0' SAMPLE Recovered 1 8/2 0' = 90% 0 0-0 3' CLAY AND GRAVEL dusky brown (5 YR 2/2), scattered cobbles, subangular and subrounded gravel with numerous roots, moderately cemented, light moist 0 3-1 8' SAND AND GRAVEL gravish orange (10 YR 7/4) to some dark yellowish orange (10 YR 6/6), sand (2 5-2 0 Ø) to scattered (1 0-0 5 Ø), gravel ranging from 1 25 mm to 2 75 mm, subangular and subrounded, very calcareous, weakly cemented, moist 2.0-3.5' SAMPLE Recovered 1 0/1 5' = 67% SAND AND GRAVEL very pale orange (10 YR 8/2) to some dark yellowish orange (10 YR 6/6) to light brown (5 YR 5/6), sand ranging (2 5-2 0 Ø) to scattered (0 5-0 0 Ø), gravel ranging 0 25 mm to 2 25 mm, subangular, subrounded, and few rounded, weakly cemented, poorly sorted, very calcareous, moist 3.5-4 0' Center bit drill 4.0-6 0' SAMPLE Recovered 1 0/2 0' = 50% SAND WITH SCATTERED GRAVEL color as stated above, sand ranging (3 0-2 5 Ø) to scattered (1 0-0 5 Ø), gravel 1 00 mm and smaller, weakly cemented, poorly sorted, light moist	HNu Background=0 6 OVA Background=1 2 Ludlum Background=0 0.0-1.8' Readings on core HNu = 5 4, OVA = 4 2 0.0-1.8' Direct hit sample 72870000DH 2.0-3.0' Readings on core HNu = 0 0, OVA = 1 4 2.0-3.0' Direct hit sample 72870002DH 4.0-5.0' Readings on core HNu = 1 5, OVA = 0 0 4.0-5.0' Direct hit/upper contact sample 72870004UC 6.0-8.0' Water table/contact sample 72870006WT 8.0-10.0' Bedrock sample 72870008BR

LOG OF BOREHOLE

Location Rocky Flats Plant; Landfill Area

Borehole/Well No. 71-87 (cont'd.)

Coordinates

Ground Surface Elevation

Total Depth

Water Level Encountered

Static

Drilling Company

Driller

Date Drilled

Helper

Drilling Method

Drilling Fluid

Logged By

Geologist

Checked By

Site Manager

CEARP Manager

Comments

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			9.0-11.0' SAMPLE Recovered 1 6/2 0' = 80% 9 0-10 2' SANDY CLAY dark yellowish orange (10 YR 6/6), large angular pebbles; small angular cobbles, no HCl reaction, moist to wet. 10 2-10 6' SANDY CLAY light gray (N 7/0) stained with dark yellowish orange (10 YR 6/6), fine-grained sand, moderate HCl reaction, moist	
			11.0-13.0' SAMPLE Recovered 1 6/2 0' = 80% 11 0-11 4' SANDY CLAY same as above 11 4-13 0' SANDY CLAY light gray (N 7/0), stained with dark yellowish orange (10 YR 6/6), angular pebbles of feldspar and quartzite, moist to wet	
			13.0-15.0' SAMPLE Recovered 1 1/2 0' = 55% 13 0-13 5' SANDY CLAY same as above	
			ARAPAHOE FORMATION	
			13 5-14 1' CLAYSTONE light gray (N 7/0), stained with dark yellowish orange (10 YR 6/6), dense, moist	
			15.0-17.0' SAMPLE Recovered 1 1/2.0' = 55% CLAYSTONE. same as above except contains coal, slightly moist	

LOG OF BOREHOLE

Location Rocky Flats Plant, Landfill Area

Borehole/Well No. 71-87 (cont'd.)

Coordinates

Ground Surface Elevation

Total Depth

Water Level Encountered

Static

Drilling Company

Driller

Date Drilled

Helper

Drilling Method

Drilling Fluid

Logged By

Geologist

Checked By

Site Manager

CEARP Manager

Comments

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			17.0-19.0' SAMPLE Recovered 0 6/2 0' = 30% CLAYSTONE same as above TOTAL DEPTH 18 5'	

LOG OF BOREHOLE

Location Rocky Flats Plant; Landfill Area
Coordinates
Total Depth

Borehole/Well No. 72-87 (cont'd.)
Ground Surface Elevation
Water Level Encountered
Static

Drilling Company
Date Drilled
Drilling Method
Logged By
Geologist

Driller
Helper
Drilling Fluid
Checked By
Site Manager

CEARP Manager

Comments

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			6.0-8.0' SAMPLE Recovered 2 0/2 0' = 100% 6 0-6 5' SAND AND SCATTERED GRAVELS light brown (5 YR 5/6) to moderate brown (5 YR 4/4) sand (2 5-2 0 Ø) and (1 5-1 0 Ø), rounded, non-cemented poorly sorted, wet at 6 0'	13.0-13.6' Field screen readings HNU = 0 4 (1 5), OVA = 0 0 (0 0)
			ARAPAHOE FORMATION	
			6 5-8 0' CLAYEY SANDSTONE varying light brown (5 YR 5/6) and (5 YR 6/4) to moderate brown (5 YR 4/4) with pale yellowish brown (10 YR 6/2), sand (3 0-2 5 Ø), weakly to non-cemented, poorly sorted, moderately oxide (Fe) stained, highly weathered very moist to moist	
			8.0-10 0' SAMPLE Recovered 2 0/2 0' = 100% CLAYEY SANDSTONE varving light brown (5 YR 6/4) and (5 YR 5/6), light brownish gray (5 YR 6/1), and brownish gray (5 YR 4/1), fine-grained sand of (3 5-3 0 Ø) low to possible medium plastic, hardened small calcite fragments, moderately cemented, poorly sorted, moderately oxide (Fe) stained, highly weathered, moist	
			10 0-12 0' SAMPLE Recovered 0 0/2 0' = 0%	
			12.0-13.0' SAMPLE Recovered 0 0/1 0' = 0%	

LOG OF BOREHOLE

Location Rocky Flats Plant: Landfill Area

Borehole/Well No. 72-87 (cont'd.)

Coordinates

Ground Surface Elevation

Total Depth

Water Level Encountered

Static

Drilling Company

Driller

Date Drilled

Helper

Drilling Method

Drilling Fluid

Logged By

Geologist

Checked By

Site Manager

CEARP Manager

Comments

Depth Feet	Graphic Log	Sample Type	Lithologic Description	Samples Collected or Other Tests Performed
			13.0-15.0' SAMPLE Recovered 0 6/2 0' = 30% SANDY CLAYSTONE medium gray (N 5/0), medium if not highly plastic, moderately cemented, fine-grained sand (3 5-3 0 Ø), weathered, moist TOTAL DEPTH 15 0'	

LOG OF BOREHOLE

QA BY/DATE J B Berman 12-19-90
LOCATION Rocky Flats Plant, Landfill Area
COORDINATES N39,332 69 E19,481 76 (RFP)
TOTAL DEPTH 27 5'

BOREHOLE/WELL NO B106089
GROUND SURFACE ELEVATION 5993 3'
WATER LEVEL ENCOUNTERED 19 5'
STATIC 20 19' (10/13/89)
DRILLER K Parker HELPER A Boday
DRILLING FLUID None
CHECKED BY
SITE MANAGER

DRILLING COMPANY Boyles Brothers
DATE DRILLED May 8 and 18, 1989
DRILLING METHOD Hollow Stem Auger
LOGGED BY R T Treat
GEOLOGIST

CEARP MANAGER

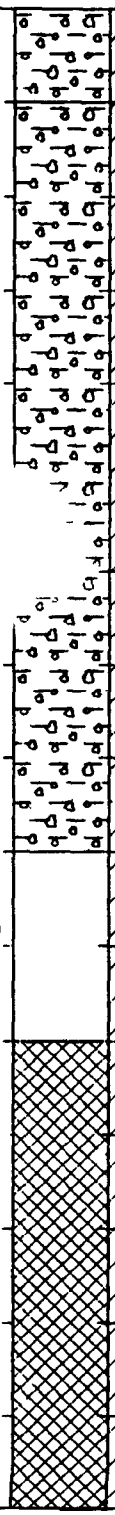
COMMENTS Dry ice was placed down hollow stem auger starting at 9 5' to neutralize the methane gases encountered down hole

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
1 2 3 4 5			**ARTIFICIAL FILL** 0 0-1 5' SAMPLE. Recovered 1.2/1 5' = 80%. CLAYEY GRAVEL: light brown (5 YR 5/6), grayish brown (5 YR 3/2) and moderate yellowish brown (10 YR 5/4); some sand; gravel (0.10 mm to 4 1/2") with some asphalt; angular, subangular and few subrounded; weakly cemented; poorly consolidated, few roots; low to no plasticity; slightly moist 1 5-3 5' SAMPLE. Recovered 0.25/2 0' = 12% CLAYEY GRAVEL same as above 3 5-5 5' SAMPLE. Recovered 1.3/2 0' = 65%. CLAY AND GRAVEL. dusky brown (5 YR 2/2), pale brown (5 YR 5/2) and some light brown (5 YR 5/6), trash consisting of wood chips, dry wall, plywood chips, fine- and medium-grained sand, gravel (0.20 mm to 3 25 mm); weakly consolidated; non-plastic, medium stiff; moist.	HNU Background. 0.0 OVA Background 1 0 Explosimeter was used during the drilling of this boring. All readings on cuttings, in breathing zone, on core, and in augers· 0 0; unless otherwise noted below. OVA was off scale in the augers and breathing zone during the entire drilling effort. TRIP BLANK SAMPLE TB050889B 0 0-1.2' SAMPLE (VOAs only) LF01890001 0.0-6.0' SAMPLE LF01890006 LF01890006FB 3.5-4.8' SAMPLE (VOAs only) LF01890305

08089A

WELL NO B106089

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
5 6 7 9 10 11 12 13			**5.5-7.5' SAMPLE** Recovered 1.2/2 0' = 60%. CLAY WITH SANDY GRAVEL: dusky brown (5 YR 5/2); pale brown (5 YR 5/2); wood fragments; paper; asphalt and gravel (0.25mm to 1.75 mm); very fine-grained sand (3.5-3 0 phi); weakly cemented, poorly consolidated; stiff, low plasticity; moist. **7 5-9.5' SAMPLE** Recovered 0.2/2 0' = 10%. CLAY WITH SANDY GRAVEL. same as above Note· 9 5-10 5'· Drilled with center bit. No sample recovery **10.5-11 5' SAMPLE.** Recovered 1.0/1 0' = 100%. LANDFILL DEBRIS grayish black (N 2/0) to dusky brown (5 YR 2/2), paper; wood; some scattered gravel (0 25 mm); angular to subangular. **11.5-13 5' SAMPLE.** Recovered 1.5/2 0' = 75%. LANDFILL DEBRIS same as above; gravelly clay with glass, wire; wood and paper	**6 0-12.0' SAMPLE** LF01890612 **7 5-7 7' SAMPLE** (VOAs only) LF01890709 **10.5-11.5'**: Reading on core OVA. 75 **11.5-13.5'** Readings on core: OVA: 55 HNu: 4.5 **11.5-13 0' SAMPLE** (VOAs only) LF01891214 **12 0-15.7' SAMPLE** LF01891218

WELL NO B106089

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
13			**13.5-15.5' SAMPLE.** Recovered 0.4/2.0' = 20%. LANDFILL DEBRIS: same as above.	**13.5-15.5'**: Reading on core: HNU: 2.5 **15.5-17.5'**: Readings on core: HNu: 1.8 OVA: 3.0
14			**15.5-17.5' SAMPLE.** Recovered 0.2/2.0' = 10%. CLAY: moderate brown (5 YR 4/4) to grayish brown (5 YR 3/2); some wood; low plasticity; weakly cemented; moist Fill	**15.5-15.7'** SAMPLE (VOAs only) LF01891618
15			**17.5-19.5' SAMPLE.** Recovered 0.2/2.0' = 10% CLAY pale brown (5 YR 5/2) to grayish brown (5 YR 3/2); some gravel; weakly cemented, poorly consolidated; low plasticity, moist	**17.5-21.5'** SAMPLE LF01891822
			ROCKY FLATS ALLUVIUM Fill	
16			**19.5-20.5' SAMPLE** Recovered 1.2/1.0' = 120%. CLAYEY SAND AND GRAVEL. pale yellowish brown (10 YR 6/2) to dark yellowish orange (10 YR 6/6), severely oxide stained; very fine-grained (3.5-3.0 phi) to fine-grained (2.5-2.0 phi) sand ;gravel (1.25 mm to 1.75 mm), subrounded, rounded, weakly cemented; very moist to moist.	**19.5-20.5'**: Reading on core: OVA. 2.4 **19.5-20.5'** SAMPLE (VOAs only) LF01892021
			20.5-21.5' SAMPLE. Recovered 1.0/1.0' = 100% CLAYEY SAND AND GRAVEL. dark yellowish orange (10 YR 6/6) to light brown (5 YR 5/6), gravel (1.25 mm to 2.25 mm), subangular; subrounded; fine-grained (2.5-2.0 phi) to coarse-grained (1.0-0.5 phi) sand, weakly cemented; poorly consolidated, medium dense; severely oxide stained, moist.	
18				
19				▽ 19.5'
20				▼ 20.19'
21				

06089C

WELL NO B106089

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
21			21.5-23.5' SAMPLE. Recovered 2.0/2.0' = 100% 21.5-22.7' CLAYEY SAND AND GRAVEL. same as above	21.5-23.5' SAMPLE (VOAs only) LF01892224
22			ARAPAHOE/LARAMIE FORMATION 22.7-23.5'. CLAYSTONE: pale yellowish brown (10 YR 6/2), light olive gray (5 Y 5/2); massive, homogeneous; medium plasticity; medium hard; slightly oxide stained, moist.	22.7-27.3' SAMPLE LF01892327 LF01892327D
23			23.5-25.5' SAMPLE. Recovered 2.0/2.0' = 100% CLAYSTONE same as above, severely oxide stained at 23.5-24.5', then moderately to slightly stained in lower run; medium gray (N 5/0) to medium dark gray (N 4/0).	23.5-25.5' SAMPLE (VOAs only) LF01892426
24			25.5-27.5' SAMPLE Recovered 1.8/2.0' = 90% SANDY CLAYSTONE· same as above; more sand, slightly moist TOTAL DEPTH = 27.5'	
26				
27				
28				
29				

060890

LOG OF BOREHOLE

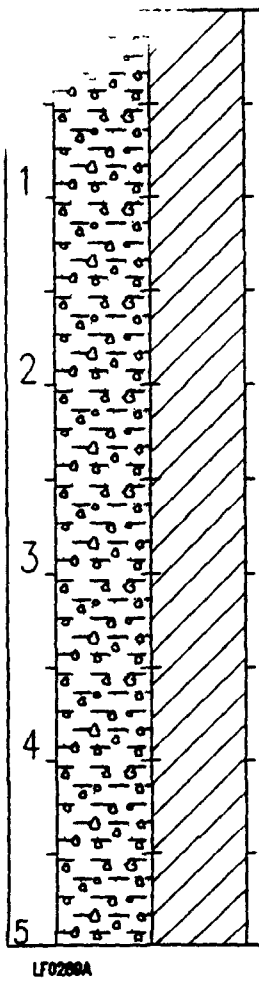
QA BY/DATE J.B. Berman 12-16-90
LOCATION Rocky Flats Plant, Landfill Area
COORDINATES N39,352.08 E20,202.58 (RFP)
TOTAL DEPTH 45.0'

DRILLING COMPANY Boyles Brothers
DATE DRILLED May 24-25, 1989
DRILLING METHOD Hollow Stem Auger
LOGGED BY S.P. Carpenter
GEOLOGIST

BOREHOLE/WELL NO B206189
GROUND SURFACE ELEVATION 5984.5'
WATER LEVEL ENCOUNTERED 18.5'
STATIC 22.88' (09/27/89)
DRILLER K. Parker HELPER R. Orr
DRILLING FLUID None
CHECKED BY J.B. Berman
SITE MANAGER

CEARP MANAGER

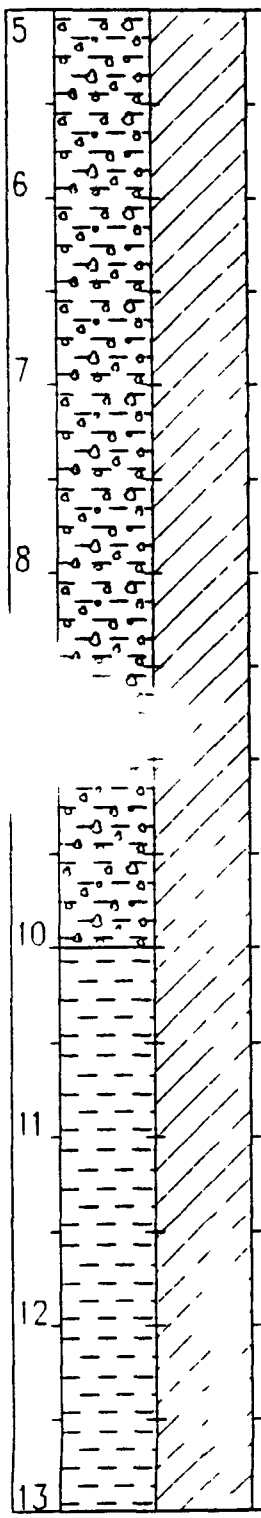
COMMENTS Dry ice was placed in and around the auger to inhibit the ventilation on methane gas emanating from the landfill soils.

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
1 2 3 4 5			ARTIFICIAL FILL 0.0-1.0' SAMPLE Recovered 0.3/1.0' = 30% SAND AND CLAY moderate yellowish brown (10 YR 5/4), some 1 to 2 cm gravel, fine- to very coarse-grained sand, poor sorting, angular; quartzose, non-stratified, unconsolidated, non-cemented, loose, dry 1.0-3.0' SAMPLE Recovered 1.1/2.0' = 55% GRAVELLY CLAYEY SAND moderate yellowish brown (10 YR 5/4), fine- to very coarse-grained sand, 1 to 2 cm gravel, poor sorting, angular to subangular, quartzose, non-stratified, unconsolidated, non-cemented, loose; dry 3.0-4.0' SAMPLE Recovered 0.2/1.0' = 20%. SANDY GRAVELLY CLAY pale yellowish brown (10 YR 6/2), fine- to coarse-grained sand, 2 to 7 cm gravel to trace pebbles, poor sorting, subangular, quartzose non-stratified, unconsolidated, non-cemented; medium dense to loose, dry 4.0-6.0' SAMPLE Recovered 2.0/2.0' = 100% SANDY GRAVELLY CLAY moderate yellowish brown (10 YR 5/4), fine- to very coarse-grained sand, 1 to 5 cm gravel, poor sorting, subangular, granite and quartzites, non-stratified, moderately consolidated, stiff, low plasticity, slightly calcareous; moist	HNu Background 0.0 OVA Background 0.0 Explosimeter Background 0.0 All readings on cuttings, in breathing zone, on core, and in augers 0.0, unless otherwise noted below TRIP BLANK SAMPLE TB052489B 0.0-2.0' SAMPLE (VOAs only) LF0289BR0002 0.0-2.1' SAMPLE LF0289BR0003 3.0' Readings in Auger OVA 200 Explosimeter 15% LEL Reading on Core OVA 1.0 TRIP BLANK SAMPLE TB0525898 3.0-9.0' SAMPLE LF0289BR0309

LF0289A

WELL NO B206189

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
5			**6.0-8.0' SAMPLE.** Recovered 1.4/2.0' = 70%. SANDY GRAVELLY CLAY: same as above; moderate yellowish brown (10 YR 5/4); moderate olive brown (5 Y 4/4); moderate reddish brown (10 YR 4/6); 1 to 8 cm gravel.	**4.0-6.0' SAMPLE** (VOAs only) LF0289BR0406
6			**8.0-10.0' SAMPLE.** Recovered 2.0/2.0' = 100%. SANDY GRAVELLY CLAY: same as above; moderate yellowish brown (10 YR 5/4) to black (N 1/0); 1 to 4 cm gravel; wood; plastic and metal debris.	**6.0'**: Readings in Auger: OVA: 1000.0 Explosimeter: 100% LEL Reading on cuttings: OVA: 10.0
7			**ROCKY FLATS ALLUVIUM**	
8			**10.0-12.0' SAMPLE.** Recovered 2.0/2.0' = 100%. CLAYEY SAND: grayish green (10 GY 5/2) to yellowish gray (5 Y 7/2); some iron-oxide stain--dark yellowish orange (10 YR 6/6); fine- to coarse-grained sand; 1 to 2 cm gravel; poor sorting; subangular; quartzose; slightly stratified to laminated; moderately consolidated; weakly cemented; medium dense; low plastic; moist.	**8.0-10.0' SAMPLE** (VOAs only) LF0289BR0810 **10.0-15.7' SAMPLE** LF0289BR1016
10			**12.0-14.0' SAMPLE.** Recovered 2.0/2.0' = 100%. CLAYEY SAND: light brown (5 YR 5/6); fine- to very coarse-grained sand; trace 1-2 cm gravel; poor sorting; subangular; quartzose lenses to non-stratified; moderately consolidated; weakly cemented; medium dense; low plastic; iron-oxide staining; moist	**12.0-14.0' SAMPLE** (VOAs only) LF0289BR1214
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12				
13				

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
13			**14.0-16.0' SAMPLE.** Recovered 1.7/2.0' = 85%. CLAYEY SAND: same as above; dark yellowish orange (10 YR 6/6) to dark yellowish brown (10 YR 4/2); low to non-plastic; medium dense to dense.	
14			**16.0-18.0' SAMPLE.** Recovered 2.0/2.0' = 100%. CLAYEY GRAVELLY SAND. light brown (5 YR 5/6) to moderate yellowish brown (10 YR 5/4); fine- to very coarse-grained sand; 1 to 2 cm gravel; poorly sorted; subangular; quartzose; slightly stratified; very thin (1/2 cm) clean sand lenses; moderately consolidated; weakly cemented; medium dense to dense; medium to low plastic; moist.	16.0-18.0' SAMPLE (VOAs only) LF0289BR1618 16.0-19.9' SAMPLE LF0289BR1620
15			**18.0-20.0' SAMPLE.** Recovered 1.9/2.0' = 95%. 18.0-18.5': CLAYEY GRAVELLY SAND: same as above. 18.5-19.9': SAND· dark yellowish orange (10 YR 6/6); trace silt; fine- to very coarse-grained sand; some (1 to 3 cm) gravel; poorly sorted; subangular; quartzose to arkosic; unconsolidated; non-stratified; non-plastic, medium dense; wet.	
16			**20.0-22.0' SAMPLE.** Recovered 2.0/2.0' = 100%. 20.0-20.9': SANDY GRAVELLY CLAY. dark yellowish orange (10 YR 6/6), fine- to coarse-grained sand; 1 to 8 cm gravel and pebbles; poorly sorted; subangular; granite and quartzite; non-stratified; moderately consolidated; non-cemented; medium plastic; very stiff to hard; a 4 cm sandy gravel lense at contact with claystone bedrock; very moist.	20.0-22.0' SAMPLE (VOAs only) LF0289BR2022 20.0-26.9' SAMPLE LF0289BR2127
18			**ARAPAHOE LARAMIE/FORMATION** 20.9-22.0': CLAYSTONE: light olive brown (5 Y 5/6) to light olive gray (5 Y 5/2); non-stratified, blocky; well consolidated, non-cemented; iron-oxide banding; hard; medium to high plastic; weathered; moist.	▽ 18.5'
19				
20				
21				

LF0289C

WELL NO B206189

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
21			**22.0-24.0' SAMPLE.** Recovered 2.0/2.0' = 100%. CLAYSTONE: same as above; light to heavy iron-oxide staining at 23.9'.	
22			**24.0-26.0' SAMPLE.** Recovered 2.0/2.0' = 100%. CLAYSTONE: same as above; grayish brown (5 YR 3/2); pale yellowish brown (10 YR 6/2); grayish orange (10 YR 7/4); very mottled; abundant iron-oxide staining.	24.0-26.0' SAMPLE (VOAs only) LF0289BR2426
23			**26.0-28.0' SAMPLE.** Recovered 2.0/2.0' = 100%. CLAYSTONE: same as above; manganese oxide and iron-oxide staining; very thin silty sand interbeds.	22.88' 26.9-32.9' SAMPLE LF0289BR2733
			28.0-30.0' SAMPLE. Recovered 2.0/2.0' = 100%. CLAYSTONE: same as above; dark yellowish orange (10 YR 6/6); light olive gray (5 Y 5/2); dusky yellowish brown (10 YR 2/2); very hard to hard; no sand; mottled to 29.1'.	28.0-30.0' SAMPLE (VOAs only) LF0289BR2830
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28				
29				

LF0289D

WELL NO B206189 LOG OF BOREHOLE PAGE 5 OF 6

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
29			**30.0-32.0' SAMPLE.** Recovered 2.0/2.0' = 100%. CLAYSTONE: same as above; light olive brown (5 Y 5/6); medium gray (N 5/0, light olive gray (5 Y 5/2); very mottled; high plastic; trace iron-oxide staining.	**30.0'**: Reading in Auger: Explosimeter: 20% LEL
30			**32.0-34.0' SAMPLE.** Recovered 2.0/2.0' = 100%. CLAYSTONE: same as above; olive gray (5 Y 4/1); light olive brown (5 Y 5/6); dark gray (N 3/0); laminated; dark gray zone due to manganese oxide staining.	**32.0-34.0'** SAMPLE (VOAs only) LF02898R3234
31			**34.0-35.0' SAMPLE.** Recovered 1.0/1.0' = 100%. CLAYSTONE: same as above; brownish black (5 YR 2/1); medium gray (N 5/0); medium dark gray (N 4/0); mottled.	
			35.0-36.0' SAMPLE. Recovered 1.0/1.0' = 100%. CLAYSTONE: same as above; dark gray (N 3/0) to light olive gray (5 Y 6/1); slightly silty; trace very fine-grained sand; slightly mottled.	
			36.0-37.0' SAMPLE. Recovered 1.0/1.0' = 100%. CLAYSTONE: same as above; medium gray (N 6/0) to medium dark gray (N 4/0); blocky to platy; very hard.	
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35				
36				
37				

LF028SE

WELL NO B206189

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
37			**37.0-38.0' SAMPLE.** Recovered 1.0/1.0' = 100%. CLAYSTONE: same as above.	
38			**38.0-39.0' SAMPLE.** Recovered 1.0/1.0' = 100%. CLAYSTONE: same as above; medium gray (N 5/0) to light gray (N 7/0).	
39			**39.0-40.0' SAMPLE.** Recovered 1.0/1.0' = 100%. CLAYSTONE: same as above; dark gray (N 3/0) to light olive gray (5 Y 6/1), laminated, manganese oxide staining in discrete layers.	
			40.0-41.0' SAMPLE. Recovered 1 0/1.0' = 100% CLAYSTONE: same as above.	**FIELD BLANK** SAMPLE LF0289BR00FB
			41.0-42.0" SAMPLE Recovered 1.0/1.0' = 100% CLAYSTONE. same as above; brownish gray (5 YR 4/1) to medium dark gray (N 4/0)	
			42.0-43.0' SAMPLE. Recovered 1.0/1.0' = 100%. CLAYSTONE. same as above; increasing silt content; increasing manganese oxide staining	
41			**43.0-44.0' SAMPLE.** Recovered 0.4/1.0' = 40%. CLAYSTONE: same as above; trace very fine-grained sand.	
			44.0-45 0' SAMPLE. Recovered 0.0-1 0' = 0%.	
42			**TOTAL DEPTH = 45 0'**	
43				
44				
45				

LF0289F

LOG OF BOREHOLE

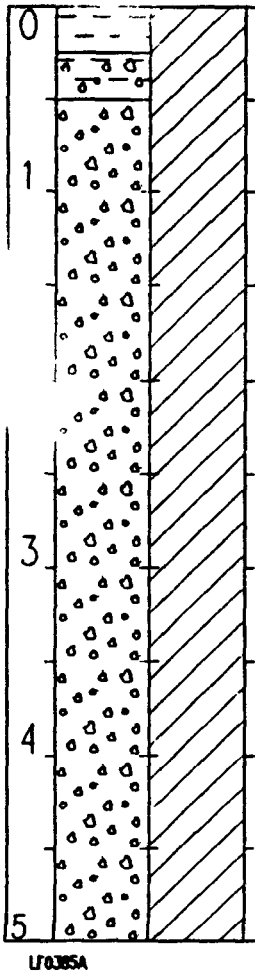
QA BY/DATE J B Bergman 11-18-89
LOCATION Rocky Flats Plant, Landfill Area
COORDINATES N39,272 29 E20,465 42 (RFP)
TOTAL DEPTH 47 5'

DRILLING COMPANY Boyles Brothers
DATE DRILLED May 1 and 2, 1989
DRILLING METHOD Hollow Stem Auger
LOGGED BY R T Treat
GEOLOGIST

BOREHOLE/WELL NO B206289
GROUND SURFACE ELEVATION 5977 59'
WATER LEVEL ENCOUNTERED 12 5'
STATIC 30 52' (09/28/89)
DRILLER K Parker HELPER R Orr
DRILLING FLUID None
CHECKED BY J B. Bergman
SITE MANAGER

CEARP MANAGER

COMMENTS

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
0 1 3 4 5			ARTIFICIAL FILL 0 0-1 5' SAMPLE Recovered 1 2/1 5' = 80% 0 0-0 25' SANDY CLAY pale yellowish brown (10 YR 6/2), trace to some gravel, fine-grained (3 0-2 5 phi) sand , weakly cemented, poorly consolidated, medium stiff, very moist TOP SOIL 0 25-0 50' CLAY AND GRAVEL dusky brown (5 YR 2/2), gravel (0 75 mm to 3 50 mm), angular, subangular and few subrounded, poorly consolidated, abundant roots, slightly moist ROCKY FLATS ALLUVIUM 0 50-1 20' SANDY GRAVEL pale yellowish brown (10 YR 6/2), medium-grained (2 0-1 5 phi) to very coarse-grained (-0 5 to -1 0 phi) sand, gravel (0 25 mm to 4 75 mm), weakly cemented, poorly consolidated, non-plastic, dense, dry 1 5-3 5' SAMPLE Recovered 1 3/2 0' = 65% SANDY GRAVEL dark reddish brown (10 R 3/4) to pale red (10 R 6/2), clayey (1 5-2.0') to trace clay (2 0-2 3'), fine-grained (3 0-2 5 phi) up to very coarse-grained (-0 5 to -1 0 phi) sand; gravel (0 15 mm to 2 10 mm), granite and quartzite, moderately cemented, medium dense, moderately consolidated, slightly damp	HNu Background 0 0 OVA Background 0 0 All readings on cuttings, in breathing zone, on core, and in augers 0 0, unless otherwise noted below 1 5' Reading in Auger OVA 0 2 3 5' Reading in Auger OVA 1 8

LF0385A

WELL NO B206289

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
5			3 5-4 5' SAMPLE. Recovered 1 0/1 0' = 100% SANDY GRAVEL: same as above, some clay Note 4 5-5 5' Drilled with center bit No sample recovery	3 5-4 5' Readings on core OVA 0 2 HNu 4 5 4 5' Reading in Auger OVA 5 0
6				
7			5 5-7 5' SAMPLE Recovered 1 3/2 0' = 65% SAND AND GRAVEL dark yellowish orange (10 YR 6/6) to pale yellowish brown (10 YR 6/2), very fine-grained (3 5-3 0 phi) to very coarse-grained (0 0 to -0 5 phi) sand; gravel (0 25 mm to 2 25 mm), angular, subangular and few subrounded, quartzite and granite; weakly cemented, poorly consolidated, medium dense, non-plastic, slightly moist	5 5-7 5' Reading on Core OVA 0 4
			7 5-9 5' SAMPLE Recovered 1 1/2 0' = 55% 7 5-7 8' SAND AND GRAVEL same as above 7 8-8 6' CLAYEY SAND light gray (N 7/0) to streaks of moderate brown (5 YR 4/4), fine-grained (3 0-2 5 phi) sand, moderately cemented, weakly consolidated, medium dense, low plasticity, moist	7 5-9 5' Reading on Core OVA 5 6 9 5' Readings in Auger OVA 250 HNu 5 5
9				
10			9 5-11 5' SAMPLE Recovered 2 0/2 0' = 100% CLAYEY SAND dark yellowish orange (10 YR 6/6) to pale yellowish brown (10 YR 6/2), very fine-grained (3 5-3 0 phi) to coarse-grained (0 5-0 0 phi) sand, gravel (0 25 mm to 1 75 mm), subangular, angular and some rounded, weakly cemented, poorly consolidated, medium dense, moist.	9 5-11 5' Reading on Core OVA 2 2
11			11 5-13 5' SAMPLE Recovered 1 0/2 0' = 50%. SAND: moderate yellowish brown (10 YR 5/4), some gravel (0 25 mm to 1 50 mm), fine-grained (3 0-2 5 phi) to very coarse-grained (0 0 to -0 5 phi) sand; non-cemented; poorly consolidated, medium dense, wet.	11.5-13 5' Reading on Core OVA 12 4 13 5' Readings in Auger OVA 150 HNu 2 2
12				▽ 12 5'
13				

LF0389B

WELL NO B206289

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
13			13 5-14 5' SAMPLE Recovered 1 0/1 0' = 100% SAND dark yellowish orange (10 YR 6/6) to light brown (5 YR 5/6), some gravel; non-cemented, weakly consolidated, loose; non-plastic, wet	13 5-14 5' Reading on Core OVA· 3 2
14				14 5' Readings in Auger OVA. 85.0 HNU 0 3
			14.5-15 5' SAMPLE Recovered 1 0/1 0' = 100% 14 5-14 8' SAND same as above	14 5-15 5' Reading on Core OVA 4 0
15				15 5' Readings in Auger OVA 18 0 HNu 0 4
			ARAPAHOE/LARAMIE FORMATION 14 8-15 5' CLAYSTONE light gray (N 7/0) to medium light gray (N 6/0), highly plastic; moderately cemented to weakly cemented, medium hard; moist	
			15 5-17 5' SAMPLE Recovered 2 0/2 0' = 100% CLAYSTONE dark yellowish orange (10 YR 6/6) to streaks of pale yellowish brown (10 YR 6/2), trace fine-grained sand, highly plastic, moderately cemented, moderately consolidated, oxide stained, weathered, damp	15 5-17 5' Reading on core OVA 2 0
17			17 5'-19 5' SAMPLE Recovered 2 0/2 0' = 100% CLAYSTONE same as above, less iron-stained	
			19 5-21 5' SAMPLE Recovered 2 0/2 0' = 100% CLAYSTONE light olive gray (5 Y 6/1), moderately cemented, highly plastic, medium hard, massive, homogeneous, blocky, slightly oxide stained, weathered, moist	
18				
19				
20				
21				

LF038BC

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
21 22 23 25 26 27 28 29			21 5-23 5' SAMPLE Recovered 2 0/2 0' = 100% CLAYSTONE same as above; light gray (N 7/0) to medium light gray (N 6/0), some sand to sandy lensed, moist 23 5-25 5' SAMPLE Recovered 2 0/2 0' = 100%. CLAYSTONE: light gray (N 7/0) to predominantly dark yellowish orange (10 YR 6/6), some fine-grained sand; medium plasticity; moderately cemented, moderately consolidated, medium hard, iron-stained, massive, homogeneous, weathered, moist 25 5-27 5' SAMPLE Recovered 0 0/2 0' = 0% 27 5-28 5' SAMPLE Recovered 2 0/1 0' = 200% CLAYSTONE medium light gray (N 6/0), trace fine-grained sand, massive, medium plasticity, homogeneous, moderately cemented and moderately consolidated, medium hard, slightly weathered, slightly moist 28.5-29 5' SAMPLE Recovered 1 0/1 0' = 100% CLAYSTONE medium dark gray (N 4/0), some fine-grained sand, low plasticity, massive, homogeneous, weakly cemented, poorly consolidated, medium hard, slightly moist	

UF03890

WELL NO B206289

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
29			29 5-30 5' SAMPLE Recovered 1 0/1 0' = 100% CLAYSTONE same as above, some fine-grained sand to sandy.	
30			30 5-31 5' SAMPLE Recovered 1 0/1 0' = 100% CLAYSTONE same as above, less sand and more weathered, oxide stained, lensed and streaked, moist.	
			31.5-33 5' SAMPLE Recovered 2 0/2.0' = 100% CLAYSTONE. dark gray (N 3/0), trace to some very fine-grained sand, massive, medium plasticity, moderately cemented, poorly consolidated, medium hard, slightly weathered, caliche lense noted at 33 2-33 25', strongly reactive to HCl, very light gray (N 8/0), slightly moist	30 52'
31				
			33 5-34 5' SAMPLE Recovered 1 0/1 0' = 100% CLAYSTONE same as above, more very fine-grained sand	
32				
			34 5-35 5' SAMPLE Recovered 1 0/1 0' = 100% SANDY SILTSTONE medium gray (N 5/0), some clay, massive, homogeneous, very fine-grained (3 5-3 0 phi) sand, low plasticity, moderately cemented, moderately consolidated, hard to medium hard, damp.	34 5-35 5' Reading on Core HNu 2 0 35 5' Readings in Auger OVA 0 2 HNu 10
			35 5-36 5' SAMPLE Recovered 1 0/1 0' = 100% SANDY SILTSTONE same as above	36 5' Reading in Auger OVA 2 0
34			36 5-37 5' SAMPLE Recovered 1 0/1 0' = 100% SANDY SILTSTONE same as above; slightly weathered	36.5-37 5' Reading on Core OVA 2 0 37 5' Readings in Auger OVA 1 8 HNu 1 0
35				
28				
37				

LF038E

WELL NO B206289

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
37			37 5-38 5' SAMPLE Recovered 1 0/1 0' = 100% SANDY SILTSTONE same as above	37 5-38 5' Readings on Core OVA. 1 2 HNu 0 2
38				38 5' Reading in Auger HNu 0 2
			38 5-39 5' SAMPLE Recovered 1 0/1 0' = 100% SANDY SILTSTONE same as above, more very fine-grained sand	38 5-39 5' Reading on Core HNu 0 4
39				39 5' Reading in Auger HNu 1 0
			39 5-41 0' SAMPLE Recovered 1 2/1 5' = 96% SANDY SILTSTONE medium gray (N 5/0); some clay, very fine-grained (3 5-3 0 phi) sand, blocky, massive; homogeneous, moderately cemented, moderately consolidated, some slickensides apparent, low plasticity, medium hard, unweathered, damp.	41 0' Reading in Auger OVA 1 0
			41 0-42 5' SAMPLE Recovered 1 4/1 5' = 93% SANDY TO SANDSTONE AND SILTSTONE same as above, more very fine-grained sand	41 0-42 5' Reading on Core OVA 1 8
41				42 5' Readings in Auger OVA 49 0 HNu 4 0
			42 5-44 0' SAMPLE Recovered 1 1/1 5' = 73% SANDY SILTSTONE same as above	
42			44 0-45 5' SAMPLE Recovered 1 5/1 5' = 100% SILTSTONE grayish black (N 2/0) to dark gray (N 3/0), some very fine-grained sand, abundant lignite, homogeneous, weakly cemented, moderately consolidated, blocky to massive, slightly moist	
43				
44				
45				

LF038F

WELL NO B206289

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
45			45 5-46 5' SAMPLE Recovered 1 0/1 0' = 100% SILTSTONE same as above, some more very-fine grained sand noted from 46-46 5'	
46			46 5-47 5' SAMPLE Recovered 1 0/1 0' = 100% CLAYEY SILTSTONE. same as above, trace sand	47 5' Reading in Auger OVA 6 0
47			TOTAL DEPTH = 47 5'	
48				
49				
50				
51				
52				
53				

LF0389C

LOG OF BOREHOLE

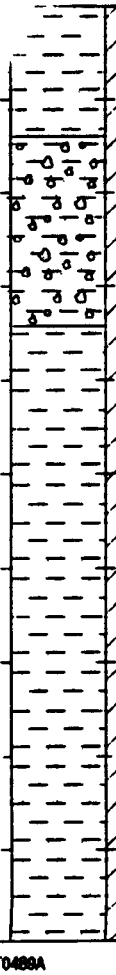
QA BY/DATE J B Bergman / 11-22-87
LOCATION Rocky Flats Plant, Landfill Area
COORDINATES N39,566 50 E20,828 68 (RFP)
TOTAL DEPTH 20.0'

DRILLING COMPANY Boyles Brothers
DATE DRILLED May 19, 1989
DRILLING METHOD Hollow Stem Auger
LOGGED BY S P Carpenter
GEOLOGIST

BOREHOLE/WELL NO B206389
GROUND SURFACE ELEVATION 5969 7'
WATER LEVEL ENCOUNTERED None
STATIC None (09/28/89)
DRILLER K Parker HELPER A. Boday
DRILLING FLUID None
CHECKED BY J B Bergman
SITE MANAGER

CEARP MANAGER

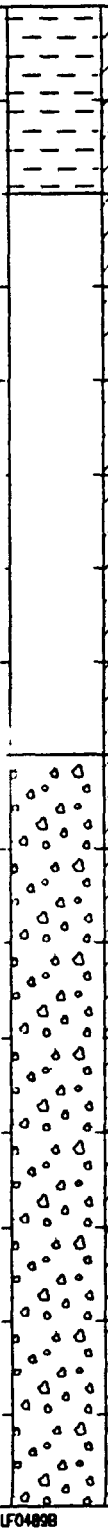
COMMENTS Dry ice was used to eliminate the threat of explosion of the methane gas emanating from the landfill.

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
1 2 3 4 5			**ARTIFICIAL FILL** 0.0-2.2' SAMPLE Recovered 1 7/2 0' = 85%. 0.0-0.7' SANDY CLAY. moderate yellowish brown (10 YR 5/4); some gravel; very stiff to stiff; moist 0.7-1 7': GRAVELLY SAND AND CLAY: dusky yellowish brown (10 YR 2/2); medium dense, with asphalt and scattered metal debris; moist. 2.0-4 0' SAMPLE. Recovered 1 45/2 0' = 72%. SAND AND CLAY. dark yellowish brown (10 YR 4/2), some gravel; non-stratified; fine to coarse-grained sands, subangular; quartzites; medium dense; some paper and wood trash; moist. 4 0-6.0' SAMPLE Recovered 0.9/2.0' = 45%. SAND AND CLAY: same as above.	HNu Background: 0 0 OVA Background: 0.0 Explosimeter Background: 0.0 All readings on cuttings, in breathing zone, on core, and in augers: 0 0, unless otherwise noted below. TRIP BLANK SAMPLE TB051989B 0 0-3.0' SAMPLE LF04890003 0 0-2.0': Reading on core: HNu: 0 3 0 0-1.7' SAMPLE (VOAs only) LF04890002 LF04890002D 2 0': Reading in Auger: OVA: 1.4 3.0-4 9' SAMPLE LF04890309 2 0-4.0' Reading on Core: HNu: 0.1

LF0489A

WELL NO B206389

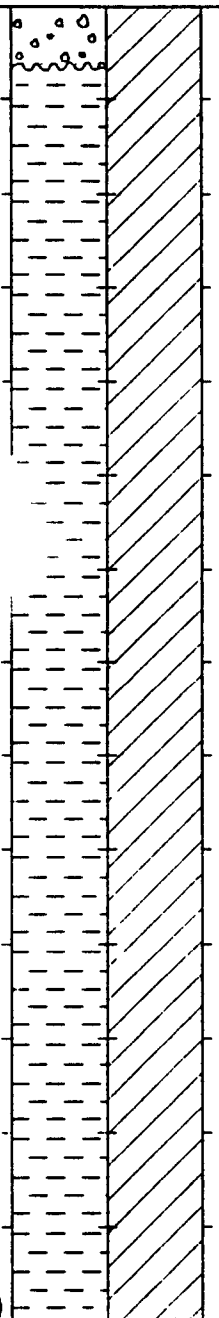
LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
5 6 7 8 10 11 12 13			**6.0-8.0' SAMPLE.** Recovered 0.0/2.0' = 0%. Note: 8.0-9.0': Drilled with center bit. No sample recovery. **ROCKY FLATS ALLUVIUM** **9.0-10.0' SAMPLE.** Recovered 0.7/1.0' = 70%. SAND AND GRAVEL: dark yellowish orange (10 YR 6/6); clayey; non-stratified; homogeneous; very fine to very coarse-grained sand; poor sorting; subangular; quartzites; non-cemented; moderately consolidated; medium dense to dense; moist to slightly moist. Note: 10.0-12.0': Drilled with center bit. No sample recovery. **12.0-14.0' SAMPLE.** Recovered 1.9/2.0' = 95%. 12.0-13.3'. SAND AND GRAVEL same as above. **ARAPAHOE LARAMIE/FORMATION** 13.3-13.9'· CLAYSTONE· light olive gray (5 Y 6/1) to medium gray (N 5/0); some silt; trace sand; high to medium plasticity; moderately cemented; moderately consolidated; iron oxide stained; weathered, moist.	4.0-4.9' SAMPLE (VOAs only) LF04890406 4.0': Readings in Auger: OVA: 150 Explosimeter 5% LEL 4.0-6.0': Readings on Core: HNu: 2.0 OVA: 2.5 6.0'· Readings in Auger· OVA: 7.5 Explosimeter 50% LEL 6.0-8.0': Reading on Core: HNu: 0 4 8.0': Readings in Auger· OVA: 1000 HNu: 0 4 Explosimeter: 7% LEL 9.0': Reading in Auger: OVA: 45 9 0-9 7' SAMPLE LF04890913 9.0-10.0': Reading on Core: OVA: 2.4 9.0-9.7' SAMPLE (VOAs only) LF04890910 10.0': Reading in Breathing Zone: OVA: 75 10.0': Readings in Auger OVA: 1000 HNu: 1.2 Explosimter: 80% LEL 12.0-13.9' SAMPLE (VOAs only) LF04891214 12.0-14.0': Reading on Core: OVA: 0.4 14.0'· Reading in Auger: OVA: 35

LF04898

WELL NO B206389

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
13 14 15 17 18 19 20 21			**14.0-16.0' SAMPLE.** Recovered 1.9/2.0' = 95%. CLAYSTONE: same as above. **16.0-18.0' SAMPLE.** Recovered 1.9/2.0' = 95%. CLAYSTONE: dark yellowish orange (10 YR 6/6) to light olive gray (5 Y 5/2); trace silt, laminated homogenous; medium to high plasticity; very hard; some iron oxide stain; highly weathered. **18.0-20 0' SAMPLE.** Recovered 2.1/2.0' = 105%. CLAYSTONE. same as above; increased iron oxide staining at 19.0-20.0'. **TOTAL DEPTH 20 0'**	**14.0-16.0'**: Reading on Core: OVA: 0.3 **14.0-20.0' SAMPLE** LF04891319 **14.0-15.9' SAMPLE** (VOAs only) LF04891416 **16.0-18.0'**: Reading on Core: OVA: 0.2 **18.0'**. Reading in Auger OVA. 45 **20.0'**: Reading in Auger: OVA: 15

LF0489C

LOG OF BOREHOLE

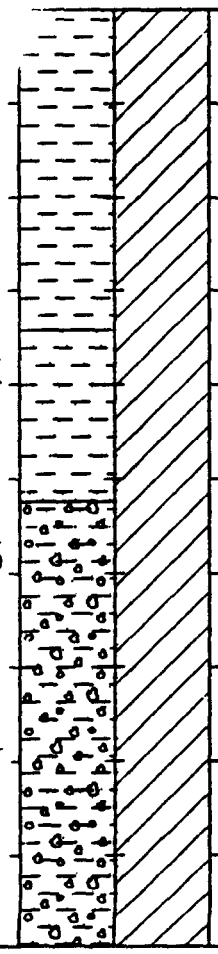
QA BY/DATE J B Berman 11-18-89
LOCATION Rocky Flats Plant, Landfill Area
COORDINATES N39,445 20 E20,865 79 (RFP)
TOTAL DEPTH 41 5'

DRILLING COMPANY Boyles Brothers
DATE DRILLED May 3, 1989
DRILLING METHOD Hollow Stem Auger
LOGGED BY R T Treat
GEOLOGIST

BOREHOLE/WELL NO B206489
GROUND SURFACE ELEVATION 5969.14'
WATER LEVEL ENCOUNTERED None
STATIC 4.92' (09/27/89)
DRILLER K Parker HELPER R. Orr
DRILLING FLUID None
CHECKED BY J B Berman
SITE MANAGER

CEARP MANAGER

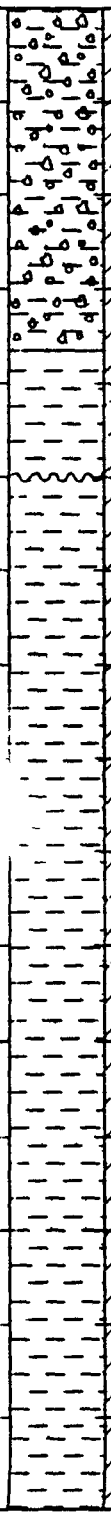
COMMENTS

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
1 2 3 4 5			TOPSOIL 0 0-1 5' SAMPLE Recovered 1 25/1 5' = 83% 0 0-0 4' CLAY dusky brown (5 YR 2/2), some gravel, weakly cemented, poorly consolidated, medium stiff, abundant roots, moist ROCKY FLATS ALLUVIUM 0 4-1 25' CLAY dusky brown (5 YR 2/2), some gravel (0 25 mm to 4 75 mm), quartzite and granite, rounded, subrounded, and few subangular, weakly cemented, poorly consolidated, moist 1 5-3 5' SAMPLE Recovered 1 1/2 0' = 55% 1 5-1 7' CLAY same as above, some gravel 1 7-2 6' CLAYEY SAND grayish orange pink (10 R 8/2) and grayish pink (5 R 8/2), some gravel to gravelly (0 25 mm to 6 50 mm), angular, subangular, and few subrounded, fine-grained (3 0-2 5 phi) to coarse-grained (0.5-0 0 phi) sand; weakly cemented, poorly consolidated, very calcareous, moist. 3 5-5 5' SAMPLE Recovered 1 0/2 0' = 50%. CLAYEY SAND AND GRAVEL light brown (5 YR 6/4) to pale yellowish brown (10 YR 6/2), sand and gravel same as above, weakly cemented, poorly consolidated; medium dense, non-plastic, moist	HNu Background 0 0 OVA Background 0 0 All readings on cuttings, in breathing zone, on core and in augers 0 0, unless otherwise noted 3 5' Reading in Auger OVA 4 6 5 5' Reading in Auger OVA 1 2 ▼ 4 92'

LT0500A

WELL NO B206489

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
5 6 7 8 10 11 12 13			5 5-7 5' SAMPLE Recovered 1 6/2 0' = 80%. 5.5-6 8': CLAYEY SAND AND GRAVEL: same as above 6 8-7 1': CLAY dark yellowish orange (10 YR 6/6), some gravel; trace fine-grained sand, moderately cemented, medium stiff; low plasticity, moist. ARAPAHOE/LARAMIE FORMATION 7 5-9 5' SAMPLE Recovered 1 7/2 0' = 85% CLAYEY SANDSTONE light gray (N 7/0) to dark yellowish orange (10 YR 6/6), very fine-grained (4 0-3 0 phi) sand, weakly cemented, poorly consolidated, medium hard, oxide-stained at bottom, highly weathered, moist 9 5-11 5' SAMPLE Recovered 1 8/2 0' = 90% SANDY CLAYSTONE dark yellowish orange (10 YR 6/6) to streaks of pale yellowish brown (10 YR 6/2), severely oxide-stained, very fine-grained sand, blocky to layered, low to medium plasticity, highly weathered, moist Note 11 5-12 0' Drilled with center bit No sample recovery 12 0-13 5' SAMPLE Recovered 1 5/1 5' = 100% SANDY CLAYSTONE· same as above; trace sand	9 5' Readings in Auger HNu 5 0 OVA 34 0

LF05898

WELL NO B206489

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
13 14 15 17 18 19 20 21			13 5-15 5' SAMPLE Recovered 1 8/2 0' = 90% SANDY CLAYSTONE. medium light gray (N 6/0), very fine-grained sand, weakly cemented, moderately consolidated, medium hard; low to medium plasticity, homogeneous, blocky to layered, slightly weathered, slightly moist 15 5-17 5' SAMPLE Recovered 1.7/2 0' = 100% SANDY CLAYSTONE same as above 17 5-19 5' SAMPLE Recovered 2 0/2 0' = 100% SANDY CLAYSTONE same as above, dark yellowish orange (10 YR 6/6) and light brown (5 YR 5/6) to streaks of pale yellowish brown (10 YR 6/2), severely oxide-stained 19 5-21 5' SAMPLE Recovered 2 0/2 0' = 100% SANDY CLAYSTONE dark yellowish orange (10 YR 6/6) streaks of pale yellowish brown (10 YR 6/2), grading to some sand, severely oxide-stained, highly weathered, weakly cemented, poorly consolidated, moist	15 5' Reading in Auger OVA 1 0

LF0589C

WELL NO B206489

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
21 22 23 24 5 26 27 28 29			21 5-23 5' SAMPLE Recovered 1 7/2 0' = 85% CLAYSTONE same as above, some to trace sand 23 5-25 5' SAMPLE Recovered 2.0/2.0' = 100%. CLAYSTONE medium gray (N 5/0) to dark gray (N 3/0), streaks of pale yellowish brown (10 YR 6/2), massive; blocky, medium plasticity, moderately cemented and consolidated, homogeneous, slightly weathered, slightly moist 25 5-27 5' SAMPLE Recovered 2 0/2 0' = 100% CLAYSTONE same as above 27 5-29 5' SAMPLE Recovered 2 0/2 0' = 100% CLAYSTONE greenish gray (5 GY 6/1) to light gray (N 7/0) and moderate yellowish brown (10 YR 5/4), trace sand to sandy lense at 28 5-28 8'; very fine-grained, moderately cemented, weakly consolidated, massive, homogeneous, low plasticity; slightly weathered, slightly moist.	

LF05890

WELL NO B206489

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
29			29 5-31 5' SAMPLE Recovered 2 0/2.0' = 100% SANDY CLAYSTONE: same as above; more sand, very fine-grained (4.0-3 0 phi) sand lenses, moderately oxide-stained; slightly moist.	29 5' Reading in Auger OVA. 1.3
30			31 5-33 5' SAMPLE Recovered 2 0/2 0' = 100% SANDY CLAYSTONE dark yellowish orange (10 YR 6/6) to pale yellowish brown (10 YR 6/2) with steaks of light gray (N 6/0), very fine-grained sand, low plasticity; moderately cemented and consolidated; medium hard to hard lensed, massive, homogeneous, weathered, damp	31 5' Reading in Auger OVA 1 0
31			33 5-35 5' SAMPLE Recovered 2 0/2 0' = 100% SANDY CLAYSTONE medium gray (N 5/0), very fine-grained sand, massive, homogeneous, iron-oxide streaked, low plasticity, moderately cemented, moderately consolidated, slightly weathered, damp	33 5' Reading in Auger ova 37 0
32			35.5-37 5' SAMPLE Recovered 2.0/2 0' = 100%. CLAYSTONE same as above, less sand	
33				
34				
35				
36				
37				

LF058BE

WELL NO B206489

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
37 38 39 40			37 5-39 5' SAMPLE Recovered 1 0/2 0' = 50% CLAYSTONE brownish gray (5 YR 4/1) to brownish black (5 YR 2/1), trace sand, lignite streaked, low plasticity, weakly cemented; poorly consolidated, slight iron-oxide stained, slightly weathered, damp 39.5-41 5' SAMPLE Recovered 2.0/2 0' = 100% CLAYSTONE medium gray (N 5/0); medium dark gray (N 4/0); trace very fine-grained sand, homogeneous, massive, low plasticity; blocky; some iron streaks, slightly weathered, weakly to moderately cemented, damp TOTAL DEPTH = 41 5'	37 5' Reading in Auger OVA 38 0 39 5' Reading in Auger OVA 1 0
42 43 44 45				

LF0588F

LOG OF BOREHOLE

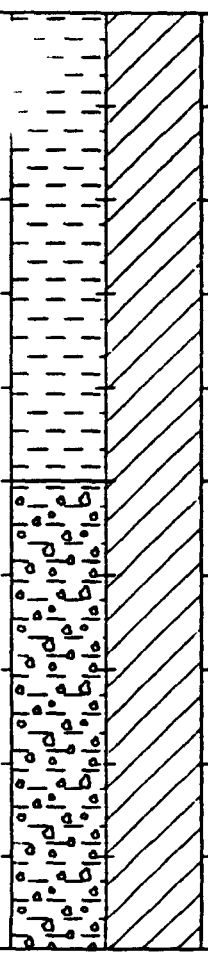
QA BY/DATE J B Burman 11-18-89
LOCATION Rocky Flats Plant, Landfill Area
COORDINATES N39,475.67 E21,023.37 (RFP)
TOTAL DEPTH 41.5'

DRILLING COMPANY Boyles Brothers
DATE DRILLED May 4 and 5, 1989
DRILLING METHOD Hollow Stem Auger
LOGGED BY R.T. Treat
GEOLOGIST

BOREHOLE/WELL NO B206589
GROUND SURFACE ELEVATION 5967 80'
WATER LEVEL ENCOUNTERED 27 5'
STATIC 7 30' (09/25/89)
DRILLER K Parker HELPER R Orr
DRILLING FLUID None
CHECKED BY J B Burman
SITE MANAGER

CEARP MANAGER

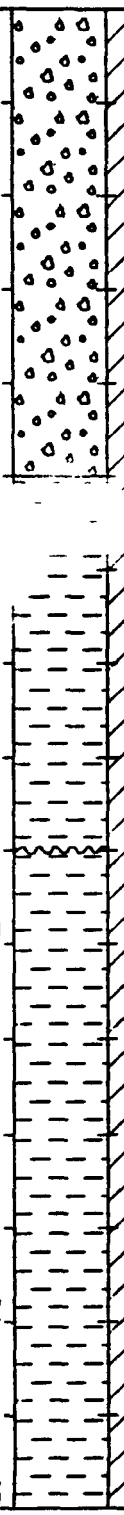
COMMENTS

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
1 2 3 4 5			**TOPSOIL** 0.0-1 5' SAMPLE Recovered 0 5/1 5' = 33% CLAY. dusky brown (5 YR 2/2) to moderate brown (5 YR 4/4), some gravel and scattered cobbles, low plasticity, abundant roots, weakly cemented, poorly consolidated; loose to medium stiff; slightly moist. **ROCKY FLATS ALLUVIUM** 1 5-3 5' SAMPLE Recovered 1 3/2 0' = 65% 1 5-2 5' CLAY yellowish gray (5 Y 7/2), some sand and some gravel, very calcareous and highly effervescent to HCl, very fine- (3 5-3 0 phi) to fine-grained (3 0-2 5 phi) sand, gravel size (0 15 to 1 25 cm), weakly cemented, low plasticity, poorly consolidated, moist 2 5-2 8' CLAYEY SAND AND GRAVEL fine- (3 0-2 5 phi) to very coarse-grained sand (0 0 to -0 5 phi), gravel (0 20 to 3 75 cm); quartzite and granitic origin, weakly cemented, poorly consolidated, subrounded to mostly subangular and angular, moist 3 5-5 5' SAMPLE Recovered 1.8/2 0' = 90% 3 5-4 9' CLAYEY SAND AND GRAVEL. same as above 4 9-5 3' SAND AND GRAVEL grayish orange pink (5 YR 7/2) to light brown (5 YR 6/4), sand range fine- (2.5-2 0 phi) to very coarse-grained (-0 5 to -1 0 phi) sand, gravel size: (0.25 to 5.50 cm); subrounded, subangular and angular; weakly cemented, poorly consolidated; medium dense, non-plastic, slightly moist.	HNu Background 0 0 OVA Background 1 0 All readings on cuttings, in breathing zone, on core, and in augers 0 0, unless otherwise noted below 5 5' Readings in Auger· OVA 4 0 HNu 1 0

LF0080A

WELL NO B206589

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
5 6 7 9 10 11 12 13			5 5-7 5' SAMPLE Recovered 1 8/2 0' = 90%. SAND AND GRAVEL same as above 7 5-9 5' SAMPLE Recovered 1 5/2 0' = 75% CLAY dark yellowish orange (10 YR 6/6) to pale yellowish brown (10 YR 6/2); fine- and medium-grained sands, gravel size· (0 20 cm to 0 75 cm), medium plastic, moderately cemented, medium stiff, slightly calcareous, moist ARAPAHOE/LARAMIE FORMATION 9 5-11 5' SAMPLE Recovered 1 0/2 0' = 50% CLAYSTONE pale yellowish brown (10 YR 6/2) to dark yellowish orange (10 YR 6/6), oxide stained, massive, homogeneous, moderately cemented, medium hard, medium plasticity, highly weathered, slightly moist 11 5-13 5' SAMPLE Recovered 1 2/2 0' = 60% CLAYSTONE same as above	7 30'

UF06888

WELL NO B206589

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
13			13 5-14 5' Drilled with center bit No sample recovered	
			14 5-15 5' SAMPLE Recovered 1 0/1.0' = 100% CLAYSTONE same as above, now more sand (3 5-3 0 phi)	14 5' Readings in Auger OVA 4 0 HNu 8 0 15 5' Readings in Auger OVA 2 0 HNu 1 0
14				
15			15.5-17 5' SAMPLE Recovered 1 7/2 0' = 85% SANDY CLAYSTONE light gray (N 7/0) to dark yellowish orange (10 YR 6/6), very fine-grained sand (4 0-3 5 phi), low plasticity, moderately oxide stained, weakly to moderately cemented, medium hard, homogeneous, massive, blocky, slightly moist	
			17 5-19 5' SAMPLE Recovered 1 8/2 0' = 90% SANDY CLAYSTONE same as above	
			19 5-21 5' SAMPLE Recovered 1 5/2 0' = 75% CLAYSTONE same as above, now some sand and now severely oxide stained	19 5' Readings in Auger OVA 6 0 HNU 55 0
17				
18				
19				
20				
21				

LF068BC

WELL NO B206589

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
21 22 23 24 26 27 28 29			21.5-23.5' SAMPLE. Recovered 2 0/2 0' = 100% SANDY CLAYSTONE medium gray (N 5/0) to medium dark gray (N 4/0), sand (3 5-3.0 phi), massive, homogeneous, medium hard; blocky; moderately cemented, weakly to moderately consolidated, very sandy at 23 4-23 5', moist 23 5-25 5' SAMPLE. Recovered 1 6/2 0' = 80% CLAYEY SANDSTONE light brown (5 YR 5/6) to pale yellowish brown (10 YR 6/2), sand (3.5-3 0 phi) to (3 0-2 5 phi), weakly cemented; medium hard, non-plastic to low plasticity, more clay at bottom, moderately oxide stained, slightly moist 25 5-27 5' SAMPLE Recovered 1 2/2 0' = 60% CLAYEY SANDSTONE same as above 27 5-29 5' SAMPLE Recovered 1.0/2.0' = 50%. CLAYEY SANDSTONE same as above	23 5' Reading in Auger HNu 1 0 25 5' Readings in Auger OVA 10 0 HNu 1 0 25 5-27 5' Reading on Core HNu 7 0 27 5' Readings in Auger OVA 22 0 HNu 9 0 27 5-29 5' Reading on Core HNu 2 2 ▽ 27 5'

BHLOG4A.MB

WELL NO B206589

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
29 30 31 32 33 34 35 36 37			**29.5-31 5' SAMPLE** Recovered 2 0/2.0' = 100% CLAYEY SANDSTONE pale yellowish brown (10 YR 6/2) to dark yellowish orange (10 YR 6/6), streaks of light gray (N 7/0), oxide stained, sand (3 5-3 0 phi) to (3 0-2 5 phi), massive, homogeneous, non-plastic to low plasticity, moderately cemented, moderately weathered, moist. **31.5-33 5' SAMPLE** Recovered 2 0/2.0' = 100% CLAYEY SANDSTONE same as above **33 5-35 5' SAMPLE** Recovered 2 0/2 0' = 100% 33.5-34 5' CLAYEY SANDSTONE same as above 34 5-35 5' CLAYSTONE light brown (5 YR 5/6), streaks of dark yellowish orange (10 YR 6/6), trace of fine-grained sand, low plasticity, medium hard, moderately consolidated, severely oxide stained, slightly moist **35 5-37 5' SAMPLE** Recovered 2 0/2 0' = 100% CLAYSTONE medium light gray (N 6/0) to medium gray (N 5/0), trace of very fine-grained sand, low plasticity, massive, homogeneous, slightly oxide stained, moderately consolidated, hard, slightly weathered; slightly moist	29 5' Readings in Auger OVA 35 0 HNu 150

BOTTOM

LF0688E

WELL NO B206589

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
37			37.5-39 5' SAMPLE Recovered 2.0/2 0' = 100% CLAYSTONE same as above, less iron-staining, slightly weathered to weathered 39 5-41 5' SAMPLE Recovered 2 0/2 0' = 100% CLAYSTONE same as above TOTAL DEPTH = 41 5'	
38				
39				
40				
42				
43				
44				
45				

LF0688F

LOG OF BOREHOLE

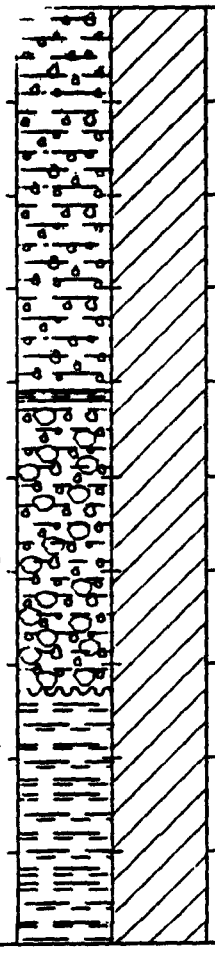
QA BY/DATE J.B. Byman 11-18-89
LOCATION Rocky Flats Plant, Landfill Area
COORDINATES N39,605.08 E21,263.69 (RFP)
TOTAL DEPTH 21 7'

DRILLING COMPANY Boyles Brothers
DATE DRILLED April 28, 1989
DRILLING METHOD Hollow Stem Auger
LOGGED BY E.M. Hill
GEOLOGIST

BORFHOLE/WELL NO B206689
GROUND SURFACE ELEVATION 5959 31'
WATER LEVEL ENCOUNTERED None
STATIC 15.35' (09/19/89)
DRILLER K Parker HELPER R Orr
DRILLING FLUID None
CHECKED BY J.B. Byman
SITE MANAGER

CEARP MANAGER

COMMENTS

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
1 2 3 4 5			TOPSOIL 0 0-1 7' SAMPLE Recovered 1 0/1 7' = 59% SILT, SAND AND GRAVEL: grayish brown (5 YR 3/2), very fine to coarse-grained sand, fine to coarse gravel, subangular, granitic, very loose, humic, grass and roots, damp 1 7-2 7' SAMPLE Recovered 0 4/1 0' = 40% 1 7-2 05' SILT, SAND AND GRAVEL same as above 2 05-2 10' SILTY CLAY pale brown (5 YR 5/2), moderately plastic, soft, moist 2.7-3 7' SAMPLE Recovered 0 4/1 0' = 40% GRAVEL, COBBLES AND CLAY pinkish gray (5 YR 8/1), mottled with yellowish gray (5 Y 7/2), clay is plastic, high calcite content, sticky, silt, moist; soft ARAPAHOE/LARAMIE FORMATION 3 7-5 7' SAMPLE Recovered 2 0/2 0' = 100% SILTY CLAYSTONE light olive gray (5 Y 6/1), mottled with dark yellowish orange (10 YR 6/6), trace very fine to fine-grained sand; 1-2 mm lenses of caliche; highly weathered; very soft, moderately plastic, moist.	HNu Background 0 0 OVA Background 0 0 All readings on cuttings, core, breathing zone and in augers 0 0, unless otherwise noted below 1 7' Reading in Augers OVA 1 1 2 7' Reading in Augers OVA 0 4

LF0880A

WELL NO B206689

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
5 6 7 8 TOP OF 10 11 12 13			5.7-7 7' SAMPLE. Recovered 2 0/2 0' = 100%. SILTY CLAYSTONE· brownish gray (5 YR 4/1); mottled with dark yellowish orange (10 YR 6/6); trace very fine to fine-grained sand, 1-40 mm lenses of caliche, blocky to fissile, highly weathered, very soft, moist. 7 7-9 7' SAMPLE Recovered 2.0/2 0' = 100% SILTY CLAYSTONE light olive gray (5 Y 6/1), mottled with dark yellowish orange (10 YR 6/6), trace very fine to fine-grained sand, trace organics, few 1-2 mm caliche lenses, blocky, fractured, very soft, slightly moist 9 7-11 7' SAMPLE Recovered 2 0/2 0' = 100% SILTY CLAYSTONE same as above, few sandy silty claystone partings 11.7-13 7' SAMPLE Recovered 2 0/2 0' = 100% SILTY CLAYSTONE brownish gray (5 YR 4/1), mottled with light brownish gray (5 YR 6/1) and dark yellowish orange (10 YR 6/6), trace very fine to fine-grained sand, (< 1 mm) lignite partings, iron-filled fractures; blocky, highly weathered, very soft, damp	9 7' Reading in Augers OVA 9 0

LF08898

WELL NO B206689

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
13			13 7-15 7' SAMPLE Recovered 2.0/2 0' = 100% SILTY CLAYSTONE. brownish gray (5 YR 4/1), trace very fine to fine-grained sand, trace organics, few iron-filled fractures, trace calcite-filled fractures; soft, moderately weathered; blocky, moderately plastic; damp.	
14			15.7-17 7' SAMPLE. Recovered 2.0/2 0' = 100% SILTY CLAYSTONE: brownish gray (5 YR 4/1), trace very fine to fine-grained sand, occasional lignite partings; trace iron-stained fractures, blocky; moderately weathered, damp, soft	
15			17 7-19 7' SAMPLE Recovered 2 0/2 0' = 100% SILTY CLAYSTONE same as above, blocky to fissile	15 35'
			19 7-21.7' SAMPLE Recovered 2 0/2 0' = 100% SILTY CLAYSTONE mottled light brownish gray (10 YR 6/1), brownish gray (10 YR 4/1), moderate yellowish brown (10 YR 5/4), trace very fine-grained sand; trace organics, blocky, moderately plastic; moderately weathered, soft, damp	
17				
18				
19				
20				
21				

LF0[illegible]C

WELL NO B206689

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
21			TOTAL DEPTH = 21 7'	
22				
23				
24				
26				
27				
28				
29				

UF0888D

LOG OF BOREHOLE

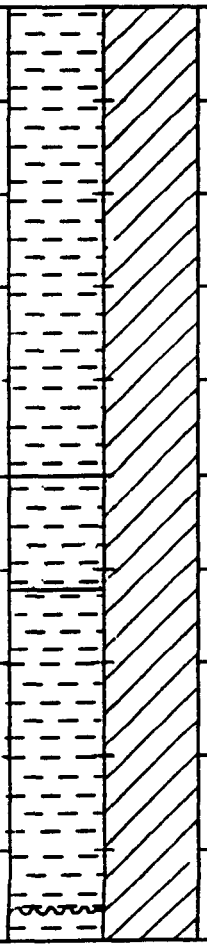
QA BY/DATE J B Burman 11-18-89
LOCATION Rocky Flats Plant, Landfill Area
COORDINATES N39,836.16 E21,064.34 (RFP)
TOTAL DEPTH 30.0'

DRILLING COMPANY Boyles Brothers
DATE DRILLED May 23, 1989
DRILLING METHOD Hollow Stem Auger
LOGGED BY S.P. Carpenter
GEOLOGIST

BOREHOLE/WELL NO B206789
GROUND SURFACE ELEVATION 5927.9'
WATER LEVEL ENCOUNTERED None
STATIC 11.08' (09/27/89)
DRILLER K Parker HELPER A. Bodoy
DRILLING FLUID None
CHECKED BY J B Burman
SITE MANAGER

CEARP MANAGER

COMMENTS

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
0 1 2 3 4 5			ARTIFICIAL FILL 0 0-2 0' SAMPLE Recovered 1 5/2 0' = 75% CLAY moderate brown (5 YR 4/4), some fine to very coarse-grained sand, fill, poor sorting, angular to subangular, quartzites, non-stratified, uncemented, stiff, medium plastic, moist 2 0-4 0' SAMPLE. Recovered 1 6/2 0 = 80% 2 0-2 5' CLAY dusty yellowish brown (10 YR 2/2), trace fine to coarse-grained sand; fill, poor sorting, subangular, quartzite, non-stratified, non-cemented, very stiff, medium plastic, moist 2 5-3 1 SAND AND CLAY dark yellowish orange (10 YR 6/6), trace gravel, medium to very coarse-grained sand; 1-4 cm gravel, poor sorting; subangular, granite-quartzite, non-stratified, weakly cemented, poor consolidation; medium dense, low plastic; moist. 3 1-3 6.CLAY medium gray (N 5/0), trace sand to sandy at shoe, medium to very coarse-grained sand, fill, poor sorting; subangular; quartzose, slightly stratified, blocky, weakly cemented, high to medium plastic, abundant calcium carbonate; moist.	HNu Background 0 0 OVA Background 0 0 Explosimeter Background 0 0 All readings on cuttings, in breathing zone, on core, and in augers 0 0, unless otherwise noted below TRIP BANK SAMPLE TB0523889B 0 0-3 0' SAMPLE LF0989BR0003 0 0-1 5' SAMPLE (VOAs only) LF0989BR0002 1 5-4 0' Reading in Auger OVA 10

LF0888A

WELL NO B206789

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
5 6 7 8 10 11 12 13			4 0-6 0' SAMPLE. Recovered 1 9/2 0' = 95%. 4 0-4 8. CLAY same as above with some gravel, fill. ARAPAHOE/LARAMIE FORMATION 4.8-5 9 CLAYSTONE· medium gray (N 5/0) to dark yellowish orange (10 YR 6/6) color due to banding and marbling by iron oxide staining, non stratified, blocky, poorly cemented, medium hard, weathered, medium-high plastic, trace calcium carbonate, moist 6 0-8 0' SAMPLE Recovered 2.0/2 0 = 100% CLAYSTONE light olive gray (5 Y 5/2) to dark yellowish orange (10 YR 6/6), some to trace very fine to fine-grained sand, rounded, well sorted, non stratified, blocky, weathered, medium hard to hard, medium high to high plastic, abundant iron oxide staining, moist 8 0-10 0' SAMPLE Recovered 2 0/2 0' = 100% 8.0-8.3' SANDSTONE dark yellowish orange (10 YR 6/6) to light gray (N 7/0), some clay, fine-grained sand, well sorted, rounded, non stratified, banded with iron oxide staining, slightly to poorly cemented, moderately to poorly consolidated; medium hard, weathered, low plastic, moist. 8.3-10 0' CLAYSTONE. olive gray (5 Y 4/1) banded dark yellowish orange (10 YR 6/6), trace silt, non stratified, homogeneous, blocky, well consolidated, weakly cemented, sightly weathered, medium to high plastic, iron oxide staining in part, moist. 10 0-12 0' SAMPLE Recovered 2 0/2 0' = 100% CLAYSTONE same as above, medium gray (N 5/0) and banded dark yellowish orange (10 YR 6/6) 12 0-14 0' SAMPLE. Recovered 2 0/2.0' = 100%. CLAYSTONE same as above; medium gray (N 5/0) to light olive brown (5 Y 4/4) with dark yellowish orange (10 YR 6/6) mottling	4 0-5 9' SAMPLE (VOAs only) LF0989BR0406 4 8-10 8' SAMPLE LF0989BR0511 LF0989BR0511D 5 9-6 0 Reading in Auger OVA 10 4 8-8 0 Reading in Auger OVA 5 8 0-10 0' SAMPLE (VOAs only) LF0989BR0810 LF0989BR0810D 10 8-16 8' SAMPLE LF0989BR1117 LF0989BR1117FB 12 0-14 0' SAMPLE (VOAs only) LF0989BR1214 ▼ 11 08'

LF0989B

WELL NO B206789

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
13 14 15 16 17 18 19 20 21			14.0-16 0' SAMPLE Recovered 2 0/2 0' = 100% CLAYSTONE. same as above, medium gray (N 5/0) to light olive gray (5 Y 5/2) with occasional bands of iron oxide staining 16.0-18 0' SAMPLE Recovered 2.0/2 0' = 100% CLAYSTONE same as above, medium dark gray (N 4/0) with dark yellowish orange (10 YR 6/6), iron oxide staining 18 0-20 0' SAMPLE Recovered 2 0/2 0' = 100% 18 0-18 4' CLAYSTONE same as above 18 4-19 2' CLAYSTONE dark yellowish orange (10 YR 6/6) to light brown (5 YR 5/6), very mottled, some fine to very fine-grained sand, non stratified, some platiness due to iron oxide cementation; well consolidated, hard, weathered; moist 19 2-20 0' CLAYSTONE same as 18 0-18 4', light olive brown (5 Y 5/6) to medium gray (N 5/0) 20 0-22 0' SAMPLE Recovered 2 0/2 0' = 100 % CLAYSTONE medium dark gray (N 4/0) to moderate olive brown (5 Y 4/4), banded coloring, trace of iron staining, non stratified, blocky, non cemented, well consolidated, high plastic, hard, slightly weathered, moist	16 0-18 0' SAMPLE (VOAs only) LF0989BR1618

LF0988C

WELL NO B206789

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
21 22 23 24 25 26 27 28 29			22.0-24 0 SAMPLE Recovered 2 0/2 0' = 100% CLAYSTONE same as above, light olive gray (5 Y 5/2) to medium gray (N 5/0) 24 0-26 0' SAMPLE Recovered 2 0/2 0' = 100% 24 0-25 6' CLAYSTONE same as above, dark gray (N 4/0) 25.6-16 0' CLAYSTONE same as above, light olive brown (5 Y 5/6) to dark gray (N 4/0), banded due to iron oxide staining. 26 0-28 0' SAMPLE Recovered 2 0/2 0' = 100% CLAYSTONE same as above, light olive brown (5 Y 5/6) grading to olive/black (5 Y 2/1)	

LF09890

WELL NO B206789

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
29			28 0-30 0' SAMPLE Recovered 2 0/2 0' = 100%. CLAYSTONE same as above, light olive brown (5 Y 5/6) to medium dark gray (N 4/0)	
30			TOTAL DEPTH = 30 0'	
31				
33				
34				
35				
36				
37				

LF0988E

LOG OF BOREHOLE

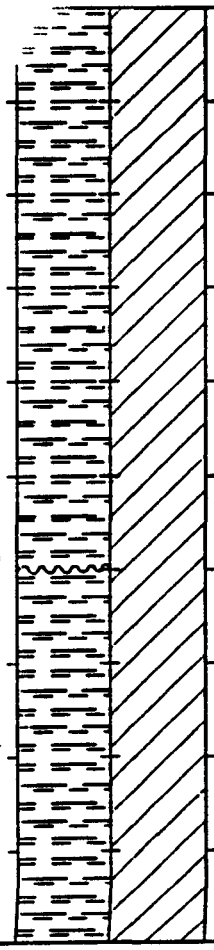
QA BY/DATE J B Burman 11-18-89
LOCATION Rocky Flats Plant, Landfill Area
COORDINATES N39,838.69 E21,684 46 (RFP)
TOTAL DEPTH 19 5'

DRILLING COMPANY Boyles Brothers
DATE DRILLED April 26 and 27, 1989
DRILLING METHOD Hollow Stem Auger
LOGGED BY E M. Hill
GEOLOGIST

BOREHOLE/WELL NO B206889
GROUND SURFACE ELEVATION 5917.09'
WATER LEVEL ENCOUNTERED None
STATIC 14.79' (09/18/89)
DRILLER K Parker HELPER R Orr
DRILLING FLUID None
CHECKED BY J B Burman
SITE MANAGER

CEARP MANAGER

COMMENTS

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
1 2 3 4 5			**COLLUVIUM** 0 0-1 5' SAMPLE Recovered 0 0/1 5' = 0% Note· 2 5' cobble in shoe, no sample recovered 1 5-3 5' SAMPLE Recovered 2 0/2 0' = 100% 1 5-3 0' SILTY CLAY dark yellowish brown (10 YR 4/2), some very fine-to medium-grained subangular sand, fine roots, stiff damp **ARAPAHOE/LARAMIE FORMATION** 3 0-3 5' SILTY CLAYSTONE brownish gray (5 YR 4/1), laminated, frequent lignite layers, <1 mm, occasional calcite streaks, abundant iron-staining 3 5-5 5' SAMPLE Recovered 2 0/2 0' = 100% SILTY CLAYSTONE some very fine- to fine-grained sand at bottom of sample, blocky fractures, highly weathered, very soft, extensive iron-staining decreasing with depth, lignite layers, <1 m to 5 mm	HNu Background 0 0 OVA Background 0 0 All readings on cuttings, on core, in breathing zone, and in augers 0 0, unless otherwise noted below 3 5' Readings in Auger OVA 0 6 3 5-5 5' Readings on Core HNu 0 2

LF1000A

WELL NO B206889

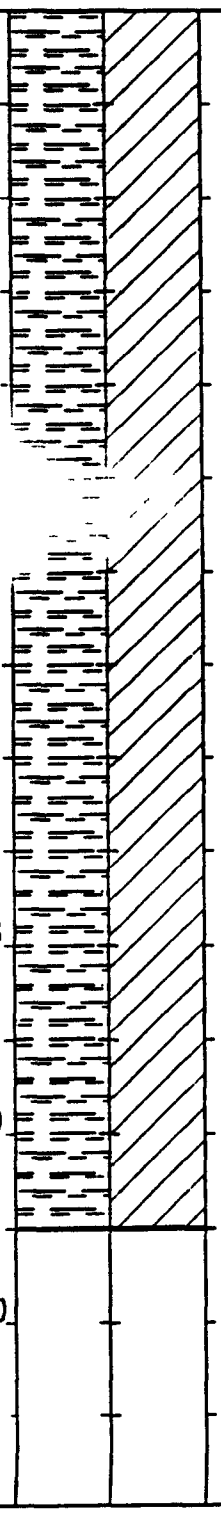
LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
5			5 5-7 5' SAMPLE Recovered 2 0/2 0' = 100% SILTY CLAYSTONE some very fine-to fine-grained sand; angular; quartz; blocky fractures, highly weathered; very soft; occasional iron-stained fractures, few lignite layers (<1 mm)	5 5' Readings in Auger HNu 0 4 OVA 6 0
6			7 5-9 5' SAMPLE Recovered 2.0/2 0' = 100% SILTY CLAYSTONE. brownish gray (5 YR 4/1), trace to some very fine- to fine-grained sand, laminated to no visible bedding; highly weathered, very soft; occasional iron-stained fractures, very few thin organic streaks, damp	7 5-9 5' Readings on Core OVA 0 4 HNU 0 2
7			9 5-11 5' SAMPLE Recovered 2 0/2 0' = 100% SILTY CLAYSTONE brownish gray (5 YR 4/1), trace to some very fine to fine-grained sand, layer of extremely weathered sandstone, heavy iron-staining, continuous iron-filled fractures, blocky to laminated, moderately weathered, very soft, damp.	9 5' Readings in Auger HNu 105 OVA 8 0
TOP OF [illegible]			11 5-13.5' SAMPLE Recovered 2 0/2 0' = 100% SILTY CLAYSTONE brownish gray (5 YR 4/1), trace very fine-grained sand, continuous iron-filled and very thin carbon-filled fractures, slightly weathered, soft	
9				
10				
11				
12				
13				

LF10898

WELL NO B206889

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
13 14 15 17 18 19 20 21			13.5-14 5' SAMPLE Recovered 1 0/1 0' = 100% SILTY CLAYSTONE brownish gray (5 YR 4/1), trace very fine-grained sand, few continuous iron-filled fractures, moderately weathered, soft, damp 14 5-16 5' SAMPLE Recovered 2 0/2 0' = 100%. SILTY CLAYSTONE brownish gray (5 YR 4/1), some very fine to fine-grained sand, 0 3' zone of laminated severely weathered sandier claystone, few continuous iron-filled fractures, moderately weathered; soft, damp. 16 5-18 5' SAMPLE Recovered 2 0/2 0' = 100% SILTY CLAYSTONE trace to some very fine to fine-grained sand; grain size increasing with depth to sandy silty claystone, blocky, few iron-filled fractures, moderately weathered, grading to highly weathered with extensive fractures; iron-mottling, friable, trace organic spots in fractures, soft to very soft; damp. 18 5-19 5' SAMPLE Recovered 1 0/1 0' = 100% SILTY CLAYSTONE brownish gray (5 YR 4/1), trace to some very fine to fine-grained sand, thin sand partings, top strongly weathered, fractured, friable, very soft grading to moderately weathered; blocky, few iron-filled and organic-filled fractures, soft, damp TOTAL DEPTH = 19 5'	▼ 14 79'

LF108BC

LOG OF BOREHOLE

QA BY/DATE J B Berman 11-18-89
LOCATION Rocky Flats Plant, Landfill Area
COORDINATES N40,160 69 E21,739.67 (RFP)
TOTAL DEPTH 23.6'

DRILLING COMPANY Boyles Brothers
DATE DRILLED April 19, 1989
DRILLING METHOD Hollow Stem Auger
LOGGED BY R. T Treat
GEOLOGIST

BOREHOLE/WELL NO B206989
GROUND SURFACE ELEVATION 5882 42'
WATER LEVEL ENCOUNTERED None
STATIC 18 42' (09/18/89)
DRILLER K Parker HELPER R Orr
DRILLING FLUID None
CHECKED BY J B Berman
SITE MANAGER

CEARP MANAGER

COMMENTS

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
1 2 3 4 5			TOPSOIL 0 0-1 6' SAMPLE. Recovered 1 5/1.6' = 94% 0.0-0 8' CLAY grayish brown (5 YR 3/2), some gravel (1 75 to 2 50 cm); subrounded and subangular, low plasticity; weakly cemented, poorly consolidated, abundant roots; moist VALLEY FILL ALLUVIUM 0 0-1 5' CLAY pale brown (5 YR 5/2) to pale yellowish brown (10 YR 6/2), some gravel, numerous roots, medium plasticity, weakly cemented, poorly consolidated, moist 1 6-3 6' SAMPLE Recovered 2 0/2 0' = 100% CLAY moderate brown (5 YR 3/4), some gravel to gravelly at bottom of sample, gravel (1 25 to 2 50 cm), subangular and subrounded, medium plasticity, moderately cemented, medium stiff, moist to very moist at 3 4 to 3 6' 3 6-5 6' SAMPLE Recovered 2 0/2 0' = 100%. CLAY pale yellowish brown (10 YR 6/2) to pale brown (5 YR 5/2), some granitic and quartzite gravel, gravelly lense at 4 1' to 4 3', (0 75 to 1 50 cm), subrounded; subangular, few scattered roots, slightly oxide-stained, medium plasticity, moderately cemented, moderately consolidated, moist.	HNu Background· 0 0 OVA Background. 0 0 All readings on cuttings, on core, in augers, and in breathing zone 0 0, unless otherwise noted below.

UT169A

WELL NO B206989

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
5			5 6-7 6' SAMPLE Recovered 2 0/2 0' = 100% 5 6-6.0'. SANDY CLAY. same as above, fine-grained sand.	8 6' Reading in Auger HNu 0 4
			ARAPAHOE/LARAMIE FORMATION	
6			6 0-7 6' SANDY CLAYSTONE. pale yellowish brown (10 YR 6/2), light brown (5 YR 5/6); fine-grained sand (3/0-2 5 phi), weakly cemented; low plasticity; lignite pockets; massive; homogeneous, medium hard, oxide stained, weathered, slightly moist	
7			7 6-9.6' SAMPLE. Recovered 2 0/2 0' = 100% SANDY CLAYSTONE same as above.	
			9 6-11 6' SAMPLE Recovered 2 0/2 0' = 100% SANDY CLAYSTONE. same as above	
8			11 6-13 6' SAMPLE Recovered 2.0/2.0' = 100% SANDY CLAYSTONE same as above	
			13 6-15 6' SAMPLE Recovered 1 8/2 0' = 90% SANDY CLAYSTONE pale yellowish brown (10 YR 6/2) to grayish orange pink (5 YR 7/2) and pale brown (5 YR 5/2), fine-grained sand (3 5-2 5 phi), well sorted, low plasticity, weakly cemented; massive, homogeneous, poorly consolidated, medium hard, weathered, slightly moist	15 6' Reading in Auger HNu 0 5
10				
11				
TOP OF G'REEN 12				
13				

LF1189B

WELL NO B206989

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
13			15.6-17 6'SAMPLE Recovered 2 0/2.0' = 100%. CLAYSTONE. medium light gray (N 6/0), massive, homogeneous, moderately cemented, medium hard to hard; medium plasticity, occasional thin oxide streaks or strings, blocky, slightly weathered, slightly moist	
14			17.6-19 6' SAMPLE Recovered 2 0/2 0' = 100% CLAYSTONE. same above	
15			19 6-21 6' SAMPLE Recovered 2 0/2 0' = 100% CLAYSTONE same as above	
16				
18				18 42'
19				
20				
21				

LF1188C

WELL NO B206989

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
21			21.6-23 6' SAMPLE. Recovered 2.0/2 0' = 100%. CLAYSTONE same as above TOTAL DEPTH = 23 6'	
22				
23				
24				
26				
27				
28				
29				

LF11890

LOG OF BOREHOLE

QA BY/DATE Jarell Berman 11-18-84
LOCATION Rocky Flats Plant, Landfill Area
COORDINATES N40,118 58 E21,741 54 (RFP)
TOTAL DEPTH 60.0'

DRILLING COMPANY Boyles Brothers
DATE DRILLED April 21 and 24, 1989
DRILLING METHOD Hollow Stem Auger
LOGGED BY R T. Treat
GEOLOGIST

BOREHOLE/WELL NO B207089
GROUND SURFACE ELEVATION 5883 07'
WATER LEVEL ENCOUNTERED 50 0'
STATIC 20.82' (09/07/89)
DRILLER K Parker HELPER R Orr
DRILLING FLUID None
CHECKED BY J S Berman
SITE MANAGER

CEARP MANAGER

COMMENTS

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
0			TOPSOIL 0.0-1 5' SAMPLE Recovered 1 5/1 5' = 100% 0.0-0.5'. CLAY grayish brown (5 YR 3/2), some gravel, weakly cemented, poorly consolidated, low plasticity, abundant roots, slightly moist.	HNu Background 0 0 OVA Background 0 0 All readings on cuttings, on core, in breathing zone and augers 0 0, unless otherwise noted below
2			VALLEY FILL ALLUVIUM 0 5-1 5' CLAY dusky brown (5 YR 2/2) to moderate brown (5 YR 4/4), some gravel; (0 50 to 2.50 cm), angular and subangular, granitic and quartzite, medium plasticity, weakly cemented, moderately consolidated, stiff, moist	
3			1 5-3 5' SAMPLE Recovered 2 0/2 0' = 100% CLAY moderate yellowish brown (10 YR 5/4) to light brown (5 YR 5/6), trace fine-grained sand, calcareous pockets, trace gravel; medium plasticity, moderately consolidated, moderately cemented, stiff, few roots, slightly moist	3 5' Readings in Auger HNu 0 8, OVA 2 0
4			3 5-5 5' SAMPLE Recovered 2 0/2 0' = 100% CLAY moderate brown (5 YR 4/4) to light brown (5 YR 5/6) to moderate yellowish brown (10 YR 5/4), some fine-grained sand (3 0-2 5 phi), low plasticity, moderately cemented, moderately consolidated, lignite blotches, calcareous streaks, stiff, slightly moist	5 5' Readings in Auger HNu 1 4, OVA 12 0
5				

LF1280A

WELL NO B207089

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
5			5 5-7.5' SAMPLE Recovered 2 0/2 0' = 100% 5 5-6.0' SANDY CLAY same as above	7.5' Readings in Auger HNu 1 0, OVA 10
6			ARAPAHOE/LARAMIE FORMATION 6 0-7.5' CLAYSTONE pale yellowish brown (10 YR 6/2), light brown (5 YR 6/4); pale brown (5 YR 5/2); some fine-grained sand (3 0-2.5 phi), low plasticity; moderately cemented to weakly cemented, medium hard, lignite strings and blotches; weathered, slightly moist.	
7			7 5-9.5' SAMPLE Recovered 2 0/2 0' = 100% SANDY CLAYSTONE same as above, more sand	9 5' Readings in Auger HNu. 5 0, OVA. 48.0
8			9 5-11 5' SAMPLE. Recovered 2.0/2.0' = 100%. SANDY CLAYSTONE pale yellowish brown (10 YR 6/2) and pale brown (5 YR 5/2), some streaks light brown (5 YR 5/6), fine-grained sand (3 0-2 5 phi), weakly cemented, poorly consolidated, some oxide stained streaks, massive, homogeneous, weathered, slightly moist	9 5' Readings in Breathing Zone HNu 2 2, OVA 6 0
			11 5-13 5' SAMPLE Recovered 2 0/2 0' = 100% CLAYSTONE light gray (N 7/0) to medium light gray (N 6/0), some fine-grained sand (3 5-3 0 phi), low plasticity, massive, homogeneous, hard, moderately consolidated, slightly weathered, slightly moist	
10				
11				
12				
13				

LF1289B

WELL NO B207089

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
13			13 5-15.5' SAMPLE Recovered 2.0/2 0' = 100% CLAYSTONE same as above 15 5-17 5' SAMPLE Recovered 2 0/2 0' = 100% SANDY CLAYSTONE pale yellowish brown (10 YR 6/2) to medium light gray (N 6/0), medium plasticity, moderately cemented, medium hard, slightly weathered--thin streaks or blotches, slightly moist 17 5-19 5' SAMPLE Recovered 2 0/2 0' = 100% SANDY CLAYSTONE same as above, damp 19 5-21 5' SAMPLE Recovered 2 0/2 0' = 100% SANDY CLAYSTONE same as above, less sand.	
14				
15				
17				
18				
19				
20				20 82'
21				

UFT28BC

WELL NO B207089

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
21 22 23 25 26 27 28 29			21.5-23 5' SAMPLE Recovered 2 0/2.0' = 100% SANDY CLAYSTONE. pale yellowish brown (10 YR 6/2), pale brown (5 YR 5/2) to medium light gray (N 6/0), fine- (4.0-3 5 phi) to very fine-grained sand (3 5-3.0 phi); low plasticity; weakly to moderately cemented, poorly consolidated, hard, massive, homogeneous; blocky in lenses, weathered, damp. 23 5-25 5' SAMPLE. Recovered 2 0/2 0' = 100% SANDY CLAYSTONE. same as above; moderate brown (5 YR 3/4) to pale brown (5 YR 5/2), less sand, moderately oxide stained 25 5-27 5' SAMPLE Recovered 2 0/2 0 = 100% SANDY CLAYSTONE same as above, less oxide staining 27.5-29 5' SAMPLE Recovered 2 0/2 0' = 100% SANDY CLAYSTONE same as above, medium light gray (N 6/0), moderately cemented, well consolidated, low to medium plasticity, slightly damp	

LF12890

WELL NO B207089

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
29 30 31 33 34 35 36 37			29 5-31 5' SAMPLE Recovered 2 0/2 0' = 100% SANDY CLAYSTONE. medium dark gray (N 4/0) to medium light gray (N 6/0), fine-grained sand (3 5-3 0 phi), low plasticity, hard, moderately cemented, well consolidated, blocky, massive, homogeneous, unweathered, dry 31.5-33.5' SAMPLE Recovered 1 2/2.0' = 60%. SILTSTONE AND SANDSTONE: medium dark (N 4/0) to medium light gray (N 6/0); fine-grained sand (4 0-3.5 phi); moderately cemented; non-plastic; weakly consolidated, hard; massive; slightly damp. 33 5-35 5' SAMPLE. Recovered 1 0/2.0' = 50% SILTSTONE AND SANDSTONE same as above 35 5-37 5' SAMPLE Recovered 1 5/2.0' = 75% SILTSTONE AND SANDSTONE. medium dark gray (N 4/0) to medium light gray (N 6/0), very fine grained-sand (4.0-3.5 phi) with thin clean sandstone streaks (0 3 cm), non-plastic, moderately cemented, hard, massive, well consolidated, dry	

LF1288E

WELL NO B207089

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
37 38 39 40 42 43 44 45			37.5-38 5' SAMPLE Recovered 1 0/1 0' = 100% SANDSTONE AND SILTSTONE same as above, more sand (approximately 60%) with approximately 40% fines, slightly damp 38 5-39 5' SAMPLE Recovered 0 0/1 0' = 0% 39 5-41 5' SAMPLE Recovered 0 0/2 0' = 0% 41 5-42 5' SAMPLE Recovered 0 0/1 0' = 0%. 42.5-43 5' SAMPLE Recovered 1 0/1 0' = 100% SANDY SILTSTONE. medium gray (N 5/0) to medium dark gray (N 4/0); very fine-grained sand (3 0-4 0 phi); massive; homogeneous, very hard; moderately cemented, moderately consolidated, unweathered, slightly damp. 43.5-45 0' SAMPLE Recovered 1 5/1 5' = 100% SANDY SILTSTONE· same as above; thin lenses sandstone; more lignite strings and pockets, slightly damp. 45 0-46 0' SAMPLE Recovered 1 0/1 0' = 100%. SANDY SILTSTONE same as above.	

LF128F

WELL NO B207089

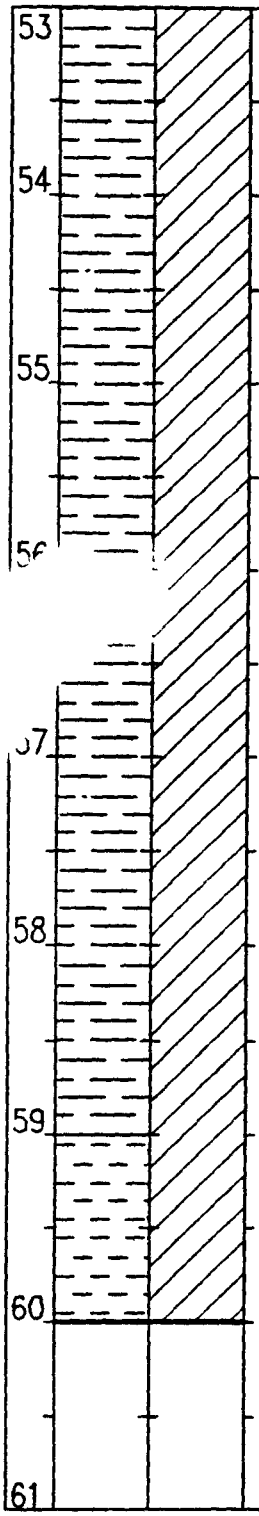
LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
45			46.0-47.0 SAMPLE. Recovered 1 0/1.0' = 100% SANDY SILTSTONE. same as above	
46			47 0-48 0' SAMPLE Recovered 1 0/1 0' = 100% SANDY SILTSTONE. same as above	47 0' Reading in Auger HNU 0 0, OVA 2.0 ppm
			48 0-49.0' SAMPLE Recovered 1 0/1 0' = 100% SANDY SILTSTONE. same as above, more very fine-grained sand.	
47			Note· 49 0-49 5'· Drilled with center bit No sample recovery	
			49 5-51 5' SAMPLE Recovered 2 0/2 0' = 100% SANDSTONE AND SILTSTONE dark gray (N 3/0) to grayish black (N 2/0), fine-grained sand (3 0-3 5 phi), massive, lignite pockets, homogeneous, low to non-plasticity; weakly consolidated, medium hard, moist to wet lense at 50', saturated for less than 0.1'	
48			51.5-52.5' SAMPLE Recovered 1 0/1 0' = 100% SILTSTONE AND SANDSTONE same as above, more silt, slightly moist	
			52 5-53 5' SAMPLE Recovered 1 0/1 0' = 100% SANDY SILTSTONE same as above, less sand, damp.	
50				▽ 50 0'
51				
52				
53				

UF1288G

WELL NO B207089

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
53 54 55 56 57 58 59 60 61			53 5-54 5' SAMPLE Recovered 1 0/1.0' = 100% SANDY SILTSTONE. same as above, slightly damp 54 5-55 5' SAMPLE. Recovered 1 0/1 0' = 100% SANDY SILTSTONE dark gray (N 3/0) to grayish black (N 2/0), fine-grained sand; massive, hard lenses, lignite strings and pockets; weakly consolidated, moderately cemented, damp 55.5-56 5' SAMPLE. Recovered 1 0/1 0' = 100%. SANDY SILTSTONE. same as above. 56 5-57 5' SAMPLE Recovered 1 0/1 0' 100% SANDY SILTSTONE same as above 57 5-58 5' SAMPLE Recovered 1 0/1 0' = 100% SANDY SILTSTONE same as above, 58 5-59 0' SAMPLE Recovered 0 5/0 5' = 100% SANDY SILTSTONE same as above, more clay 59 0-60 0' SAMPLE Recovered 1 0/1 0' = 100% SANDY CLAYSTONE dark gray (N 3/0), grayish black (N 2/0), blocky, medium plasticity; medium hard, homogeneous, massive, fine-grained sand; damp TOTAL DEPTH = 60 0'	

LF1289H

LOG OF BOREHOLE

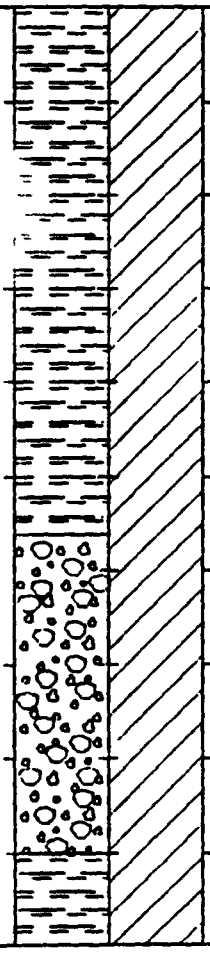
QA BY/DATE James B Burman / 11-18-89
LOCATION Rocky Flats Plant, Landfill Area
COORDINATES N40,107 10 E21,741 74 (RFP)
TOTAL DEPTH 259.0'

DRILLING COMPANY Boyles Brothers
DATE DRILLED June 7-13,1989
DRILLING METHOD Hollow Stem Auger 0.0-28.0' Rotary Core 28.0-259.0'
LOGGED BY E.M Hill, H G Bienkowski
GEOLOGIST

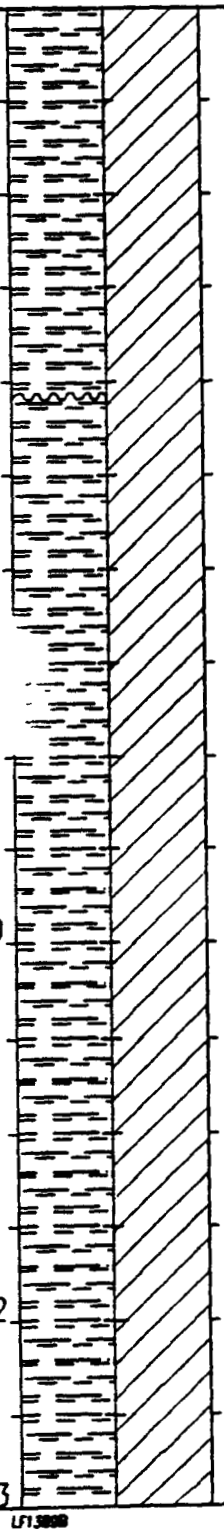
BOREHOLE/WELL NO B207189
GROUND SURFACE ELEVATION 5884 8'
WATER LEVEL ENCOUNTERED None
STATIC 31 43' (09/08/89)
DRILLER P Mesa P Bushkovski HELPER R Orr, H McCree
DRILLING FLUID 0.0-28.0' none; 28.0-259.0' water
CHECKED BY J B Burman
SITE MANAGER

CEARP MANAGER

COMMENTS Surface casing set at 28 feet below ground surface on 4/25/89 by E.M Hill

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
0			TOPSOIL 0 0-1 5' SAMPLE Recovered 1 5/1 5' = 100% 0.0-0 6' CLAYEY SILT dusky brown (5 YR 2/2), trace fine to coarse angular gravel, firm, unconsolidated, 1 mm fleck of clayey material--dusky blue (5 PB 3/2), damp.	HNU Background 0 0, OVA Background 0 0, All readings on cuttings, core, in breathing zone and in augers 0 0, unless otherwise noted
2			COLLUVIUM 0.6-1.5'. CLAYEY SILT dusky yellowish brown (10 YR 2/2), trace fine to coarse angular quartz and granite gravel, stiff, no bedding; massive, abundant fine roots, damp	
3			1 5-3 5' SAMPLE Recovered 2 0/2 0' = 100%. 1.5-2.8'. SILTY CLAY dusky yellowish brown (10 YR 2/2); some angular or granitic fine to coarse gravel, cobbles; mottled, stiff, damp 2 8-3 5' GRAVEL AND COBBLES granitic, medium- to very coarse-grained, angular, dry, 0 2' layer of very stiff silty clay--damp	3 5' Reading in Auger OVA. 2 0
4			Note 3 5-4 5' Drilled with center bit No sample recovered 4 5-5 5' SAMPLE Recovered 0.4/1.0' = 40%. SILTY CLAY· light olive gray (5 Y 5/2); some fine to coarse subangular to angular gravel, granitic, highly mottled with orange, 1-2 mm black flecks, spots, firm, moderately plastic; moist	
5				

LF1388A

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
5 6 7 8 10 11 12 13			5 5-7 5' SAMPLE. Recovered 2.0/2.0' = 100%. SILTY CLAY AND CLAY moderate yellowish brown (10 YR 5/4); medium gray (N 5/0), trace very fine-grained sand, calcareous streaks, thin carbonaceous streaks, stiff, moderately to highly plastic, laminated, damp ARAPAHOE/LARAMIE FORMATION 7.1-7 5'· SILTY CLAYSTONE AND CLAYSTONE moderate yellowish brown (10 YR 5/4), medium gray (N 5/0), trace very fine-grained sand--increasing with depth; frequent <0 5 mm lignite layers, very soft, extremely weathered, laminated; heavy iron-staining. 7 5-9 5' SAMPLE. Recovered 2.0/2 0' = 100% SILTY CLAYSTONE TO SANDY SILTY CLAYSTONE dark yellowish brown (10 YR 4/2), trace to some very fine- to fine-grained subangular sand, fining upward, orange iron streaks, frequent lignite streaks, calcareous pods and streaks, extremely weathered; damp 9 5-11 5' SAMPLE Recovered 2 0/2 0' = 100% SILTY CLAYSTONE some very fine- to fine-grained sand, heavy iron-staining; very thin lignite laminations, stiff; moderately plastic, clay layers, very soft; highly weathered, damp to moist 11 5-13 5' SAMPLE Recovered 2.0/2 0' = 100% SILTY CLAYSTONE brownish gray (5 YR 4/1), trace very fine-grained sand; soft; slightly weathered, blocky, few fractures throughout, iron and gypsum filled; damp	

LF1300B

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
13			13 5-15 5' SAMPLE Recovered 2.0/2 0' = 100% SILTY CLAYSTONE: same as above, trace very fine-grained sand.	
14			15 5-17 5' SAMPLE. Recovered 2 0/2 0' = 100% SILTY CLAYSTONE brownish gray (5 YR 4/1), trace very fine-grained sand, soft, slightly weathered, blocky, more frequent fractures; iron-filled, zone of silty clay, some sand, laminated, highly weathered, trace organic flecks, damp	
15			17 5-19 5' SAMPLE. Recovered 2 0/2.0' = 100%. SILTY CLAYSTONE. same as above, trace very fine- to fine-grained sand, moderately to slightly weathered, increasing to some sand at 19-19 5'	
16			19 5-21 5' SAMPLE Recovered 2.0/2.0' = 100% SILTY CLAYSTONE· dark yellowish brown (10 YR 4/2); trace to some very fine-grained sand, angular; laminated to lenticular; highly weathered, crumbly, iron-staining in streaks, damp	19 5-21 5' Reading on Core· HNu 2 2
17				
18				
19				
20				
21				

LF138BC

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
21 22 23 24 25 26 27 28 29			21.5-23.5' SAMPLE. Recovered 2.0/2.0' = 100%. SILTY CLAYSTONE: light brownish gray (10 YR 6/1) to pale yellowish brown (10 YR 6/2), trace very fine- to fine-grained sand, angular, blocky to laminated, iron-stained fractures, very soft, some mottling; damp 23.5-25 5' SAMPLE. Recovered 2 0/2 0' = 100% SILTY CLAYSTONE. brownish gray (5 YR 4/1), some very fine- to fine-grained sand, blocky, iron-filled fractures; trace 1 mm lignite streaks; slightly weathered, soft, damp 25 5-27 5' SAMPLE. Recovered 2.0/2 0' = 100% SILTY CLAYSTONE· dark yellowish brown (10 YR 4/2), trace very fine-grained sand, abundant fractures with iron-staining, moderately weathered, blocky, crumbly; soft, damp. 27 5-29 5' SAMPLE Recovered 2.0/2 0' = 100% SILTY CLAYSTONE TO SANDY SILTY CLAYSTONE same as above; medium dark gray (N 4/0), trace fine sand, grading to medium gray (N 5/0), slightly weathered; soft; few iron-filled fractures, slightly damp.	21.5-23.5' Reading on Core OVA. 0 2

WELL NO B207189

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
29			29 0-33 0' SAMPLE Recovered 3 1/4 0' = 78%. RQD 2 6/3/1' = 84%. 29 0-30.3' CLAYSTONE dark yellowish brown (10 YR 4/2), homogeneous; firm to moderately hard, no reaction to HCl, damp 30 3-32 6'. CLAYEY SILTSTONE· medium dark gray (N 4/0); homogeneous except for an organic rich claystone 31.65-31.9'; trace very fine-grained sand; moist. 33 0-36 0' SAMPLE Recovered 4 1/3 0' = 137% RQD 3 55/4 1' = 87%. 32.1-33 4' CLAYSTONE, olive gray (5 YR 4/1) and mottled, homogeneous, trace medium nodules, soft, plastic, no reaction to HCl, damp 33 4-36 0' SILTSTONE medium dark gray (N 4/0), homogeneous, trace very fine-grained sand, trace clay; no reaction to HCl, damp 36 0-37 0 SAMPLE Recovered 1 1/1 0' = 110%. RQD 0 75/1.1' = 68% CLAYEY SILTSTONE. medium dark gray (N 4/0), trace very fine-grained sand, firm to hard, no reaction to HCl, damp	▼ 31 43'
30				
31				
32				
33				
34				
35				
36				
37				

LF138E

WELL NO B207189

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
37 38 39 41 42 43 44 45			37.0-39 0' SAMPLE. Recovered 1 5/2.0' = 75%. RQD 0 8/1 5' = 53% CLAYEY SILTSTONE. brownish gray (5 YR 4/1), to medium dark gray (N 4/0), homogeneous, trace very fine-grained sand, firm, no reaction to HCL, damp 39 0-43 0' SAMPLE Recovered 3.9/4.0' = 98%. RQD 3 6/3 9' = 92% SILTY CLAYSTONE dark gray (N 3/0) to medium dark gray (N 4/0), homogeneous, trace very fine-grained sand, moderately hard to hard; no reaction to HCl, damp 43.0-47.0 SAMPLE Recovered 1 4/4.0' = 35% RQD 1 25/1.4' = 89%. CLAYEY SILTSTONE dark gray (N 3/0) to medium dark gray (N 4/0); homogeneous, organic rich laminae at 44.3-44 4'; to trace very fine-grained sand, hard, no reaction to HCl, damp.	

LF1389

WELL NO B207189

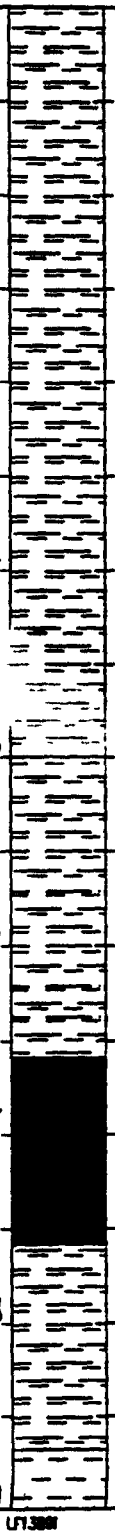
LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
45				
			47 0-49.0 SAMPLE. Recovered 4 6/2.0' = 230% RQD 4.6/4 6' = 100%. CLAYEY SILTSTONE dark gray (N 3/0) to brownish gray (5 YR 4/1), laminated, trace lignite stringers; trace to occasionally some very fine- to fine-grained sand, hard; no reaction to HCl, damp.	
46				
			49.0-53 0' SAMPLE. Recovered 4 0/4 0' = 100% RQD 4 0/4 0' = 100% CLAYEY SILTSTONE dark gray (N 3/0) to brownish gray (5 YR 4/1), laminated, trace lignite stringers; trace to occasionally some very fine- to fine-grained sand, hard, no reaction to HCl, damp	
47				
48				
50				
51				
52				
53				

LF1388g

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
53			53 0-57 0 SAMPLE Recovered 4 1/4 0' = 103% RQD 2 9/4 1' = 71%. SILTY CLAY dark gray (N 3/0), laminated, organic rich; some lignite stringers; trace very fine-grained sand; moderately hard; no reaction to HCl, damp 57.0-61 0 SAMPLE. Recovered 4 3/4 0' = 108% RQD 4 3/4.3' = 100% CLAYEY SILTSTONE dark gray (N 3/0), laminated, organic rich in part, trace lignite stringers, trace very fine-grained sand, moderately hard to firm; no reaction to HCl, damp	
54				
55				
56				
58				
59				
60				
61				

LFT.389h

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
61			61.0-65 0 SAMPLE. Recovered 4 0/4 0' = 100%. RQD 3 5/4 0' = 88%. CLAYEY SILTSTONE dark gray (N 3/0) to medium dark gray (N 4/0), laminated, organic rich above 61 5' with trace lignite stringers, moderately hard, no reaction to HCl, damp 65.0-69 0 SAMPLE Recovered 4 5/4 0' = 113%. RQD 4.3/4 5' = 96% 65 0-66 6' SILTY CLAYSTONE· dark gray (N 3/0) to medium dark gray (N 4/0), laminated, organic rich, firm; no reaction to HCl, damp 66 6-67 6'· LIGNITE brownish black (5 YR 4/1) to brownish gray (5 YR 2/1); fissile, firm, no reaction to HCl, damp 67 6-68 7' SILTY CLAYSTONE medium dark gray (N 4/0); organics decreasing with depth, hard, no reaction to HCl; damp. 68 7-69 0' SANDY CLAYSTONE medium dark gray (N 4/0), homogeneous, very fine-grained, subrounded, well sorted sand, firm, damp	
62				
63				
64				
65				
66				
67				
68				
69				

LF1388

WELL NO B207189

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
69 70 TOP OF SCREEN 71 73 74 75 76 77			69 0-73 0' SAMPLE Recovered 4.0/4 0' = 100% RQD 3 3/4 0' = 83%. 69 0-69.3' CLAYEY SANDSTONE· medium dark gray (N 4/0), very fine- to fine-grained, subrounded, well sorted, damp. 69 3-73 0'. CLAYEY SILTSTONE. laminated, organic rich with lignite bed, 69 2-69 4; silty, very fine-grained sandstone bed 72.0-72 2, damp 73 0-77 0 SAMPLE Recovered 2.5/4 0' = 63% RQD 1.3/2 5' = 52%. 73.0-73.3' CLAYEY SILTSTONE medium dark gray (N 4/0); laminated; waxy; hard; damp. 73 3-73.6'. CLAYEY SANDSTONE medium dark gray (N 4/0), very fine- to fine-grained; subrounded, well sorted, firm, no reaction to HCl, damp 73 6-75 5' CLAYEY SILTSTONE dark gray (N 4/0), fissile, organic rich, damp	70 98-75.43' Geotechnical sample (Hydrometer Analysis) LF1389BR7075 16% Sand 44% Silt 40% Clay

LF1389J

WELL NO B207189

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
77 78 79 80 82 83 84 85			77.0-80.0 SAMPLE Recovered 4 0/3 0' = 133%. RQD 3.8/4.0' = 95%. 77.0-78 0'· SILTY CLAYSTONE. dark gray (N 4/0), laminated; trace very fine-grained sand, firm, no reaction to HCl; moist. 78.0-80.0': CLAYEY SANDSTONE: dark gray (N 3/0) to medium dark gray (N 4/0); laminated, trace very fine-grained sand; moderately hard to firm, no reaction to HCl; moist. 80 0-83.0 SAMPLE Recovered 4 5/3.0' = 150% RQD 3 8/4.5' = 84% 80.0-81 4' SILTY CLAYSTONE brownish black (5 YR 2/1) to dark gray (N 3/0), laminated; organic rich with uppermost 0 5' lignite, organics decreasing downward, firm to moderately hard, no reaction to HCl, damp. 81 4-83 0' CLAYEY SILTSTONE medium dark gray (N 4/0); homogeneous, breaks with concoidal fractures; hard to very hard, no reaction to HCl, damp. 83 0-87.0 SAMPLE. Recovered 3 9/4 0' = 98% RQD 3 7/3 9' = 95% 83 0-85.1' CLAYEY SILTSTONE medium dark gray (N 4/0); laminated, firm no reaction to HCl, damp 84 1-86.9' SILTY SANDSTONE dark gray (N 3/0) to brownish gray (5 YR 4/1), crossbedded, trace organics along crossbeds, very fine-grained, subrounded, well sorted; well consolidated (hard to very hard), no reaction to HCl, damp	

LF1389k

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
85			87 0-91 0 SAMPLE Recovered 3.0/4 0' = 98%. RQD 1 7/3.9' = 44%. 87.0-89.0': SANDY SILTSTONE. medium dark gray (N 4/0); laminated; some silty sandstone stringers, some organic rich siltstone stringers, some clay, moderately hard, no reaction to HCl, damp 89 9-90 9' SILTY CLAYEY SANDSTONE: medium dark gray (N 4/0) to brownish gray, (5 YR 4/1), laminated, very fine-grained, subrounded, well sorted, well consolidated (moderately hard to hard), no reaction to HCl, damp.	
86				
87			91 0-94 0 SAMPLE. Recovered 2 9/3 0' = 97%. RQD 2 4/2 9' = 83%. SILTY SANDSTONE· dark gray (N 3/0) to brownish gray (5 YR 4/1), laminated, poorly sorted, very fine-grained, silty, subrounded sands and moderately well sorted fine-grained, subrounded sands; trace organic rich sandstone, trace clayey sandstones, well consolidated; no reaction to HCl, damp.	
88				
90				
91				
92				
93				

LF138W

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
93				
94			94 0-98 0 SAMPLE. Recovered 3.8/4.0' = 95%. RQD 3 8/3.8' = 100%. 94.0-97.5'· SILTY SANDSTONE, medium dark gray (N 4/0) to brownish grey (5 YR 4/1); very fine- to fine-grained, subrounded, moderately well sorted, trace lignite stringers; well consolidated, no reaction to HCl, damp. 97 5-97 8'. LIGNITE. brownish black (5 YR 2/1), laminated, subfissile, no reaction to HCl, damp	
95			98 0-102 0 SAMPLE. Recovered 4 1/4 0' = 103% RQD 3 9/4 1' = 95% 98 0-101 7' SILTY SANDSTONE medium dark gray (N 4/0) to olive gray (5 Y 4/1), laminated, very fine- to fine-grained (fining downward), some sandstone clasts (rounded, medium pebbles), moderately well sorted, well consolidated, no reaction to HCl, damp 101 7-102 0' CLAYEY SILTY SANDSTONE alternating bands of medium gray (N 5/0) and dark gray (N 3/0), crossbedded; very fine-grained, well sorted, firm, damp	
96				
97				
98				
99				
100				
101				

LF1388m

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
101				
			102.0-106.0' SAMPLE. Recovered 3 5/3 5' = 100% RQD 2 4/3 5' = 69%. CLAYEY SILTY SANDSTONE: alternating bands of medium gray (N 5/0) and dark gray (N 3/0), crossbedded; very fine- to fine-grained, well sorted; friable becoming well consolidated below 104.6'; no reaction to HCl; damp.	
102				
			106 0-110.0 SAMPLE. Recovered 4 0/4 0' = 100%. RQD 3.1/4.0' = 78%. 106.0-108 4' SILTY SANDSTONE. medium dark gray (N 4/0); faintly laminated; very fine- to fine-grained, moderately well sorted, rounded, well consolidated; no reaction to HCl, damp 108.4-110.0' CLAYSTONE dark gray (N 3/0) to brownish black (5 YR 2/1), homogeneous to subfissile, becoming organic rich at 109 1', damp	
103				
104				
105				
106				
107				
108				
109				

LF13880

WELL NO B207189

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
109				
			<u>110.0-114 0 SAMPLE</u> Recovered 4.3/4.0' = 110% RQD 3 7/4 3' = 90% SILTY CLAYSTONE dark gray (N 3/0) to brownish black (5 YR 2/1); subfissile, some very fine-grained sand in part, firm, no reaction to HCl, moist.	
110				
			<u>114.0-118 0 SAMPLE.</u> Recovered 3.8/4 0' = 95% RQD 0 9/3.8' = 24%. SILTY CLAYSTONE. same as above	
111				
112				
114				
115				
116				
117				

LF1389e

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
117				
			118 0-122.0 SAMPLE Recovered 3 8/4 0' = 95%. RQD 1 5/3.8' = 39% 118.0-121 3' SILTY CLAYSTONE: same as above except for sandy claystone layer (118 5 to 118 7') with olive gray color (5 Y 4/1). 121 3-121.8 SILTY SANDSTONE pale brown (5 YR 5/2), homogeneous, very fine- to fine-grained, moderately well sorted, subangular to subrounded, well consolidated, no reaction to HCl, damp	
118				
			122 0-126 0 SAMPLE Recovered 4 0/4 0' = 100% RQD 3 8/4 0' = 95%. CLAYSTONE dark gray (N 3/0), subfissle above 125 2'; homogeneous, waxy, very fine- to fine-grained, poorly sorted sandstone stringer at 123.1 to 123 2 and 125 1' depth, no reaction to HCl, moist	
119				
121				
122				
123				
124				
125				

LF138Bp

WELL NO B207189

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
125				
			126 0-130 0 SAMPLE. Recovered 2 3/4.0' = 58%. RQD 1.8/2.3' = 78%. CLAYEY SILTSTONE: medium dark gray (N 4/0), homogeneous, some disseminated very fine-grained sand; moderately hard to hard, no reaction to HCl, damp.	
126				
			130.0-133.0 SAMPLE Recovered 4 0/3.0' = 133%. RQD 2 9/4 0' = 73% SILTY CLAYSTONE brownish black (5 YR 2/1) to olive black (5 Y 2/1), subfissle to fissle, organic rich grading into clayey lignite at 129 9-130 3' trace very fine-grained sand in part, firm to moderately hard; no reaction to HCl, moist	
127				
128				
130				
131				
132				
133				

LF1389q

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
133			133 0-137.0 SAMPLE. Recovered 4 1/4.0' = 103% RQD 3 5/4 1' = 85%. 133 0-133.9', SILTY CLAYSTONE same as above except no lignite. 133 9-137 0'. SANDY SILTSTONE medium dark gray (N 4/0) to medium gray (N 4/0); homogeneous, disseminated very fine-grained sand, some clay above 135.1, interbedded very fine-grained sandstone below 136 5, moderately hard to hard; no reaction to HCl;damp	
134				
135			137 0-141 0 SAMPLE Recovered 4 2/4 0' = 105%. RQD 2 8/4.2' = 67% 137 0-139 0'. SILTY CLAYSTONE. medium dark gray (N 4/0) to dark gray (N 3/0), waxy, trace disseminated very fine-grained sand, firm, no reaction to HCl, damp. 139 0-141 0'. SANDY CLAYEY SILTSTONE medium dark gray (N 4/0) to dark gray (N 3/0); finely interbedded; some very fine-grained sandstone interbeds; moderately hard, no reaction to HCl, damp	
136				
138				
139				
140				
141				

LF1389r

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
141			141 0-145.0 SAMPLE. Recovered 4 0/4 0' = 100%. RQD 3.5/4 0' = 88%. 141.0-141.9' CLAYEY SILTSTONE medium dark gray (N 4/0) to dark gray (N 3/0), faintly laminated, trace to some very fine- to fine-grained disseminated sand; lignite stringer at base; moderately hard; no reaction to HCl, damp 141.9-145 0': SANDSTONE AND SILTSTONE· medium gray (N 5/0) and dark gray (N 4/0); finely interbedded sandstones and siltstones; primarily sandstone at top becoming more siltstone at depth, very fine-grained, well sorted subrounded sands, no reaction to HCl; damp 145 0-149 0 SAMPLE Recovered 3 9/4 0' = 98% RQD 3 9/3 9' = 100% SILTY SANDSTONE medium dark gray (N 4/0) and light olive gray (5 Y 6/1), possible soft sediment deformation; some interbeds of siltstone, very fine- to fine-grained, rounded, well sorted, well consolidated, no reaction to HCl; damp	
142				
143				
145				
146				
147				
148				
149				

LF1.589a

WELL NO B207189

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
149			149.0-153.0' SAMPLE Recovered 3 7/4 0' = 93% RQD 3 6/3 7' = 17% 149 0-152.7' SILTY SANDSTONE same as above 153 0-157 0 SAMPLE Recovered 3 7/4 0' = 93% RQD 2 6/3 7' = 70% 153.0-155.0' SILTY CLAYSTONE dark gray (N 3/0), fissle; moderately hard, no reaction to HCl, damp 155.0-156 7' LIGNITE black (N 1/0) to brownish black (5 YR 2/1); fissle lignite, no reaction to HCl, damp	
150				
151				
152				
154				
155				
156				
157				

LF1389R

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
157			157 0-161 0 SAMPLE Recovered 0.3/4.0' = 1% RQD 0 0/0 3' = 0%. 157.0-157 3' CLAYSTONE olive black (5 YR 2/1), organic rich, no reaction to HCl, damp	
158			161 0-161 5 SAMPLE Recovered 2.4/0 5' = 480%. RQD 0 4/2.4' = 20% CLAYSTONE· medium dark gray (N 4/0); some organic material and silt at top decreasing downwards, firm, no reaction to HCl, damp.	
159			161 6-164 0 SAMPLE Recovered 0 0/2 5' = 0% RQD 0 0/2 5' = 0%	
			164 0-165 0 SAMPLE. Recovered 3 5/1 0' = 350% RQD 2 7/3 5' = 77%. CLAYSTONE medium dark gray (N 4/0) to dark gray (N 3/0), trace organics, trace to some silt increasing downwards, soft to moderately hard, no reaction to HCl, damp 163-165 0' SILTY SANDSTONE dark gray (N 3/0) to brownish gray (5 YR 4/1), homogeneous, breaks along concoidal fractures; very fine- to fine-grained; subrounded; subangular, moderately well sorted, well consolidated, hard, no reaction to HCl; damp	
161				
162				
163				
164				
165				

WELL NO B207189

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
165			165.0-169.0 SAMPLE. Recovered 4.0/4 0' = 100%. RQD 4 0/4 0' = 100% SILTY SANDSTONE same as above except natural subhorizontal silt filled fractures at 166' depth, some clay, moderately hard	
166			169.0-173 0 SAMPLE Recovered 4 0/4.0' = 100%. RQD 3 7/4 0' = 93% 169.0-171 8'. SILTY SANDSTONE: same as above 171 8-173 0'. SANDY CLAYEY SILTSTONE· brownish gray (5 YR 4/1) to brownish black (5 YR 2/1), organic rich, trace lignite, trace interbeds of very fine- to fine-grained sandstone, moderately hard, no reaction to HCl, damp	
167				
169				
170				
171				
172				
173				

LF1389v

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
173			173.0-177 0 SAMPLE. Recovered 2.3/4.0' = 58%. RQD 1.8/2.3' = 78% 173 0-173 5' SILTY SANDSTONE· dark gray (N 3/0) to brownish gray (5 YR 4/1). 173.5-174 6'. LIGNITE AND COAL brownish black (5 YR 2/1) to black (N 1/0) subfissile to fissile firm; no reaction to HCl, damp 174 6-175 3'· SILTY CLAYSTONE dark gray (N 3/0), laminated; organic rich, moderately hard no reaction to HCl; damp 177 0-180 0 SAMPLE. Recovered 2.0/3 0' = 97%. RQD 1.0/2.0' = 66%. 177.0-177.8'· LIGNITE, brownish black (5 YR 2/1); fissle; trace coal; firm; damp 177.8-179 9'· CLAYEY SANDY SILTSTONE medium dark gray (N 4/0), organic rich at top becoming less clayey and more sandy downward, very fine-grained, rounded sands; moderately hard to firm, damp 180.0-184 0 SAMPLE Recovered 3 9/4.0' = 98% RQD 3 8/3.9' = 97% SILTY SANDSTONE AND SANDY SILTSTONE medium dark gray (N 4/0) to dark gray (N 3/0), SANDSTONE very fine- to fine-grained, well sorted, subrounded, well consolidated; sandstone grading into SANDY SILTSTONE some clay, disseminated very fine- to fine-grained sandstone laminae, hard to moderately hard, no reaction to HCl, damp	
174				
175				
176				
178				
179				
180				
181				

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
181				
			184 0-188.0 SAMPLE. Recovered 4 2/4 0' = 105% RQD 3 4/4.2' = 81% SILTY CLAYSTONE dark gray (N 3/0), laminated; trace very fine- to fine-grained sandstone laminae; firm to moderately hard, no reaction to HCl; damp	
182				
			188.0-192 0 SAMPLE Recovered 2 6/4 0' = 65% RQD 2.4/2 6' = 92% SILTY CLAYSTONE. dark gray (N 3/0) to brownish black (5 YR 2/1); subfissle, trace very fine- to fine-grained sandstone laminae, some organics below 190' depth, firm to moderately hard, no reaction to HCl, damp	
183				
185				
186				
187				
188				
189				

LFT389x

WELL NO B207189

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
37				
			192 0-195 0 SAMPLE Recovered 4.7/3.0' = 118% RQD 4 7/4.7' = 100%. SILTY CLAYSTONE· same as above except some organics above 191 2' depth; trace iron staining. 195 0-199 0 SAMPLE Recovered 0 0/4 0' = 0%. RQD 0 0/0 0'	
190				
191				
192				
194				
195				
196				
197				

LF1380y

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
197				
			199 0-199 5 SAMPLE Recovered 3 0/0.5' = 600% RQD 1 6/3 0' = 53% 196 5-198 3' SILTY CLAYSTONE dark gray (N 3/0) to brownish gray (5 YR 4/1), homogeneous to subfissle (associated with organics) trace organics; firm, no reaction to HCl, damp. 198.3-199 5': SANDSTONE. medium dark gray (N 4/0); very fine- to fine-grained, trace medium-grained, subrounded, moderately well sorted, some silt, consolidated, hard; no reaction to HCl; damp	
198				
199			199 5-203.0 SAMPLE Recovered 3 7/3 5' = 106% RQD 3 7/3 7' = 100% SANDSTONE medium dark gray (N 4/0) to olive gray (5 Y 4/1), natural subvertical fractures throughout, staining and mineralization along fractures; very fine- to fine-grained; subrounded, well sorted, trace to some clay; well consolidated, hard to very hard, no reaction to HCl, damp	
200			203 0-207 0 SAMPLE. Recovered 4 1/4 0' = 102% RQD 3 4/4 1' = 83% CLAYEY SANDSTONE crossbedded, trace natural fractures, with mineralization, very fine- to fine-grained, subrounded, well sorted, trace calcite cement in better developed sandstone stringers (HCl reaction), hard, damp	
202				
203				
204				
205				

LF1389z

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
205			207 0-211.5' SAMPLE Recovered 4 5/4 5' = 100% RQD 4.5/4.5' = 100%. SILTY SANDSTONE. medium dark gray (N 4/0) to olive gray (5 Y 4/1), crossbedded, very fine- to fine-grained; subrounded, well sorted, silt decreases to trace below 210 2' depth, well consolidated; uncemented below 210 2' depth; no reaction to HCl; moist.	
206				
			211.5-216 0' SAMPLE Recovered 4 1/4 5' = 91% RQD 1 3/4 1' = 32% SANDSTONE: medium gray (N 5/0), crossbedded, very fine- to fine-grained, subrounded, well sorted, consolidated, uncemented, no reaction to HCl, moist.	
207				
208				
210				
211				
212				
213				

LF1389zz

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
213			216 0-220.0 SAMPLE. Recovered 3.9/4 0' = 98% RQD 3.0/3.0' = 100%. SANDSTONE: medium gray (N 5/0), very dark gray (N 3/0) to black (N 1/0) banding; crossbedded; laminated; black banding, fine- to very fine-grained, subrounded, well sorted, consolidated; hard, strong HCl reaction 216 3 to 217 0, none elsewhere; moist.	
214				
			220.0-224.0 SAMPLE. Recovered 4 0/4 0' = 100%. RQD 3 8/4 0' = 95%. SANDSTONE· same as above except, medium gray (N 4/0), no reaction to HCl, moist.	
215				
217				
218				
219				
220				
221				

LF1389zb

WELL NO B207189

LOG OF BOREHOLE

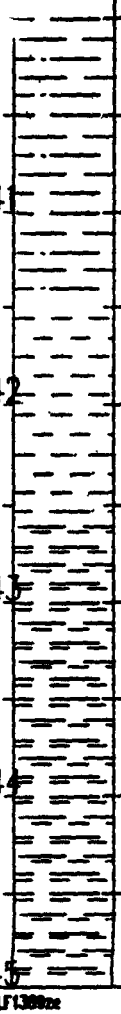
DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
221				
222			224.0-228 0' SAMPLE Recovered 3 9/4 9' = 98% RQD 2 9/3 0' = 74%. SANDSTONE· medium dark gray (N 4/0), crossbedded with limited soft sediment deformation, black banded, very fine- to fine-grained, subrounded; well sorted, trace organics along laminae surfaces; consolidated; firm to moderately hard; no reaction to HCl, moist.	
223			228.0-232.0' SAMPLE Recovered 4 0/4 0' = 100%. RQD 3 3/4.0' = 83% SANDSTONE· medium dark gray (N 4/0) and dark gray (N 3/0), same as above	
224				
225				
226				
227				
228				
229				

LF1389zc

WELL NO B207189

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
229				
230			232.0-236 0 SAMPLE. Recovered 4 0/4.0' = 100%. RQD 3 2/4 0' = 80%. SANDSTONE AND SANDY SILTSTONE medium dark gray (N 4/0) to dark gray (N 3/0), crossbedded, SANDSTONE very fine- to fine-grained, subrounded, well sorted; well sorted, some silt well consolidated Interbedded siltstone. very fine-grained, subrounded, disseminated sand, trace claystone beds, hard; no reaction to HCl, damp	
231			236 0-240 0 SAMPLE Recovered 4.0/4 0' = 100% RQD 4.0/4 0' = 100% SANDSTONE medium gray (N 4/0) to medium dark gray (N 4/0), crossbedded, trace organic rich; silty interbeds; trace iron staining, very fine- to fine-grained; subrounded, well sorted, well consolidated; no reaction to HCl, moist	
232				
233				
234				
235				
236				
237				

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
237 238 239 241 242 243 244 245			240 0-244.0' SAMPLE. Recovered 2.6/4 0' = m65%. RQD 2.0/2.6' = 77%. 240.0-241.5' SANDSTONE AND SILTY SANDSTONE medium dark gray (N 4/0) to dark gray (N 3/0), crossbedded, trace claystone interbeds, trace organic rich siltstone interbeds, SANDSTONE very fine- to fine-grained; subrounded, well sorted, well consolidated, SILTY SANDSTONE very fine-grained; trace fine-grained, subrounded, well consolidated, no reaction to HCl; damp 241 5-242 6' CLAYEY SANDY SILTSTONE dark gray (N 4/0); homogeneous, trace natural fractures with organic material infilling, disseminated very fine- to trace fine-grained, subrounded sand, no reaction to HCl, damp 244 0-247 0 SAMPLE Recovered 4 3/3 0' = 143%. RQD 3 4/4 3' = 79% SILTY CLAYSTONE dark gray (N 3/0) to brownish black (5 YR 2/1), faintly laminated, waxy, trace high angle open natural fractures (45 to 70° from horizontal), trace very fine- to fine-grained sand, grading to base to sandy, clayey, siltstone; moderately hard, no reaction to HCl, damp	

LF1300ze

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
245			247 0-251.0 SAMPLE Recovered 0 0/4 0' = 0% RQD 0 0/0 0 251 0-251 5 SAMPLE. Recovered 4 5/0.5' = 900% RQD 4 4/4 5' = 98%. SILTY CLAYSTONE. dark gray (N 3/0) to brownish black (5 YR 2/1); laminated, natural high angle open fractures (45 to 70° from horizontal), trace very fine-grained sand, organic rich below 249 0' depth; 0 1' lignite bed at base; moderately hard, no reaction to HCl; damp. SANDSTONE. medium gray (N 5/0), homogeneous, very fine-grained; subrounded; well sorted; consolidated, firm, no reaction to HCl; damp 251 5-255 0 SAMPLE Recovered 3 5/3 5' = 100%. RQD 0 4/3 5' = 11% 251 5-252 3' COAL AND LIGNITE black (N 1/0) and brownish black (5 YR 2/1), orthorhombic fracturing in coal, lignite, some clay, some silt, trace very fine-grained sand, moderately hard, no reaction to HCl, moist 252 3-255 0': CLAYSTONE grayish brown (5 YR 3/2) to dark gray (N 3/0), subfissle in part, waxy, organic rich above 254 0' depth, some silt in part, moderately hard, no reaction to HCl, damp	
246				
247				
248				
250				
251				
252				
253				

WELL NO B207189

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
253				
			255 0-259.0 SAMPLE. Recovered 3 7/4 0' = 93%. RQD 1 4/3 7' = 38%. SILTY CLAYSTONE. dark gray (N 3/0) to brownish black (5 YR 2/1); waxy; trace lignite, trace very fine-grained sand at base, firm to hard, no reaction to HCl, damp	
254				
			TOTAL DEPTH = 259 0'	
255				
257				
258				
259				
260				
261				

LF1389zq

LOG OF BOREHOLE

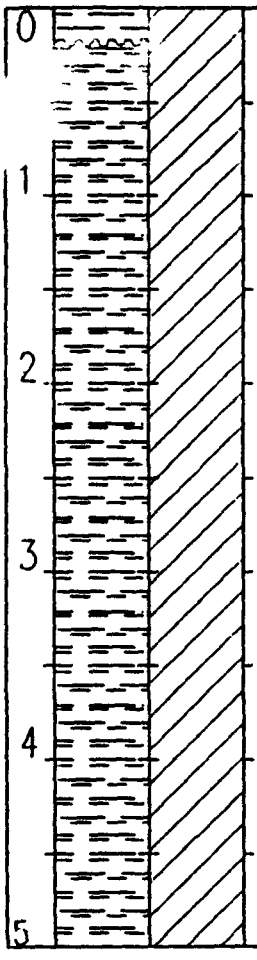
QA BY/DATE J B Burman 11-18-89
LOCATION Rocky Flats Plant, Landfill Area
COORDINATES N40,284.53 E21,264.93 (REP)
TOTAL DEPTH 19.5'

DRILLING COMPANY Boyles Brothers
DATE DRILLED April 27, 1989
DRILLING METHOD Hollow Stem Auger
LOGGED BY E M Hill, R T Treat
GEOLOGIST

BOREHOLE/WELL NO B207289
GROUND SURFACE ELEVATION 5948.27'
WATER LEVEL ENCOUNTERED None
STATIC None (09/19/89)
DRILLER K Parker HELPER R Orr
DRILLING FLUID None
CHECKED BY J B Burman
SITE MANAGER

CEARP MANAGER

COMMENTS

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
0 1 2 3 4 5			**TOPSOIL** 0 0-1 5' SAMPLE Recovered 1 5/1 5' = 100%. 0 0-0 2'. SILT. grayish brown (5 YR 3/2), humic, rooted, loose, damp **ARAPAHOE/LARAMIE FORMATION** 0 2-1 5' SILTY CLAYSTONE pale yellowish brown (10 YR 6/2), some very fine-grained sand, highly weathered, blocky; friable, frequent iron-staining in distinct fractures; very soft, damp 1 5-3 5' SAMPLE Recovered 1 9/2.0' = 95% SILTY CLAYSTONE pale yellowish brown (10 YR 6/2), abundant streaks and mottles--dark yellowish brown (10 YR 6/6), trace to some very fine- to fine-grained sand, highly weathered, very soft, few calcite streaks up to 3 mm, rooted, trace organic partings, blocky, friable, damp 3 5-5 5' SAMPLE Recovered 2 0/2 0' = 100% SILTY CLAYSTONE· light olive gray (5 Y 6/1), mottled with dark yellowish orange (10 YR 6/6), moderately weathered, very soft, few calcite lenses; damp.	HNu Background. 0.0 OVA Background. 0 0 All readings on cuttings, core, breathing zone, and in augers 0 0, unless otherwise noted below

LF1469A

WELL NO B207289

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
5			**5 5-7 5' SAMPLE** Recovered 2 0/2.0' = 100% SILTY CLAYSTONE pale yellowish brown (10 YR 6/2), mottled with dark yellowish orange (10 YR 6/6)--decreasing with depth, trace very fine-grained sand, laminated lignite partings (< 1mm)--increasing with depth, highly weathered, very soft; damp.	
6			**7.5-9.5' SAMPLE.** Recovered 2 0/2 0' = 100%. SILTY CLAYSTONE pale yellowish brown (10 YR 6/2), occasional dark yellowish orange (10 YR 6/6) mottling, trace very fine-grained sand, few lignite partings, few very small calcite lenses, highly weathered, very soft; damp	
7			**9 5-11 5' SAMPLE** Recovered 2 0/2 0' = 100% SILTY CLAYSTONE pale yellowish brown (10 YR 6/2) with occasional dark yellowish orange (10 YR 6/6) mottling and fractures, trace to some sand, few thin lignite partings and steaks, blocky to fissile, highly weathered, very soft, damp	
8			**11 5-13 5' SAMPLE** Recovered 2 0/2 0' = 100% SILTY CLAYSTONE pale yellowish brown (10 YR 6/2), mottled with grayish orange (10 YR 7/4), trace to some very fine- to fine-grained sand, occasional (< 1 mm) lignite partings, iron-stained fractures, blocky, very soft, highly weathered, damp	
10				
11				
12				
13				

TOP - WHEN

LF1489B

WELL NO B207289

LOG OF BOREHOLE

DEPTH (FT)	GRAPHIC LOG	SAMPLE TYPE	LITHOLOGIC DESCRIPTION	SAMPLES COLLECTED OR OTHER TESTS PERFORMED
13			13 5-15 5' SAMPLE. Recovered 2 0/2 0' = 100% SILTY CLAYSTONE pale yellowish brown (10 YR 6/2), mottled with decreasing dark yellowish orange (10 YR 6/6), trace very fine- to fine-grained sand, iron-filled fractures, increasing lignite partings blocky to fissile, moderately weathered, very soft, damp	
14			15.5-17 5' SAMPLE. Recovered 2 0/2 0' = 100% SILTY CLAYSTONE same as above	15 5' Reading in Auger OVA 6 5
BOTTOM OF AN 15			17 5-19 5' SAMPLE Recovered 2 0/2 0' = 100% SILTY CLAYSTONE pale yellowish brown (10 YR 6/2) to medium gray (N 5/0), massive, homogeneous, blocky, iron-stained, medium hard, medium consolidated, medium plastic, damp	19 5' Reading in Auger OVA 0 8
17			TOTAL DEPTH = 19 5'	
18				
19				
20				
21				

LF1489C

APPENDIX E

Well Construction Logs for

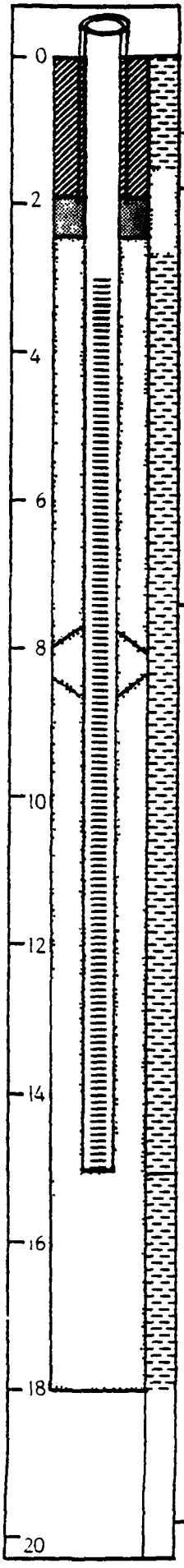
Present Landfill Monitoring Wells

WELL 4-86

WELL CONSTRUCTION SUMMARY

LOCATION or COORDS N 40437.1 E 30774.2

ELEVATION GROUND LEVEL 5636.60'
TOP OF CASING 5637.94'



LOCATION Golden, CO
PERSONNEL S. Paschke
PROJECT 106K0622 Rocky Flats Plant

DRILLING SUMMARY

TOTAL DEPTH Well 14 92' Hole 18.00'
BOREHOLE DIAMETER 7½"

DRILLER Boyles Brothers Drilling Co.
15865 W. 5th Avenue
Golden, CO (Doyle Styles)
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'	3 52'	C1	
3 52'	14 92'	S1	

CASING C1 2" I D Sch 5 type 316 stainless steel, threaded and flush jointed

SCREEN S1 2" I.D Sch. 5 type 316 stainless steel, threaded and flush jointed, 0 020" wire wrap screen, 0 25' welded bottom cap.

CENTRALIZERS Centralizer placed approximately mid-point on screened interval

FILTER MATERIAL 12-20 silica sand
2 40' - 18 00'

CEMENT Portland Type I
0 00' - 1 95'

OTHER 3/8" bentonite pellets
1 95' - 2 40'

CONSTRUCTION TIME LOG

TASK	START DATE 1986	START TIME	FINISH DATE 1986	FINISH TIME
DRILLING				
7½" auger	4/24	1440	4/24	1600
GEOPHYS. LOGGING	—	—	—	—
CASING				
2" stainless	4/24	1725	4/24	1730
FILTER PLACEMENT	4/24	1730	4/24	1810
CEMENTING	4/25	1010	4/25	1020
DEVELOPMENT	8/29	1606	8/29	1606
OTHER				
Bentonite	4/25	1000	4/25	1010

WELL DEVELOPMENT

See Well Development Summary Sheet.

COMMENTS

Water encountered at 12 00' during drilling

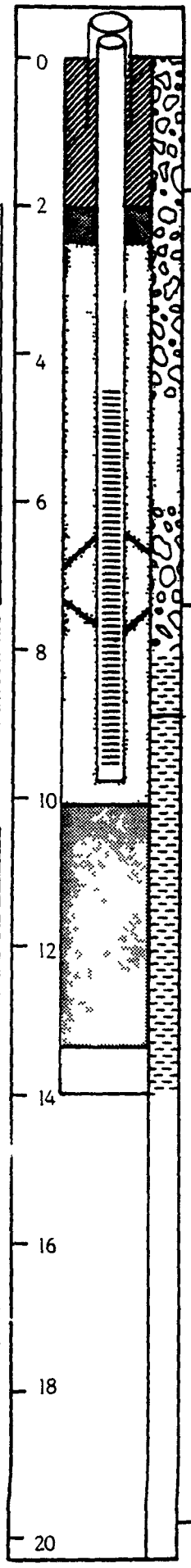
Top of stainless steel casing 1.34'

WELL 5-86

WELL CONSTRUCTION SUMMARY

LOCATION or COORDS N 40694.8 E 26699.7

ELEVATION GROUND LEVEL 5720.07'
TOP OF CASING 5722.61'



LOCATION Golden, CO
PERSONNEL J Bergman
PROJECT 106P06222 Rocky Flats Plant

DRILLING SUMMARY

TOTAL DEPTH Well 9 76' Hole 14 0'
BOREHOLE DIAMETER 7¼"

DRILLER Boyles Brothers Drilling Co.
15365 W. 5th Avenue
Golden, CO (Tony Robinson)
RIG Acker
BIT(S) Bull nose 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 0'	- 4 40'	C1		-	
4 40'	- 9 76'	S1		-	

CASING C1 2" I D Sch 5 type 316 stainless steel, threaded and flush jointed.

SCREEN S1 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.
6 54' - 7 71'

FILTER MATERIAL 32-42 silica sand
2.50' - 10.02'

CEMENT Portland Type I
0 00' - 2 00'

OTHER 3/8" bentonite pellets
2.00' - 2 50'
10 02' - 13 30'

CONSTRUCTION TIME LOG.

TASK	START DATE 1986	START TIME	FINISH DATE 1986	FINISH TIME
DRILLING				
7¼" auger	9/4	1500	9/4	1635
GEOPHYS. LOGGING	—	—	—	—
CASING				
2" stainless	9/5	1040	9/5	1045
FILTER PLACEMENT	9/5	1045	9/5	1050
CEMENTING	9/5	1100	9/5	1105
DEVELOPMENT	9/8	1515	9/8	1515
OTHER				
Bentonite	9/5	1050	9/5	1055
	9/5	1035	9/5	1040

WELL DEVELOPMENT

See Well Development Summary Sheets.

COMMENTS·

No water encountered during drilling

Top of stainless steel casing: 2.54'

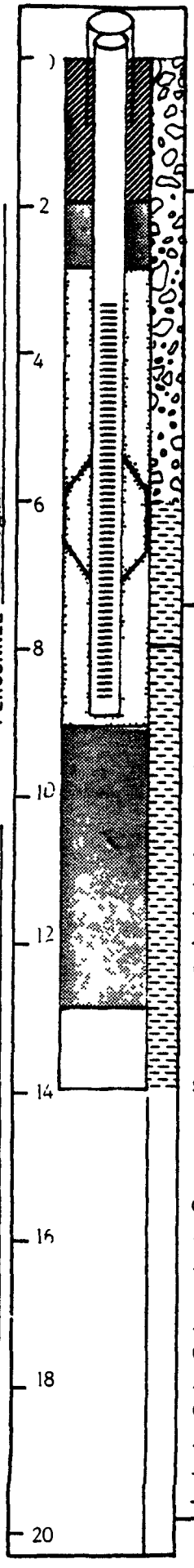
Cave from TD to 13.30'

WELL 6-86

WELL CONSTRUCTION SUMMARY

LOCATION or COORDS N 40588.1 E 23577.5

ELEVATION GROUND LEVEL 5806.10'
TOP OF CASING 5808.58'



LOCATION Golden, CO
PERSONNEL J Bergman
PROJECT 106P06222 Rocky Flats Plant

DRILLING SUMMARY

TOTAL DEPTH Well 8 88' Hole 14 0'
BOREHOLE DIAMETER 7½"

DRILLER Boyles Brothers Drilling Co
15865 W. 5th Avenue
Golden, CO (Tony Robinson)
RIG Acker
BIT(S) Bull nose bit

DRILLING FLUID None

SURFACE CASING 5" x 5' steel w/ locking cap

WELL DESIGN.

BASIS GEOLOGIC LOG X GEOPHYSICAL LOG ___

CASING STRING(S) C=CASING S=SCREEN

0 0'	- 3 28'	C1		-	
3 28'	- 8 88'	S1		-	

CASING C1 2" I.D Sch 5, type 316 stainless steel, threaded and flush jointed.

SCREEN S1 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
5 47' - 6 65'

FILTER MATERIAL 32-42 silica sand
9 10' - 2 75'

CEMENT Portland Type I
0.00' - 1 91'

OTHER 3/8" bentonite pellets
1 91' - 2 75'
9.10' - 12 90'

CONSTRUCTION TIME LOG

TASK	START DATE 1986	START TIME	FINISH DATE 1986	FINISH TIME
DRILLING				
7½" auger	9/4	0930	9/4	1140
GEOPHYS. LOGGING	—	—	—	—
CASING				
2" stainless	9/4	1310	9/4	1312
FILTER PLACEMENT	9/4	1312	9/4	1315
CEMENTING	9/4	1340	9/4	1345
DEVELOPMENT	9/8	1515	9/8	1515
OTHER				
Bentonite	9/4	1315	9/4	1320
	9/4	1305	9/4	1310

WELL DEVELOPMENT

See Well Development Summary Sheet.

COMMENTS:

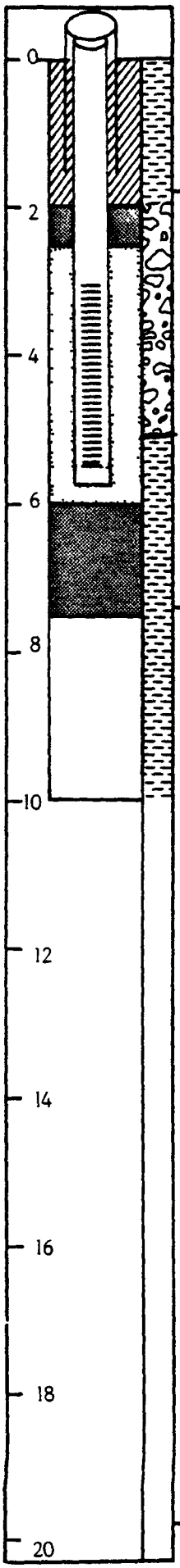
No water encountered during drilling.

Top of stainless steel casing 2.48'

Cave from TD to 12 90'

WELL 7-86

WELL CONSTRUCTION SUMMARY



LOCATION or COORDS N 39869.8 E 20892.8

ELEVATION GROUND LEVEL 5923.40' (est.)
TOP OF CASING 5925.66' (est.)

DRILLING SUMMARY

TOTAL DEPTH Well 5.74' Hole 10 00'
BOREHOLE DIAMETER 7¼"

DRILLER Boyles Brothers Drilling Co
15865 W. 5th Avenue
Golden, CO (Tony Robinson)
RIG Acker
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 0'	-	3.0'	C1				
3.0'	-	5.74'	S1				

CASING C1 2" I D Sch 5 type 316 stainless steel, threaded and flush jointed.

SCREEN S1 2" I.D. Sch. 5 type 316 stainless steel, threaded and flush jointed, 0.010" wire wrap screen, 0.25' welded bottom cap.

CENTRALIZERS None

FILTER MATERIAL 32-42 silica sand
2 50' - 6.00'

CEMENT Portland Type I
0 00' - 2 00'

OTHER 3/8" bentonite pellets
2 00' - 2.50'
6.00' - 7 51'

CONSTRUCTION TIME LOG

TASK	START DATE 1986	START TIME	FINISH DATE 1986	FINISH TIME
DRILLING				
7¼" auger	9/23	0955	9/23	1045
GEOPHYS. LOGGING	—	—	—	—
CASING				
2" stainless	9/23	1215	9/23	1220
FILTER PLACEMENT	9/23	1220	9/23	1225
CEMENTING	9/23	1230	9/23	1235
DEVELOPMENT	9/29	1445	9/29	1445
OTHER				
Bentonite	9/23	1225	9/23	1230
	9/23	1210	9/23	1215

WELL DEVELOPMENT

See Well Development Summary Sheets.

COMMENTS:

No water encountered during drilling

Top of stainless steel casing 2.26'

Cave from TD to 7.51'

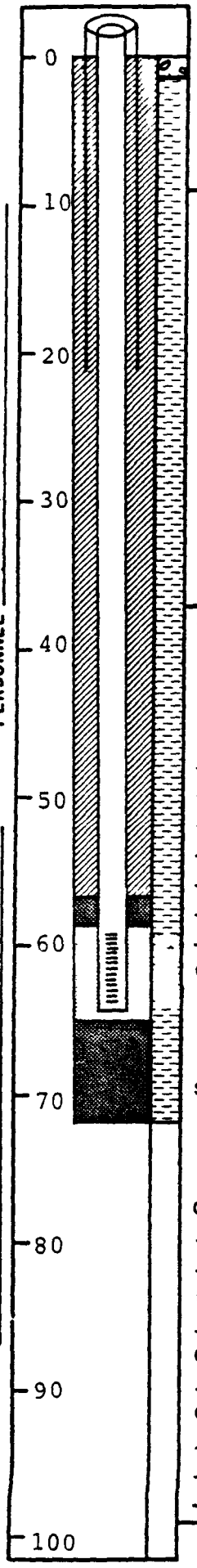
LOCATION Golden, CO
PERSONNEL C Walker
PROJECT 106P06222 Rocky Flats Plant

WELL 8-86

WELL CONSTRUCTION SUMMARY

LOCATION or COORDS N 39859.3 E 20916.8

ELEVATION GROUND LEVEL 5923.81' (est.)
TOP OF CASING 5925.81' (est.)



LOCATION Rocky Flats Plant
PERSONNEL C. Walker/L. Pivonka
PROJECT 106P06222

DRILLING SUMMARY

TOTAL DEPTH Well: 63.80' Hole: 71.50'

BOREHOLE DIAMETER 0.00' - 18.35': 7½"
18.35' - 71.50: 4 3/4"

DRILLER Boyles Brothers Drilling Co.
15865 W. 5th Ave., Golden, CO
(Tony Robinson, Jim Horn)

RIG 0.00' - 18.35': Acker, 18.35' - 71.50': Mobile B-57

BIT(S) 0.00' - 18.35': Blade bit;
18.35' - 71.50': Coring bit

DRILLING FLUID None

SURFACE CASING 5" x 20.85' steel w/ locking cap

WELL DESIGN:

BASIS GEOLOGIC LOG X GEOPHYSICAL LOG ___

CASING STRING(S): C=CASING S=SCREEN

0.00'	18.35'	C1			
0.00'	59.08'	C2			
59.08'	63.79'	S1			

CASING C1 5" I.D. steel surface casing
C2 2" I.D. Sch. 5 type 316 stainless steel, threaded and flush jointed.

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

CENTRALIZERS None

FILTER MATERIAL 32-42 silica sand
58.00' - 64.30'

CEMENT Portland Type I
0.00' - 56.00'

OTHER 3/8" bentonite pellets
56.00' - 58.00'
64.30' - 71.50'

CONSTRUCTION TIME LOG

TASK	START DATE 1986	START TIME	FINISH DATE 1986	FINISH TIME
DRILLING				
7½" auger	9/24	0930	9/24	1135
NC Core	10/20	1049	10/20	1310
Reaming	10/22	1720	10/23	0920
GEOPHYS. LOGGING	—	—	—	—
CASING				
5" steel	9/24	1315	9/24	1327
2" stainless	11/3	1243	11/3	1253
FILTER PLACEMENT	11/3	1207	11/3	1340
CEMENTING	11/3	1415	11/3	1500
DEVELOPMENT	11/5	1515	11/13	0930
OTHER				
Bentonite	11/3	1340	11/3	1410
	11/3	1143	11/3	1207
Packer testing	10/22	0900	10/22	1516
Cementing 5" steel	9/24	1330	9/24	1350

WELL DEVELOPMENT

See Well Development Summary Sheet.

COMMENTS:

No water encountered during drilling.

Top of stainless steel casing: 1.86'

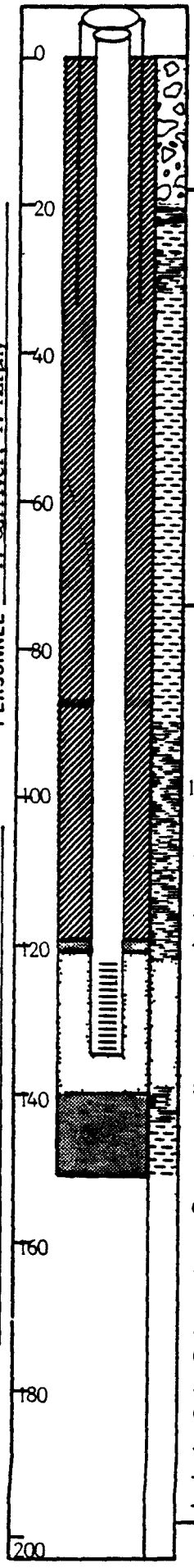
When drilling (with air and water) abundant bubbles surface in the adjacent pond near the rig. When drilling stops, the bubbling stops. Probable cause: (1) fractured bedrock from 20' - 30'.

WELL 9-86

WELL CONSTRUCTION SUMMARY

LOCATION or COORDS N 39246.2 E 19382.2

ELEVATION GROUND LEVEL 5995.23' (est.)
TOP OF CASING 5999.64' (est.)



PROJECT 106P06222 Rocky Flats Plant
LOCATION Golden, CO
PERSONNEL T. Gulliver, T. Murphy

DRILLING SUMMARY

TOTAL DEPTH Well 135.35' Hole 151.00'

BOREHOLE DIAMETER 0.00' - 35.00', 5 5/8"
35.00' - 151.00': 4 3/4"

DRILLER Boyles Brothers Drilling Co.
15865 W. 5th Avenue
Golden, CO (Tom High, Robert Roach)

RIG 0.00' - 35 00' casing advancer, 35.00' - 151.00': Failing

BIT(S) 0.00' - 35.00': down hole hammer
35 00' - 151.00' strata back coring bit, reaming

DRILLING FLUID 0 00' - 35.00' None
35.00' - 151.00' air/water mist

SURFACE CASING 5" x 35 0' steel w/ locking cap

WELL DESIGN.

BASIS GEOLOGIC LOG X GEOPHYSICAL LOG X

CASING STRING(S) C=CASING S=SCREEN

0.00'	33.51'	C1			
0.00'	122.57'	C2			
122.57'	135.35'	S1			

CASING C1 5" I D steel surface casing
C2 2" I D , Sch. 5, type 316 stainless steel, threaded and flush jointed

SCREEN S1 2" I.D., Sch. 5, type 316 stainless steel, threaded and flush jointed, 0 010" wire wrap screen, 0 25' welded bottom cap.

CENTRALIZERS None (see comments)

FILTER MATERIAL 32-42 silica sand
121.20' - 140.50'

CEMENT Portland Type I
33.51' - 119.40'

OTHER 3/8" bentonite pellets
119.40' - 121.20'
140 50' - 151.00'

CONSTRUCTION TIME LOG

TASK	START DATE	START TIME	FINISH DATE	FINISH TIME
DRILLING	1986		1986	
5 5/8" casing advancer	9/24	0900	9/24	1615
NC Core	10/1	0826	10/2	1200
Reaming	10/6	1000	10/6	1230
GEOPHYS. LOGGING	10/6	1336	10/7	1627
CASING				
2" stainless	10/7	1218	10/7	1244
5" steel	9/24	0900	9/24	1615
FILTER PLACEMENT	10/7	1414	10/7	1700
CEMENTING	10/8	0900	10/8	1030
DEVELOPMENT	10/14	0830	10/31	1400
OTHER				
Bentonite	10/7	1710	10/17	1754
	10/7	0821	10/17	0850
Packer testing	10/2	1200	10/3	1700

WELL DEVELOPMENT

COMMENTS:

Water encountered at 105.37' during drilling on 10/8/86
Top of stainless steel casing 1.41'

Built well in NC rod, no centralizers used.

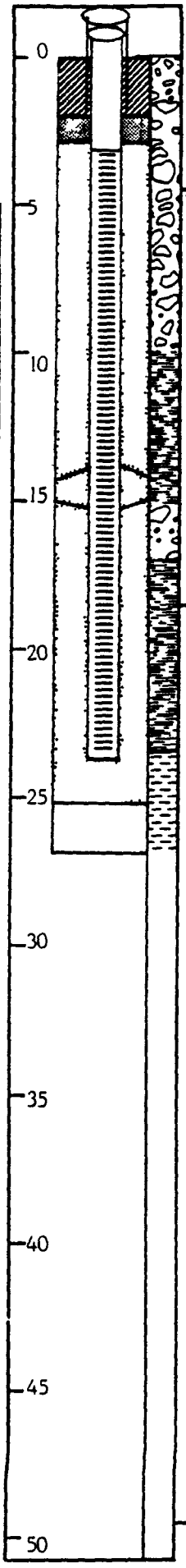
Geophysical logs
SP - resistivity: 59.00' - 146 00'
Natural gamma, 0.00' - 147.00'

WELL 10-86

WELL CONSTRUCTION SUMMARY

LOCATION or COORDS N 39223.9 E 19400 6

ELEVATION GROUND LEVEL 5995.02' (est.)
TOP OF CASING 5996.63' (est.)



LOCATION Golden, CO
PERSONNEL T. Gulliver
PROJECT 106P06222 Rocky Flats Plant

DRILLING SUMMARY

TOTAL DEPTH Well 23 78' Hole: 27.00'

BOREHOLE DIAMETER 0 00' - 23 40' 5 5/8"
23 40' - 27.00' 5"

DRILLER Boyles Brothers Drilling Co.
15865 W 5th Avenue
Golden, CO (Arrow Drilling, Tom High)

RIG Casing advancer

BIT(S) Down hole hammer

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'	3 29'	C1			
3.29'	23.78'	S1			

CASING C1 2" I D. Sch 5 type 316 stainless steel, threaded and flush jointed.

SCREEN S1 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
14.08' - 15.33'

FILTER MATERIAL 32-42 silica sand
2.80' - 25.50'

CEMENT Portland Type I
0 00' - 2 00'

OTHER 3/8" bentonite pellets
2 00' - 2 80'

CONSTRUCTION TIME LOG

TASK	START DATE 1986	START TIME	FINISH DATE 1986	FINISH TIME
DRILLING				
Casing advancer	9/24	1420	9/24	1600
GEOPHYS. LOGGING	—	—	—	—
CASING				
2" stainless	9/25	0900	9/25	0910
FILTER PLACEMENT	9/25	0910	9/25	1300
CEMENTING	9/25	1400	9/25	1410
DEVELOPMENT	9/29	1345	10/16	1515
OTHER				
Bentonite	9/25	1300	9/25	1305

WELL DEVELOPMENT

See Well Development Summary Sheet.

COMMENTS:

Water encountered at 10' during drilling

Top of stainless steel casing, 1.61'

Cave from TD to 25.50'

Well No 45-86

WELL DEVELOPMENT SUMMARY SHEET

DATE	TIME	METHOD	VOLUME	APPEARANCE	COMMENTS
10-7-86	0915				1 Well Bore Volume = 4.24 gals. 10 Well Bore Volumes = 42.2 gals.
10-7-86	0915	Airlifted	4.2 gals.	Light to medium spray - lots of sand	7' of sand lifted out before reaching T.D.
10-8-86	1540	Bailed	12 gals.	Medium to dark brown, highly turbid, lots of sand	12/42.4 gals. purged to date
10-9-86	0700	Airlifted	4.2 gals.	Medium to dark brown spray	-----
10-9-86	1500	Bailed	16 gals.	Medium brown, clearing slightly	28/42.4 gals. purged to date
10-10-86	1410	Bailed	16 gals.	Bottom 3' - light brown, rest of well med. brown	44/42.4 gals. purged to date
10-14-86	1200	Bailed	12 gals.	Light to medium brown	56/42.4 gals. purged to date
10-15-86	0830	Airlifted	---	Medium brown mist - sandy	-----
10-15-86	1400	Bailed	25 gals.	Medium brown, clearing	81/42.4 gals. purged to date
10-16-86	1200	Bailed	---	Clear	Sampled

WELL COMPLETION INFORMATION

Location Rocky Flats Plant, Landfill Area

Well No 40-87

Coordinates N 40158.03 E 21727.76

Elevation Ground Surface 5882.69'

Total Depth Well 6.70'

Top of Casing 5884.69'

Borehole 13.00'

Formation of Completion Valley Fill Alluvium

Casing Material Sch 5, Type 316, TFJ Stainless Steel

Casing Diameter 2" ID

Screen Material 0.010" wire wrap, Type 316, TFJ Stainless Steel

Surface Casing Diameter 5" ID

Date Installed June 9, 1987

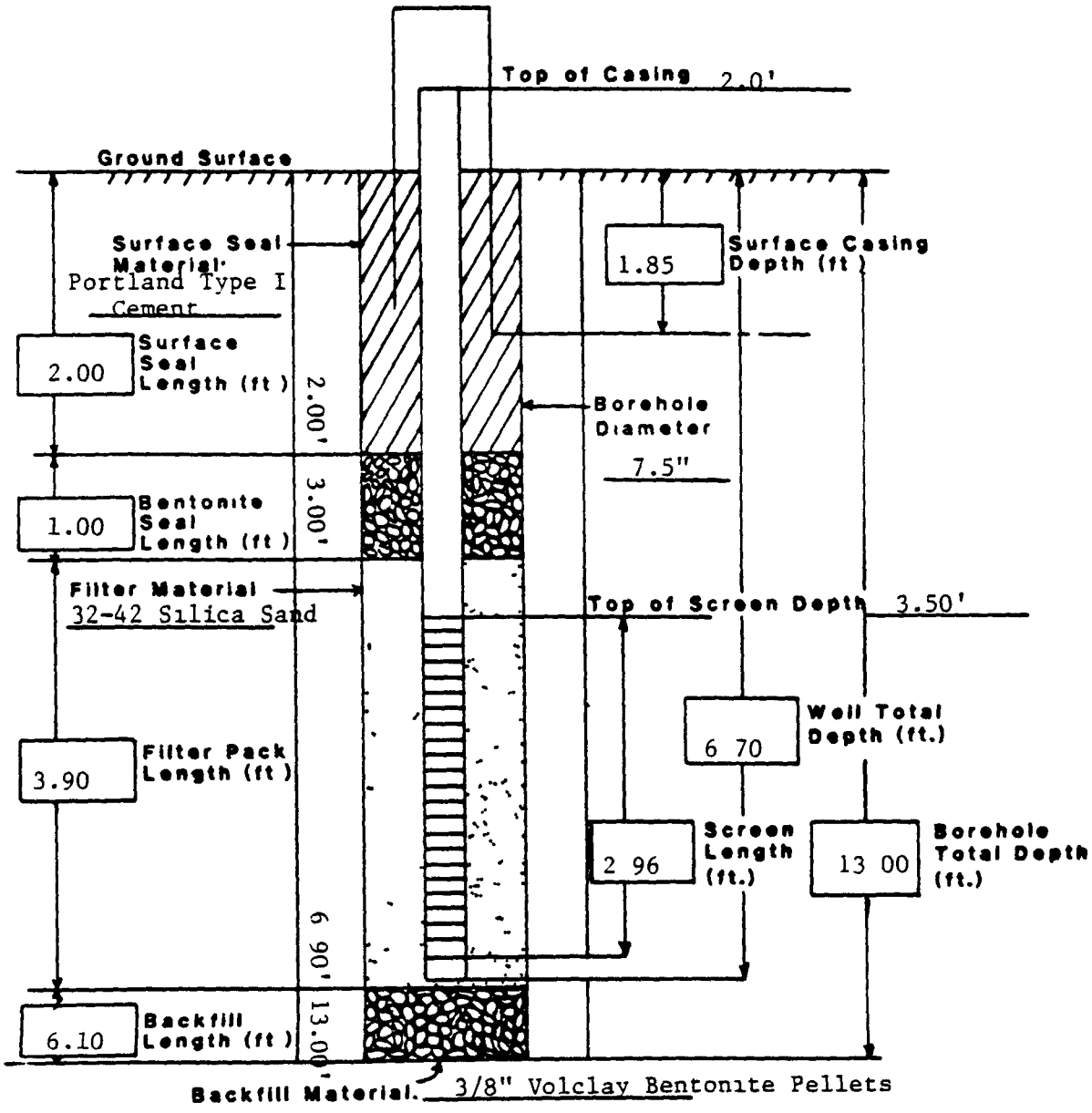
Approved By

Site Manager

Installed By J. Bergman
Geologist

CEARP Manager

Comments Centralizer at 3.96-5.15'



WELL COMPLETION INFORMATION

Location Rocky Flats Plant; Landfill Area

Well No 41-87BR

Coordinates N 40133.61 E 21725.75

Elevation Ground Surface 5882.78'

Total Depth Well 94.03'

Top of Casing 5884.55'

Borehole 110.00'

Formation of Completion Arapahoe Formation

Casing Material Sch 5, Type 316, TFJ Stainless Steel

Casing Diameter 2" ID

Screen Material 0.010" wire wrap, Type 316, TFJ Stainless Steel

Surface Casing Diameter 5" ID

Date Installed August 3, 1987

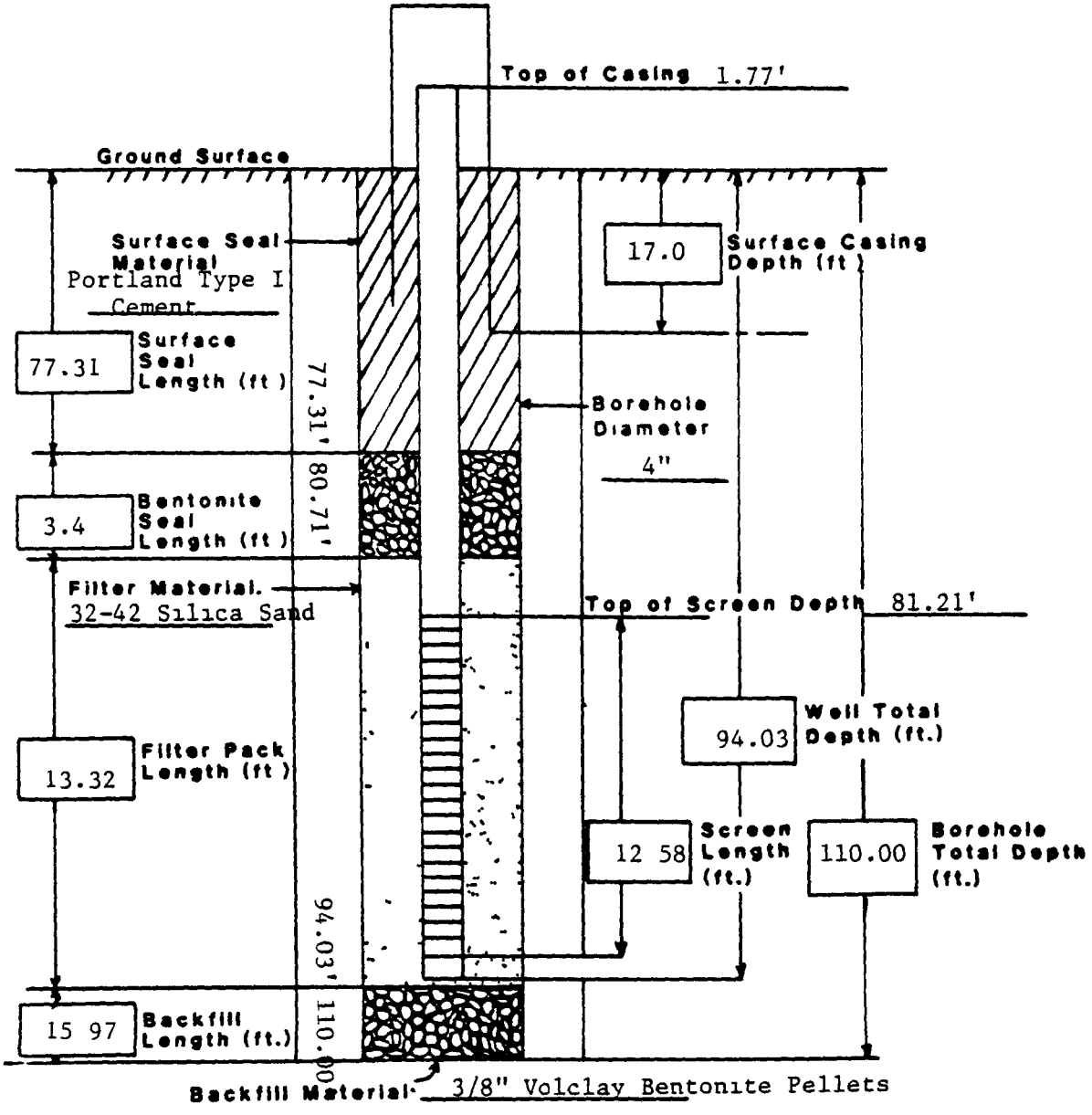
Approved By

Installed By K.D. Holliway
Geologist

Site Manager

CEARP Manager

Comments Surface casing set to 17.0' by J.B. Bergman on June 9, 1987.



WELL COMPLETION INFORMATION

Location Rocky Flats Plant, Landfill Area

Well No 42-87

Coordinates N 40355.10 E 22430.99

Elevation Ground Surface 5854 05'

Total Depth Well 6.60'

Top of Casing 5855.93'

Borehole 12.40'

Formation of Completion Valley Fill Alluvium

Casing Material Sch 5, Type 316, TFJ Stainless Steel

Casing Diameter 2" ID

Screen Material 0.010" wire wrap, Type 316, TFJ Stainless Steel

Surface Casing Diameter 5" ID

Date Installed June 10, 1987

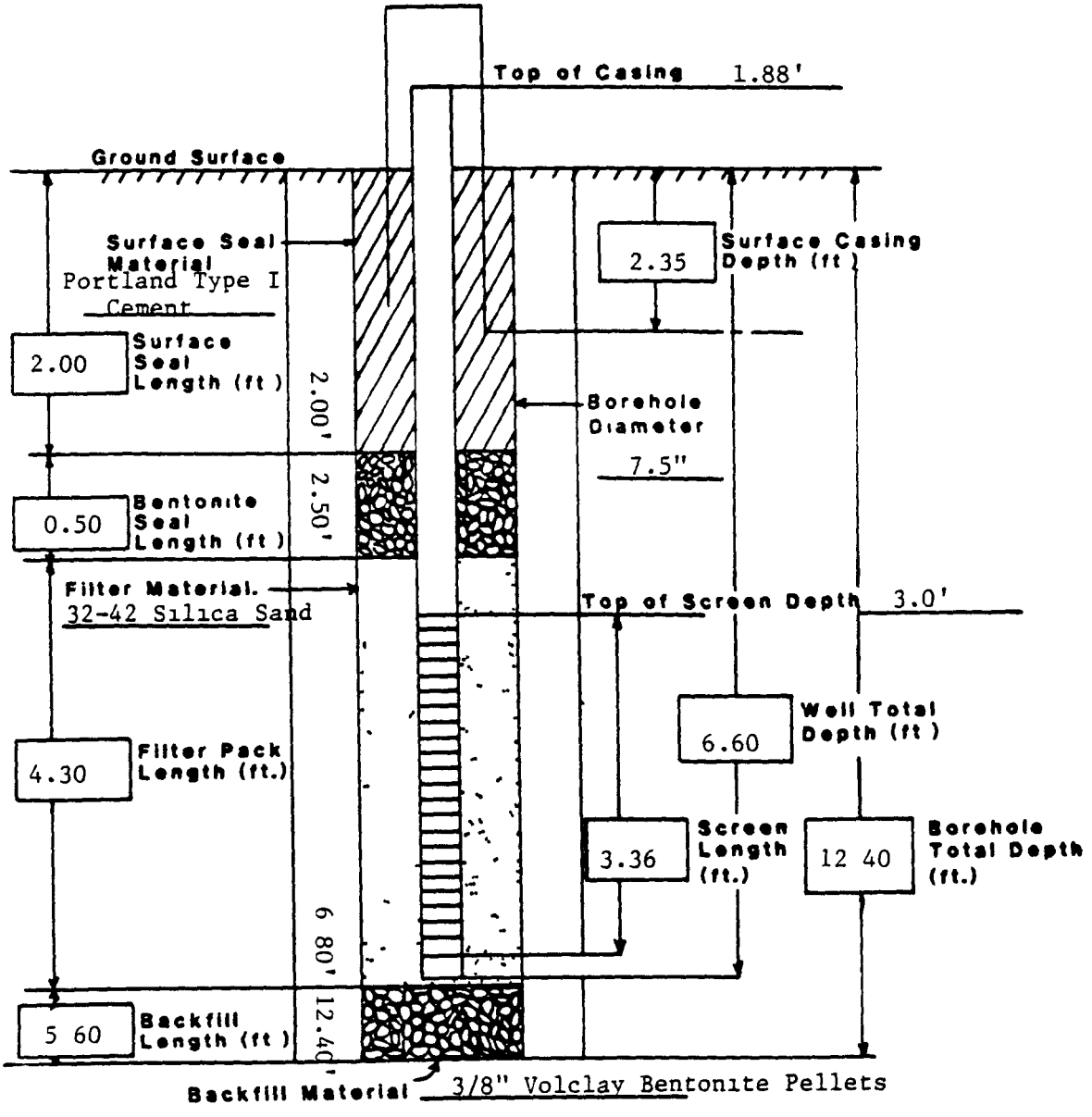
Approved By

Installed By J. Bergman
Geologist

Site Manager

CEARP Manager

Comments



WELL COMPLETION INFORMATION

Location Rocky Flats Plant; Landfill Area

Coordinates N 39257.05 E 19431.75

Total Depth Well 22.5'

Borehole 32.0'

Well No 58-87

Elevation Ground Surface 5995.10'

Top of Casing 5996.75'

Formation of Completion Rocky Flats Alluvium

Casing Material Sch 5, Type 316, TFJ Stainless Steel

Casing Diameter 2" ID

Screen Material 0.010" wire wrap, Type 316, TFJ Stainless Steel

Surface Casing Diameter 5" ID

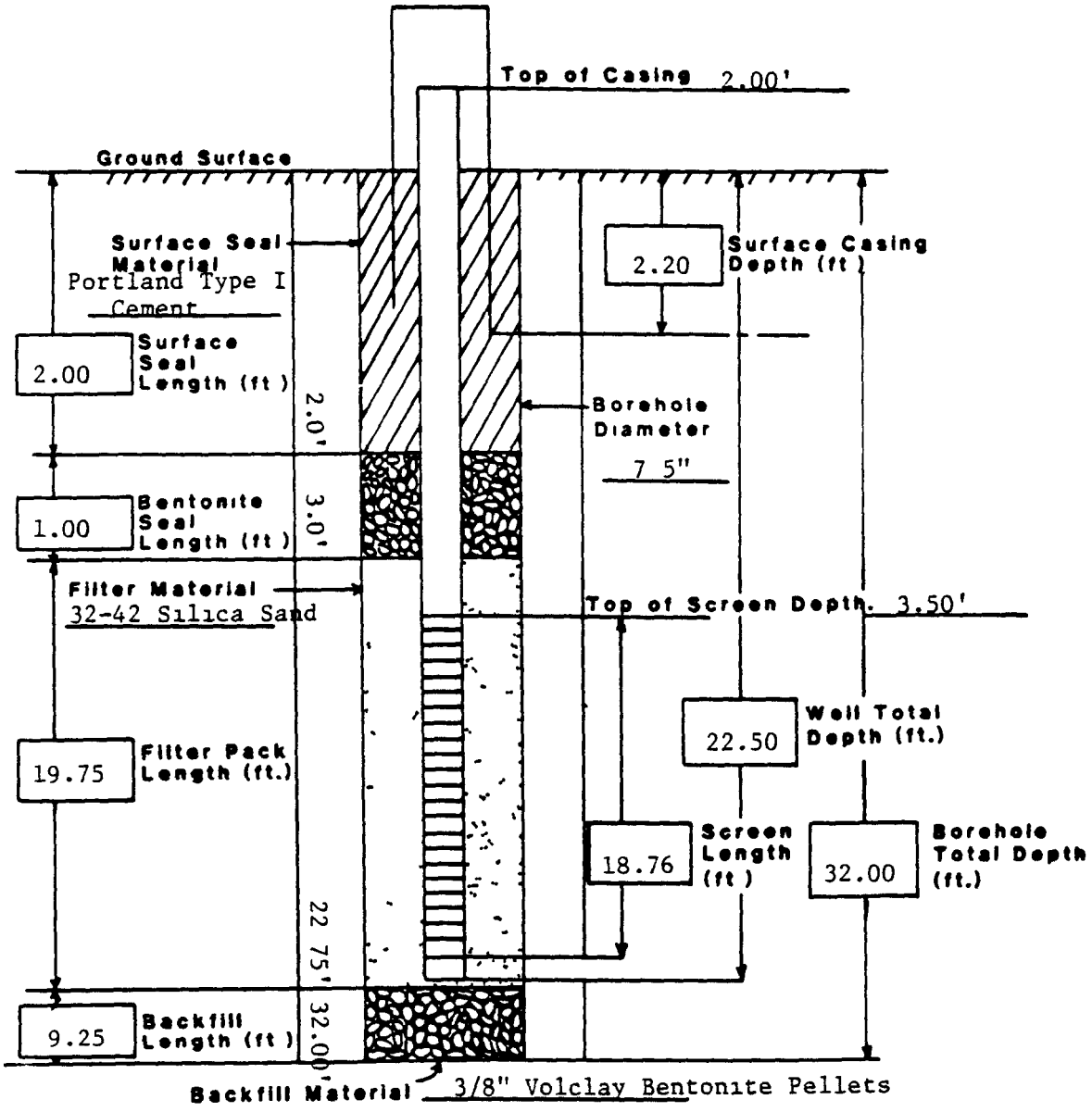
Date Installed November 18, 1987

Approved By _____ Site Manager

Installed By R. Treat Geologist

_____ CEARP Manager

Comments _____



WELL COMPLETION INFORMATION

Location Rocky Flats Plant, Landfill Area

Well No 59-87

Coordinates N 39336.25 E 19463.99

Elevation Ground Surface 5992.90'

Total Depth Well 21.20'

Top of Casing 5994.67'

Borehole 26.0'

Formation of Completion Rocky Flats Alluvium

Casing Material Sch 5, Type 316, TFJ Stainless Steel

Casing Diameter 2" ID

Screen Material 0.010" wire wrap, Type 316, TFJ Stainless Steel

Surface Casing Diameter 5" ID

Date Installed November 23, 1987

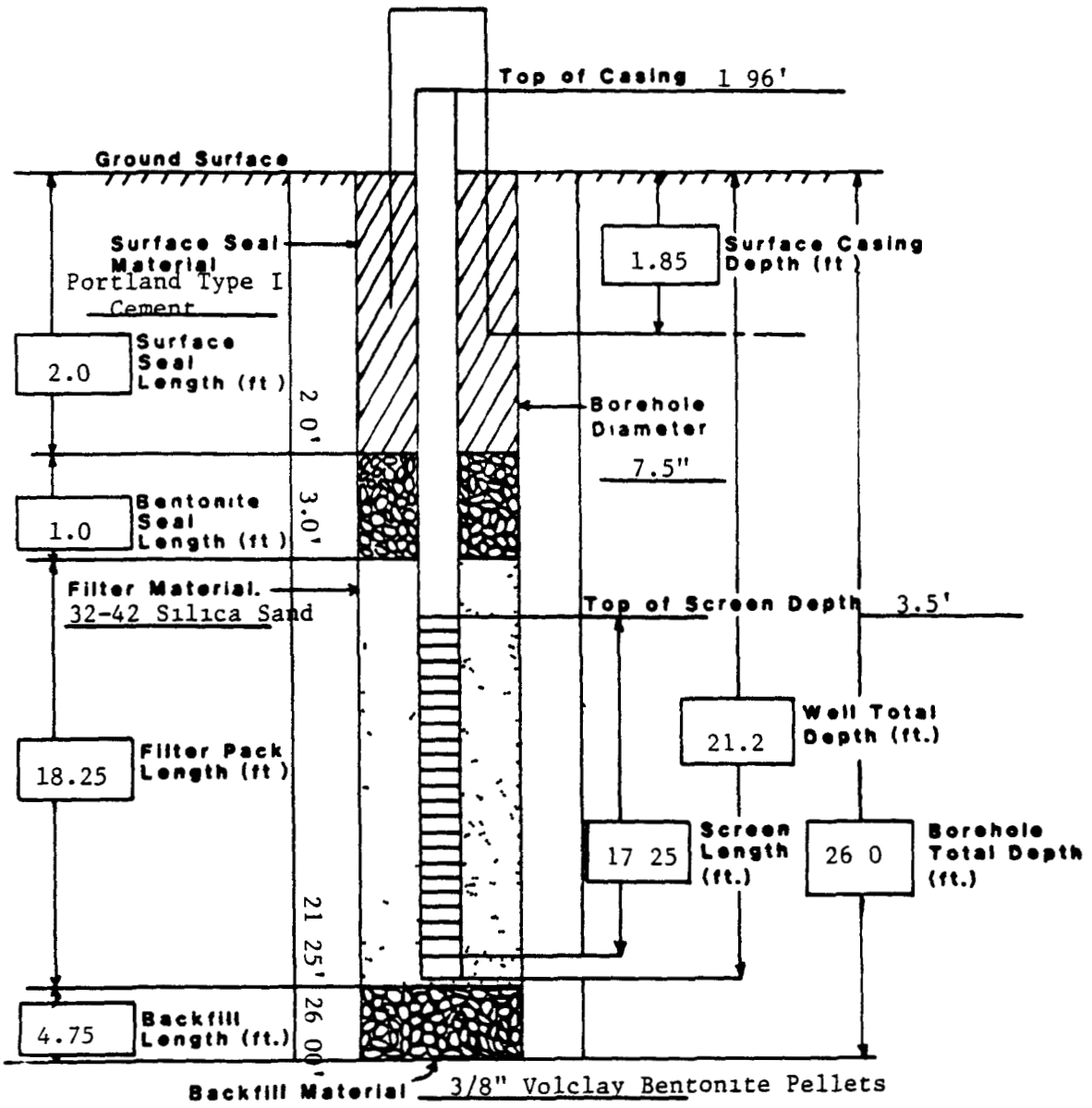
Approved By

Installed By J. Bacchus
Geologist

Site Manager

CEARP Manager

Comments



WELL COMPLETION INFORMATION

Location Rocky Flats Plant, Landfill Area

Well No 60-87

Coordinates N 39951 63 E 19938.52

Elevation Ground Surface 5984.03'

Total Depth Well 27.7'

Top of Casing 5985.96'

Borehole 32.0'

Formation of Completion Rocky Flats Alluvium

Casing Material Sch 5, Type 316, TFJ Stainless Steel

Casing Diameter 2" ID

Screen Material 0.010" wire wrap, Type 316, TFJ Stainless Steel

Surface Casing Diameter 5" ID

Date Installed November 20, 1987

Approved By

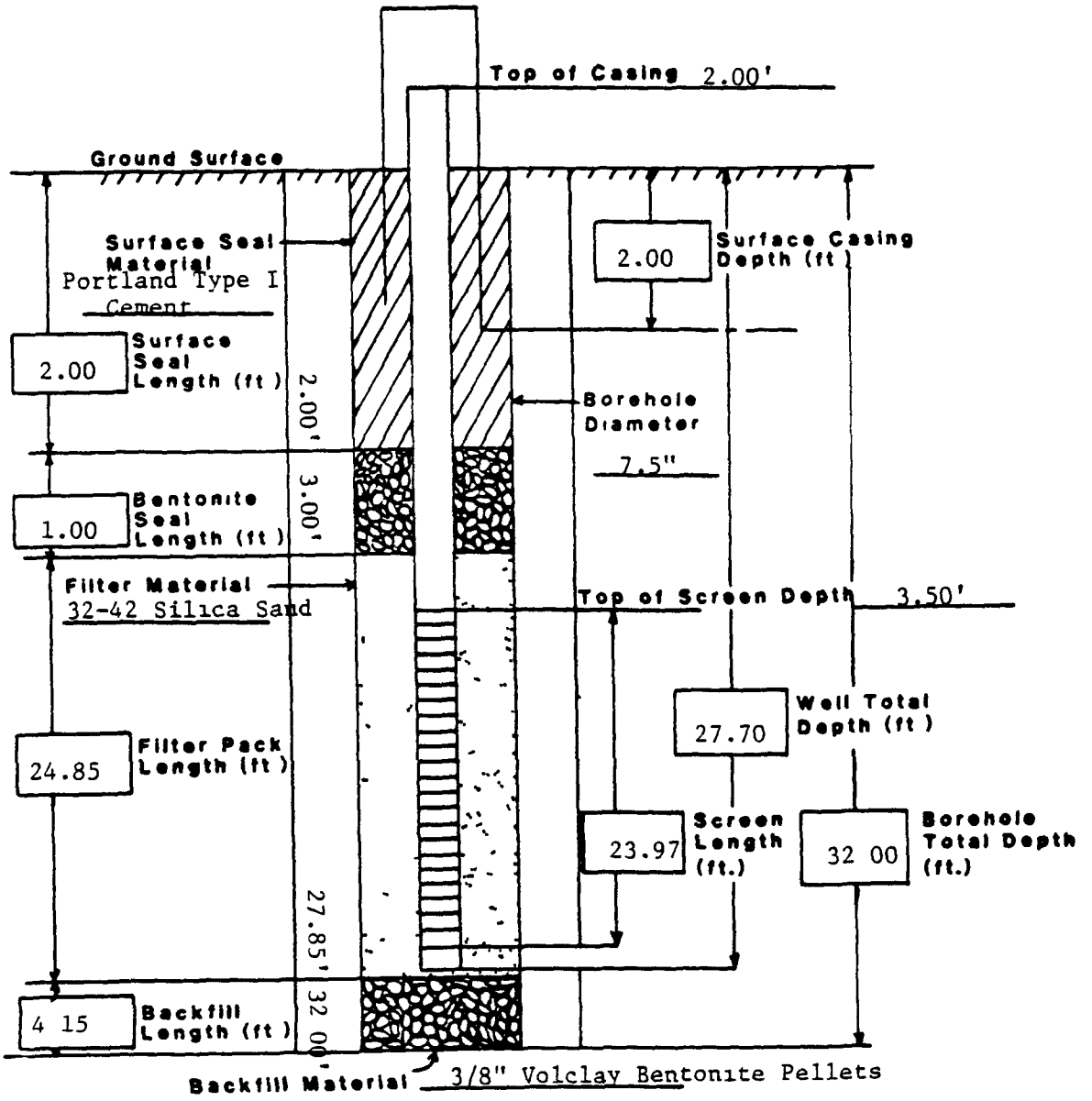
Site Manager

Installed By R. Treat

Geologist

CEARP Manager

Comments



WELL COMPLETION INFORMATION

Location Rocky Flats Plant, Landfill Area

Well No 61-87

Coordinates N 39881 26 E 19974.80

Elevation Ground Surface 5984.00'

Total Depth Well 28.5'

Top of Casing 5985.75'

Borehole 34.0'

Formation of Completion Rocky Flats Alluvium

Casing Material Sch 5, Type 316, TFJ Stainless Steel

Casing Diameter 2" ID

Screen Material 0.010" wire wrap, Type 316, TFJ Stainless Steel

Surface Casing Diameter 5" ID

Date Installed November 25, 1987

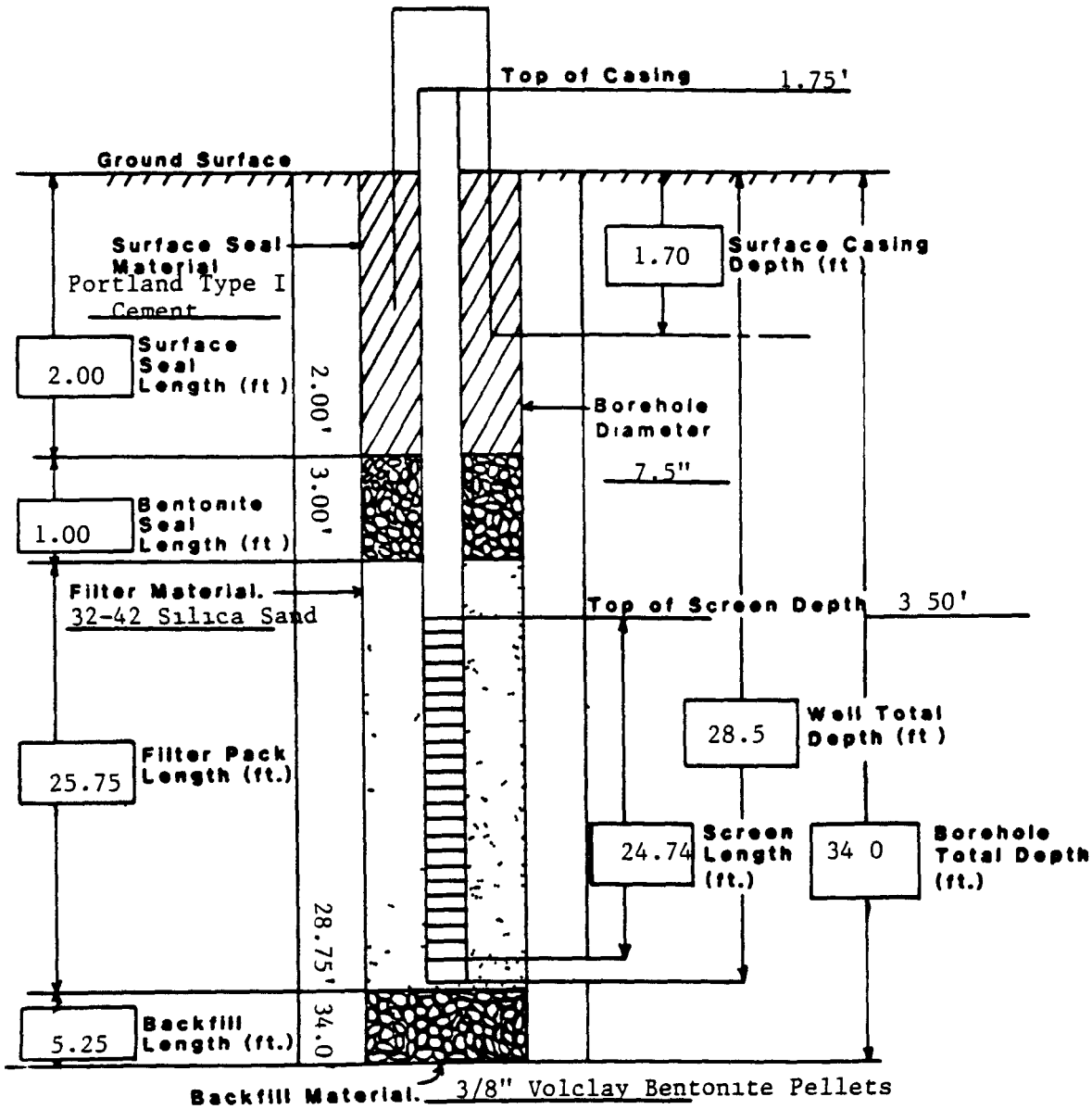
Approved By

Site Manager

Installed By J. Bacchus
Geologist

CEARP Manager

Comments



WELL COMPLETION INFORMATION

Location Rocky Flats Plant, Landfill Area

Well No 62-87

Coordinates N 39821.22 E 19999.70

Elevation Ground Surface 5984.16'

Total Depth Well 26.80'

Top of Casing 5986.36'

Borehole 30.0'

Formation of Completion Rocky Flats Alluvium

Casing Material Sch 5, Type 316, TFJ Stainless Steel

Casing Diameter 2" ID

Screen Material 0.010" wire wrap, Type 316, TFJ Stainless Steel

Surface Casing Diameter 5" ID

Date Installed November 25, 1987

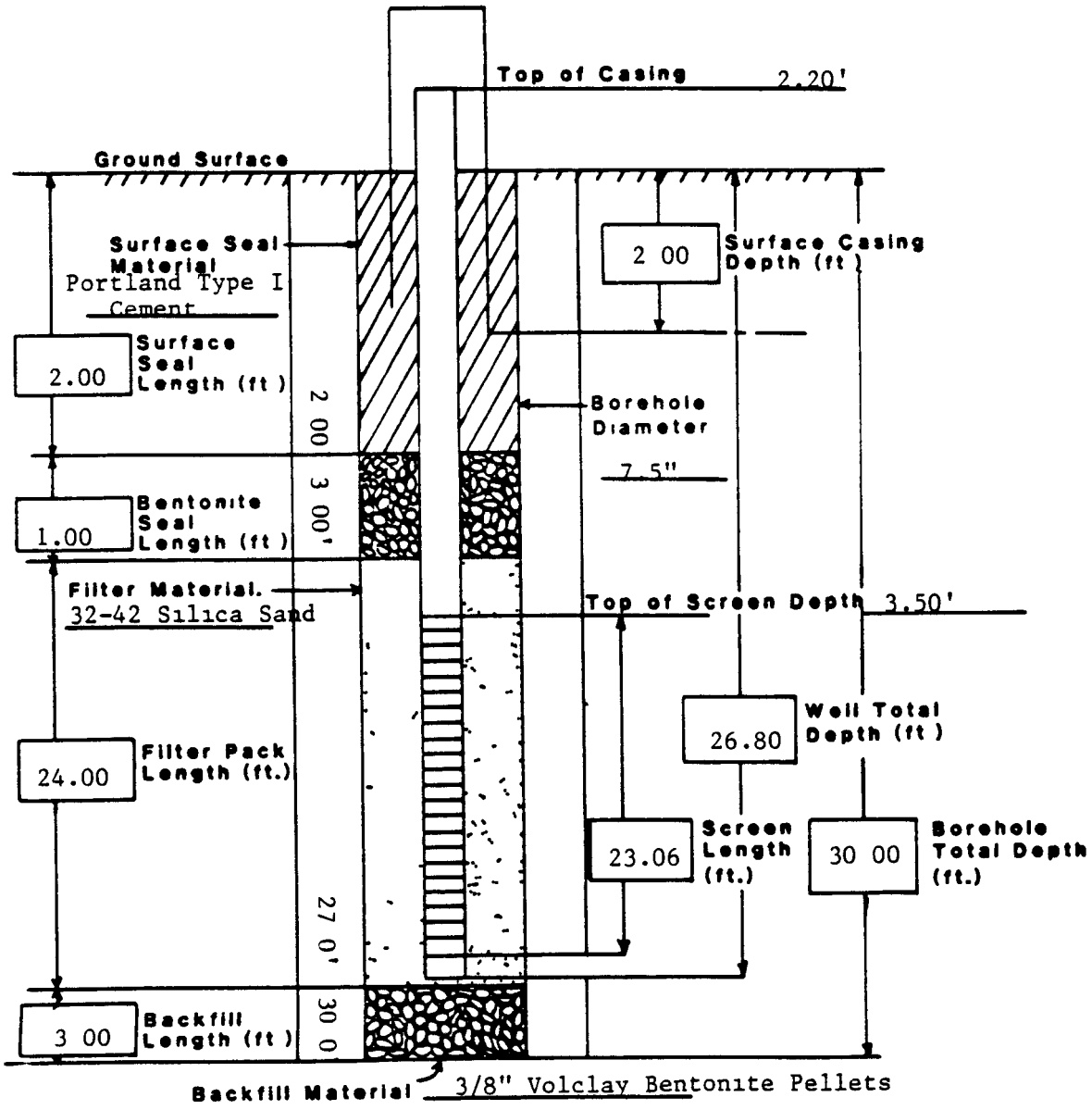
Approved By

Site Manager

Installed By R. Treat
Geologist

CEARP Manager

Comments



WELL COMPLETION INFORMATION

Location Rocky Flats Plant, Landfill Area

Coordinates N 39738.07 E 20040.50

Total Depth Well 25.5'

Borehole 30 0'

Well No 63-87

Elevation Ground Surface 5985.42'

Top of Casing 5987.06'

Formation of Completion Rocky Flats Alluvium

Casing Material Sch 5, Type 316, TFJ Stainless Steel

Casing Diameter 2" ID

Screen Material 0.010" wire wrap, Type 316, TFJ Stainless Steel

Surface Casing Diameter 5" ID

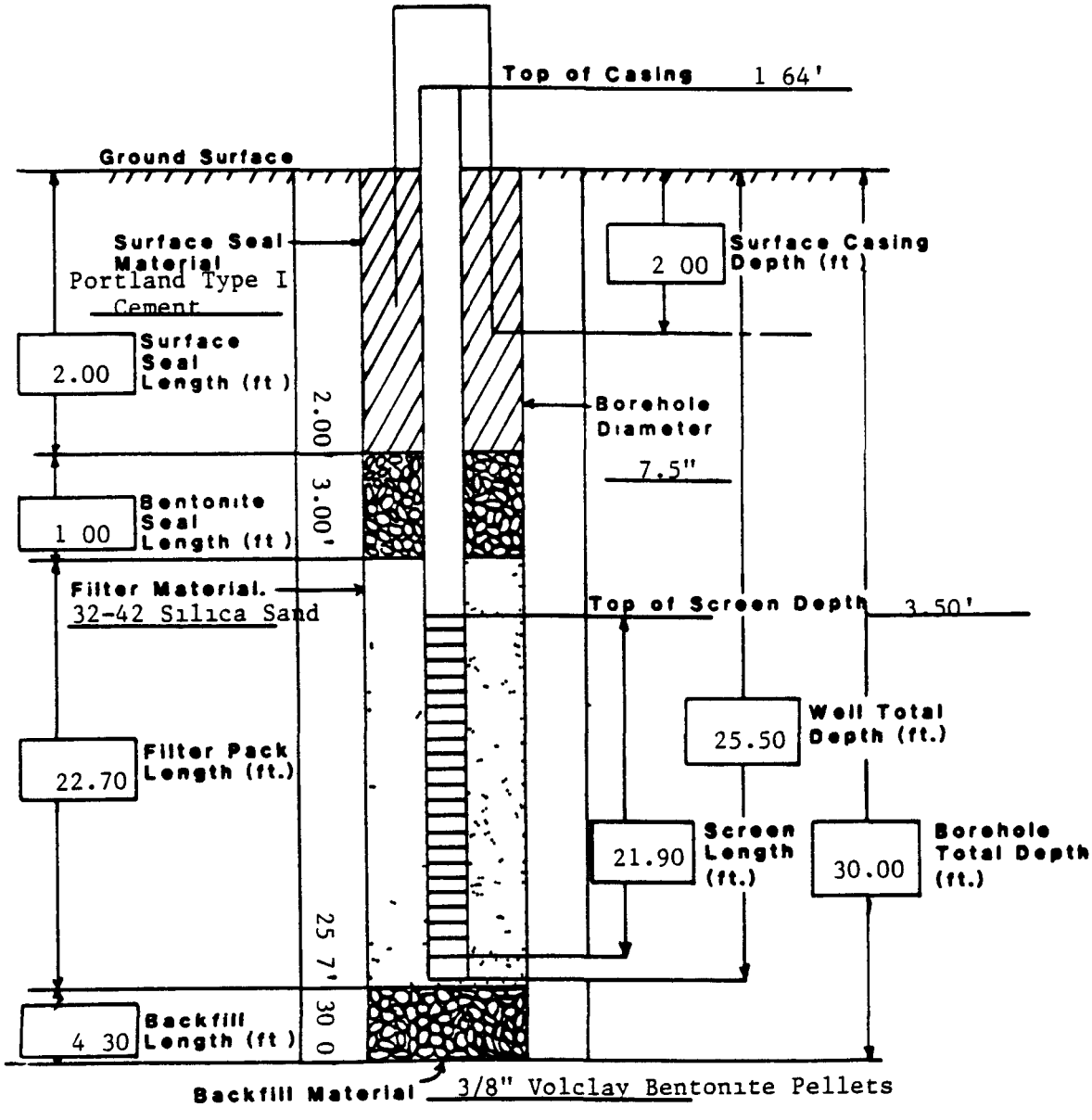
Date Installed December 1, 1987

Approved By _____ Site Manager

Installed By R. Treat Geologist

_____ CEARP Manager

Comments _____



WELL COMPLETION INFORMATION

Location Rocky Flats Plant, Landfill Area

Well No 64-87

Coordinates N 39349.01 E 20162.23

Elevation Ground Surface 5985.89'

Total Depth Well 23.8'

Top of Casing 5987.33'

Borehole 28.0'

Formation of Completion Rocky Flats Alluvium

Casing Material Sch 5, Type 316, TFJ Stainless Steel

Casing Diameter 2" ID

Screen Material 0.010" wire wrap, Type 316, TFJ Stainless Steel

Surface Casing Diameter 5" ID

Date Installed December 4, 1987

Approved By

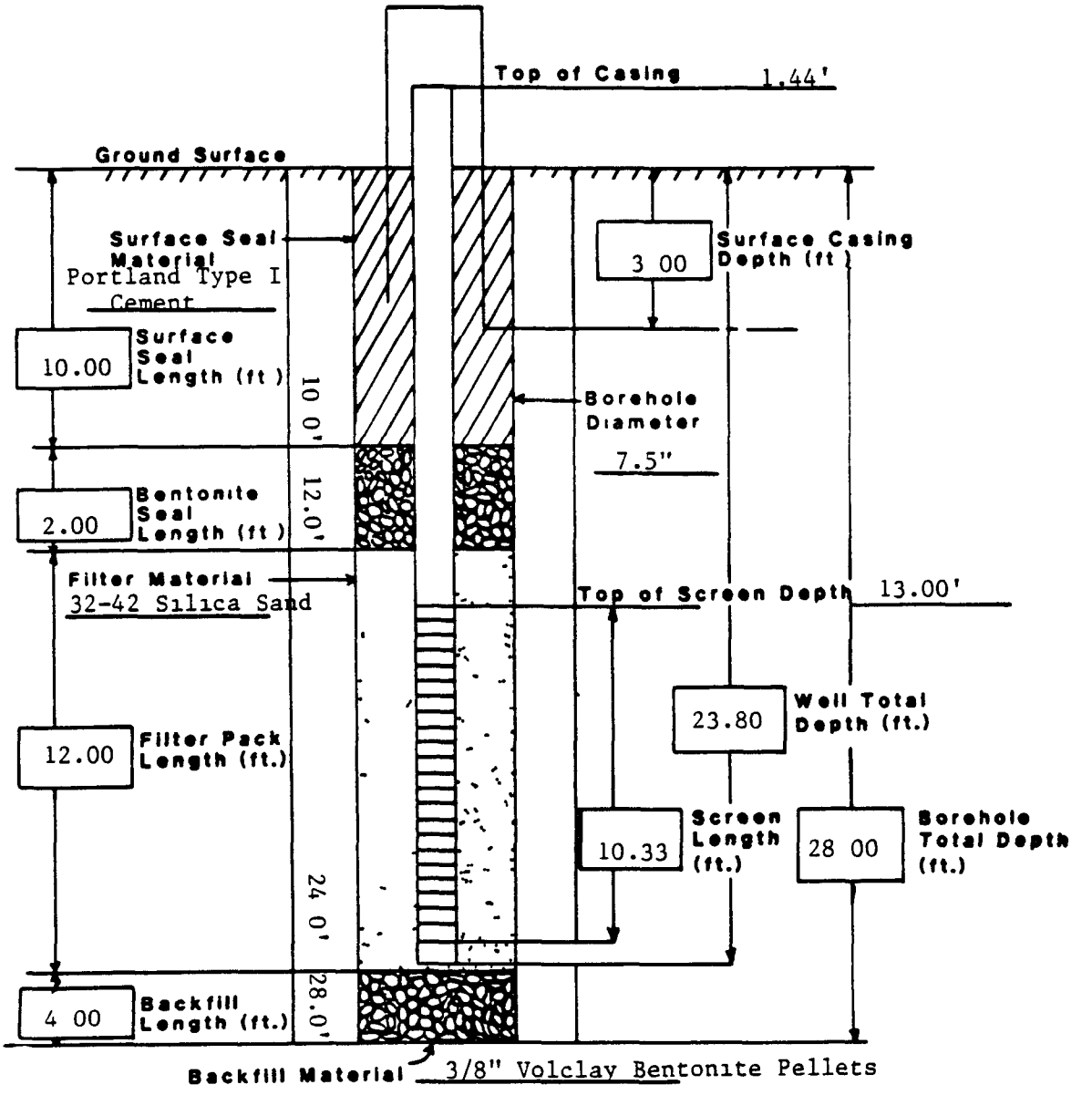
Site Manager

Installed By R. Treat

Geologist

CEARP Manager

Comments



WELL COMPLETION INFORMATION

Location Rocky Flats Plant, Landfill Area

Well No 65-87

Coordinates N 39250.14 E 20200.22

Elevation Ground Surface 5983.08'

Total Depth Well 24.2'

Top of Casing 5985.02'

Borehole 27.0'

Formation of Completion Rocky Flats Alluvium/ Weathered Arapahoe Formation

Casing Material Sch 5, Type 316, TFJ Stainless Steel

Casing Diameter 2" ID

Screen Material 0.010" wire wrap, Type 316, TFJ Stainless Steel

Surface Casing Diameter 5" ID

Date Installed December 9,10, 1987

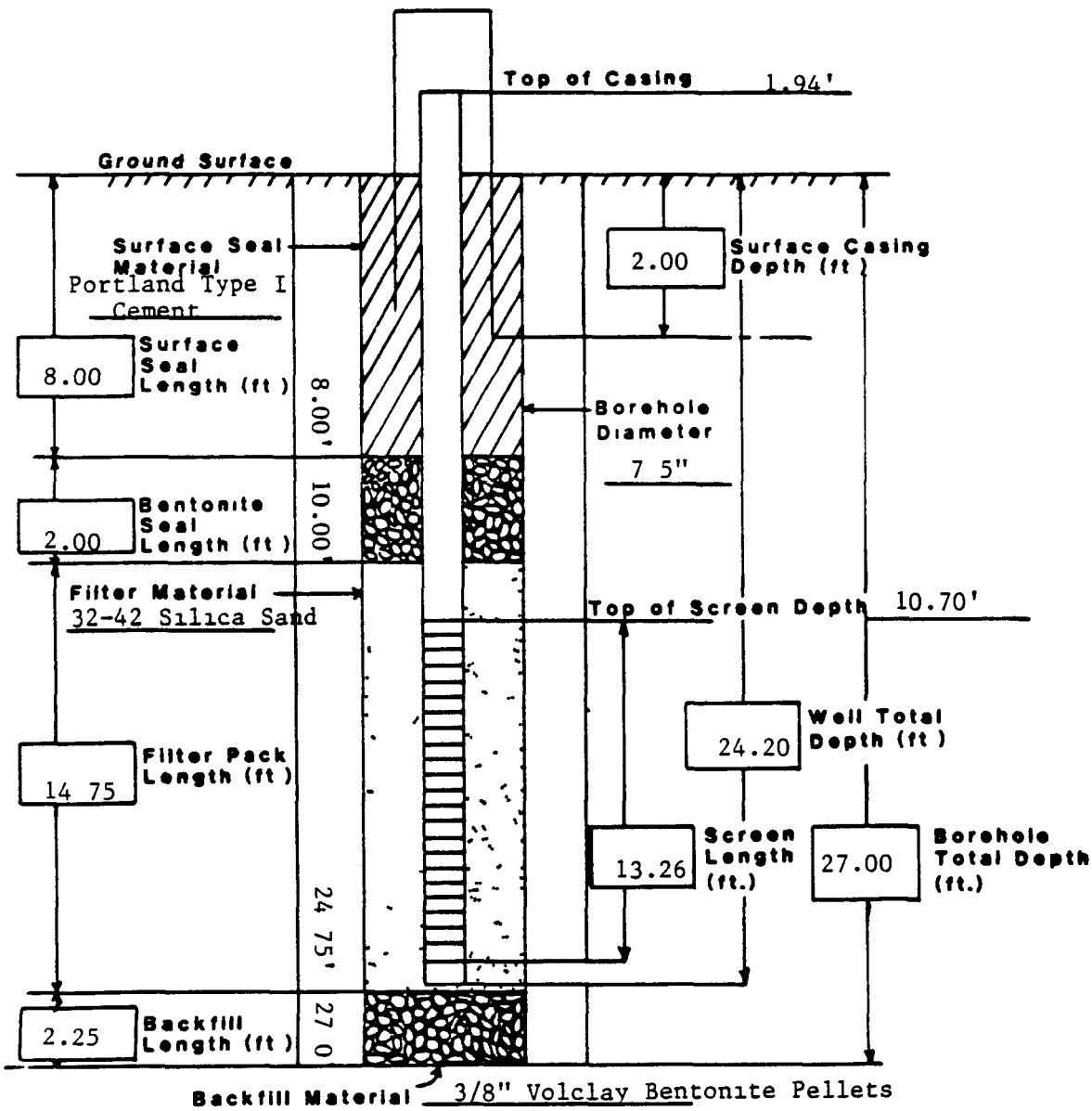
Approved By

Installed By R. Treat
Geologist

Site Manager

CEARP Manager

Comments



WELL COMPLETION INFORMATION

Location Rocky Flats Plant, Landfill Area

Well No 66-87

Coordinates N 39170.26 E 20226.01

Elevation Ground Surface 5981.90'

Total Depth Well 18.20'

Top of Casing 5983.64'

Borehole 23.00'

Formation of Completion Rocky Flats Alluvium

Casing Material Sch 5, Type 316, TFJ Stainless Steel

Casing Diameter 2" ID

Screen Material 0.010" wire wrap, Type 316, TFJ Stainless Steel

Surface Casing Diameter 5" ID

Date Installed November 24, 1987

Approved By

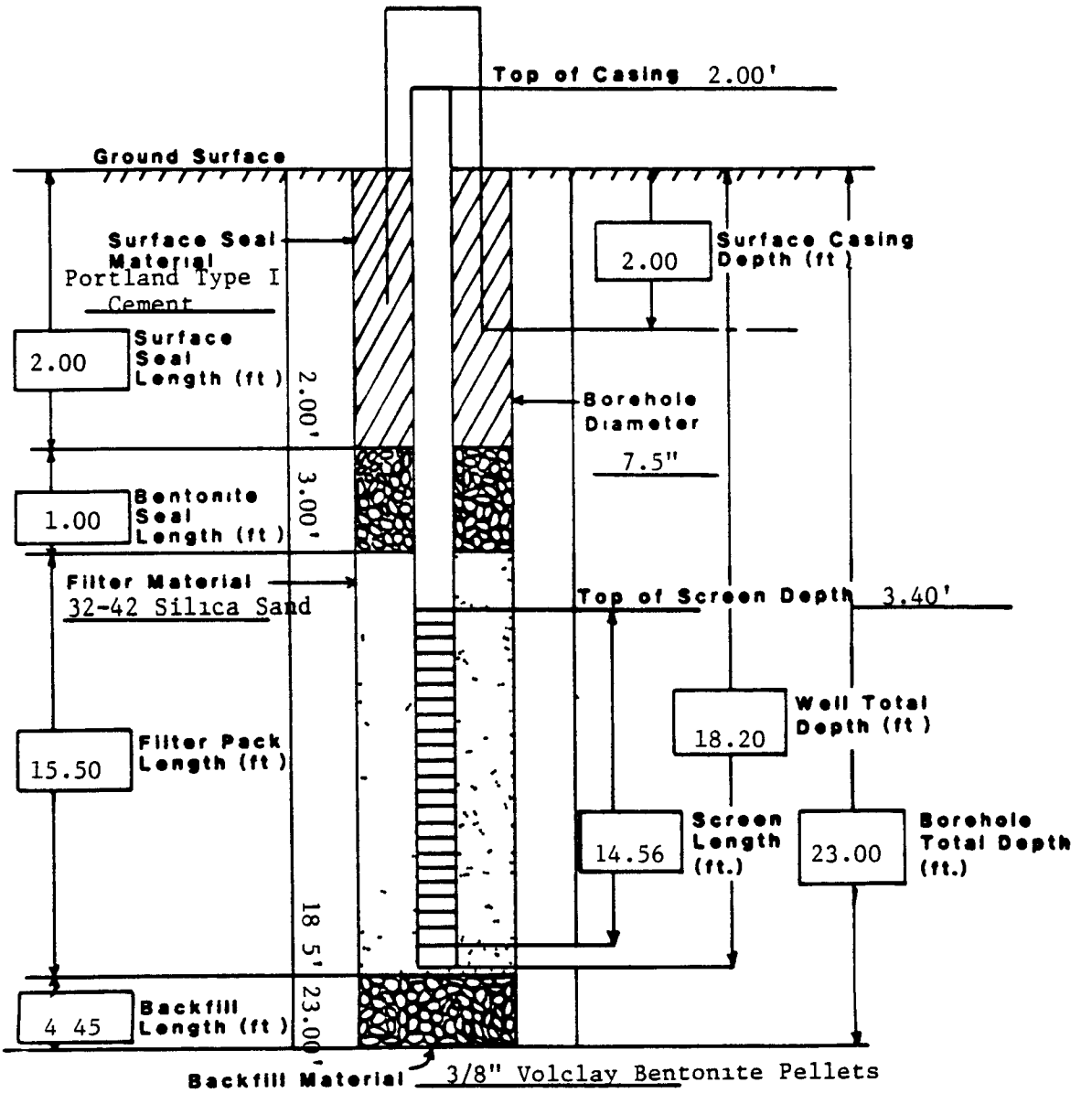
Site Manager

Installed By R. Treat

Geologist

CEARP Manager

Comments



WELL COMPLETION INFORMATION

Location Rocky Flats Plant, Landfill Area

Well No 67-87

Coordinates N 40182.78 E 20678.79

Elevation Ground Surface 5969.50'

Total Depth Well 16.8'

Top of Casing 5971.72'

Borehole 21.4'

Formation of Completion Rocky Flats Alluvium

Casing Material Sch 5, Type 316, TFJ Stainless Steel

Casing Diameter 2" ID

Screen Material 0.010" wire wrap, Type 316, TFJ Stainless Steel

Surface Casing Diameter 5" ID

Date Installed December 4, 1987

Approved By

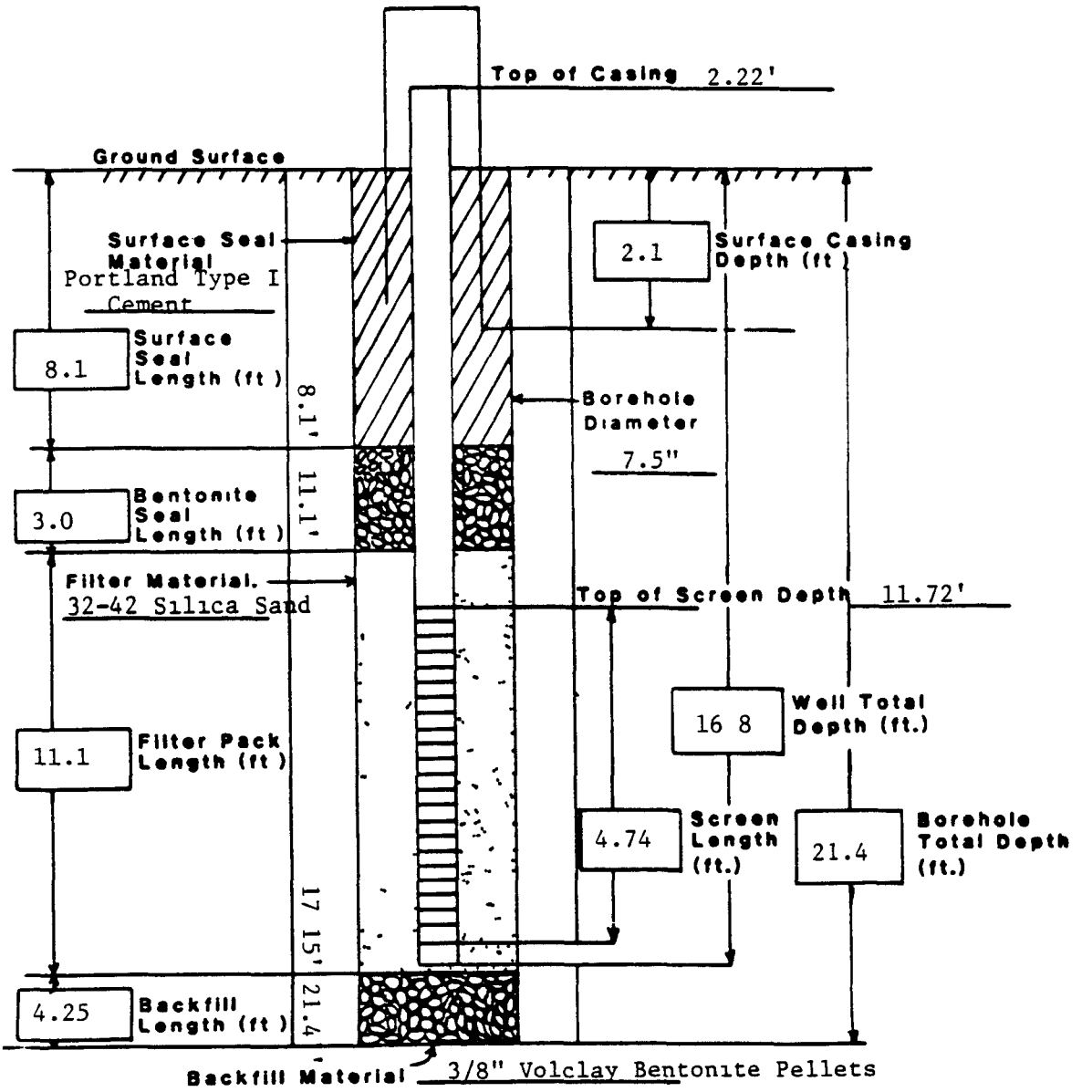
Site Manager

Installed By J. Bacchus

Geologist

CEARP Manager

Comments



WELL COMPLETION INFORMATION

Location Rocky Flats Plant; Landfill Area

Well No 68-87

Coordinates N 40163.59 E 20680.82

Elevation Ground Surface 5968 48'

Total Depth Well 16.0'

Top of Casing 5970.31'

Borehole 20.0'

Formation of Completion Rocky Flats Alluvium

Casing Material Sch 5, Type 316, TFJ Stainless Steel

Casing Diameter 2" ID

Screen Material 0.010" wire wrap, Type 316, TFJ Stainless Steel

Surface Casing Diameter 5" ID

Date Installed December 4 &7, 1987

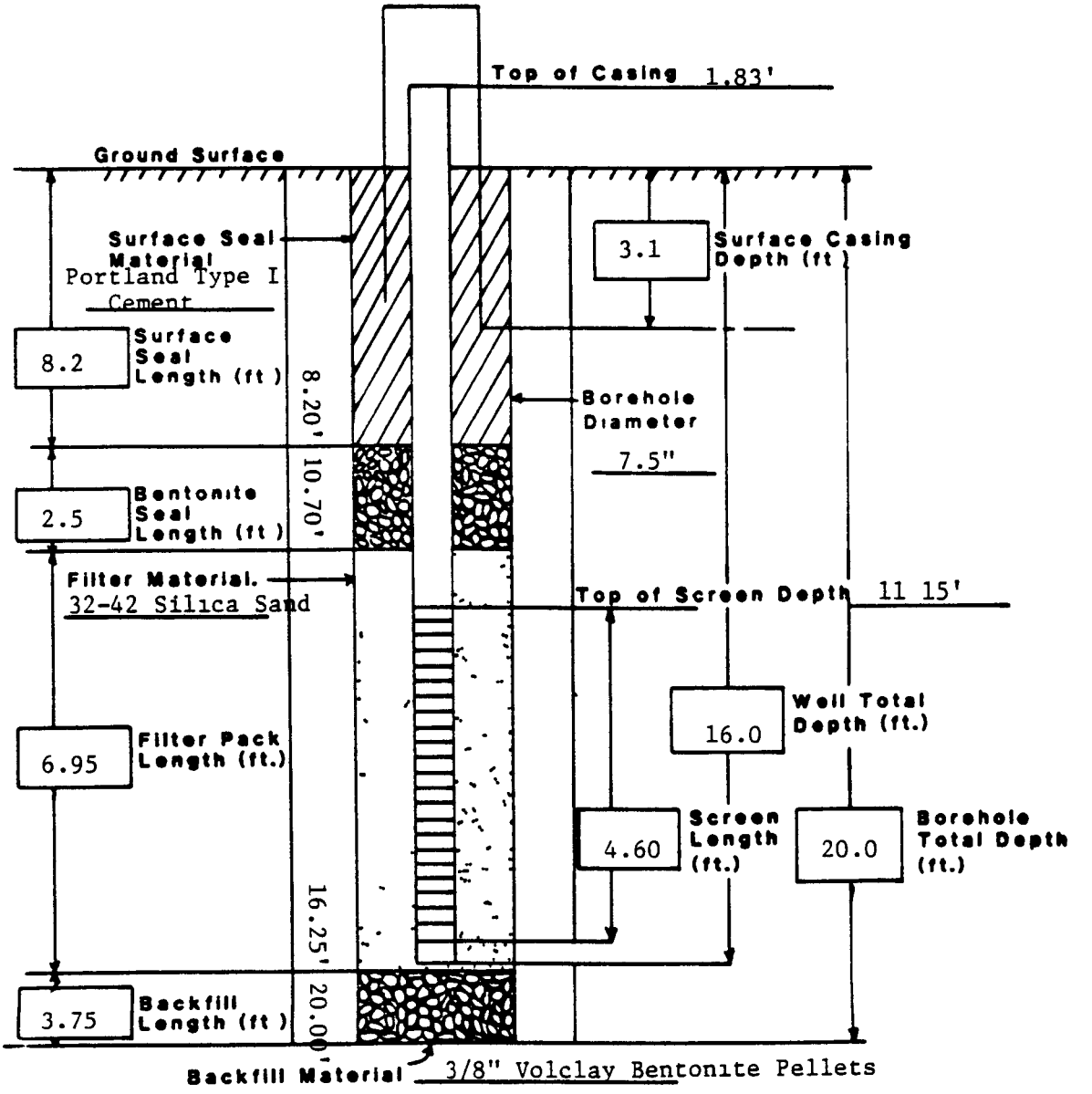
Approved By

Site Manager

Installed By J. Bacchus
Geologist

CEARP Manager

Comments



WELL COMPLETION INFORMATION

Location Rocky Flats Plant, Landfill Area

Well No 70-87

Coordinates N 39588.09 E 21098.79

Elevation Ground Surface 5966.30'

Total Depth Well 16.5'

Top of Casing 5968.35'

Borehole 17.0'

Formation of Completion Rocky Flats Alluvium/ Weathered Arapahoe Formation

Casing Material Sch 5, Type 316, TFJ Stainless Steel

Casing Diameter 2" ID

Screen Material 0.010" wire wrap, Type 316, TFJ Stainless Steel

Surface Casing Diameter 5" ID

Date Installed December 14, 1987

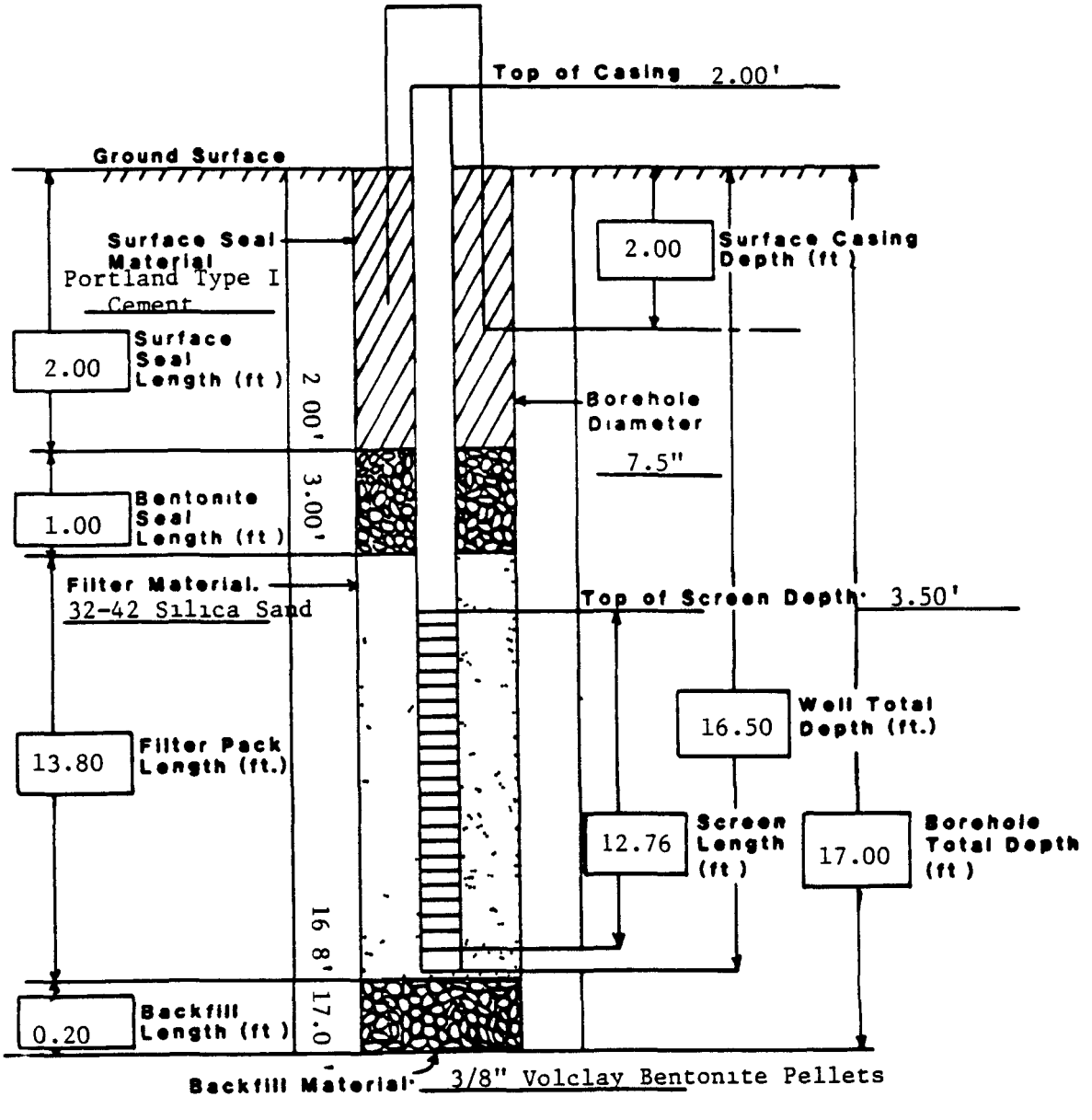
Approved By

Installed By R. Treat
Geologist

Site Manager

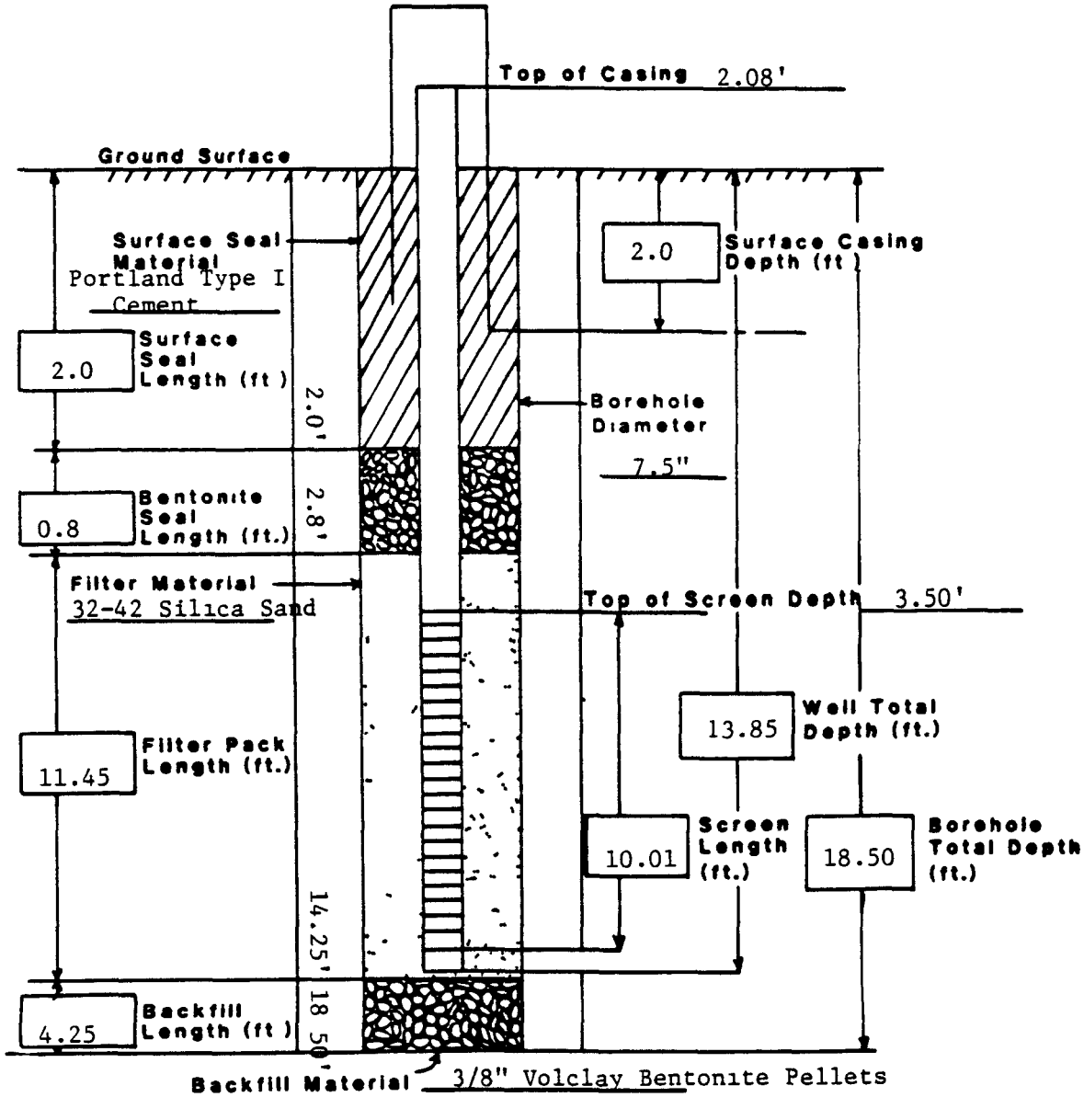
CEARP Manager

Comments



WELL COMPLETION INFORMATION

Location Rocky Flats Plant, Landfill Area
Well No 71-87
Coordinates N 40339.90 E 20991.74
Elevation Ground Surface 5963.39'
Total Depth Well 13.85'
Top of Casing 5965.47'
Borehole 18.50'
Formation of Completion Rocky Flats Alluvium
Casing Material Sch 5, Type 316, TFJ Stainless Steel
Casing Diameter 2" ID
Screen Material 0.010" wire wrap, Type 316, TFJ Stainless Steel
Surface Casing Diameter 5" ID
Date Installed December 11, 1987
Approved By _____
Installed By J. Bacchus
Geologist
Site Manager
CEARP Manager
Comments _____



WELL COMPLETION INFORMATION

Location Rocky Flats Plant, Landfill Area

Well No 72-87

Coordinates N 39459 12 E 20855.24

Elevation Ground Surface 5969.11'

Total Depth Well 7.0'

Top of Casing 5971.18'

Borehole 15.0'

Formation of Completion Rocky Flats Alluvium

Casing Material Sch 5, Type 316, TFJ Stainless Steel

Casing Diameter 2" ID

Screen Material 0.010" wire wrap, Type 316, TFJ Stainless Steel

Surface Casing Diameter 5" ID

Date Installed December 17, 1987

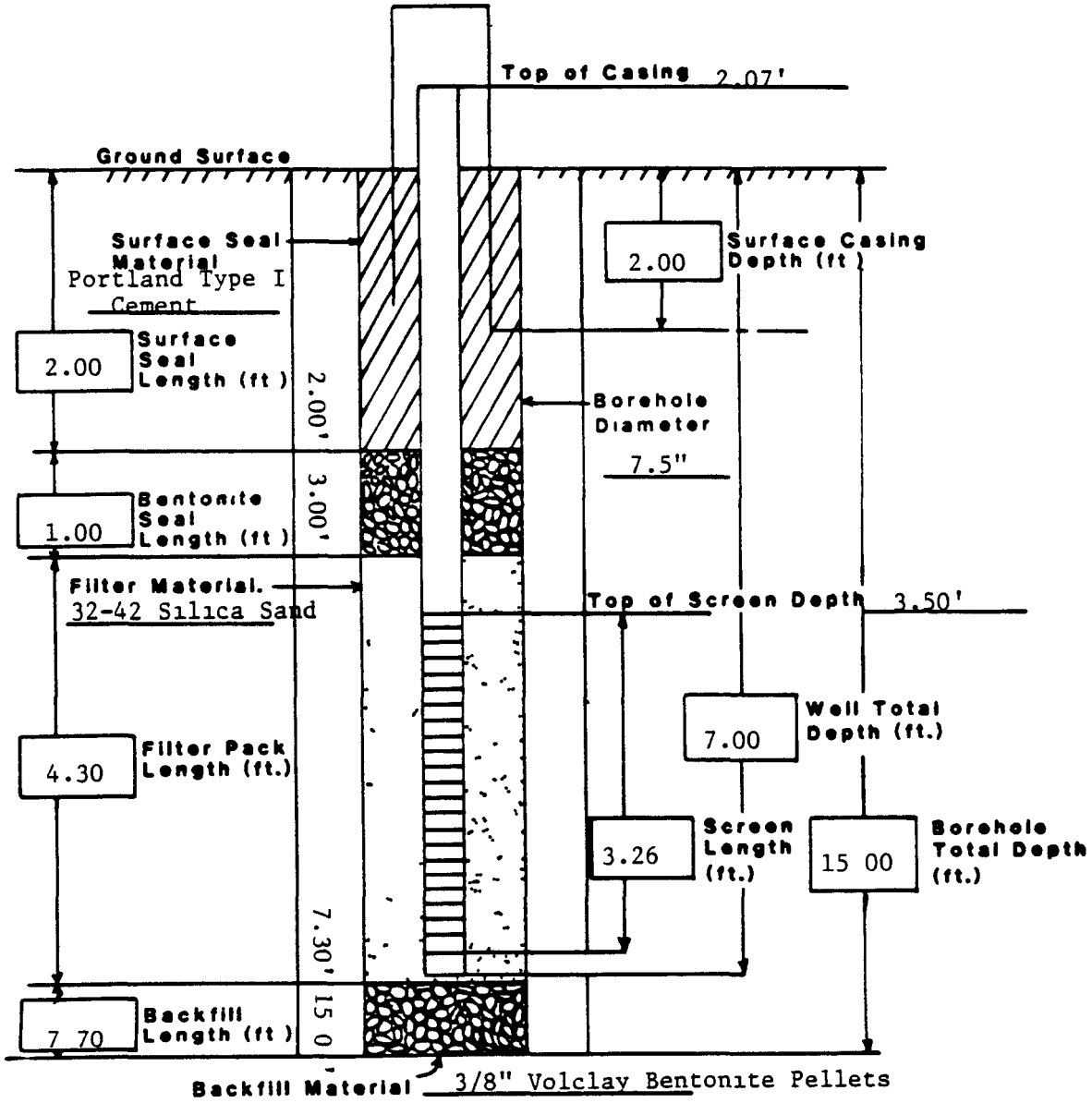
Approved By

Installed By R. Treat
Geologist

Site Manager

CEARP Manager

Comments



WELL COMPLETION INFORMATION

QA By/Date Jarell Burman 15-19-89

Location Rocky Flats Plant, Landfill Area

Well No B106089

Coordinates N 39332 69 E 19481 76 (RFP)

Elevation **Ground Surface** 5993.3'

Total Depth: **Well** 24.47'

Top of Casing 5995.35'

Borehole 27.50'

Formation of Completion Rocky Flats Alluvium and Landfill

Casing Material Schedule 40 PVC

Casing Diameter 4 1/2" O D

Screen Material Schedule 40 10-slotted PVC

Surface Casing Diameter 8 5/8" O.D.

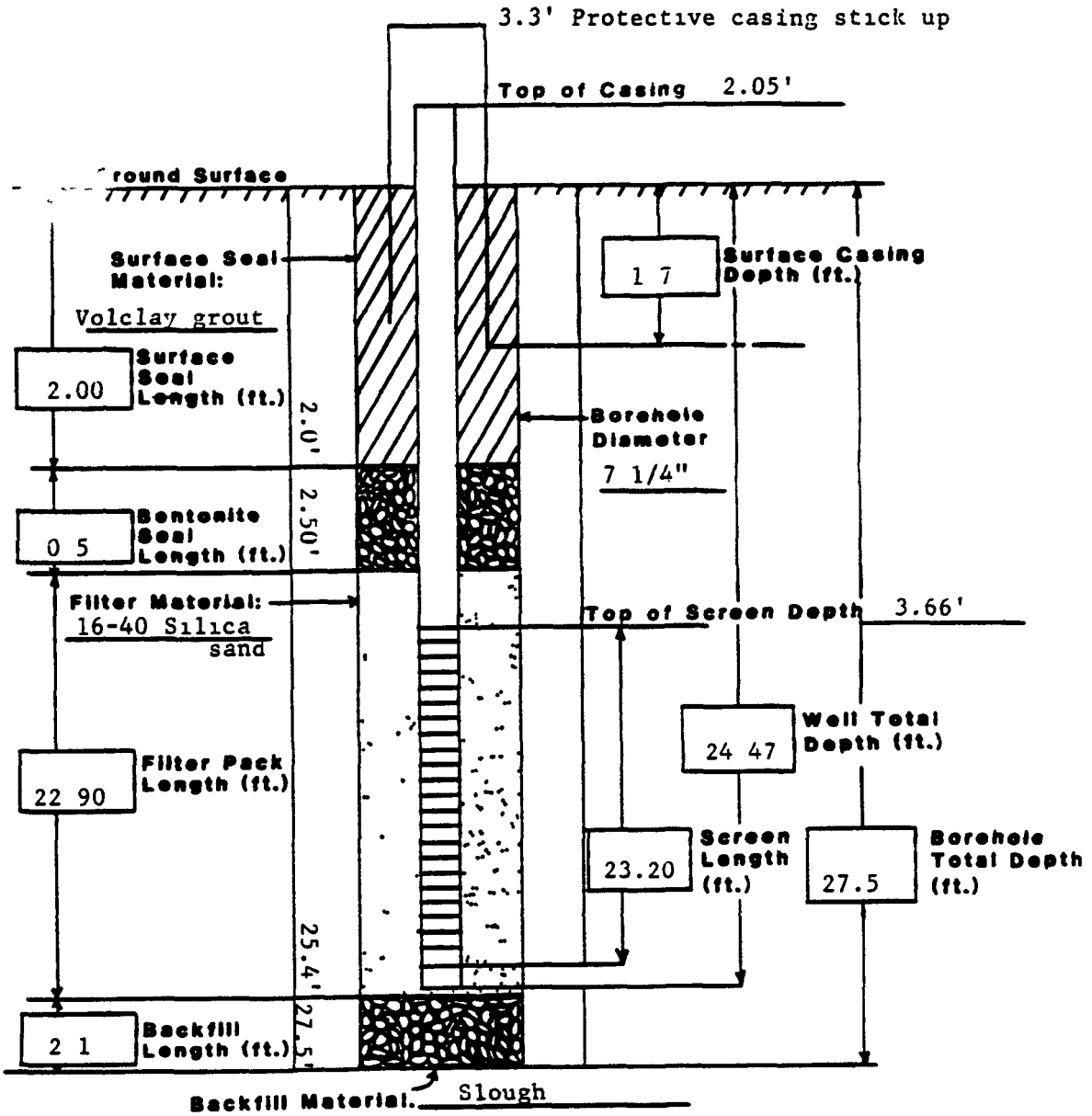
Date Installed 05/18/1989

Approved By Jarell Burman
Site Manager

Installed By R.T Treat
Geologist

CEARP Manager

Comments Set stainless steel centralizer from 22.93' to 24.14' below ground surface.



WELL COMPLETION INFORMATION

QA By/Date Janell Burrian 10-2-89

Location Rocky Flats Plant, Landfill Area **Well No.** B206189

Coordinates N 39332.03 E 20202.58 (RFP) **Elevation Ground Surface** 5984.5'

Total Depth: Well 36.61' **Top of Casing** 5986.57'

Borehole 45.0'

Formation of Completion Weathered Claystone

Casing Material Schedule 40 PVC **Casing Diameter** 4 1/2" O.D.

Screen Material Schedule 40 10-slotted PVC **Surface Casing Diameter** 8 5/8" O.D.

Date Installed 06/01/1989 **Approved By** Janell Burrian

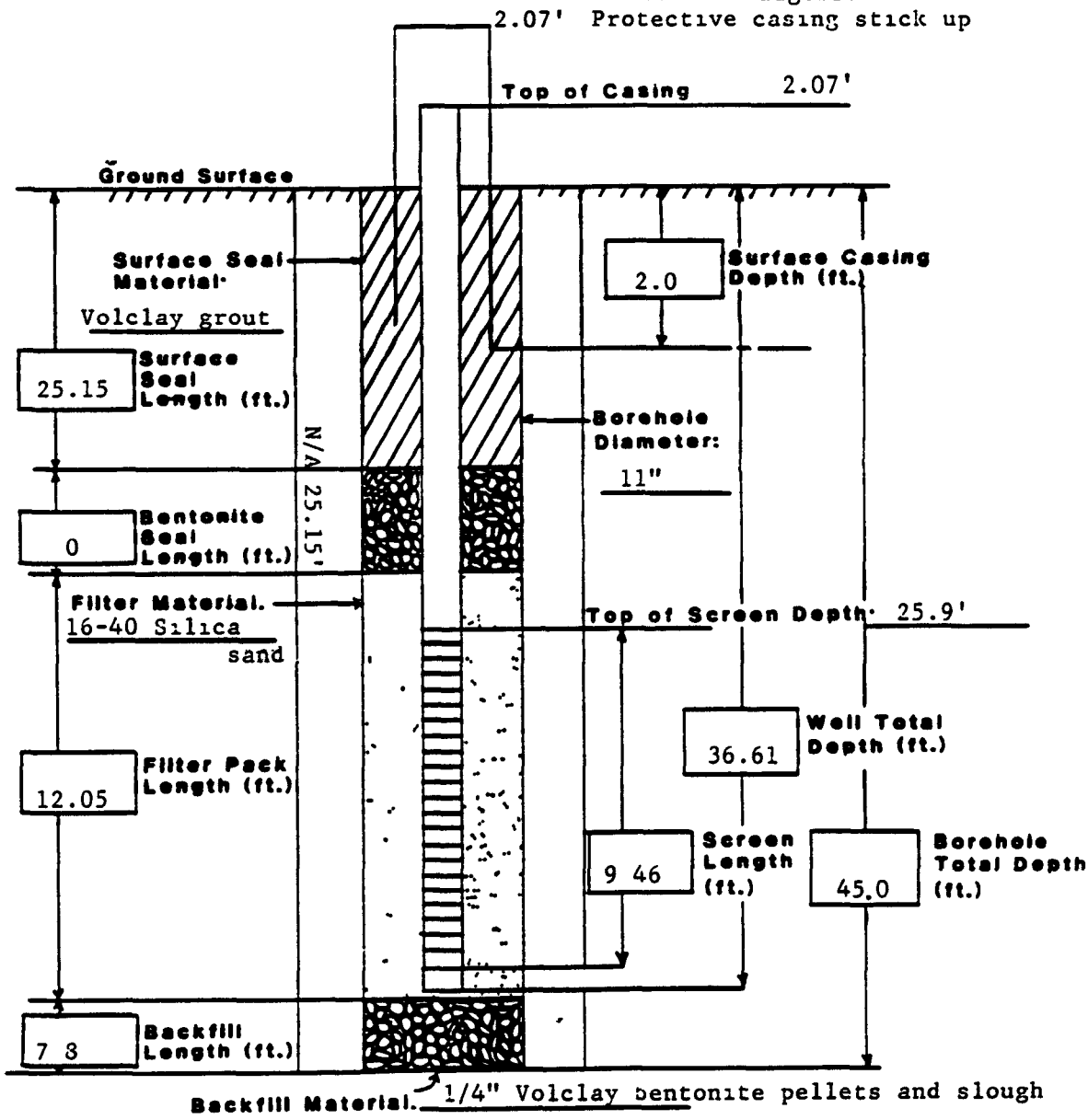
Installed By S.P. Carpenter **Site Manager**

Geologist

CEARP Manager

Comments Unable to set an upper bentonite pellet seal due to colloidial mixture above sand pack, volclay grout was placed above sand pack.

No centralizer used. Well was constructed in augers.



WELL COMPLETION INFORMATION

QA By/Date Jarell Burman 15-3-89

Location Rocky Flats Plant, Landfill Area **Well No** B206289

Coordinates N 39272 29 E 20465 42 (RFP) **Elevation: Ground Surface** 5977.59'

Total Depth: Well 43.05' **Top of Casing** 5979 49'

Borehole 47.5'

Formation of Completion Weathered Claystone

Casing Material Schedule 40 PVC **Casing Diameter** 4 1/2" O.D.

Screen Material Schedule 40 10-slotted PVC **Surface Casing Diameter** 8 5/8" O D

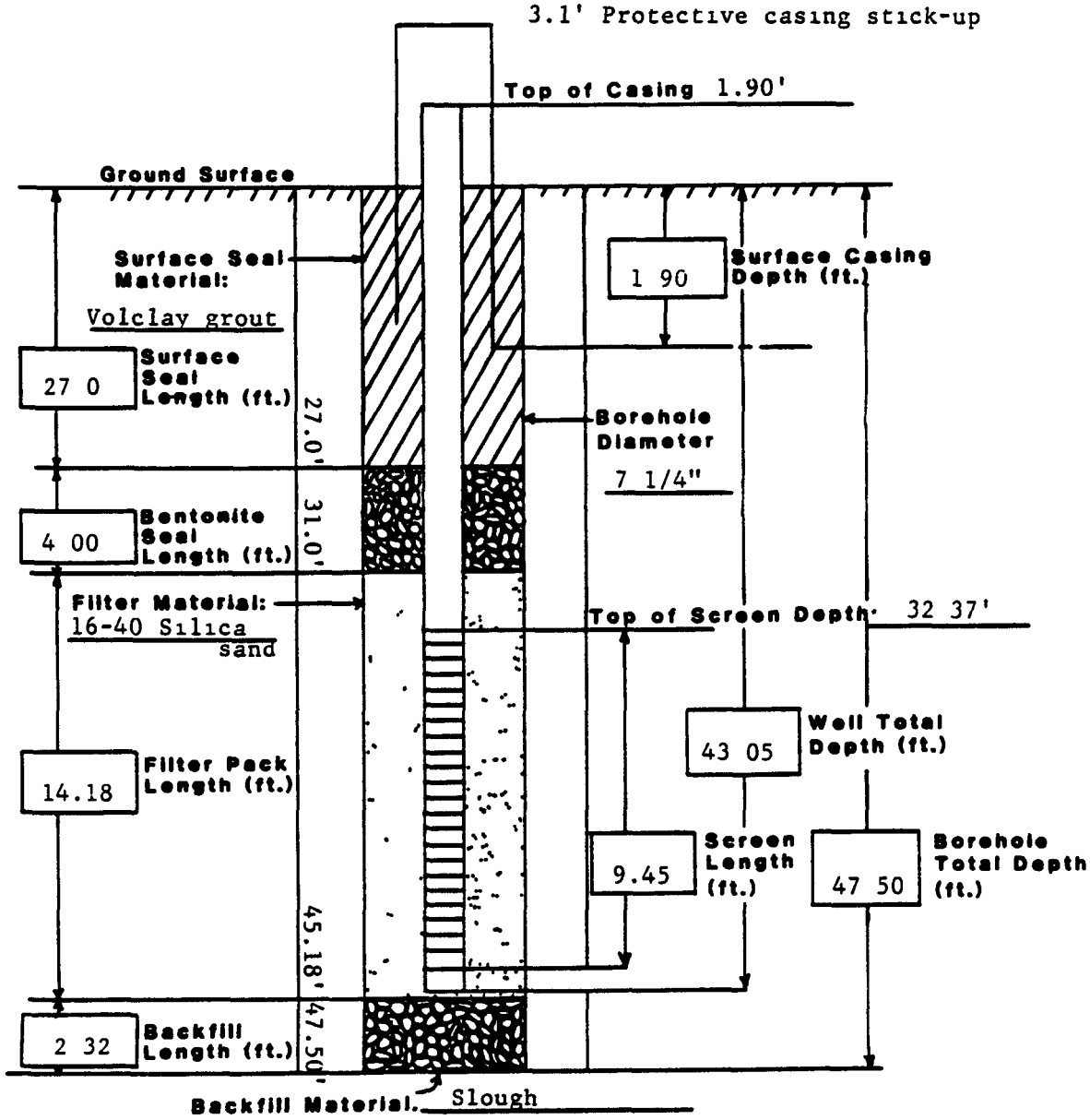
Date Installed 05/02/1989 **Approved By** Jarell Burman

Installed By R.T. Treat **Site Manager**

Geologist

CEARP Manager

Comments Set stainless steel centralizer from 41 45' to 42 65' below ground surface



WELL COMPLETION INFORMATION

QA By/Date Farell Burman 15-24-89

Location Rocky Flats Plant, Landfill Area **Well No** B206389

Coordinates N 39566 50 E 20828.68 **Elevation: Ground Surface** 5969 7'

Total Depth. Well 14 74' **Top of Casing** 5971 56'

Borehole 20.0'

Formation of Completion Rocky Flats Alluvium/Artifical Fill

Casing Material Schedule 40 PVC **Casing Diameter** 4 1/2" O.D

Screen Material Schedule 40 10-slotted PVC **Surface Casing Diameter** 8 5/8" O D.

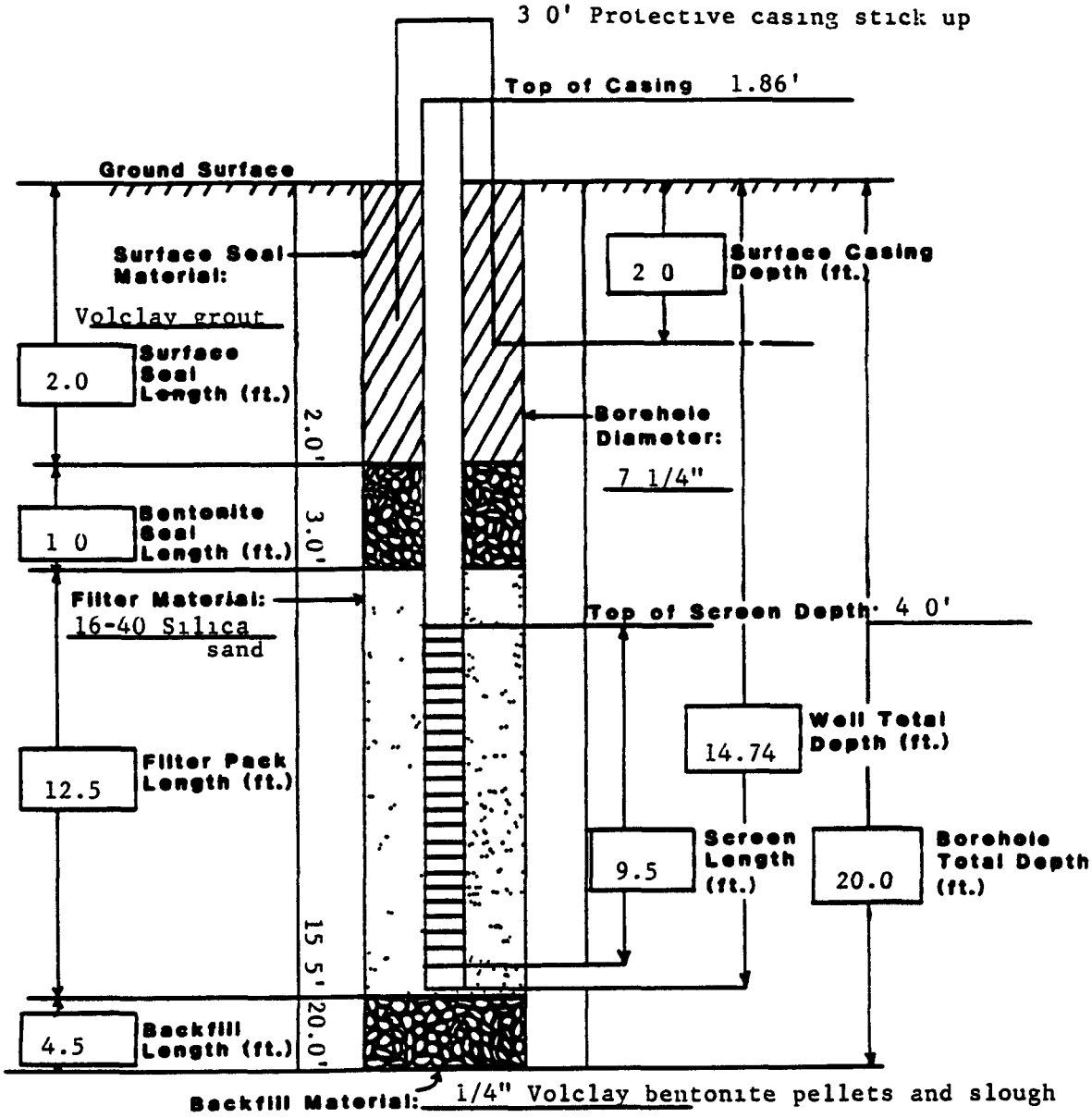
Date Installed 05/22/1989 **Approved By** Farell Burman

Installed By S P. Carpenter **Site Manager**

Geologist

CEARP Manager

Comments Set stainless steel centralizer from 13.27' to 14.47' below ground surface.



WELL COMPLETION INFORMATION

QA By/Date Janell Burman 5-5-89

Location Rocky Flats Plant, Landfill Area

Well No B206489

Coordinates N 39445.20 E 20865.79 (RFP)

Elevation: Ground Surface 5969.14'

Total Depth: Well 11.35'

Top of Casing 5971.46'

Borehole 41 50'

Formation of Completion Rocky Flats Alluvium/ Weathered Sandstone

Casing Material Schedule 40 PVC

Casing Diameter 4 1/2" O D.

Screen Material Schedule 40 10-slotted PVC

Surface Casing Diameter 8 5/8" O.D.

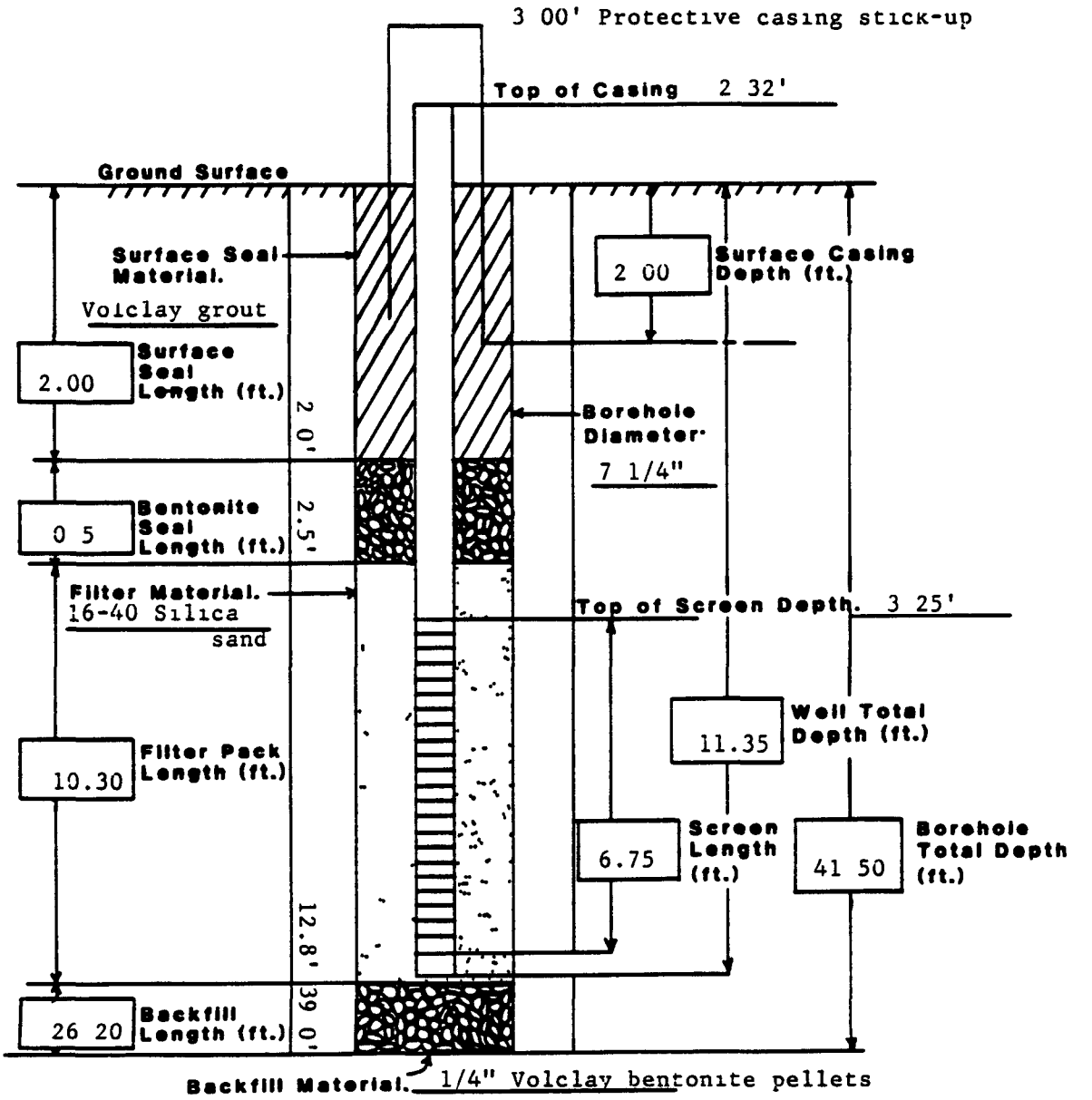
Date Installed 05/04/1989

Approved By Janell Burman
Site Manager

Installed By R.T Treat
Geologist

CEARP Manager

Comments Set stainless steel centralizer from 9 85' to 11 05' below ground surface



WELL COMPLETION INFORMATION

QA By/Date Janell Burman / 5-10-89

Location Rocky Flats Plant, Landfill Area **Well No.** B206589

Coordinates N 39475 67 E 21023.37 (RFP) **Elevation:** **Ground Surface** 5967 80'

Total Depth: **Well** 36 24' **Top of Casing** 5969 72'

Borehole 41 50'

Formation of Completion Weathered Sandstone

Casing Material Schedule 40 PVC **Casing Diameter** 4 1/2" O.D.

Screen Material Schedule 40 10-slotted PVC **Surface Casing Diameter** 8 5/8" O.D.

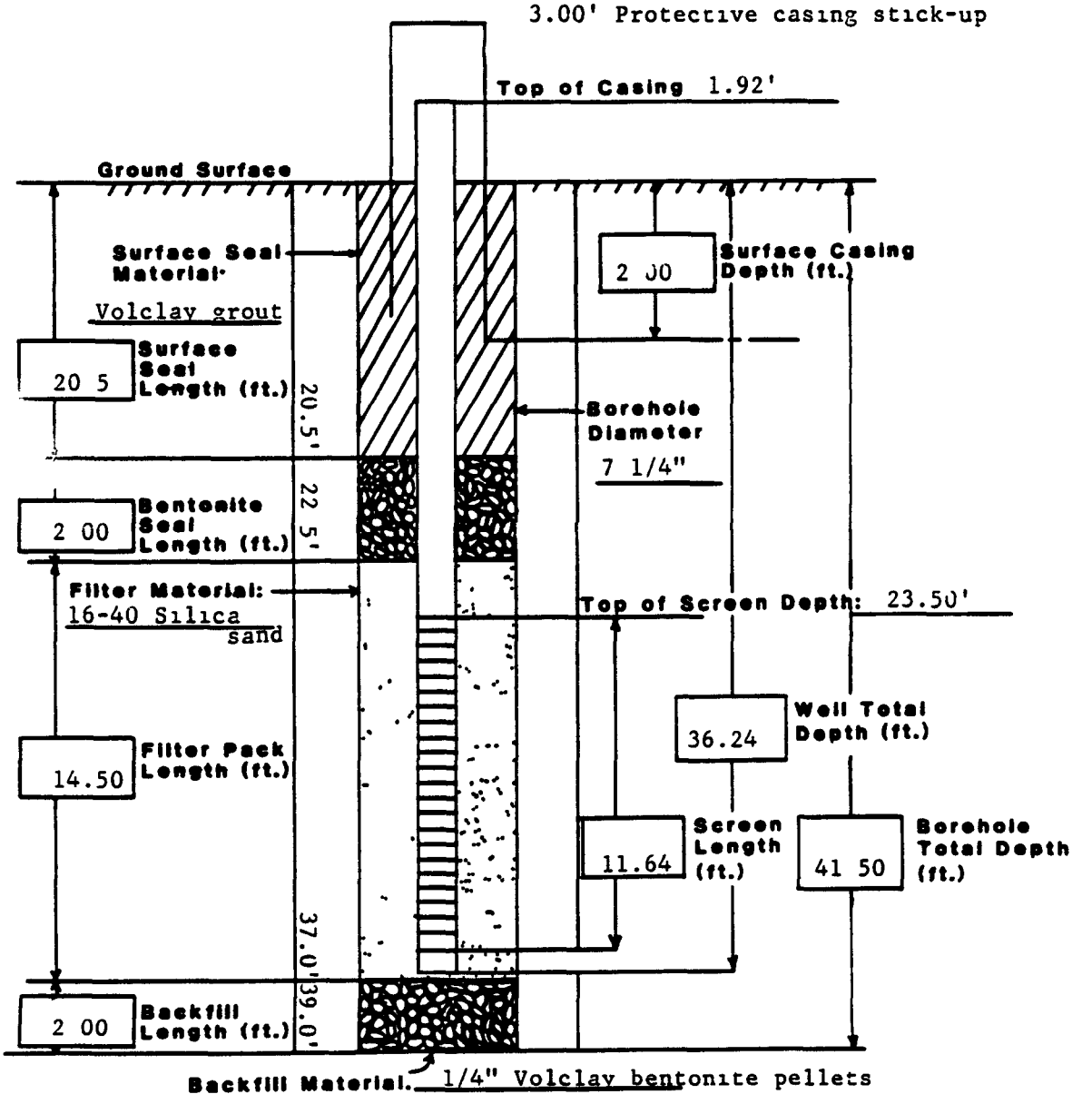
Date Installed 05/05/1989 **Approved By** Janell Burman

Installed By R T. Treat **Site Manager**

Geologist

CEARP Manager

Comments Set stainless steel centralizer from 34 62' to 35 82' below ground surface



WELL COMPLETION INFORMATION

QA By/Date Jarell Burman 15-2-89

Location Rocky Flats Plant, Landfill Area **Well No.** B206689

Coordinates N 39605.08 E 21263.69 (RFP) **Elevation Ground Surface** 5959 31'

Total Depth: Well 19.41' **Top of Casing** 5961 20'

Borehole 21.7'

Formation of Completion Weathered Claystone

Casing Material Schedule 40 PVC **Casing Diameter** 4 1/2" O.D.

Screen Material Schedule 40 10-slotted PVC **Surface Casing Diameter** 8 5/8" O D.

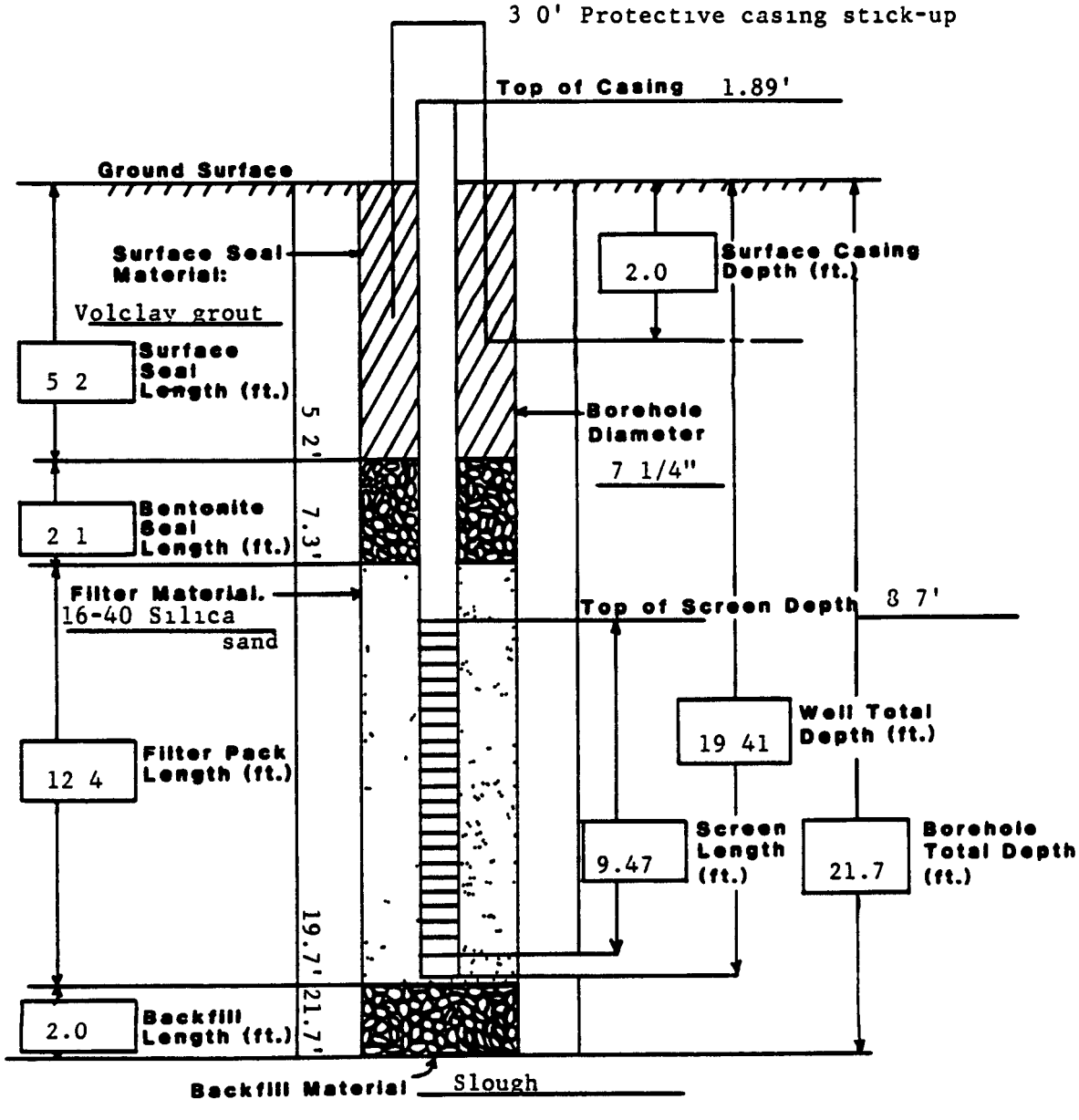
Date Installed 04/28/1989 **Approved By** Jarell Burman

Installed By E.M. Hill **Site Manager**

Geologist

CEARP Manager

Comments Placed stainless steel centralizer from 18.09' to 19 29' below ground surface



WELL COMPLETION INFORMATION

QA By/Date Janell Burman 15-24-89

Location Rocky Flats Plant, Landfill Area

Well No B206789

Coordinates N 39836.16 E 21064.34 (RFP)

Elevation: Ground Surface 5927 9'

Total Depth: Well 20.52'

Top of Casing 5930.19'

Borehole 30.0'

Formation of Completion Weathered Claystone

Casing Material Schedule 40 PVC

Casing Diameter 4 1/2" O.D.

Screen Material Schedule 40 10-slotted PVC

Surface Casing Diameter 8 5/8" O.D.

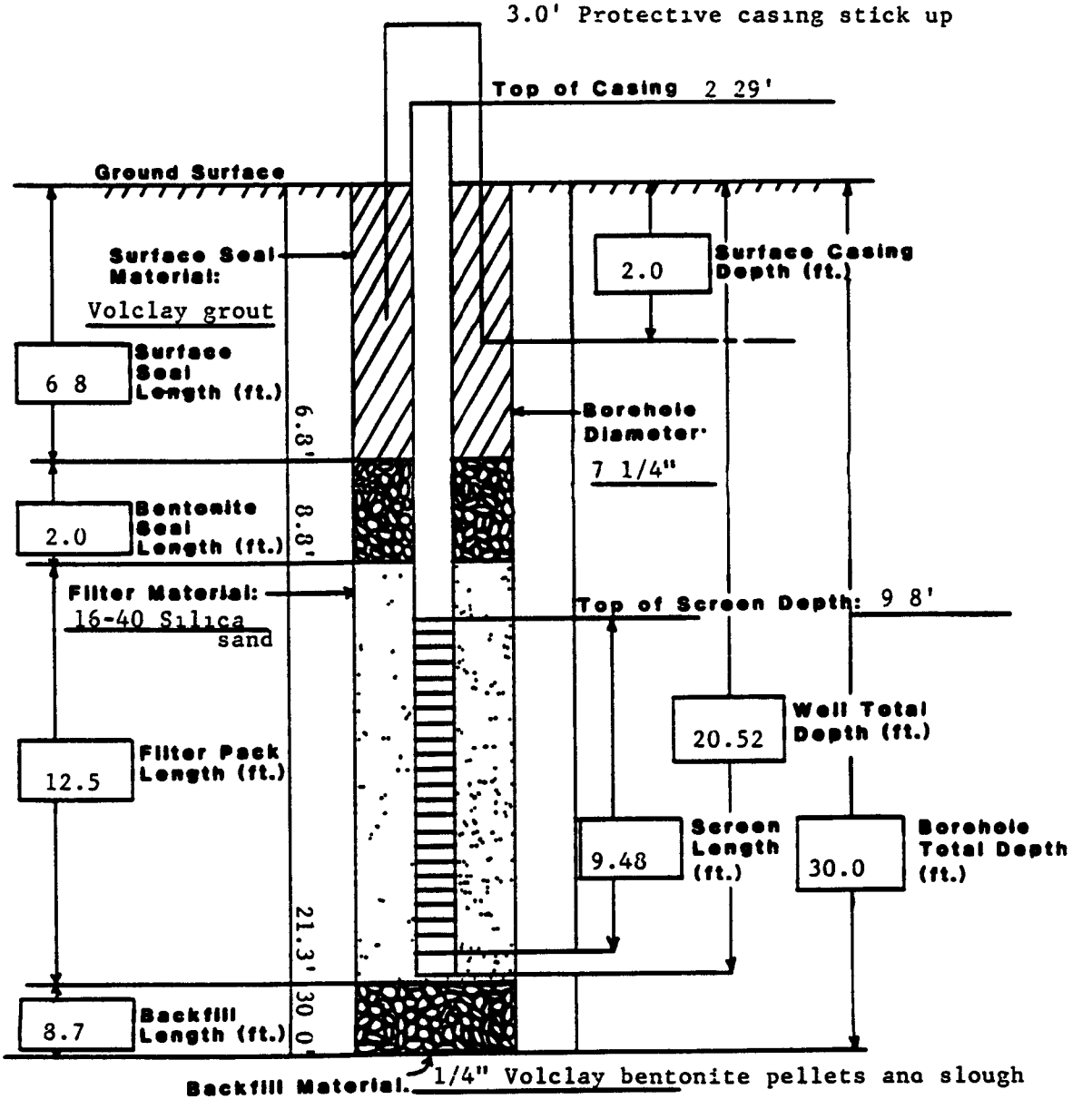
Date Installed 05/23/1989

Approved By Janell Burman
Site Manager

Installed By S P. Carpenter
Geologist

CEARP Manager

Comments Set stainless steel centralizer from 19.01' to 20 24' below ground surface.



WELL COMPLETION INFORMATION

QA By/Date Janell Burman 15-8-89

Location Rocky Flats Plant; Landfill Area

Well No B206889

Coordinates N 39838 69 E 21684.46 (RFP)

Elevation: Ground Surface 5917.09'

Total Depth. Well 18 2'

Top of Casing 5919.15'

Borehole 19.5'

Formation of Completion Weathered Claystone

Casing Material Schedule 40 PVC

Casing Diameter 4 1/2" O.D

Screen Material Schedule 40 10-slotted PVC

Surface Casing Diameter 8 5/8" O D.

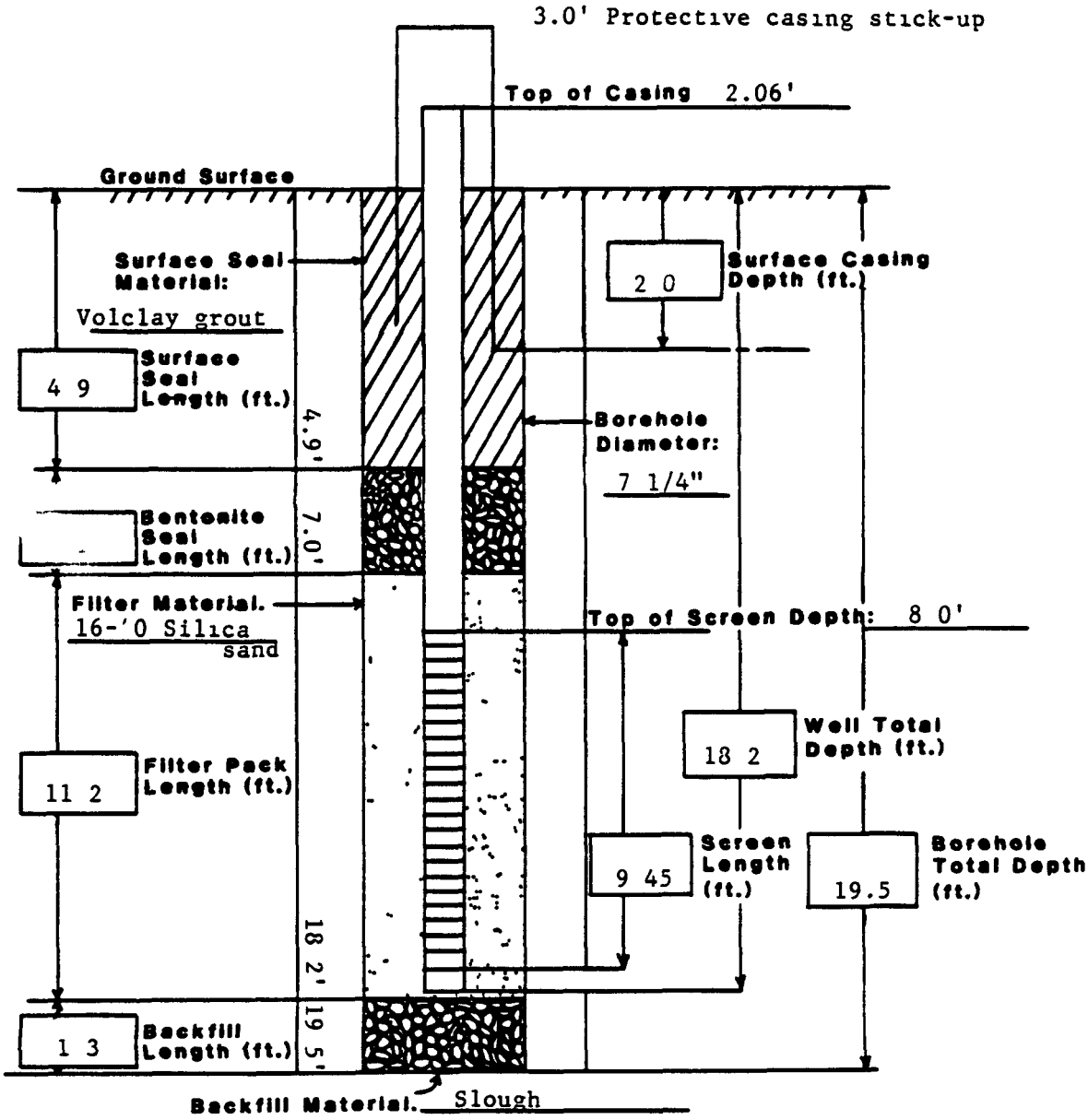
Date Installed 04/27/1989

Approved By Janell Burman
Site Manager

Installed By E M Hill
Geologist

CEARP Manager

Comments Placed stainless steel centralizer from 16.75' to 18 0' below ground surface.



WELL COMPLETION INFORMATION

QA By/Date Jarell Burman 14-24-89

Location Rocky Flats Plant, Land Fill Area

Well No. B206989

Coordinates N 40160.69 E 21739.67 (RFP)

Elevation: Ground Surface 5882.42'

Total Depth Well 22.5'

Top of Casing 5884.32'

Borehole 23.6'

Formation of Completion Weathered Claystone

Casing Material Schedule 40 PVC

Casing Diameter 4 1/2" O.D.

Screen Material Schedule 40 10-slotted PVC

Surface Casing Diameter 8 5/8" O.D.

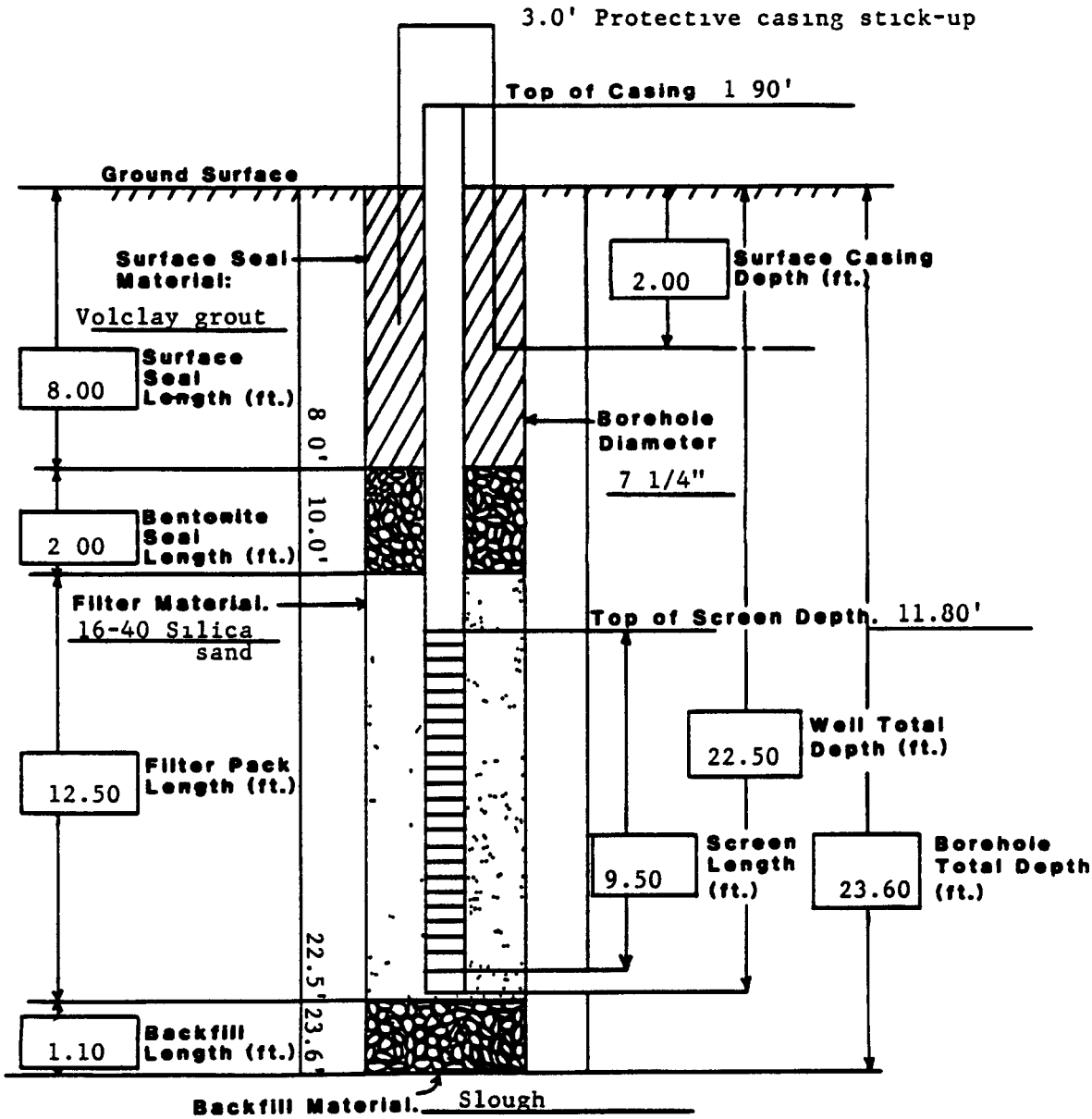
Date Installed 04/20/1989

Approved By Jarell Burman
Site Manager

Installed By R.T. Treat
Geologist

CEARP Manager

Comments Set stainless steel centralizer from 21.10' to 22.30' below ground surface



WELL COMPLETION INFORMATION

QA By/Date Farell Burman 11-26-89

Location Rocky Flats Plant: Land Fill Area **Well No.** B207089

Coordinates N 40113.58 E 21741.54 (RFP) **Elevation: Ground Surface** 5883.07'

Total Depth: Well 54.0' **Top of Casing** 5884.95'

Borehole 60.0'

Formation of Completion Unweathered Sandstone

Casing Material Schedule 40 PVC **Casing Diameter** 4 1/2" O D.

Screen Material Schedule 40 10-slotted PVC **Surface Casing Diameter** 8 5/8" O.D.

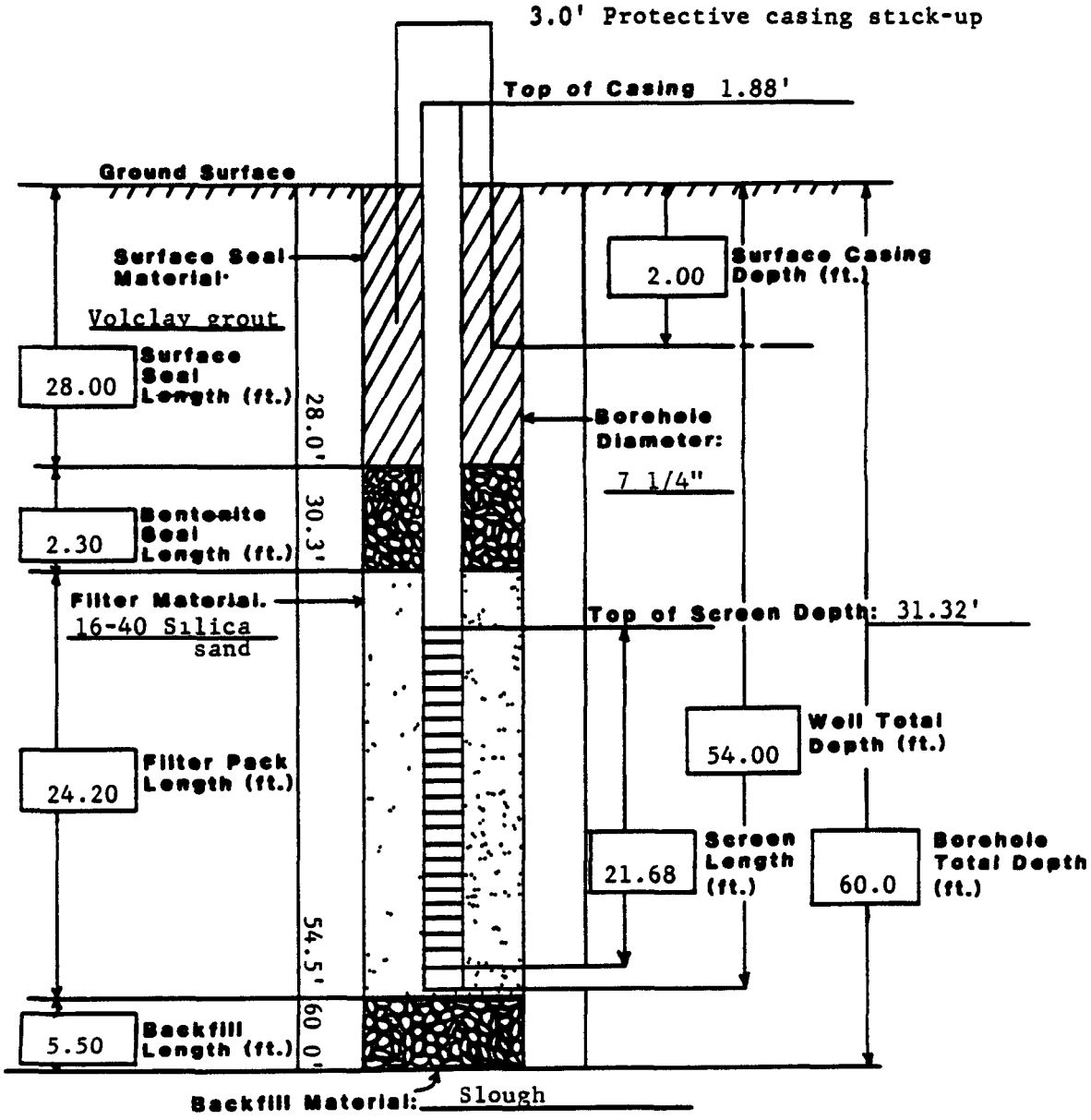
Date Installed 04/25/1989 **Approved By** Farell Burman

Installed By R T Treat
Geologist

Site Manager

CEARP Manager

Comments Set stainless steel centralizer from 52 6' to 53.8' below ground surface



WELL COMPLETION INFORMATION

QA By/Date Farell Gurman 11-29-89

Location Rocky Flats Plant; Landfill Area **Well No.** B207189

Coordinates N 40107.09 E 21741.74 (RFP) **Elevation: Ground Surface** 5884.80'

Total Depth: Well 77.76' **Top of Casing** 5886.72'

Borehole 259'

Formation of Completion Unweathered ~~Sandstone~~ claystone

Casing Material Schedule 80 PVC **Casing Diameter** 2 3/8" O.D.

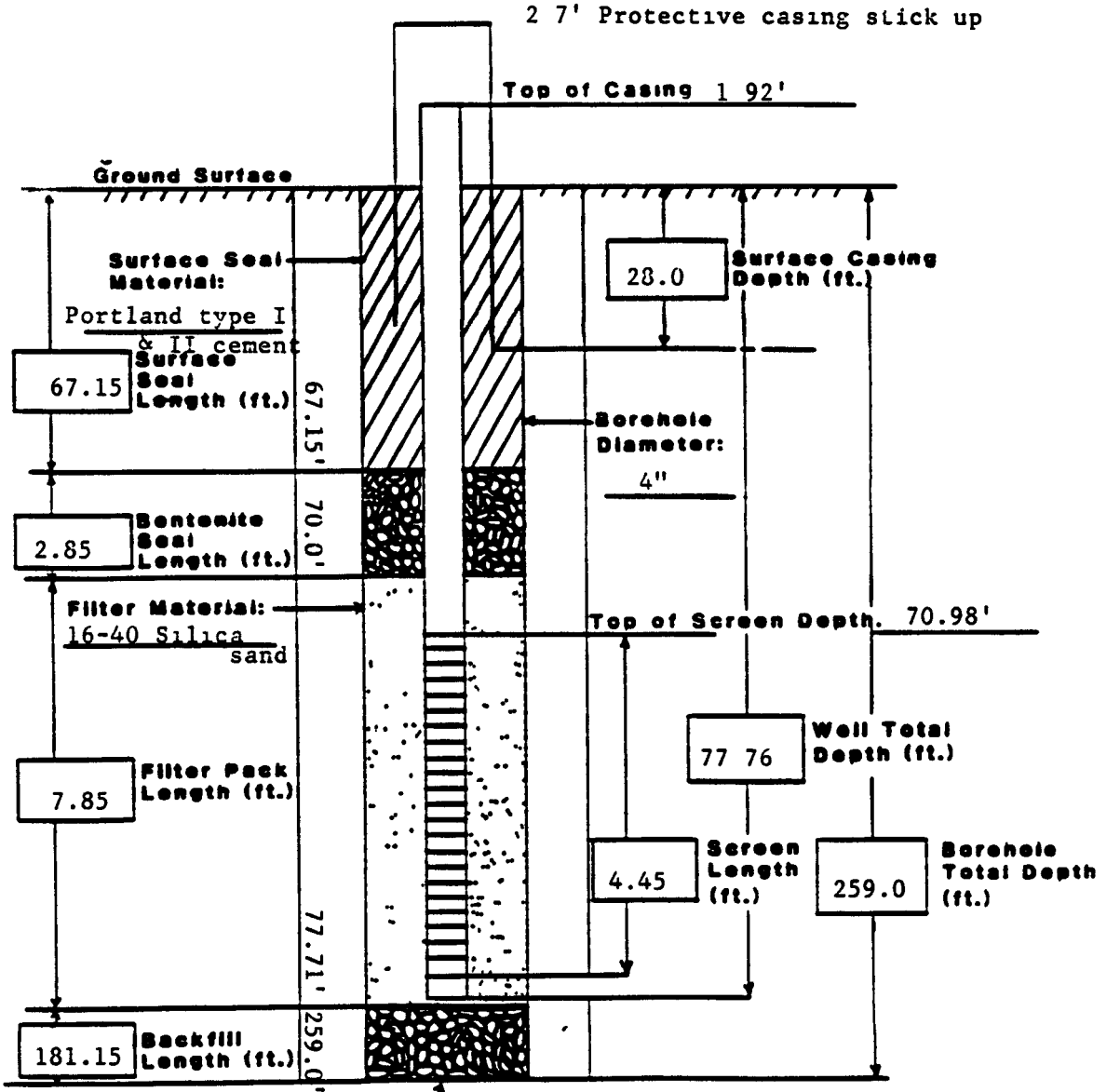
Screen Material Scnedule 80 10-slotted PVC **Surface Casing Diameter** 5 5/8" O.D.

Date Installed 06/19 & 06/20/1989 **Approved By** Farell Gurman, Site Manager

Installed By H.G. Bienkowski, Geologist

CEARP Manager

Comments No centralizer used. Well was constructed inside drill rods.



WELL COMPLETION INFORMATION

QA By/Date Jasell Bryman 14-28-89

Location Rocky Flats Plant, Landfill Area **Well No.** B207289

Coordinates N 40284.53 E 21264.93 (RFP) **Elevation. Ground Surface** 5948.27'

Total Depth· Well 15.89' **Top of Casing** 5950.49'

Borehole 19.5'

Formation of Completion Weathered Claystone

Casing Material Schedule 40 PVC **Casing Diameter** 4 1/2" O.D

Screen Material Schedule 40 10-slotted PVC **Surface Casing Diameter** 8 5/8" O D

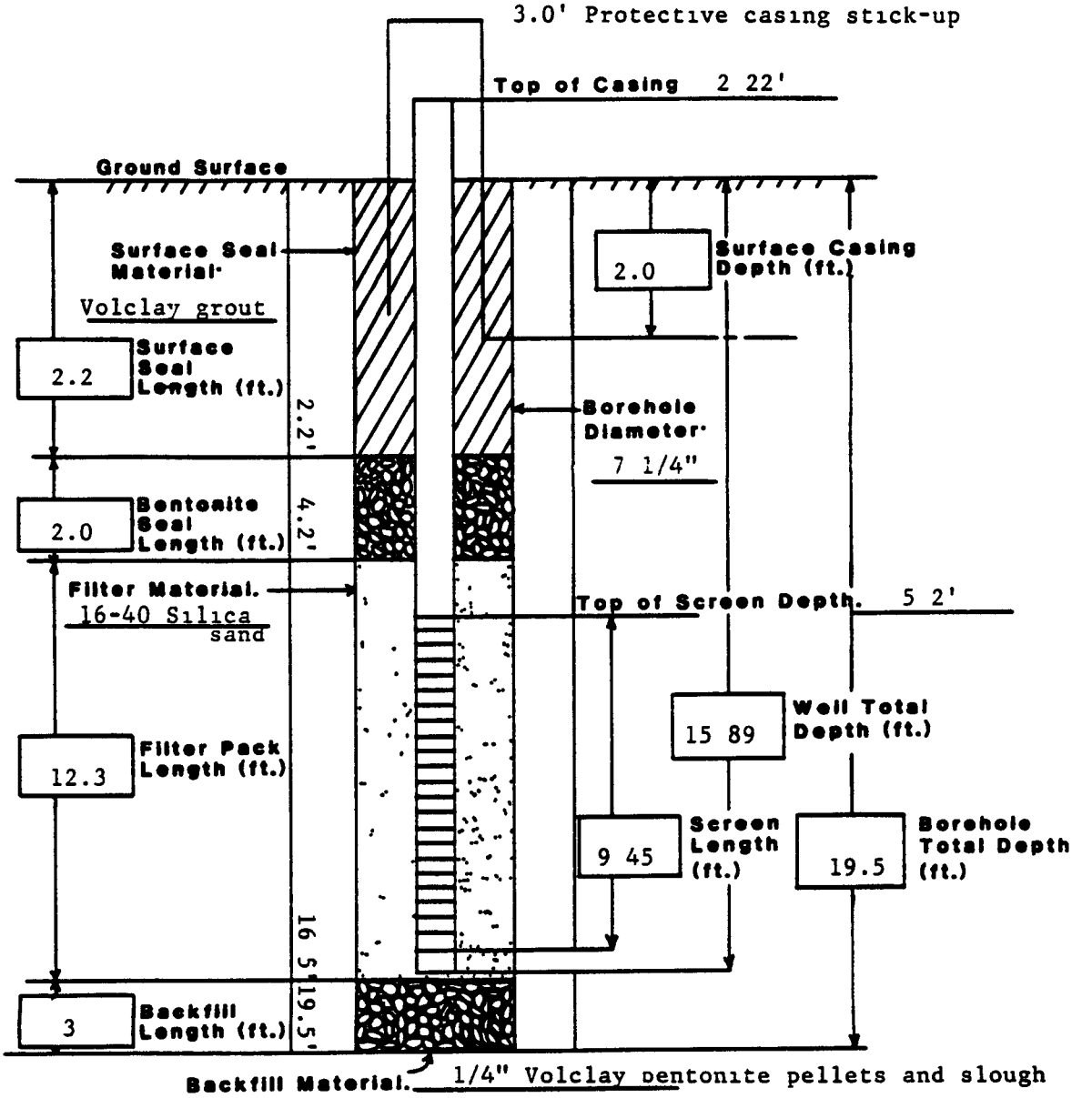
Date Installed 04/28/1989 **Approved By** Jasell Bryman

Installed By E.M. Hill **Site Manager**

Geologist

CEARP Manager

Comments Placed stainless steel centralizer from 14 36' to 15.56' below ground surface



Backfill Material. 1/4" Volclay bentonite pellets and slough

APPENDIX F

Analytical Data for

Present Landfill Borehole Samples

OU07 DRILL CUTTINGS ANALYTICAL DATA

Location Code	Parameter	Proj Sample No	Sample Date	Result	Q	Units	Det Limit	Validation	Type Flag	Pkg. Valid
B106089	% SOLIDS	LF01890006	08-MAY-89	90.9		%			TRG	
		LF01891218	18-MAY-89	89.7		%			TRG	
		LF01890612	18-MAY-89	89		%			TRG	
		LF01892327D	18-MAY-89	85 6		%			TRG	
		LF01892327	18-MAY-89	85 9		%			TRG	
		LF01891822	18-MAY-89	87 7		%			TRG	
	NITRATE	LF01890006	08-MAY-89	15.9372					TRG	
		LF01891218	18-MAY-89	4.8697	U				TRG	
		LF01890612	18-MAY-89	4 8697	U				TRG	
		LF01892327D	18-MAY-89	5 3124	U				TRG	
		LF01891822	18-MAY-89	4 8697	U				TRG	
		LF01892327	18-MAY-89	5 3124	U				TRG	
	NITRATE/NITRITE	LF01890006	08-MAY-89	3 6		MG/KG		V	TRG	
		LF01891218	18-MAY-89	1 1	U	MG/KG		A	TRG	
		LF01890612	18-MAY-89	1 1	U	MG/KG		V	TRG	
		LF01892327D	18-MAY-89	1 2	U	MG/KG		A	TRG	
		LF01891822	18-MAY-89	1.1	U	MG/KG		A	TRG	
		LF01892327	18-MAY-89	1.2	U	MG/KG		A	TRG	
	SULFIDE	LF01890006	08-MAY-89	2	U	MG/KG		V	TRG	
		LF01891218	18-MAY-89	2.2		MG/KG		V	TRG	
		LF01890612	18-MAY-89	2	U	MG/KG		V	TRG	
		LF01892327	18-MAY-89	2.3		MG/KG		V	TRG	
		LF01891822	18-MAY-89	2	U	MG/KG		V	TRG	
		LF01892327D	18-MAY-89	2	U	MG/KG		V	TRG	
	pH	LF01890006	08-MAY-89	8 7		PHUNIT			TRG	
		LF01891218	18-MAY-89	7 9		PHUNIT			TRG	
		LF01890612	18-MAY-89	7 8		PHUNIT			TRG	
		LF01892327D	18-MAY-89	8		PHUNIT			TRG	
		LF01892327	18-MAY-89	8 2		PHUNIT			TRG	
		LF01891822	18-MAY-89	8 2		PHUNIT			TRG	

OU07 DRILL CUTTINGS ANALYTICAL DATA

Location Code	Parameter	Proj Sample No	Sample Date	Result	Q	Units	Det. Limit	Validation	Type Flag	Pkg	Valid
B106089	ALUMINUM	LF01890006	08-MAY-89	10400		UG/G	45 6	A	TRG	A	
		LF01891218	18-MAY-89	10300		UG/G	45 1	V	TRG	A	
		LF01890612	18-MAY-89	11400		UG/G	45.7	V	TRG	A	
		LF01892327D	18-MAY-89	9320		UG/G	44	V	TRG	A	
		LF01891822	18-MAY-89	10100		UG/G	44 8	V	TRG	A	
		LF01892327	18-MAY-89	8580		UG/G	46 5	V	TRG	A	
	ANTIMONY	LF01890006	08-MAY-89	13 7	U	UG/G	13.7	V	TRG	A	
		LF01891218	18-MAY-89	13 5	U	UG/G	13 5	A	TRG	A	
		LF01890612	18-MAY-89	13.7	U	UG/G	13.7	A	TRG	A	
		LF01892327D	18-MAY-89	13 2	U	UG/G	13.2	A	TRG	A	
		LF01891822	18-MAY-89	13 4	U	UG/G	13.4	A	TRG	A	
		LF01892327	18-MAY-89	13 9	U	UG/G	13.9	A	TRG	A	
	ARSENIC	LF01890006	08-MAY-89	8 1		UG/G	4 6	A	TRG	A	
		LF01891218	18-MAY-89	4 8		UG/G	2 3	V	TRG	A	
		LF01890612	18-MAY-89	5		UG/G	2.3	A	TRG	A	
		LF01892327D	18-MAY-89	2 7		UG/G	2.3	A	TRG	A	
		LF01891822	18-MAY-89	14 1		UG/G	2 3	V	TRG	A	
		LF01892327	18-MAY-89	2.5		UG/G	2 4	A	TRG	A	
	BARIUM	LF01890006	08-MAY-89	103		UG/G	45.6	A	TRG	A	
		LF01891218	18-MAY-89	102		UG/G	45.1	V	TRG	A	
		LF01890612	18-MAY-89	110		UG/G	45.7	V	TRG	A	
		LF01892327D	18-MAY-89	128		UG/G	44	V	TRG	A	
		LF01892327	18-MAY-89	121		UG/G	46 5	V	TRG	A	
		LF01891822	18-MAY-89	132		UG/G	44 8	V	TRG	A	
	BERYLLIUM	LF01890006	08-MAY-89	2 9		UG/G	1 1	A	TRG	A	
		LF01891218	18-MAY-89	3 2		UG/G	1 1	A	TRG	A	
		LF01890612	18-MAY-89	3 4		UG/G	1 1	A	TRG	A	
		LF01892327D	18-MAY-89	2 8		UG/G	1 1	A	TRG	A	
		LF01892327	18-MAY-89	2 6		UG/G	1 2	A	TRG	A	
		LF01891822	18-MAY-89	4		UG/G	1.1	A	TRG	A	

OU07 DRILL CUTTINGS ANALYTICAL DATA

Location Code	Parameter	Proj Sample No	Sample Date	Result	Q	Units	Det Limit	Validation	Type Flag	Pkg Valid
B106089	CADMIUM	LF01890006	08-MAY-89	1 1	U	UG/G	1.1	V	TRG	A
		LF01891218	18-MAY-89	1 1	U	UG/G	1.1	A	TRG	A
		LF01890612	18-MAY-89	1.1	U	UG/G	1.1	R	TRG	A
		LF01892327D	18-MAY-89	1 1	U	UG/G	1.1	R	TRG	A
		LF01892327	18-MAY-89	1 2	U	UG/G	1 2	R	TRG	A
		LF01891822	18-MAY-89	1 1	U	UG/G	1 1	R	TRG	A
	CALCIUM	LF01890006	08-MAY-89	9200		UG/G	1140	V	TRG	A
		LF01891218	18-MAY-89	13100		UG/G	1130	A	TRG	A
		LF01890612	18-MAY-89	10700		UG/G	1140	A	TRG	A
		LF01892327D	18-MAY-89	4320		UG/G	1100	A	TRG	A
		LF01892327	18-MAY-89	4950		UG/G	1160	A	TRG	A
		LF01891822	18-MAY-89	3040		UG/G	1120	A	TRG	A
	CESIUM	LF01890006	08-MAY-89	228	U	UG/G	228	V	TRG	A
		LF01891218	18-MAY-89	226	U	UG/G	226	V	TRG	A
		LF01890612	18-MAY-89	229	U	UG/G	229	V	TRG	A
		LF01892327D	18-MAY-89	220	U	UG/G	220	V	TRG	A
		LF01892327	18-MAY-89	232	U	UG/G	232	V	TRG	A
		LF01891822	18-MAY-89	224	U	UG/G	224	V	TRG	A
	CHROMIUM	LF01890006	08-MAY-89	11.7		UG/G	2.3	A	TRG	A
		LF01891218	18-MAY-89	13		UG/G	2 3	A	TRG	A
		LF01890612	18-MAY-89	13 8		UG/G	2 3	A	TRG	A
		LF01892327D	18-MAY-89	10 8		UG/G	2 2	A	TRG	A
		LF01892327	18-MAY-89	8 9		UG/G	2 3	A	TRG	A
		LF01891822	18-MAY-89	14 8		UG/G	2 2	A	TRG	A
	COBALT	LF01890006	08-MAY-89	11 4	U	UG/G	11 4	V	TRG	A
		LF01891218	18-MAY-89	11 3	U	UG/G	11 3	V	TRG	A
		LF01890612	18-MAY-89	11 4	U	UG/G	11 4	V	TRG	A
		LF01892327D	18-MAY-89	11	U	UG/G	11	V	TRG	A
		LF01892327	18-MAY-89	11 6	U	UG/G	11 6	V	TRG	A
		LF01891822	18-MAY-89	11 4		UG/G	11 2	A	TRG	A

OU07 DRILL CUTTINGS ANALYTICAL DATA

Location Code	Parameter	Proj Sample No	Sample Date	Result	Q	Units	Det Limit	Validation	Type Flag	Pkg Valid
B106089	COPPER	LF01890006	08-MAY-89	15 4		UG/G	5.7	A	TRG	A
		LF01891218	18-MAY-89	9.9		UG/G	5.6	V	TRG	A
		LF01890612	18-MAY-89	9.7		UG/G	5.7	V	TRG	A
		LF01892327D	18-MAY-89	11.9		UG/G	5.5	V	TRG	A
		LF01891822	18-MAY-89	26.9		UG/G	5 6	A	TRG	A
		LF01892327	18-MAY-89	11 7		UG/G	5.8	V	TRG	A
	IRON	LF01890006	08-MAY-89	14100		UG/G	22.8	A	TRG	A
		LF01891218	18-MAY-89	12200		UG/G	22.6	A	TRG	A
		LF01890612	18-MAY-89	13100		UG/G	22 9	A	TRG	A
		LF01892327D	18-MAY-89	11100		UG/G	22	A	TRG	A
		LF01892327	18-MAY-89	10300		UG/G	23.2	A	TRG	A
		LF01891822	18-MAY-89	32500		UG/G	224	A	TRG	A
	LEAD	LF01890006	08-MAY-89	29.4		UG/G	5 8	A	TRG	A
		LF01891218	18-MAY-89	14		UG/G	4.6	A	TRG	A
		LF01890612	18-MAY-89	13 5		UG/G	5.7	A	TRG	A
		LF01892327D	18-MAY-89	17 3		UG/G	4.6	A	TRG	A
		LF01891822	18-MAY-89	11 8		UG/G	4.6	A	TRG	A
		LF01892327	18-MAY-89	19 3		UG/G	6	A	TRG	A
	LITHIUM	LF01890006	08-MAY-89	5 8		UG/G	2 3	V	TRG	A
		LF01890612	18-MAY-89	6 7		UG/G	2 3	V	TRG	A
		LF01892327D	18-MAY-89	3 4		UG/G	2 2	V	TRG	A
		LF01892327	18-MAY-89	2 8		UG/G	2.3	V	TRG	A
		LF01891822	18-MAY-89	6.3		UG/G	2.2	V	TRG	A
		LF01891218	18-MAY-89	6 6		UG/G	2.3	V	TRG	A
	MAGNESIUM	LF01890006	08-MAY-89	2330		UG/G	1140	A	TRG	A
		LF01890612	18-MAY-89	2140		UG/G	1140	V	TRG	A
		LF01892327D	18-MAY-89	2230		UG/G	1100	V	TRG	A
		LF01891218	18-MAY-89	2100		UG/G	1130	V	TRG	A
		LF01892327	18-MAY-89	2180		UG/G	1160	V	TRG	A
		LF01891822	18-MAY-89	2630		UG/G	1120	V	TRG	A

OU07 DRILL CUTTINGS ANALYTICAL DATA

Location Code	Parameter	Proj Sample No	Sample Date	Result	Q	Units	Det Limit	Validation	Type Flag	Pkg Valid
B106089	MANGANESE	LF01890006	08-MAY-89	187		UG/G	3.4	A	TRG	A
		LF01890612	18-MAY-89	157		UG/G	3 4	A	TRG	A
		LF01892327D	18-MAY-89	202		UG/G	3 3	A	TRG	A
		LF01891218	18-MAY-89	135		UG/G	3 4	A	TRG	A
		LF01891822	18-MAY-89	396		UG/G	3 4	A	TRG	A
		LF01892327	18-MAY-89	197		UG/G	3 5	A	TRG	A
	MERCURY	LF01890006	08-MAY-89	.1	U	UG/G	1	R	TRG	A
		LF01890612	18-MAY-89	1 6		UG/G	12	A	TRG	A
		LF01892327D	18-MAY-89	.37		UG/G	.12	A	TRG	A
		LF01891822	18-MAY-89	37		UG/G	12	A	TRG	A
		LF01891218	18-MAY-89	44		UG/G	097	A	TRG	A
		LF01892327	18-MAY-89	42		UG/G	.11	A	TRG	A
	MOLYBDENUM	LF01890006	08-MAY-89	8 5		UG/G	2 3	V	TRG	A
		LF01890612	18-MAY-89	7.3		UG/G	2 3	V	TRG	A
		LF01892327D	18-MAY-89	6		UG/G	2.2	V	TRG	A
		LF01891822	18-MAY-89	3 3		UG/G	2 2	V	TRG	A
		LF01892327	18-MAY-89	5.9		UG/G	2 3	V	TRG	A
		LF01891218	18-MAY-89	7 2		UG/G	2 3	V	TRG	A
	NICKEL	LF01890006	08-MAY-89	9 1	U	UG/G	9 1	R	TRG	A
		LF01890612	18-MAY-89	15 3		UG/G	9.1	A	TRG	A
		LF01892327D	18-MAY-89	10 6		UG/G	8 8	A	TRG	A
		LF01892327	18-MAY-89	11		UG/G	9.3	A	TRG	A
		LF01891218	18-MAY-89	15 9		UG/G	9	A	TRG	A
		LF01891822	18-MAY-89	35 6		UG/G	9	A	TRG	A
	POTASSIUM	LF01890006	08-MAY-89	1170		UG/G	1140	V	TRG	A
		LF01890612	18-MAY-89	1140	U	UG/G	1140	A	TRG	A
		LF01892327D	18-MAY-89	1100	U	UG/G	1100	A	TRG	A
		LF01891822	18-MAY-89	1120	U	UG/G	1120	A	TRG	A
		LF01891218	18-MAY-89	1130	U	UG/G	1130	A	TRG	A
		LF01892327	18-MAY-89	1160	U	UG/G	1160	A	TRG	A

OU07 DRILL CUTTINGS ANALYTICAL DATA

Location Code	Parameter	Proj Sample No	Sample Date	Result	Q	Units	Det. Limit	Validation	Type Flag	Pkg	Valid.
B106089	SELENIUM	LF01890006	08-MAY-89	11 1	U	UG/G	11.1	A	TRG	A	
		LF01890612	18-MAY-89	5 7	U	UG/G	5.7	R	TRG	A	
		LF01892327D	18-MAY-89	5.8	U	UG/G	5.8	R	TRG	A	
		LF01892327	18-MAY-89	6	U	UG/G	6	R	TRG	A	
		LF01891218	18-MAY-89	5 7	U	UG/G	5.7	R	TRG	A	
		LF01891822	18-MAY-89	5 8	U	UG/G	5 8	R	TRG	A	
	SILVER	LF01890006	08-MAY-89	2 3	U	UG/G	2.3	V	TRG	A	
		LF01890612	18-MAY-89	2 5		UG/G	2.3	A	TRG	A	
		LF01892327D	18-MAY-89	2 2	U	UG/G	2.2	A	TRG	A	
		LF01892327	18-MAY-89	2 3	U	UG/G	2.3	A	TRG	A	
		LF01891218	18-MAY-89	2 3	U	UG/G	2.3	A	TRG	A	
		LF01891822	18-MAY-89	2 6		UG/G	2.2	A	TRG	A	
	SODIUM	LF01890006	08-MAY-89	1140	U	UG/G	1140	V	TRG	A	
		LF01890612	18-MAY-89	1140	U	UG/G	1140	V	TRG	A	
		LF01892327	18-MAY-89	1160	U	UG/G	1160	V	TRG	A	
		LF01891218	18-MAY-89	1130	U	UG/G	1130	V	TRG	A	
		LF01891822	18-MAY-89	1120	U	UG/G	1120	V	TRG	A	
		LF01892327D	18-MAY-89	1100	U	UG/G	1100	V	TRG	A	
	STRONTIUM	LF01890006	08-MAY-89	228	U	UG/G	228	V	TRG	A	
		LF01890612	18-MAY-89	229	U	UG/G	229	V	TRG	A	
		LF01892327	18-MAY-89	232	U	UG/G	232	V	TRG	A	
		LF01891218	18-MAY-89	226	U	UG/G	226	V	TRG	A	
		LF01891822	18-MAY-89	224	U	UG/G	224	V	TRG	A	
		LF01892327D	18-MAY-89	220	U	UG/G	220	V	TRG	A	
	THALLIUM	LF01890006	08-MAY-89	4.1		UG/G	2 3	A	TRG	A	
		LF01890612	18-MAY-89	2.3	U	UG/G	2 3	A	TRG	A	
		LF01892327	18-MAY-89	2.4	U	UG/G	2 4	R	TRG	A	
		LF01891218	18-MAY-89	2.3	U	UG/G	2 3	R	TRG	A	
		LF01891822	18-MAY-89	2.3	U	UG/G	2 3	R	TRG	A	
		LF01892327D	18-MAY-89	2 3	U	UG/G	2 3	R	TRG	A	

OU07 DRILL CUTTINGS ANALYTICAL DATA

Location Code	Parameter	Proj Sample No	Sample Date	Result	Q	Units	Det Limit	Validation	Type Flag	Pkg. Valid.
B106089	TIN	LF01890006	08-MAY-89	22.8	U	UG/G	22.8	V	TRG	A
		LF01890612	18-MAY-89	22 9	U	UG/G	22.9	V	TRG	A
		LF01892327D	18-MAY-89	22	U	UG/G	22	V	TRG	A
		LF01891218	18-MAY-89	22.6	U	UG/G	22.6	V	TRG	A
		LF01891822	18-MAY-89	22.4	U	UG/G	22.4	V	TRG	A
		LF01892327	18-MAY-89	23 2	U	UG/G	23 2	V	TRG	A
	VANADIUM	LF01890006	08-MAY-89	32.1		UG/G	11.4	A	TRG	A
		LF01890612	18-MAY-89	37.5		UG/G	11.4	A	TRG	A
		LF01892327D	18-MAY-89	28 6		UG/G	11	A	TRG	A
		LF01891218	18-MAY-89	34		UG/G	11.3	A	TRG	A
		LF01891822	18-MAY-89	93.4		UG/G	11.2	A	TRG	A
		LF01892327	18-MAY-89	25 4		UG/G	11.6	A	TRG	A
	ZINC	LF01890006	08-MAY-89	80		UG/G	4.6	A	TRG	A
		LF01890612	18-MAY-89	104		UG/G	4.6	A	TRG	A
		LF01892327D	18-MAY-89	44 6		UG/G	4 4	A	TRG	A
		LF01891822	18-MAY-89	40.7		UG/G	4.5	A	TRG	A
		LF01891218	18-MAY-89	469		UG/G	4.5	A	TRG	A
		LF01892327	18-MAY-89	38 2		UG/G	4 6	A	TRG	A
	CESIUM-137	LF01890006	08-MAY-89	0		PCI/G			TRG	
		LF01890006	08-MAY-89	0		PCI/G	1		TRG	
		LF01890612	18-MAY-89	0		PCI/G	1		TRG	
		LF01892327D	18-MAY-89	0		PCI/G	.1		TRG	
		LF01892327	18-MAY-89	0		PCI/G	.1		TRG	
		LF01891218	18-MAY-89	0		PCI/G	1		TRG	
		LF01891822	18-MAY-89	0		PCI/G	1		TRG	
	GROSS ALPHA PARTICLE RADIOACTI	LF01890006	08-MAY-89	18		PCI/G			TRG	
	GROSS BETA PARTICLE RADIOACTIV	LF01890006	08-MAY-89	25		PCI/G			TRG	
	PLUTONIUM-239	LF01890006	08-MAY-89	02		PCI/G			TRG	

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Location Code	Parameter	Proj Sample No	Sample Date	Result	Q	Units	Det. Limit	Validation	Type Flag	Pkg	Valid
B106089	RADIUM-226	LF01890006	08-MAY-89	.6		PCI/G			TRG		
	RADIUM-228	LF01890006	08-MAY-89	1.6		PCI/G			TRG		
	STRONTIUM-90	LF01890006	08-MAY-89	0		PCI/G			TRG		
	TRITIUM	LF01890006	08-MAY-89	63		PCI/ML			TRG		
	URANIUM, TOTAL	LF01890006	08-MAY-89	1 7					TRG		
	URANIUM-233,-234	LF01890006	08-MAY-89	9		PCI/G			TRG		
	URANIUM-235	LF01890006	08-MAY-89	0		PCI/G			TRG		
	URANIUM-238	LF01890006	08-MAY-89	8		PCI/G			TRG		
	1,1,1-TRICHLOROETHANE	LF01890709	08-MAY-89	280	U	UG/G	280		TRG		
		LF01890001	08-MAY-89	6	U	UG/G	6		TRG		
		LF01890305	08-MAY-89	6	U	UG/G	6		TRG		
		LF01892224	18-MAY-89	29	U	UG/G	29		TRG		
		LF01892021	18-MAY-89	6	U	UG/G	6		TRG		
		LF01891214	18-MAY-89	28	U	UG/G	28		TRG		
		LF01891618	18-MAY-89	30	U	UG/G	30		TRG		
		LF01892426	18-MAY-89	6	U	UG/G	6		TRG		
	1,1,2,2-TETRACHLOROETHANE	LF01890709	08-MAY-89	280	U	UG/G	280		TRG		
		LF01890001	08-MAY-89	6	U	UG/G	6		TRG		
		LF01890305	08-MAY-89	6	U	UG/G	6		TRG		
		LF01892224	18-MAY-89	29	U	UG/G	29		TRG		
		LF01891618	18-MAY-89	30	U	UG/G	30		TRG		
		LF01891214	18-MAY-89	28	U	UG/G	28		TRG		
		LF01892021	18-MAY-89	6	U	UG/G	6		TRG		
		LF01892426	18-MAY-89	6	U	UG/G	6		TRG		
	1,1,2-TRICHLOROETHANE	LF01890709	08-MAY-89	280	U	UG/G	280		TRG		

OU07 DRILL CUTTINGS ANALYTICAL DATA

Location Code	Parameter	Proj Sample No	Sample Date	Result	Q	Units	Det Limit	Validation	Type Flag	Pkg Valid
B106089	1,1,2-TRICHLOROETHANE	LF01890305	08-MAY-89	6	U	UG/G	6		TRG	
		LF01890001	08-MAY-89	6	U	UG/G	6		TRG	
		LF01892224	18-MAY-89	29	U	UG/G	29		TRG	
		LF01891618	18-MAY-89	30	U	UG/G	30		TRG	
		LF01892021	18-MAY-89	6	U	UG/G	6		TRG	
		LF01891214	18-MAY-89	28	U	UG/G	28		TRG	
		LF01892426	18-MAY-89	6	U	UG/G	6		TRG	
	1,1-DICHLOROETHANE	LF01890709	08-MAY-89	280	U	UG/G	280		TRG	
		LF01890305	08-MAY-89	6	U	UG/G	6		TRG	
		LF01890001	08-MAY-89	6	U	UG/G	6		TRG	
		LF01892224	18-MAY-89	29	U	UG/G	29		TRG	
		LF01891214	18-MAY-89	28	U	UG/G	28		TRG	
		LF01891618	18-MAY-89	30	U	UG/G	30		TRG	
		LF01892021	18-MAY-89	6	U	UG/G	6		TRG	
		LF01892426	18-MAY-89	6	U	UG/G	6		TRG	
	1,1-DICHLOROETHENE	LF01890709	08-MAY-89	280	U	UG/G	280		TRG	
		LF01890305	08-MAY-89	6	U	UG/G	6		TRG	
		LF01890001	08-MAY-89	6	U	UG/G	6		TRG	
		LF01892224	18-MAY-89	29	U	UG/G	29		TRG	
		LF01891618	18-MAY-89	30	U	UG/G	30		TRG	
		LF01891214	18-MAY-89	28	U	UG/G	28		TRG	
		LF01892021	18-MAY-89	6	U	UG/G	6		TRG	
		LF01892426	18-MAY-89	6	U	UG/G	6		TRG	
	1,2-DICHLOROETHANE	LF01890709	08-MAY-89	280	U	UG/G	280		TRG	
		LF01890001	08-MAY-89	6	U	UG/G	6		TRG	
		LF01890305	08-MAY-89	6	U	UG/G	6		TRG	
		LF01892224	18-MAY-89	29	U	UG/G	29		TRG	
		LF01891214	18-MAY-89	28	U	UG/G	28		TRG	
		LF01892021	18-MAY-89	6	U	UG/G	6		TRG	
		LF01891618	18-MAY-89	30	U	UG/G	30		TRG	
		LF01892426	18-MAY-89	6	U	UG/G	6		TRG	

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Location Code	Parameter	Proj Sample No	Sample Date	Result	Q	Units	Det Limit	Validation	Type Flag	Pkg. Valid
B106089	1,2-DICHLOROETHYLENE	LF01890709	08-MAY-89	280	U	UG/G	280		TRG	
		LF01890001	08-MAY-89	6	U	UG/G	6		TRG	
		LF01890305	08-MAY-89	6	U	UG/G	6		TRG	
		LF01892224	18-MAY-89	29	U	UG/G	29		TRG	
		LF01892021	18-MAY-89	6	U	UG/G	6		TRG	
		LF01891214	18-MAY-89	28	U	UG/G	28		TRG	
		LF01891618	18-MAY-89	30	U	UG/G	30		TRG	
		LF01892426	18-MAY-89	6	U	UG/G	6		TRG	
	1,2-DICHLOROPROPANE	LF01890709	08-MAY-89	280	U	UG/G	280		TRG	
		LF01890305	08-MAY-89	6	U	UG/G	6		TRG	
		LF01890001	08-MAY-89	6	U	UG/G	6		TRG	
		LF01892224	18-MAY-89	29	U	UG/G	29		TRG	
		LF01892021	18-MAY-89	6	U	UG/G	6		TRG	
		LF01891618	18-MAY-89	30	U	UG/G	30		TRG	
		LF01891214	18-MAY-89	28	U	UG/G	28		TRG	
		LF01892426	18-MAY-89	6	U	UG/G	6		TRG	
	2-BUTANONE	LF01890709	08-MAY-89	530	J	UG/G	560		TRG	
		LF01890305	08-MAY-89	7	J	UG/G	12		TRG	
		LF01890001	08-MAY-89	12	U	UG/G	12		TRG	
		LF01892224	18-MAY-89	59	U	UG/G	59		TRG	
		LF01892021	18-MAY-89	12	U	UG/G	12		TRG	
		LF01891618	18-MAY-89	330		UG/G	61		TRG	
		LF01891214	18-MAY-89	220		UG/G	57		TRG	
		LF01892426	18-MAY-89	12	U	UG/G	12		TRG	
	2-HEXANONE	LF01890709	08-MAY-89	560	U	UG/G	560		TRG	
		LF01890305	08-MAY-89	12	U	UG/G	12		TRG	
		LF01890001	08-MAY-89	12	U	UG/G	12		TRG	
		LF01892224	18-MAY-89	59	U	UG/G	59		TRG	
		LF01892021	18-MAY-89	12	U	UG/G	12		TRG	
		LF01891214	18-MAY-89	40	J	UG/G	57		TRG	
		LF01891618	18-MAY-89	41	J	UG/G	61		TRG	
		LF01892426	18-MAY-89	12	U	UG/G	12		TRG	

OU07 DRILL CUTTINGS ANALYTICAL DATA

Location Code	Parameter	Proj Sample No	Sample Date	Result	Q	Units	Det Limit	Validation	Type Flag	Pkg	Valid
B106089	4-METHYL-2-PENTANONE	LF01890709	08-MAY-89	560	U	UG/G	560		TRG		
		LF01890305	08-MAY-89	12	U	UG/G	12		TRG		
		LF01890001	08-MAY-89	12	U	UG/G	12		TRG		
		LF01892224	18-MAY-89	59	U	UG/G	59		TRG		
		LF01892021	18-MAY-89	2	JB	UG/G	12		TRG		
		LF01891214	18-MAY-89	16	JB	UG/G	57		TRG		
		LF01891618	18-MAY-89	13	J	UG/G	61		TRG		
		LF01892426	18-MAY-89	12	U	UG/G	12		TRG		
	ACETONE	LF01890709	08-MAY-89	830		UG/G	560		TRG		
		LF01890305	08-MAY-89	39		UG/G	12		TRG		
		LF01890001	08-MAY-89	12	U	UG/G	12		TRG		
		LF01892224	18-MAY-89	59	U	UG/G	59		TRG		
		LF01892021	18-MAY-89	13	B	UG/G	12		TRG		
		LF01891618	18-MAY-89	990		UG/G	61		TRG		
		LF01891214	18-MAY-89	680	B	UG/G	57		TRG		
		LF01892426	18-MAY-89	12	U	UG/G	12		TRG		
	BENZENE	LF01890709	08-MAY-89	280	U	UG/G	280		TRG		
		LF01890305	08-MAY-89	6	U	UG/G	6		TRG		
		LF01890001	08-MAY-89	6	U	UG/G	6		TRG		
		LF01892224	18-MAY-89	29	U	UG/G	29		TRG		
		LF01891618	18-MAY-89	30	U	UG/G	30		TRG		
		LF01892021	18-MAY-89	6	U	UG/G	6		TRG		
		LF01891214	18-MAY-89	7	J	UG/G	28		TRG		
		LF01892426	18-MAY-89	6	U	UG/G	6		TRG		
	BROMODICHLOROMETHANE	LF01890709	08-MAY-89	280	U	UG/G	280		TRG		
		LF01890305	08-MAY-89	6	U	UG/G	6		TRG		
		LF01890001	08-MAY-89	6	U	UG/G	6		TRG		
		LF01892224	18-MAY-89	29	U	UG/G	29		TRG		
		LF01891214	18-MAY-89	28	U	UG/G	28		TRG		
		LF01891618	18-MAY-89	30	U	UG/G	30		TRG		
		LF01892021	18-MAY-89	6	U	UG/G	6		TRG		
		LF01892426	18-MAY-89	6	U	UG/G	6		TRG		

OU07 DRILL CUTTINGS ANALYTICAL DATA

Location Code	Parameter	Proj Sample No	Sample Date	Result	Q	Units	Det. Limit	Validation	Type Flag	Pkg	Valid
B106089	BROMOFORM	LF01890709	08-MAY-89	280	U	UG/G	280		TRG		
		LF01890305	08-MAY-89	6	U	UG/G	6		TRG		
		LF01890001	08-MAY-89	6	U	UG/G	6		TRG		
		LF01892224	18-MAY-89	29	U	UG/G	29		TRG		
		LF01891214	18-MAY-89	28	U	UG/G	28		TRG		
		LF01891618	18-MAY-89	30	U	UG/G	30		TRG		
		LF01892021	18-MAY-89	6	U	UG/G	6		TRG		
		LF01892426	18-MAY-89	6	U	UG/G	6		TRG		
	BROMOMETHANE	LF01890709	08-MAY-89	560	U	UG/G	560		TRG		
		LF01890305	08-MAY-89	12	U	UG/G	12		TRG		
		LF01890001	08-MAY-89	12	U	UG/G	12		TRG		
		LF01892224	18-MAY-89	59	U	UG/G	59		TRG		
		LF01891618	18-MAY-89	61	U	UG/G	61		TRG		
		LF01891214	18-MAY-89	57	U	UG/G	57		TRG		
		LF01892021	18-MAY-89	12	U	UG/G	12		TRG		
		LF01892426	18-MAY-89	12	U	UG/G	12		TRG		
	CARBON DISULFIDE	LF01890709	08-MAY-89	280	U	UG/G	280		TRG		
		LF01890305	08-MAY-89	6	U	UG/G	6		TRG		
		LF01890001	08-MAY-89	6	U	UG/G	6		TRG		
		LF01892224	18-MAY-89	29	U	UG/G	29		TRG		
		LF01891618	18-MAY-89	30	U	UG/G	30		TRG		
		LF01892021	18-MAY-89	6	U	UG/G	6		TRG		
		LF01891214	18-MAY-89	28	U	UG/G	28		TRG		
		LF01892426	18-MAY-89	6	U	UG/G	6		TRG		
	CARBON TETRACHLORIDE	LF01890709	08-MAY-89	280	U	UG/G	280		TRG		
		LF01890305	08-MAY-89	6	U	UG/G	6		TRG		
		LF01890001	08-MAY-89	6	U	UG/G	6		TRG		
		LF01892224	18-MAY-89	29	U	UG/G	29		TRG		
		LF01891618	18-MAY-89	30	U	UG/G	30		TRG		
		LF01892021	18-MAY-89	6	U	UG/G	6		TRG		
		LF01891214	18-MAY-89	28	U	UG/G	28		TRG		
		LF01892426	18-MAY-89	6	U	UG/G	6		TRG		

OU07 DRILL CUTTINGS ANALYTICAL DATA

Location Code	Parameter	Proj Sample No	Sample Date	Result	Q	Units	Det Limit	Validation	Type Flag	Pkg	Valid
B106089	CHLOROBENZENE	LF01890709	08-MAY-89	280	U	UG/G	280		TRG		
		LF01890305	08-MAY-89	6	U	UG/G	6		TRG		
		LF01890001	08-MAY-89	6	U	UG/G	6		TRG		
		LF01892224	18-MAY-89	29	U	UG/G	29		TRG		
		LF01892021	18-MAY-89	6	U	UG/G	6		TRG		
		LF01891618	18-MAY-89	30	U	UG/G	30		TRG		
		LF01891214	18-MAY-89	28	U	UG/G	28		TRG		
		LF01892426	18-MAY-89	6	U	UG/G	6		TRG		
	CHLOROETHANE	LF01890709	08-MAY-89	560	U	UG/G	560		TRG		
		LF01890305	08-MAY-89	12	U	UG/G	12		TRG		
		LF01890001	08-MAY-89	12	U	UG/G	12		TRG		
		LF01892224	18-MAY-89	59	U	UG/G	59		TRG		
		LF01892021	18-MAY-89	12	U	UG/G	12		TRG		
		LF01891214	18-MAY-89	57	U	UG/G	57		TRG		
		LF01891618	18-MAY-89	61	U	UG/G	61		TRG		
		LF01892426	18-MAY-89	12	U	UG/G	12		TRG		
	CHLOROFORM	LF01890709	08-MAY-89	280	U	UG/G	280		TRG		
		LF01890305	08-MAY-89	6	U	UG/G	6		TRG		
		LF01890001	08-MAY-89	6	U	UG/G	6		TRG		
		LF01892224	18-MAY-89	29	U	UG/G	29		TRG		
		LF01891214	18-MAY-89	28	U	UG/G	28		TRG		
		LF01892021	18-MAY-89	6	U	UG/G	6		TRG		
		LF01891618	18-MAY-89	30	U	UG/G	30		TRG		
		LF01892426	18-MAY-89	6	U	UG/G	6		TRG		
	CHLOROMETHANE	LF01890709	08-MAY-89	560	U	UG/G	560		TRG		
		LF01890305	08-MAY-89	12	U	UG/G	12		TRG		
		LF01890001	08-MAY-89	12	U	UG/G	12		TRG		
		LF01892224	18-MAY-89	59	U	UG/G	59		TRG		
		LF01891618	18-MAY-89	61	U	UG/G	61		TRG		
		LF01891214	18-MAY-89	57	U	UG/G	57		TRG		
		LF01892021	18-MAY-89	12	U	UG/G	12		TRG		
		LF01892426	18-MAY-89	12	U	UG/G	12		TRG		

OU07 DRILL CUTTINGS ANALYTICAL DATA

Location Code	Parameter	Proj Sample No	Sample Date	Result	Q	Units	Det Limit	Validation	Type Flag	Pkg Valid
B106089	DIBROMOCHLOROMETHANE	LF01890709	08-MAY-89	280	U	UG/G	280		TRG	
		LF01890305	08-MAY-89	6	U	UG/G	6		TRG	
		LF01890001	08-MAY-89	6	U	UG/G	6		TRG	
		LF01892224	18-MAY-89	29	U	UG/G	29		TRG	
		LF01891618	18-MAY-89	30	U	UG/G	30		TRG	
		LF01892021	18-MAY-89	6	U	UG/G	6		TRG	
		LF01891214	18-MAY-89	28	U	UG/G	28		TRG	
		LF01892426	18-MAY-89	6	U	UG/G	6		TRG	
	ETHYLBENZENE	LF01890709	08-MAY-89	92	J	UG/G	280		TRG	
		LF01890305	08-MAY-89	5	J	UG/G	6		TRG	
		LF01890001	08-MAY-89	6	U	UG/G	6		TRG	
		LF01892224	18-MAY-89	29	U	UG/G	29		TRG	
		LF01892021	18-MAY-89	6	U	UG/G	6		TRG	
		LF01891618	18-MAY-89	10	J	UG/G	30		TRG	
		LF01891214	18-MAY-89	24	J	UG/G	28		TRG	
		LF01892426	18-MAY-89	6	U	UG/G	6		TRG	
	METHYLENE CHLORIDE	LF01890709	08-MAY-89	220	J	UG/G	280		TRG	
		LF01890305	08-MAY-89	11		UG/G	6		TRG	
		LF01890001	08-MAY-89	27		UG/G	6		TRG	
		LF01892224	18-MAY-89	20	J	UG/G	29		TRG	
		LF01891618	18-MAY-89	28	JB	UG/G	30		TRG	
		LF01891214	18-MAY-89	25	JB	UG/G	28		TRG	
		LF01892021	18-MAY-89	4	JB	UG/G	6		TRG	
		LF01892426	18-MAY-89	15		UG/G	6		TRG	
	STYRENE	LF01890709	08-MAY-89	280	U	UG/G	280		TRG	
		LF01890305	08-MAY-89	6	U	UG/G	6		TRG	
		LF01890001	08-MAY-89	6	U	UG/G	6		TRG	
		LF01892224	18-MAY-89	29	U	UG/G	29		TRG	
		LF01891214	18-MAY-89	28	U	UG/G	28		TRG	
		LF01892021	18-MAY-89	6	U	UG/G	6		TRG	
		LF01891618	18-MAY-89	7	J	UG/G	30		TRG	
		LF01892426	18-MAY-89	6	U	UG/G	6		TRG	

OU07 DRILL CUTTINGS ANALYTICAL DATA

Location Code	Parameter	Proj Sample No	Sample Date	Result	Q	Units	Det. Limit	Validation	Type Flag	Pkg	Valid
B106089	TETRACHLOROETHENE	LF01890709	08-MAY-89	280	U	UG/G	280		TRG		
		LF01890305	08-MAY-89	3	J	UG/G	6		TRG		
		LF01890001	08-MAY-89	6	U	UG/G	6		TRG		
		LF01892224	18-MAY-89	29	U	UG/G	29		TRG		
		LF01891214	18-MAY-89	8	J	UG/G	28		TRG		
		LF01891618	18-MAY-89	30	U	UG/G	30		TRG		
		LF01892021	18-MAY-89	6	U	UG/G	6		TRG		
		LF01892426	18-MAY-89	6	U	UG/G	6		TRG		
	TOLUENE	LF01890709	08-MAY-89	350		UG/G	280		TRG		
		LF01890305	08-MAY-89	21		UG/G	6		TRG		
		LF01890001	08-MAY-89	6	U	UG/G	6		TRG		
		LF01892224	18-MAY-89	29	U	UG/G	29		TRG		
		LF01892021	18-MAY-89	6	U	UG/G	6		TRG		
		LF01891214	18-MAY-89	71		UG/G	28		TRG		
		LF01891618	18-MAY-89	33		UG/G	30		TRG		
		LF01892426	18-MAY-89	6	U	UG/G	6		TRG		
	TOTAL XYLENES	LF01890709	08-MAY-89	280	U	UG/G	280		TRG		
		LF01890305	08-MAY-89	6		UG/G	6		TRG		
		LF01890001	08-MAY-89	6	U	UG/G	6		TRG		
		LF01892224	18-MAY-89	29	U	UG/G	29		TRG		
		LF01892021	18-MAY-89	6	U	UG/G	6		TRG		
		LF01891214	18-MAY-89	14	J	UG/G	28		TRG		
		LF01891618	18-MAY-89	30	U	UG/G	30		TRG		
		LF01892426	18-MAY-89	6	U	UG/G	6		TRG		
	TRICHLOROETHENE	LF01890709	08-MAY-89	280	U	UG/G	280		TRG		
		LF01890305	08-MAY-89	6	U	UG/G	6		TRG		
		LF01890001	08-MAY-89	6	U	UG/G	6		TRG		
		LF01892224	18-MAY-89	29	U	UG/G	29		TRG		
		LF01891214	18-MAY-89	28	U	UG/G	28		TRG		
		LF01892021	18-MAY-89	6	U	UG/G	6		TRG		
		LF01891618	18-MAY-89	30	U	UG/G	30		TRG		
		LF01892426	18-MAY-89	6	U	UG/G	6		TRG		

OU07 DRILL CUTTINGS ANALYTICAL DATA

Location Code	Parameter	Proj Sample No	Sample Date	Result	Q	Units	Det. Limit	Validation	Type Flag	Pkg	Valid
B106089	VINYL ACETATE	LF01890709	08-MAY-89	560	U	UG/G	560		TRG		
		LF01890001	08-MAY-89	12	U	UG/G	12		TRG		
		LF01890305	08-MAY-89	12	U	UG/G	12		TRG		
		LF01892224	18-MAY-89	59	U	UG/G	59		TRG		
		LF01891618	18-MAY-89	61	U	UG/G	61		TRG		
		LF01891214	18-MAY-89	57	U	UG/G	57		TRG		
		LF01892021	18-MAY-89	12	U	UG/G	12		TRG		
		LF01892426	18-MAY-89	12	U	UG/G	12		TRG		
	VINYL CHLORIDE	LF01890709	08-MAY-89	560	U	UG/G	560		TRG		
		LF01890305	08-MAY-89	12	U	UG/G	12		TRG		
		LF01890001	08-MAY-89	12	U	UG/G	12		TRG		
		LF01892224	18-MAY-89	59	U	UG/G	59		TRG		
		LF01891618	18-MAY-89	61	U	UG/G	61		TRG		
		LF01892021	18-MAY-89	12	U	UG/G	12		TRG		
		LF01891214	18-MAY-89	57	U	UG/G	57		TRG		
		LF01892426	18-MAY-89	12	U	UG/G	12		TRG		
	cis-1,3-DICHLOROPROPENE	LF01890709	08-MAY-89	280	U	UG/G	280		TRG		
		LF01890305	08-MAY-89	6	U	UG/G	6		TRG		
		LF01890001	08-MAY-89	6	U	UG/G	6		TRG		
		LF01892224	18-MAY-89	29	U	UG/G	29		TRG		
		LF01892021	18-MAY-89	6	U	UG/G	6		TRG		
		LF01891214	18-MAY-89	28	U	UG/G	28		TRG		
		LF01891618	18-MAY-89	30	U	UG/G	30		TRG		
		LF01892426	18-MAY-89	6	U	UG/G	6		TRG		
	trans-1,3-DICHLOROPROPENE	LF01890709	08-MAY-89	280	U	UG/G	280		TRG		
		LF01890001	08-MAY-89	6	U	UG/G	6		TRG		
		LF01890305	08-MAY-89	6	U	UG/G	6		TRG		
		LF01892224	18-MAY-89	29	U	UG/G	29		TRG		
		LF01891214	18-MAY-89	28	U	UG/G	28		TRG		
		LF01891618	18-MAY-89	30	U	UG/G	30		TRG		
		LF01892021	18-MAY-89	6	U	UG/G	6		TRG		
		LF01892426	18-MAY-89	6	U	UG/G	6		TRG		

OU07 DRILL CUTTINGS ANALYTICAL DATA

Location Code	Parameter	Proj Sample No	Sample Date	Result	Q	Units	Det. Limit	Validation	Type Flag	Pkg	Valid
B206189	% SOLIDS	LF0289BR0003	24-MAY-89	93		%			TRG		
		LF0289BR1620	25-MAY-89	89		%			TRG		
		LF0289BR1016	25-MAY-89	83 5		%			TRG		
		LF0289BR0309	25-MAY-89	82 4		%			TRG		
		LF0289BR2733	25-MAY-89	82 1		%			TRG		
		LF0289BR2127	25-MAY-89	83 3		%			TRG		
	NITRATE	LF0289BR0003	24-MAY-89	4 8697	U				TRG		
		LF0289BR1620	25-MAY-89	4 8697	U				TRG		
		LF0289BR1016	25-MAY-89	5 3124	U				TRG		
		LF0289BR0309	25-MAY-89	5 3124	U				TRG		
		LF0289BR2733	25-MAY-89	5.3124	U				TRG		
		LF0289BR2127	25-MAY-89	5 3124	U				TRG		
	NITRATE/NITRITE	LF0289BR0003	24-MAY-89	1 1	U	MG/KG		V	TRG		
		LF0289BR1620	25-MAY-89	1.1	U	MG/KG		V	TRG		
		LF0289BR0309	25-MAY-89	1 2	U	MG/KG		V	TRG		
		LF0289BR1016	25-MAY-89	1 2	U	MG/KG		V	TRG		
		LF0289BR2733	25-MAY-89	1 2	U	MG/KG		V	TRG		
		LF0289BR2127	25-MAY-89	1.2	U	MG/KG		V	TRG		
	SULFIDE	LF0289BR0003	24-MAY-89	2	U	MG/KG		V	TRG		
		LF0289BR1620	25-MAY-89	2	U	MG/KG		V	TRG		
		LF0289BR0309	25-MAY-89	2	U	MG/KG		V	TRG		
		LF0289BR1016	25-MAY-89	2	U	MG/KG		V	TRG		
		LF0289BR2733	25-MAY-89	2	U	MG/KG		V	TRG		
		LF0289BR2127	25-MAY-89	2	U	MG/KG		V	TRG		
	pH	LF0289BR0003	24-MAY-89	8.5		PHUNIT			TRG		
		LF0289BR1620	25-MAY-89	7.8		PHUNIT			TRG		
		LF0289BR0309	25-MAY-89	8		PHUNIT			TRG		
		LF0289BR1016	25-MAY-89	8		PHUNIT			TRG		
		LF0289BR2733	25-MAY-89	7 7		PHUNIT			TRG		
		LF0289BR2127	25-MAY-89	7 7		PHUNIT			TRG		

OU07 DRILL CUTTINGS ANALYTICAL DATA

Location Code	Parameter	Proj Sample No	Sample Date	Result	Q	Units	Det. Limit	Validation	Type Flag	Pkg. Valid
B206189	ALUMINUM	LF0289BR2733	25-MAY-89	6800		UG/G	47.1		TRG	
		LF0289BR2127	25-MAY-89	6160		UG/G	45 9		TRG	
		LF0289BR1620	25-MAY-89	6480		UG/G	43.7		TRG	
		LF0289BR1016	25-MAY-89	9310		UG/G	44 3		TRG	
		LF0289BR0309	25-MAY-89	11400		UG/G	45 9		TRG	
	ANTIMONY	LF0289BR1620	25-MAY-89	13 1	U	UG/G	13 1		TRG	
		LF0289BR1016	25-MAY-89	13.3	U	UG/G	13 3		TRG	
		LF0289BR0309	25-MAY-89	13 8	U	UG/G	13 8		TRG	
		LF0289BR2733	25-MAY-89	14 1	U	UG/G	14.1		TRG	
		LF0289BR2127	25-MAY-89	15 2		UG/G	13 8		TRG	
	ARSENIC	LF0289BR2733	25-MAY-89	6 7		UG/G	2 4		TRG	
		LF0289BR2127	25-MAY-89	2 3	U	UG/G	2 3		TRG	
		LF0289BR1620	25-MAY-89	3 1		UG/G	2 2		TRG	
		LF0289BR1016	25-MAY-89	3 4		UG/G	2 2		TRG	
		LF0289BR0309	25-MAY-89	2 3	U	UG/G	2 3		TRG	
	BARIUM	LF0289BR1620	25-MAY-89	48 2		UG/G	43 7		TRG	
		LF0289BR1016	25-MAY-89	48.8		UG/G	44 3		TRG	
		LF0289BR0309	25-MAY-89	105		UG/G	45.9		TRG	
		LF0289BR2733	25-MAY-89	79		UG/G	47 1		TRG	
		LF0289BR2127	25-MAY-89	146		UG/G	45 9		TRG	
	BERYLLIUM	LF0289BR2733	25-MAY-89	2 6		UG/G	1.2		TRG	
		LF0289BR2127	25-MAY-89	3 3		UG/G	1 1		TRG	
		LF0289BR1620	25-MAY-89	3 2		UG/G	1 1		TRG	
		LF0289BR1016	25-MAY-89	3		UG/G	1.1		TRG	
		LF0289BR0309	25-MAY-89	3 7		UG/G	1 1		TRG	
	CADMIUM	LF0289BR1620	25-MAY-89	1.1	U	UG/G	1 1		TRG	
		LF0289BR0309	25-MAY-89	1 1	U	UG/G	1 1		TRG	
		LF0289BR1016	25-MAY-89	1 1	U	UG/G	1 1		TRG	
		LF0289BR2733	25-MAY-89	1.2	U	UG/G	1 2		TRG	
		LF0289BR2127	25-MAY-89	1.1	U	UG/G	1 1		TRG	

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Location Code	Parameter	Proj Sample No	Sample Date	Result	Q	Units	Det. Limit	Validation	Type Flag	Pkg	Valid
B206189	CALCIUM	LF0289BR2733	25-MAY-89	5860		UG/G	1180		TRG		
		LF0289BR2127	25-MAY-89	4590		UG/G	1150		TRG		
		LF0289BR1620	25-MAY-89	2290		UG/G	1090		TRG		
		LF0289BR1016	25-MAY-89	4520		UG/G	1110		TRG		
		LF0289BR0309	25-MAY-89	6660		UG/G	1150		TRG		
	CESIUM	LF0289BR1620	25-MAY-89	218	U	UG/G	218		TRG		
		LF0289BR1016	25-MAY-89	222	U	UG/G	222		TRG		
		LF0289BR0309	25-MAY-89	229	U	UG/G	229		TRG		
		LF0289BR2733	25-MAY-89	235	U	UG/G	235		TRG		
		LF0289BR2127	25-MAY-89	230	U	UG/G	230		TRG		
	CHROMIUM	LF0289BR2733	25-MAY-89	7 5		UG/G	2.4		TRG		
		LF0289BR2127	25-MAY-89	6 7		UG/G	2 3		TRG		
		LF0289BR1620	25-MAY-89	15 7		UG/G	2.2		TRG		
		LF0289BR0309	25-MAY-89	13 3		UG/G	2.3		TRG		
		LF0289BR1016	25-MAY-89	11 1		UG/G	2 2		TRG		
	COBALT	LF0289BR1620	25-MAY-89	10 9	U	UG/G	10 9		TRG		
		LF0289BR0309	25-MAY-89	11.5	U	UG/G	11.5		TRG		
		LF0289BR1016	25-MAY-89	13 1		UG/G	11 1		TRG		
		LF0289BR2733	25-MAY-89	11.8	U	UG/G	11 8		TRG		
		LF0289BR2127	25-MAY-89	24 4		UG/G	11.5		TRG		
	COPPER	LF0289BR2733	25-MAY-89	16.2		UG/G	5.9		TRG		
		LF0289BR2127	25-MAY-89	17.9		UG/G	5 7		TRG		
		LF0289BR1620	25-MAY-89	21 5		UG/G	5.5		TRG		
		LF0289BR0309	25-MAY-89	12 2		UG/G	5 7		TRG		
		LF0289BR1016	25-MAY-89	6 1		UG/G	5.5		TRG		
	IRON	LF0289BR1620	25-MAY-89	24600		UG/G	218		TRG		
		LF0289BR0309	25-MAY-89	13800		UG/G	22 9		TRG		
		LF0289BR1016	25-MAY-89	15000		UG/G	22 2		TRG		
		LF0289BR2733	25-MAY-89	8180		UG/G	23.5		TRG		
		LF0289BR2127	25-MAY-89	60700		UG/G	230		TRG		

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Location Code	Parameter	Proj Sample No	Sample Date	Result	Q	Units	Det. Limit	Validation	Type Flag	Pkg	Valid.
B206189	LEAD	LF0289BR2733	25-MAY-89	24 9		UG/G	4 9		TRG		
		LF0289BR2127	25-MAY-89	26 1		UG/G	4.6		TRG		
		LF0289BR1620	25-MAY-89	4.5	U	UG/G	4.5		TRG		
		LF0289BR0309	25-MAY-89	9.4		UG/G	4 6		TRG		
		LF0289BR1016	25-MAY-89	7.5		UG/G	4 4		TRG		
	LITHIUM	LF0289BR1620	25-MAY-89	4 5		UG/G	2.2		TRG		
		LF0289BR0309	25-MAY-89	7.7		UG/G	2.3		TRG		
		LF0289BR1016	25-MAY-89	4 9		UG/G	2 2		TRG		
		LF0289BR2733	25-MAY-89	2 4	U	UG/G	2 4		TRG		
		LF0289BR2127	25-MAY-89	2 5		UG/G	2.3		TRG		
	MAGNESIUM	LF0289BR2733	25-MAY-89	1530		UG/G	1180		TRG		
		LF0289BR2127	25-MAY-89	1830		UG/G	1150		TRG		
		LF0289BR1620	25-MAY-89	1470		UG/G	1090		TRG		
		LF0289BR0309	25-MAY-89	2250		UG/G	1150		TRG		
		LF0289BR1016	25-MAY-89	2390		UG/G	1110		TRG		
	MANGANESE	LF0289BR1620	25-MAY-89	195		UG/G	3.3		TRG		
		LF0289BR0309	25-MAY-89	215		UG/G	3 4		TRG		
		LF0289BR1016	25-MAY-89	97 6		UG/G	3 3		TRG		
		LF0289BR2733	25-MAY-89	70 1		UG/G	3 5		TRG		
		LF0289BR2127	25-MAY-89	665		UG/G	3 4		TRG		
	MERCURY	LF0289BR2733	25-MAY-89	44		UG/G	.12		TRG		
		LF0289BR2127	25-MAY-89	12		UG/G	.1		TRG		
		LF0289BR1620	25-MAY-89	33		UG/G	1		TRG		
		LF0289BR1016	25-MAY-89	4		UG/G	.11		TRG		
		LF0289BR0309	25-MAY-89	24		UG/G	.11		TRG		
	MOLYBDENUM	LF0289BR1016	25-MAY-89	7 8		UG/G	2 2		TRG		
		LF0289BR0309	25-MAY-89	10 8		UG/G	2 3		TRG		
		LF0289BR2733	25-MAY-89	7 1		UG/G	2 4		TRG		
		LF0289BR1620	25-MAY-89	3 4		UG/G	2 2		TRG		
		LF0289BR2127	25-MAY-89	2 3	U	UG/G	2 3		TRG		

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Location Code	Parameter	Proj Sample No	Sample Date	Result	Q	Units	Det Limit	Validation	Type Flag	Pkg Valid
8206189	NICKEL	LF0289BR2733	25-MAY-89	9 4	U	UG/G	9.4		TRG	
		LF0289BR2127	25-MAY-89	63		UG/G	9.2		TRG	
		LF0289BR1620	25-MAY-89	34.7		UG/G	8 7		TRG	
		LF0289BR1016	25-MAY-89	11 7		UG/G	8.9		TRG	
		LF0289BR0309	25-MAY-89	14 5		UG/G	9 2		TRG	
	POTASSIUM	LF0289BR1016	25-MAY-89	1110	U	UG/G	1110		TRG	
		LF0289BR0309	25-MAY-89	1490		UG/G	1150		TRG	
		LF0289BR2733	25-MAY-89	1180	U	UG/G	1180		TRG	
		LF0289BR1620	25-MAY-89	1090	U	UG/G	1090		TRG	
		LF0289BR2127	25-MAY-89	1150	U	UG/G	1150		TRG	
	SELENIUM	LF0289BR2733	25-MAY-89	1 2	U	UG/G	1.2		TRG	
		LF0289BR2127	25-MAY-89	1.2	U	UG/G	1.2		TRG	
		LF0289BR1620	25-MAY-89	1.1	U	UG/G	1.1		TRG	
		LF0289BR1016	25-MAY-89	1 1	U	UG/G	1.1		TRG	
		LF0289BR0309	25-MAY-89	1 1	U	UG/G	1 1		TRG	
	SILVER	LF0289BR1016	25-MAY-89	2 2	U	UG/G	2 2		TRG	
		LF0289BR0309	25-MAY-89	2 3	U	UG/G	2 3		TRG	
		LF0289BR2733	25-MAY-89	2.4	U	UG/G	2 4		TRG	
		LF0289BR1620	25-MAY-89	2 5		UG/G	2 2		TRG	
		LF0289BR2127	25-MAY-89	6.5		UG/G	2.3		TRG	
	SODIUM	LF0289BR2733	25-MAY-89	1180	U	UG/G	1180		TRG	
		LF0289BR2127	25-MAY-89	1150	U	UG/G	1150		TRG	
		LF0289BR1620	25-MAY-89	1090	U	UG/G	1090		TRG	
		LF0289BR1016	25-MAY-89	1110	U	UG/G	1110		TRG	
		LF0289BR0309	25-MAY-89	1150	U	UG/G	1150		TRG	
	STRONTIUM	LF0289BR1016	25-MAY-89	222	U	UG/G	222		TRG	
		LF0289BR0309	25-MAY-89	229	U	UG/G	229		TRG	
		LF0289BR2733	25-MAY-89	235	U	UG/G	235		TRG	
		LF0289BR2127	25-MAY-89	230	U	UG/G	230		TRG	
		LF0289BR1620	25-MAY-89	218	U	UG/G	218		TRG	

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Location Code	Parameter	Proj Sample No	Sample Date	Result	Q	Units	Det Limit	Validation	Type Flag	Pkg Valid.
B206189	THALLIUM	LF0289BR2733	25-MAY-89	2 4	U	UG/G	2.4		TRG	
		LF0289BR2127	25-MAY-89	2.3	U	UG/G	2 3		TRG	
		LF0289BR1620	25-MAY-89	2 2	U	UG/G	2.2		TRG	
		LF0289BR1016	25-MAY-89	2 2	U	UG/G	2.2		TRG	
		LF0289BR0309	25-MAY-89	2.3	U	UG/G	2 3		TRG	
	TIN	LF0289BR1016	25-MAY-89	22 2	U	UG/G	22 2		TRG	
		LF0289BR0309	25-MAY-89	22 9	U	UG/G	22.9		TRG	
		LF0289BR2733	25-MAY-89	23.5	U	UG/G	23.5		TRG	
		LF0289BR1620	25-MAY-89	21 8	U	UG/G	21 8		TRG	
		LF0289BR2127	25-MAY-89	23	U	UG/G	23		TRG	
	VANADIUM	LF0289BR2733	25-MAY-89	17.9		UG/G	11 8		TRG	
		LF0289BR1620	25-MAY-89	54 7		UG/G	10.9		TRG	
		LF0289BR2127	25-MAY-89	42.3		UG/G	11 5		TRG	
		LF0289BR1016	25-MAY-89	23 4		UG/G	11 1		TRG	
		LF0289BR0309	25-MAY-89	35.3		UG/G	11 5		TRG	
	ZINC	LF0289BR1016	25-MAY-89	9.5		UG/G	4 4		TRG	
		LF0289BR0309	25-MAY-89	24		UG/G	4.6		TRG	
		LF0289BR2733	25-MAY-89	22.3		UG/G	4 7		TRG	
		LF0289BR2127	25-MAY-89	143		UG/G	4 6		TRG	
		LF0289BR1620	25-MAY-89	35 3		UG/G	4 4		TRG	
	CESIUM-137	LF0289BR0003	24-MAY-89	0		PCI/G	.1		TRG	
		LF0289BR1016	25-MAY-89	0		PCI/G	.1		TRG	
		LF0289BR0309	25-MAY-89	0		PCI/G	1		TRG	
		LF0289BR2733	25-MAY-89	0		PCI/G	.1		TRG	
		LF0289BR2127	25-MAY-89	0		PCI/G	.1		TRG	
		LF0289BR1620	25-MAY-89	0		PCI/G	1		TRG	
	1,1,1-TRICHLOROETHANE	LF0289BR3234	25-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF0289BR2022	25-MAY-89	6	U	UG/G	6	V	TRG	A
		LF0289BR2426	25-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF0289BR2830	25-MAY-89	6	U	UG/KG	6	V	TRG	A

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Location Code	Parameter	Proj Sample No	Sample Date	Result	Q	Units	Det. Limit	Validation	Type Flag	Pkg	Valid.
B206189	1,1,1-TRICHLOROETHANE	LF0289BR1214	25-MAY-89	6	U	UG/G	6	V	TRG	A	
		LF0289BR0406	25-MAY-89	6	U	UG/L	6	V	TRG	A	
		LF0289BR0810	25-MAY-89	6	U	UG/G	6	V	TRG	A	
	1,1,2,2-TETRACHLOROETHANE	LF0289BR0810	25-MAY-89	6	U	UG/G	6	V	TRG	A	
		LF0289BR0406	25-MAY-89	6	U	UG/L	6	V	TRG	A	
		LF0289BR3234	25-MAY-89	6	U	UG/KG	6	V	TRG	A	
		LF0289BR2426	25-MAY-89	6	U	UG/KG	6	V	TRG	A	
		LF0289BR2022	25-MAY-89	6	U	UG/G	6	V	TRG	A	
		LF0289BR2830	25-MAY-89	6	U	UG/KG	6	V	TRG	A	
		LF0289BR1214	25-MAY-89	6	U	UG/G	6	V	TRG	A	
	1,1,2-TRICHLOROETHANE	LF0289BR3234	25-MAY-89	6	U	UG/KG	6	V	TRG	A	
		LF0289BR2022	25-MAY-89	6	U	UG/G	6	V	TRG	A	
		LF0289BR2426	25-MAY-89	6	U	UG/KG	6	V	TRG	A	
		LF0289BR1214	25-MAY-89	6	U	UG/G	6	V	TRG	A	
		LF0289BR2830	25-MAY-89	6	U	UG/KG	6	V	TRG	A	
		LF0289BR0810	25-MAY-89	6	U	UG/G	6	V	TRG	A	
		LF0289BR0406	25-MAY-89	6	U	UG/L	6	V	TRG	A	
	1,1-DICHLOROETHANE	LF0289BR0810	25-MAY-89	6	U	UG/G	6	V	TRG	A	
		LF0289BR0406	25-MAY-89	6	U	UG/L	6	V	TRG	A	
		LF0289BR3234	25-MAY-89	6	U	UG/KG	6	V	TRG	A	
		LF0289BR2022	25-MAY-89	6	U	UG/G	6	V	TRG	A	
		LF0289BR1214	25-MAY-89	6	U	UG/G	6	V	TRG	A	
		LF0289BR2830	25-MAY-89	6	U	UG/KG	6	V	TRG	A	
		LF0289BR2426	25-MAY-89	6	U	UG/KG	6	V	TRG	A	
	1,1-DICHLOROETHENE	LF0289BR3234	25-MAY-89	6	U	UG/KG	6	V	TRG	A	
		LF0289BR1214	25-MAY-89	6	U	UG/G	6	V	TRG	A	
		LF0289BR2022	25-MAY-89	6	U	UG/G	6	V	TRG	A	
		LF0289BR2426	25-MAY-89	6	U	UG/KG	6	V	TRG	A	
		LF0289BR2830	25-MAY-89	6	U	UG/KG	6	V	TRG	A	
		LF0289BR0810	25-MAY-89	6	U	UG/G	6	V	TRG	A	
		LF0289BR0406	25-MAY-89	6	U	UG/L	6	V	TRG	A	

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Location Code	Parameter	Proj Sample No	Sample Date	Result	Q	Units	Det. Limit	Validation	Type Flag	Pkg	Valid
B206189	1,2-DICHLOROETHANE	LF0289BR0810	25-MAY-89	6	U	UG/G	6	V	TRG	A	
		LF0289BR0406	25-MAY-89	6	U	UG/L	6	V	TRG	A	
		LF0289BR2830	25-MAY-89	6	U	UG/KG	6	V	TRG	A	
		LF0289BR2426	25-MAY-89	6	U	UG/KG	6	V	TRG	A	
		LF0289BR2022	25-MAY-89	6	U	UG/G	6	V	TRG	A	
		LF0289BR1214	25-MAY-89	6	U	UG/G	6	V	TRG	A	
		LF0289BR3234	25-MAY-89	6	U	UG/KG	6	V	TRG	A	
	1,2-DICHLOROETHYLENE	LF0289BR3234	25-MAY-89	6	U	UG/KG	6	V	TRG	A	
		LF0289BR2830	25-MAY-89	6	U	UG/KG	6	V	TRG	A	
		LF0289BR2426	25-MAY-89	6	U	UG/KG	6	V	TRG	A	
		LF0289BR2022	25-MAY-89	6	U	UG/G	6	V	TRG	A	
		LF0289BR1214	25-MAY-89	6	U	UG/G	6	V	TRG	A	
		LF0289BR0810	25-MAY-89	6	U	UG/G	6	V	TRG	A	
		LF0289BR0406	25-MAY-89	6	U	UG/L	6	V	TRG	A	
	1,2-DICHLOROPROPANE	LF0289BR0810	25-MAY-89	6	U	UG/G	6	V	TRG	A	
		LF0289BR0406	25-MAY-89	6	U	UG/L	6	V	TRG	A	
		LF0289BR2830	25-MAY-89	6	U	UG/KG	6	V	TRG	A	
		LF0289BR2426	25-MAY-89	6	U	UG/KG	6	V	TRG	A	
		LF0289BR2022	25-MAY-89	6	U	UG/G	6	V	TRG	A	
		LF0289BR1214	25-MAY-89	6	U	UG/G	6	V	TRG	A	
		LF0289BR3234	25-MAY-89	6	U	UG/KG	6	V	TRG	A	
	2-BUTANONE	LF0289BR3234	25-MAY-89	12	U	UG/KG	12	V	TRG	A	
		LF0289BR2830	25-MAY-89	12	U	UG/KG	12	V	TRG	A	
		LF0289BR2022	25-MAY-89	12	U	UG/G	12	V	TRG	A	
		LF0289BR1214	25-MAY-89	11	U	UG/G	11	V	TRG	A	
		LF0289BR2426	25-MAY-89	12	U	UG/KG	12	V	TRG	A	
		LF0289BR0810	25-MAY-89	11	U	UG/G	11	V	TRG	A	
		LF0289BR0406	25-MAY-89	12	U	UG/L	12	V	TRG	A	
	2-HEXANONE	LF0289BR0810	25-MAY-89	11	U	UG/G	11	V	TRG	A	
		LF0289BR0406	25-MAY-89	12	U	UG/L	12	V	TRG	A	
		LF0289BR2830	25-MAY-89	12	U	UG/KG	12	V	TRG	A	

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B206189	2-HEXANONE	LF0289BR2022	25-MAY-89	12	U	UG/G	12	V	TRG	A
		LF0289BR1214	25-MAY-89	11	U	UG/G	11	V	TRG	A
		LF0289BR2426	25-MAY-89	12	U	UG/KG	12	V	TRG	A
		LF0289BR3234	25-MAY-89	12	U	UG/KG	12	V	TRG	A
	4-METHYL-2-PENTANONE	LF0289BR3234	25-MAY-89	12	U	UG/KG	12	V	TRG	A
		LF0289BR2830	25-MAY-89	12	U	UG/KG	12	V	TRG	A
		LF0289BR2022	25-MAY-89	12	U	UG/G	12	V	TRG	A
		LF0289BR1214	25-MAY-89	11	U	UG/G	11	V	TRG	A
		LF0289BR2426	25-MAY-89	12	U	UG/KG	12	V	TRG	A
		LF0289BR0810	25-MAY-89	11	U	UG/G	11	V	TRG	A
		LF0289BR0406	25-MAY-89	12	U	UG/L	12	V	TRG	A
	ACETONE	LF0289BR0406	25-MAY-89	2	JB	UG/L	12	A	TRG	A
		LF0289BR2830	25-MAY-89	12	U	UG/KG	12	V	TRG	A
		LF0289BR2426	25-MAY-89	12	U	UG/KG	12	V	TRG	A
		LF0289BR0810	25-MAY-89	11	U	UG/G	11	V	TRG	A
		LF0289BR1214	25-MAY-89	21	B	UG/G	11	A	TRG	A
		LF0289BR2022	25-MAY-89	14	B	UG/G	12	A	TRG	A
		LF0289BR3234	25-MAY-89	10	JB	UG/KG	12	A	TRG	A
	BENZENE	LF0289BR3234	25-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF0289BR2830	25-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF0289BR0810	25-MAY-89	6	U	UG/G	6	V	TRG	A
		LF0289BR2022	25-MAY-89	6	U	UG/G	6	V	TRG	A
		LF0289BR1214	25-MAY-89	6	U	UG/G	6	V	TRG	A
		LF0289BR2426	25-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF0289BR0406	25-MAY-89	6	U	UG/L	6	V	TRG	A
	BROMODICHLOROMETHANE	LF0289BR0406	25-MAY-89	6	U	UG/L	6	V	TRG	A
		LF0289BR2830	25-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF0289BR2022	25-MAY-89	6	U	UG/G	6	V	TRG	A
		LF0289BR1214	25-MAY-89	6	U	UG/G	6	V	TRG	A
		LF0289BR0810	25-MAY-89	6	U	UG/G	6	V	TRG	A
		LF0289BR2426	25-MAY-89	6	U	UG/KG	6	V	TRG	A

OU07 DRILL CUTTINGS ANALYTICAL DATA

Location Code	Parameter	Proj Sample No	Sample Date	Result	Q	Units	Det Limit	Validation	Type Flag	Pkg. Valid
B206189	BROMODICHLOROMETHANE	LF0289BR3234	25-MAY-89	6	U	UG/KG	6	V	TRG	A
	BROMOFORM	LF0289BR3234	25-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF0289BR2830	25-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF0289BR0810	25-MAY-89	6	U	UG/G	6	V	TRG	A
		LF0289BR1214	25-MAY-89	6	U	UG/G	6	V	TRG	A
		LF0289BR2426	25-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF0289BR2022	25-MAY-89	6	U	UG/G	6	V	TRG	A
		LF0289BR0406	25-MAY-89	6	U	UG/L	6	V	TRG	A
	BROMOMETHANE	LF0289BR0406	25-MAY-89	12	U	UG/L	12	V	TRG	A
		LF0289BR2830	25-MAY-89	12	U	UG/KG	12	V	TRG	A
		LF0289BR1214	25-MAY-89	11	U	UG/G	11	V	TRG	A
		LF0289BR2426	25-MAY-89	12	U	UG/KG	12	V	TRG	A
		LF0289BR2022	25-MAY-89	12	U	UG/G	12	V	TRG	A
		LF0289BR0810	25-MAY-89	11	U	UG/G	11	V	TRG	A
		LF0289BR3234	25-MAY-89	12	U	UG/KG	12	V	TRG	A
	CARBON DISULFIDE	LF0289BR3234	25-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF0289BR2830	25-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF0289BR1214	25-MAY-89	6	U	UG/G	6	V	TRG	A
		LF0289BR2426	25-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF0289BR2022	25-MAY-89	6	U	UG/G	6	V	TRG	A
		LF0289BR0810	25-MAY-89	6	U	UG/G	6	V	TRG	A
		LF0289BR0406	25-MAY-89	6	U	UG/L	6	V	TRG	A
	CARBON TETRACHLORIDE	LF0289BR0406	25-MAY-89	6	U	UG/L	6	V	TRG	A
		LF0289BR2830	25-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF0289BR1214	25-MAY-89	6	U	UG/G	6	V	TRG	A
		LF0289BR2426	25-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF0289BR2022	25-MAY-89	6	U	UG/G	6	V	TRG	A
		LF0289BR0810	25-MAY-89	6	U	UG/G	6	V	TRG	A
		LF0289BR3234	25-MAY-89	6	U	UG/KG	6	V	TRG	A
	CHLOROBENZENE	LF0289BR3234	25-MAY-89	6	U	UG/KG	6	V	TRG	A

OU07 DRILL CUTTINGS ANALYTICAL DATA

Location Code	Parameter	Proj Sample No	Sample Date	Result	Q	Units	Det Limit	Validation	Type Flag	Pkg	Valid
B206189	CHLOROBENZENE	LF0289BR2830	25-MAY-89	6	U	UG/KG	6	V	TRG	A	
		LF0289BR1214	25-MAY-89	6	U	UG/G	6	V	TRG	A	
		LF0289BR0810	25-MAY-89	6	U	UG/G	6	V	TRG	A	
		LF0289BR2426	25-MAY-89	6	U	UG/KG	6	V	TRG	A	
		LF0289BR2022	25-MAY-89	6	U	UG/G	6	V	TRG	A	
		LF0289BR0406	25-MAY-89	6	U	UG/L	6	V	TRG	A	
	CHLOROETHANE	LF0289BR2830	25-MAY-89	12	U	UG/KG	12	V	TRG	A	
		LF0289BR0810	25-MAY-89	11	U	UG/G	11	V	TRG	A	
		LF0289BR2022	25-MAY-89	12	U	UG/G	12	V	TRG	A	
		LF0289BR1214	25-MAY-89	11	U	UG/G	11	V	TRG	A	
		LF0289BR0406	25-MAY-89	12	U	UG/L	12	V	TRG	A	
		LF0289BR2426	25-MAY-89	12	U	UG/KG	12	V	TRG	A	
		LF0289BR3234	25-MAY-89	12	U	UG/KG	12	V	TRG	A	
	CHLOROFORM	LF0289BR3234	25-MAY-89	6	U	UG/KG	6	V	TRG	A	
		LF0289BR2830	25-MAY-89	6	U	UG/KG	6	V	TRG	A	
		LF0289BR0810	25-MAY-89	6	U	UG/G	6	V	TRG	A	
		LF0289BR2022	25-MAY-89	6	U	UG/G	6	V	TRG	A	
		LF0289BR1214	25-MAY-89	6	U	UG/G	6	V	TRG	A	
		LF0289BR0406	25-MAY-89	6	U	UG/L	6	V	TRG	A	
		LF0289BR2426	25-MAY-89	6	U	UG/KG	6	V	TRG	A	
	CHLOROMETHANE	LF0289BR2830	25-MAY-89	12	U	UG/KG	12	V	TRG	A	
		LF0289BR2426	25-MAY-89	12	U	UG/KG	12	V	TRG	A	
		LF0289BR1214	25-MAY-89	11	U	UG/G	11	V	TRG	A	
		LF0289BR2022	25-MAY-89	12	U	UG/G	12	V	TRG	A	
		LF0289BR0406	25-MAY-89	12	U	UG/L	12	V	TRG	A	
		LF0289BR0810	25-MAY-89	11	U	UG/G	11	V	TRG	A	
		LF0289BR3234	25-MAY-89	12	U	UG/KG	12	V	TRG	A	
	DIBROMOCHLOROMETHANE	LF0289BR3234	25-MAY-89	6	U	UG/KG	6	V	TRG	A	
		LF0289BR2830	25-MAY-89	6	U	UG/KG	6	V	TRG	A	
		LF0289BR2022	25-MAY-89	6	U	UG/G	6	V	TRG	A	
		LF0289BR0810	25-MAY-89	6	U	UG/G	6	V	TRG	A	

OU07 DRILL CUTTINGS ANALYTICAL DATA

Location Code	Parameter	Proj Sample No	Sample Date	Result	Q	Units	Det Limit	Validation	Type Flag	Pkg Valid
B206189	DIBROMOCHLOROMETHANE	LF0289BR1214	25-MAY-89	6	U	UG/G	6	V	TRG	A
		LF0289BR0406	25-MAY-89	6	U	UG/L	6	V	TRG	A
		LF0289BR2426	25-MAY-89	6	U	UG/KG	6	V	TRG	A
	ETHYLBENZENE	LF0289BR2830	25-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF0289BR2022	25-MAY-89	6	U	UG/G	6	V	TRG	A
		LF0289BR0810	25-MAY-89	4	J	UG/G	6	A	TRG	A
		LF0289BR1214	25-MAY-89	6	U	UG/G	6	V	TRG	A
		LF0289BR0406	25-MAY-89	6	U	UG/L	6	V	TRG	A
		LF0289BR2426	25-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF0289BR3234	25-MAY-89	6	U	UG/KG	6	V	TRG	A
	METHYLENE CHLORIDE	LF0289BR3234	25-MAY-89	2	J	UG/KG	6	A	TRG	A
		LF0289BR2830	25-MAY-89	2	J	UG/KG	6	A	TRG	A
		LF0289BR2022	25-MAY-89	2	J	UG/G	6	A	TRG	A
		LF0289BR1214	25-MAY-89	3	J	UG/G	6	A	TRG	A
		LF0289BR0810	25-MAY-89	4	J	UG/G	6	A	TRG	A
		LF0289BR2426	25-MAY-89	2	J	UG/KG	6	A	TRG	A
		LF0289BR0406	25-MAY-89	4	J	UG/L	6	A	TRG	A
	STYRENE	LF0289BR2830	25-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF0289BR2022	25-MAY-89	6	U	UG/G	6	V	TRG	A
		LF0289BR0810	25-MAY-89	6	U	UG/G	6	V	TRG	A
		LF0289BR1214	25-MAY-89	6	U	UG/G	6	V	TRG	A
		LF0289BR2426	25-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF0289BR0406	25-MAY-89	6	U	UG/L	6	V	TRG	A
		LF0289BR3234	25-MAY-89	6	U	UG/KG	6	V	TRG	A
	TETRACHLOROETHENE	LF0289BR3234	25-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF0289BR2830	25-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF0289BR2426	25-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF0289BR0810	25-MAY-89	6	U	UG/G	6	V	TRG	A
		LF0289BR2022	25-MAY-89	6	U	UG/G	6	V	TRG	A
		LF0289BR1214	25-MAY-89	6	U	UG/G	6	V	TRG	A
		LF0289BR0406	25-MAY-89	6	U	UG/L	6	V	TRG	A

OU07. DRILL CUTTINGS ANALYTICAL DATA

Location Code	Parameter	Proj Sample No	Sample Date	Result	Q	Units	Det. Limit	Validation	Type Flag	Pkg. Valid
B206189	TOLUENE	LF0289BR2830	25-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF0289BR0810	25-MAY-89	6	U	UG/G	6	V	TRG	A
		LF0289BR2022	25-MAY-89	6	U	UG/G	6	V	TRG	A
		LF0289BR1214	25-MAY-89	6	U	UG/G	6	V	TRG	A
		LF0289BR0406	25-MAY-89	6	U	UG/L	6	V	TRG	A
		LF0289BR2426	25-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF0289BR3234	25-MAY-89	6	U	UG/KG	6	V	TRG	A
	TOTAL XYLENES	LF0289BR3234	25-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF0289BR2830	25-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF0289BR1214	25-MAY-89	6	U	UG/G	6	V	TRG	A
		LF0289BR0406	25-MAY-89	6	U	UG/L	6	V	TRG	A
		LF0289BR2022	25-MAY-89	6	U	UG/G	6	V	TRG	A
		LF0289BR0810	25-MAY-89	6	U	UG/G	6	V	TRG	A
		LF0289BR2426	25-MAY-89	6	U	UG/KG	6	V	TRG	A
	TRICHLOROETHENE	LF0289BR2830	25-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF0289BR2426	25-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF0289BR0406	25-MAY-89	6	U	UG/L	6	V	TRG	A
		LF0289BR0810	25-MAY-89	6	U	UG/G	6	V	TRG	A
		LF0289BR1214	25-MAY-89	6	U	UG/G	6	V	TRG	A
		LF0289BR2022	25-MAY-89	6	U	UG/G	6	V	TRG	A
		LF0289BR3234	25-MAY-89	6	U	UG/KG	6	V	TRG	A
	VINYL ACETATE	LF0289BR3234	25-MAY-89	12	U	UG/KG	12	V	TRG	A
		LF0289BR2830	25-MAY-89	12	U	UG/KG	12	V	TRG	A
		LF0289BR0810	25-MAY-89	11	U	UG/G	11	V	TRG	A
		LF0289BR1214	25-MAY-89	11	U	UG/G	11	V	TRG	A
		LF0289BR0406	25-MAY-89	12	U	UG/L	12	V	TRG	A
		LF0289BR2426	25-MAY-89	12	U	UG/KG	12	V	TRG	A
		LF0289BR2022	25-MAY-89	12	U	UG/G	12	V	TRG	A
	VINYL CHLORIDE	LF0289BR2830	25-MAY-89	12	U	UG/KG	12	V	TRG	A
		LF0289BR0406	25-MAY-89	12	U	UG/L	12	V	TRG	A
		LF0289BR0810	25-MAY-89	11	U	UG/G	11	V	TRG	A

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Location Code	Parameter	Proj Sample No	Sample Date	Result	Q	Units	Det. Limit	Validation	Type Flag	Pkg	Valid
B206189	VINYL CHLORIDE	LF0289BR1214	25-MAY-89	11	U	UG/G	11	V	TRG	A	
		LF0289BR2022	25-MAY-89	12	U	UG/G	12	V	TRG	A	
		LF0289BR2426	25-MAY-89	12	U	UG/KG	12	V	TRG	A	
		LF0289BR3234	25-MAY-89	12	U	UG/KG	12	V	TRG	A	
	cis-1,3-DICHLOROPROPENE	LF0289BR3234	25-MAY-89	6	U	UG/KG	6	V	TRG	A	
		LF0289BR2830	25-MAY-89	6	U	UG/KG	6	V	TRG	A	
		LF0289BR0406	25-MAY-89	6	U	UG/L	6	V	TRG	A	
		LF0289BR2022	25-MAY-89	6	U	UG/G	6	V	TRG	A	
		LF0289BR1214	25-MAY-89	6	U	UG/G	6	V	TRG	A	
		LF0289BR0810	25-MAY-89	6	U	UG/G	6	V	TRG	A	
		LF0289BR2426	25-MAY-89	6	U	UG/KG	6	V	TRG	A	
	trans-1,3-DICHLOROPROPENE	LF0289BR2830	25-MAY-89	6	U	UG/KG	6	V	TRG	A	
		LF0289BR0406	25-MAY-89	6	U	UG/L	6	V	TRG	A	
		LF0289BR1214	25-MAY-89	6	U	UG/G	6	V	TRG	A	
		LF0289BR0810	25-MAY-89	6	U	UG/G	6	V	TRG	A	
		LF0289BR2022	25-MAY-89	6	U	UG/G	6	V	TRG	A	
		LF0289BR2426	25-MAY-89	6	U	UG/KG	6	V	TRG	A	
		LF0289BR3234	25-MAY-89	6	U	UG/KG	6	V	TRG	A	

OU07. DRILL CUTTINGS ANALYTICAL DATA

Location Code	Parameter	Proj Sample No	Sample Date	Result	Q	Units	Det. Limit	Validation	Type Flag	Pkg. Valid
B206389	% SOLIDS	LF04890003	19-MAY-89	92.8		%			TRG	
		LF04890309	19-MAY-89	92 8		%			TRG	
		LF04890913	19-MAY-89	97		%			TRG	
		LF04891319	19-MAY-89	82.9		%			TRG	
	NITRATE	LF04890913	19-MAY-89	4 427	U				TRG	
		LF04891319	19-MAY-89	5.3124	U				TRG	
		LF04890003	19-MAY-89	4 8697	U				TRG	
		LF04890309	19-MAY-89	4 8697	U				TRG	
	NITRATE/NITRITE	LF04890003	19-MAY-89	1.1	U	MG/KG			TRG	
		LF04890309	19-MAY-89	1 1	U	MG/KG			TRG	
		LF04890913	19-MAY-89	1	U	MG/KG			TRG	
		LF04891319	19-MAY-89	1.2	U	MG/KG			TRG	
	SULFIDE	LF04890913	19-MAY-89	2	U	MG/KG			TRG	
		LF04891319	19-MAY-89	5		MG/KG			TRG	
		LF04890003	19-MAY-89	2	U	MG/KG			TRG	
		LF04890309	19-MAY-89	4		MG/KG			TRG	
	pH	LF04890003	19-MAY-89	8.1		PHUNIT			TRG	
		LF04890309	19-MAY-89	8 3		PHUNIT			TRG	
		LF04890913	19-MAY-89	7 9		PHUNIT			TRG	
		LF04891319	19-MAY-89	8		PHUNIT			TRG	
	ALUMINUM	LF04891319	19-MAY-89	7030		UG/G	46 5	V	TRG	A
		LF04890003	19-MAY-89	10800		UG/G	44 5	V	TRG	A
		LF04890913	19-MAY-89	8280		UG/G	42 2	V	TRG	A
		LF04890309	19-MAY-89	7620		UG/G	41 1	V	TRG	A
	ANTIMONY	LF04890003	19-MAY-89	13.4	U	UG/G	13 4	A	TRG	A
		LF04890913	19-MAY-89	12.7	U	UG/G	12 7	A	TRG	A
		LF04890309	19-MAY-89	12 3	U	UG/G	12 3	A	TRG	A
		LF04891319	19-MAY-89	13 9	U	UG/G	13 9	A	TRG	A

OU07- DRILL CUTTINGS ANALYTICAL DATA

Location Code	Parameter	Proj Sample No	Sample Date	Result	Q	Units	Det. Limit	Validation	Type Flag	Pkg	Valid
B206389	ARSENIC	LF04891319	19-MAY-89	2 8		UG/G	2.4	A	TRG	A	
		LF04890003	19-MAY-89	3.5		UG/G	2.2	A	TRG	A	
		LF04890913	19-MAY-89	3 1		UG/G	2.2	A	TRG	A	
		LF04890309	19-MAY-89	2.9		UG/G	2	A	TRG	A	
	BARIUM	LF04890003	19-MAY-89	154		UG/G	44.5	V	TRG	A	
		LF04890913	19-MAY-89	58 4		UG/G	42 2	V	TRG	A	
		LF04890309	19-MAY-89	56 5		UG/G	41.1	V	TRG	A	
		LF04891319	19-MAY-89	93 5		UG/G	46.5	V	TRG	A	
	BERYLLIUM	LF04891319	19-MAY-89	2 6		UG/G	1.2	A	TRG	A	
		LF04890003	19-MAY-89	3 5		UG/G	1 1	A	TRG	A	
		LF04890913	19-MAY-89	2.7		UG/G	1.1	A	TRG	A	
		LF04890309	19-MAY-89	2 7		UG/G	1	A	TRG	A	
	CADMIUM	LF04890003	19-MAY-89	1 1	U	UG/G	1 1	R	TRG	A	
		LF04890309	19-MAY-89	1	U	UG/G	1	R	TRG	A	
		LF04890913	19-MAY-89	1 1	U	UG/G	1.1	R	TRG	A	
		LF04891319	19-MAY-89	1.2	U	UG/G	1 2	R	TRG	A	
	CALCIUM	LF04891319	19-MAY-89	5290		UG/G	1160	V	TRG	A	
		LF04890003	19-MAY-89	8680		UG/G	1110	V	TRG	A	
		LF04890913	19-MAY-89	1770		UG/G	1060	V	TRG	A	
		LF04890309	19-MAY-89	7180		UG/G	1030	V	TRG	A	
	CESIUM	LF04890003	19-MAY-89	223	U	UG/G	223	V	TRG	A	
		LF04890309	19-MAY-89	205	U	UG/G	205	V	TRG	A	
		LF04890913	19-MAY-89	211	U	UG/G	211	V	TRG	A	
		LF04891319	19-MAY-89	232	U	UG/G	232	V	TRG	A	
	CHROMIUM	LF04891319	19-MAY-89	6 8		UG/G	2 3	V	TRG	A	
		LF04890003	19-MAY-89	17.2		UG/G	2 2	V	TRG	A	
		LF04890309	19-MAY-89	13		UG/G	2 1	V	TRG	A	
		LF04890913	19-MAY-89	13 2		UG/G	2 1	V	TRG	A	

OU07 DRILL CUTTINGS ANALYTICAL DATA

Location Code	Parameter	Proj Sample No	Sample Date	Result	Q	Units	Det Limit	Validation	Type Flag	Pkg Valid
B206389	COBALT	LF04890003	19-MAY-89	11.1	U	UG/G	11.1	V	TRG	A
		LF04890913	19-MAY-89	10 6	U	UG/G	10.6	V	TRG	A
		LF04890309	19-MAY-89	10.3	U	UG/G	10.3	V	TRG	A
		LF04891319	19-MAY-89	11 6	U	UG/G	11 6	V	TRG	A
	COPPER	LF04891319	19-MAY-89	11 5		UG/G	5.8	V	TRG	A
		LF04890003	19-MAY-89	15.8		UG/G	5 6	V	TRG	A
		LF04890309	19-MAY-89	10 4		UG/G	5.1	V	TRG	A
		LF04890913	19-MAY-89	5.3	U	UG/G	5 3	A	TRG	A
	IRON	LF04890003	19-MAY-89	15700		UG/G	22 3	V	TRG	A
		LF04890913	19-MAY-89	9950		UG/G	21 1	V	TRG	A
		LF04890309	19-MAY-89	11700		UG/G	20.5	V	TRG	A
		LF04891319	19-MAY-89	6950		UG/G	23 2	V	TRG	A
	LEAD	LF04890913	19-MAY-89	6 8		UG/G	4 3	V	TRG	A
		LF04891319	19-MAY-89	18 8		UG/G	4.8	V	TRG	A
		LF04890003	19-MAY-89	17 2		UG/G	2 2	A	TRG	A
		LF04890309	19-MAY-89	9 2		UG/G	4	V	TRG	A
	LITHIUM	LF04890003	19-MAY-89	7 2		UG/G	2 2	V	TRG	A
		LF04890913	19-MAY-89	6 2		UG/G	2.1	V	TRG	A
		LF04890309	19-MAY-89	5 5		UG/G	2 1	V	TRG	A
		LF04891319	19-MAY-89	2 3	U	UG/G	2.3	V	TRG	A
	MAGNESIUM	LF04891319	19-MAY-89	1590		UG/G	1160	V	TRG	A
		LF04890003	19-MAY-89	3190		UG/G	1110	V	TRG	A
		LF04890309	19-MAY-89	1890		UG/G	1030	V	TRG	A
		LF04890913	19-MAY-89	1540		UG/G	1060	V	TRG	A
	MANGANESE	LF04890003	19-MAY-89	209		UG/G	3 3	V	TRG	A
		LF04890913	19-MAY-89	63.3		UG/G	3 2	V	TRG	A
		LF04890309	19-MAY-89	147		UG/G	3 1	V	TRG	A
		LF04891319	19-MAY-89	26 1		UG/G	3 5	V	TRG	A

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Location Code	Parameter	Proj Sample No	Sample Date	Result	Q	Units	Det Limit	Validation	Type Flag	Pkg. Valid
B206389	MERCURY	LF04891319	19-MAY-89	12	U	UG/G	12	V	TRG	A
		LF04890003	19-MAY-89	.12		UG/G	.12	V	TRG	A
		LF04890309	19-MAY-89	.23		UG/G	098	V	TRG	A
		LF04890913	19-MAY-89	11	U	UG/G	.11	V	TRG	A
	MOLYBDENUM	LF04890003	19-MAY-89	8 4		UG/G	2.2	A	TRG	A
		LF04890913	19-MAY-89	7 7		UG/G	2 1	A	TRG	A
		LF04890309	19-MAY-89	7		UG/G	2.1	A	TRG	A
		LF04891319	19-MAY-89	7 5		UG/G	2.3	A	TRG	A
	NICKEL	LF04891319	19-MAY-89	9 3	U	UG/G	9 3	A	TRG	A
		LF04890003	19-MAY-89	18.8		UG/G	8 9	A	TRG	A
		LF04890913	19-MAY-89	8 4	U	UG/G	8.4	A	TRG	A
		LF04890309	19-MAY-89	11		UG/G	8 2	A	TRG	A
	POTASSIUM	LF04890003	19-MAY-89	1630		UG/G	1110	V	TRG	A
		LF04890309	19-MAY-89	1140		UG/G	1030	A	TRG	A
		LF04890913	19-MAY-89	1110		UG/G	1060	A	TRG	A
		LF04891319	19-MAY-89	1160	U	UG/G	1160	A	TRG	A
	SELENIUM	LF04891319	19-MAY-89	6	U	UG/G	6	A	TRG	A
		LF04890003	19-MAY-89	5.4	U	UG/G	5 4	A	TRG	A
		LF04890913	19-MAY-89	5.4	U	UG/G	5 4	A	TRG	A
		LF04890309	19-MAY-89	5	U	UG/G	5	A	TRG	A
	SILVER	LF04890003	19-MAY-89	2.2	U	UG/G	2 2	A	TRG	A
		LF04890309	19-MAY-89	2 1	U	UG/G	2.1	A	TRG	A
		LF04890913	19-MAY-89	2.1	U	UG/G	2.1	A	TRG	A
		LF04891319	19-MAY-89	2.3	U	UG/G	2 3	A	TRG	A
	SODIUM	LF04891319	19-MAY-89	1160	U	UG/G	1160	V	TRG	A
		LF04890003	19-MAY-89	1110	U	UG/G	1110	V	TRG	A
		LF04890309	19-MAY-89	1030	U	UG/G	1030	V	TRG	A
		LF04890913	19-MAY-89	1060	U	UG/G	1060	V	TRG	A

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Location Code	Parameter	Proj Sample No	Sample Date	Result	Q	Units	Det. Limit	Validation	Type Flag	Pkg	Valid.
B206389	STRONTIUM	LF04890003	19-MAY-89	223	U	UG/G	223	V	TRG	A	
		LF04890913	19-MAY-89	211	U	UG/G	211	V	TRG	A	
		LF04890309	19-MAY-89	205	U	UG/G	205	V	TRG	A	
		LF04891319	19-MAY-89	232	U	UG/G	232	V	TRG	A	
	THALLIUM	LF04891319	19-MAY-89	2 4	U	UG/G	2 4	R	TRG	A	
		LF04890003	19-MAY-89	2 2	U	UG/G	2 2	R	TRG	A	
		LF04890309	19-MAY-89	2	U	UG/G	2	R	TRG	A	
		LF04890913	19-MAY-89	2.2	U	UG/G	2.2	R	TRG	A	
	TIN	LF04890003	19-MAY-89	22.3	U	UG/G	22.3	A	TRG	A	
		LF04890913	19-MAY-89	21.1	U	UG/G	21.1	A	TRG	A	
		LF04890309	19-MAY-89	20 5	U	UG/G	20.5	A	TRG	A	
		LF04891319	19-MAY-89	23 2	U	UG/G	23 2	A	TRG	A	
	VANADIUM	LF04891319	19-MAY-89	14 8		UG/G	11.6	V	TRG	A	
		LF04890003	19-MAY-89	41		UG/G	11 1	V	TRG	A	
		LF04890913	19-MAY-89	26 8		UG/G	10 6	V	TRG	A	
		LF04890309	19-MAY-89	34.6		UG/G	10 3	V	TRG	A	
	ZINC	LF04890003	19-MAY-89	35.7		UG/G	4 5	V	TRG	A	
		LF04890309	19-MAY-89	25 5		UG/G	4 1	V	TRG	A	
		LF04890913	19-MAY-89	10.7		UG/G	4.2	A	TRG	A	
		LF04891319	19-MAY-89	22 8		UG/G	4 6	V	TRG	A	
	CESIUM-137	LF04891319	19-MAY-89	0		PCI/G	1		TRG		
		LF04890003	19-MAY-89	0		PCI/G	1		TRG		
		LF04890309	19-MAY-89	0		PCI/G	1		TRG		
		LF04890913	19-MAY-89	0		PCI/G	.1		TRG		
	1,1,1-TRICHLOROETHANE	LF04890002D	19-MAY-89	6	U	UG/KG	6	V	TRG	A	
		LF04890910	19-MAY-89	6	U	UG/KG	6	V	TRG	A	
		LF04890406	19-MAY-89	6	U	UG/KG	6	A	TRG	A	
		LF04891214	19-MAY-89	6	U	UG/KG	6	V	TRG	A	
		LF04891416	19-MAY-89	6	U	UG/KG	6	V	TRG	A	

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Location Code	Parameter	Proj Sample No	Sample Date	Result	Q	Units	Det Limit	Validation	Type Flag	Pkg Valid
B206389	1,1,2,2-TETRACHLOROETHANE	LF04891416	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04890002D	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04891214	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04890406	19-MAY-89	6	U	UG/KG	6	A	TRG	A
		LF04890910	19-MAY-89	6	U	UG/KG	6	A	TRG	A
	1,1,2-TRICHLOROETHANE	LF04890002D	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04891214	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04890406	19-MAY-89	6	U	UG/KG	6	A	TRG	A
		LF04890910	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04891416	19-MAY-89	6	U	UG/KG	6	V	TRG	A
	1,1-DICHLOROETHANE	LF04891416	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04890002D	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04891214	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04890910	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04890406	19-MAY-89	6	U	UG/KG	6	A	TRG	A
	1,1-DICHLOROETHENE	LF04890002D	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04891416	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04890910	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04891214	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04890406	19-MAY-89	6	U	UG/KG	6	A	TRG	A
	1,2-DICHLOROETHANE	LF04890002D	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04890910	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04891214	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04890406	19-MAY-89	6	U	UG/KG	6	A	TRG	A
		LF04891416	19-MAY-89	6	U	UG/KG	6	V	TRG	A
	1,2-DICHLOROETHYLENE	LF04890002D	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04891214	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04890406	19-MAY-89	6	U	UG/KG	6	A	TRG	A
		LF04891416	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04890910	19-MAY-89	6	U	UG/KG	6	V	TRG	A

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Location Code	Parameter	Proj Sample No	Sample Date	Result	Q	Units	Det. Limit	Validation	Type Flag	Pkg. Valid
B206389	1,2-DICHLOROPROPANE	LF04890002D	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04890406	19-MAY-89	6	U	UG/KG	6	A	TRG	A
		LF04891416	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04891214	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04890910	19-MAY-89	6	U	UG/KG	6	V	TRG	A
	2-BUTANONE	LF04890002D	19-MAY-89	11	U	UG/KG	11	V	TRG	A
		LF04891416	19-MAY-89	12	U	UG/KG	12	V	TRG	A
		LF04891214	19-MAY-89	12	U	UG/KG	12	V	TRG	A
		LF04890406	19-MAY-89	11	U	UG/KG	11	A	TRG	A
		LF04890910	19-MAY-89	11	U	UG/KG	11	V	TRG	A
	2-HEXANONE	LF04890002D	19-MAY-89	11	U	UG/KG	11	V	TRG	A
		LF04890406	19-MAY-89	11	U	UG/KG	11	A	TRG	A
		LF04890910	19-MAY-89	11	U	UG/KG	11	V	TRG	A
		LF04891214	19-MAY-89	12	U	UG/KG	12	V	TRG	A
		LF04891416	19-MAY-89	12	U	UG/KG	12	V	TRG	A
	4-METHYL-2-PENTANONE	LF04890002D	19-MAY-89	11	U	UG/KG	11	V	TRG	A
		LF04890406	19-MAY-89	2	J	UG/KG	11	A	TRG	A
		LF04891214	19-MAY-89	12	U	UG/KG	12	V	TRG	A
		LF04891416	19-MAY-89	12	U	UG/KG	12	V	TRG	A
		LF04890910	19-MAY-89	11	U	UG/KG	11	V	TRG	A
	ACETONE	LF04890002D	19-MAY-89	11	U	UG/KG	11	V	TRG	A
		LF04890910	19-MAY-89	9	J	UG/KG	11	A	TRG	A
		LF04891214	19-MAY-89	9	J	UG/KG	12	A	TRG	A
		LF04890406	19-MAY-89	19		UG/KG	11	A	TRG	A
		LF04891416	19-MAY-89	5	J	UG/KG	12	A	TRG	A
	BENZENE	LF04890002D	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04891214	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04891416	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04890910	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04890406	19-MAY-89	6	U	UG/KG	6	A	TRG	A

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Location Code	Parameter	Proj Sample No	Sample Date	Result	Q	Units	Det Limit	Validation	Type Flag	Pkg Valid
B206389	BROMODICHLOROMETHANE	LF04890002D	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04890406	19-MAY-89	6	U	UG/KG	6	A	TRG	A
		LF04890910	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04891214	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04891416	19-MAY-89	6	U	UG/KG	6	V	TRG	A
	BROMOFORM	LF04890002D	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04890406	19-MAY-89	6	U	UG/KG	6	A	TRG	A
		LF04891416	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04891214	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04890910	19-MAY-89	6	U	UG/KG	6	V	TRG	A
	BROMOMETHANE	LF04890002D	19-MAY-89	11	U	UG/KG	11	V	TRG	A
		LF04891214	19-MAY-89	12	U	UG/KG	12	V	TRG	A
		LF04891416	19-MAY-89	12	U	UG/KG	12	V	TRG	A
		LF04890406	19-MAY-89	11	U	UG/KG	11	A	TRG	A
		LF04890910	19-MAY-89	11	U	UG/KG	11	V	TRG	A
	CARBON DISULFIDE	LF04890002D	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04891416	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04890406	19-MAY-89	6	U	UG/KG	6	A	TRG	A
		LF04890910	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04891214	19-MAY-89	6	U	UG/KG	6	V	TRG	A
	CARBON TETRACHLORIDE	LF04890002D	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04890910	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04891416	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04891214	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04890406	19-MAY-89	6	U	UG/KG	6	A	TRG	A
	CHLOROBENZENE	LF04890002D	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04891416	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04890910	19-MAY-89	6	U	UG/KG	6	A	TRG	A
		LF04891214	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04890406	19-MAY-89	6	U	UG/KG	6	A	TRG	A

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Location Code	Parameter	Proj Sample No	Sample Date	Result	Q	Units	Det Limit	Validation	Type Flag	Pkg Valid
B206389	CHLOROETHANE	LF04890002D	19-MAY-89	11	U	UG/KG	11	V	TRG	A
		LF04890406	19-MAY-89	11	U	UG/KG	11	A	TRG	A
		LF04891214	19-MAY-89	12	U	UG/KG	12	V	TRG	A
		LF04891416	19-MAY-89	12	U	UG/KG	12	V	TRG	A
		LF04890910	19-MAY-89	11	U	UG/KG	11	V	TRG	A
	CHLOROFORM	LF04890002D	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04891214	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04891416	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04890406	19-MAY-89	6	U	UG/KG	6	A	TRG	A
		LF04890910	19-MAY-89	6	U	UG/KG	6	V	TRG	A
	CHLOROMETHANE	LF04890002D	19-MAY-89	11	U	UG/KG	11	V	TRG	A
		LF04891214	19-MAY-89	12	U	UG/KG	12	V	TRG	A
		LF04891416	19-MAY-89	12	U	UG/KG	12	V	TRG	A
		LF04890910	19-MAY-89	11	U	UG/KG	11	V	TRG	A
		LF04890406	19-MAY-89	11	U	UG/KG	11	A	TRG	A
	DIBROMOCHLOROMETHANE	LF04890002D	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04891416	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04890910	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04891214	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04890406	19-MAY-89	6	U	UG/KG	6	A	TRG	A
	ETHYLBENZENE	LF04890002D	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04891416	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04891214	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04890910	19-MAY-89	6	U	UG/KG	6	A	TRG	A
		LF04890406	19-MAY-89	2	J	UG/KG	6	A	TRG	A
	METHYLENE CHLORIDE	LF04890002D	19-MAY-89	4	JB	UG/KG	6	A	TRG	A
		LF04890406	19-MAY-89	6	B	UG/KG	6	A	TRG	A
		LF04891214	19-MAY-89	6	B	UG/KG	6	A	TRG	A
		LF04891416	19-MAY-89	6	B	UG/KG	6	A	TRG	A
		LF04890910	19-MAY-89	3	JB	UG/KG	6	A	TRG	A

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Location Code	Parameter	Proj Sample No	Sample Date	Result	Q	Units	Det Limit	Validation	Type Flag	Pkg Valid.
B206389	STYRENE	LF04890002D	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04890406	19-MAY-89	2	J	UG/KG	6	A	TRG	A
		LF04891416	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04890910	19-MAY-89	6	U	UG/KG	6	A	TRG	A
		LF04891214	19-MAY-89	6	U	UG/KG	6	V	TRG	A
	TETRACHLOROETHENE	LF04890002D	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04891416	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04890406	19-MAY-89	6	U	UG/KG	6	A	TRG	A
		LF04891214	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04890910	19-MAY-89	2	J	UG/KG	6	A	TRG	A
	TOLUENE	LF04890002D	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04890910	19-MAY-89	6	U	UG/KG	6	A	TRG	A
		LF04890406	19-MAY-89	9		UG/KG	6	A	TRG	A
		LF04891416	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04891214	19-MAY-89	6	U	UG/KG	6	V	TRG	A
	TOTAL XYLENES	LF04890002D	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04890910	19-MAY-89	6	U	UG/KG	6	A	TRG	A
		LF04890406	19-MAY-89	3	J	UG/KG	6	A	TRG	A
		LF04891214	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04891416	19-MAY-89	6	U	UG/KG	6	V	TRG	A
	TRICHLOROETHENE	LF04890002D	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04890910	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04890406	19-MAY-89	6	U	UG/KG	6	A	TRG	A
		LF04891416	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04891214	19-MAY-89	6	U	UG/KG	6	V	TRG	A
	VINYL ACETATE	LF04890002D	19-MAY-89	11	U	UG/KG	11	V	TRG	A
		LF04890910	19-MAY-89	11	U	UG/KG	11	V	TRG	A
		LF04891214	19-MAY-89	12	U	UG/KG	12	V	TRG	A
		LF04891416	19-MAY-89	12	U	UG/KG	12	V	TRG	A
		LF04890406	19-MAY-89	11	U	UG/KG	11	A	TRG	A

OU07 DRILL CUTTINGS ANALYTICAL DATA

Location Code	Parameter	Proj Sample No	Sample Date	Result	Q	Units	Det Limit	Validation	Type Flag	Pkg. Valid.
B206389	VINYL CHLORIDE	LF04890002D	19-MAY-89	11	U	UG/KG	11	V	TRG	A
		LF04891214	19-MAY-89	12	U	UG/KG	12	V	TRG	A
		LF04891416	19-MAY-89	12	U	UG/KG	12	V	TRG	A
		LF04890910	19-MAY-89	11	U	UG/KG	11	V	TRG	A
		LF04890406	19-MAY-89	11	U	UG/KG	11	A	TRG	A
	cis-1,3-DICHLOROPROPENE	LF04890002D	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04891416	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04890406	19-MAY-89	6	U	UG/KG	6	A	TRG	A
		LF04891214	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04890910	19-MAY-89	6	U	UG/KG	6	V	TRG	A
	trans-1,3-DICHLOROPROPENE	LF04890002D	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04891416	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04891214	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04890910	19-MAY-89	6	U	UG/KG	6	V	TRG	A
		LF04890406	19-MAY-89	6	U	UG/KG	6	A	TRG	A

OU07 DRILL CUTTINGS ANALYTICAL DATA

Location Code	Parameter	Proj Sample No	Sample Date	Result	Q	Units	Det. Limit	Validation	Type Flag	Pkg Valid.
B206789	% SOLIDS	LF0989BR0003	23-MAY-89	83 4		%			TRG	
		LF0989BR0511D	23-MAY-89	84 2		%			TRG	
		LF0989BR1117	23-MAY-89	83.8		%			TRG	
		LF0989BR0511	23-MAY-89	84.6		%			TRG	
	NITRATE	LF0989BR0003	23-MAY-89	5.3124	U				TRG	
		LF0989BR1117	23-MAY-89	5 3124	U				TRG	
		LF0989BR0511	23-MAY-89	5.3124	U				TRG	
		LF0989BR0511D	23-MAY-89	5.3124	U				TRG	
	NITRATE/NITRITE	LF0989BR0003	23-MAY-89	1 2	U	MG/KG		V	TRG	
		LF0989BR0511	23-MAY-89	1 2	U	MG/KG		V	TRG	
		LF0989BR1117	23-MAY-89	1 2	U	MG/KG		V	TRG	
		LF0989BR0511D	23-MAY-89	1 2	U	MG/KG		V	TRG	
	SULFIDE	LF0989BR0003	23-MAY-89	2	U	MG/KG		V	TRG	
		LF0989BR0511D	23-MAY-89	2	U	MG/KG		V	TRG	
		LF0989BR1117	23-MAY-89	2	U	MG/KG		V	TRG	
		LF0989BR0511	23-MAY-89	2	U	MG/KG		V	TRG	
	pH	LF0989BR0003	23-MAY-89	7 7		PHUNIT			TRG	
		LF0989BR1117	23-MAY-89	8 4		PHUNIT			TRG	
		LF0989BR0511D	23-MAY-89	8 6		PHUNIT			TRG	
		LF0989BR0511	23-MAY-89	9		PHUNIT			TRG	
	CESIUM-137	LF0989BR0511	23-MAY-89	0		PCI/G	.1		TRG	
		LF0989BR1117	23-MAY-89	0		PCI/G	.1		TRG	
		LF0989BR0511D	23-MAY-89	0		PCI/G	.1		TRG	

APPENDIX G

Present Landfill Groundwater Quality

Data Exceeding Background --

Uppermost Flow System

U S DEPARTMENT OF ENERGY
ROCKY FLATS PLANT
GROUNDWATER QUALITY MONITORING - OPERABLE UNIT 7
UPPER FLOW SYSTEM - QUARTERS 1,2, and 3 - 1990

WELL IDENTIFICATION CODE 0586

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
CALCIUM	62 590	315 000		5000 000	MG/L	15-MAY-90	G05860515020925	V
MAGNESIUM	16 090	249 000		5000 000	MG/L	15-MAY-90	G05860515020925	V
SODIUM	46 740	924 000		5000 000	MG/L	15-MAY-90	G05860515020925	V
TRICHLOROETHENE	5 000	8 000		5 000	UG/L	23-MAR-90	G05860390001	

WELL IDENTIFICATION CODE. 0686

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
CALCIUM	62 590	229 000		28 800	MG/L	17-MAY-90	G-0686-0516-02-1410	
		229 000		28 800	MG/L	17-MAY-90	G-0686-0516-02-1410	V
		229 000		5000 000	MG/L	17-MAY-90	G06860516021410	V
CHLORIDE	10 670	709 000		250 000	MG/L	17-MAY-90	G-0686-0516-02-1410	V
MAGNESIUM	16 090	88 900		19 400	MG/L	17-MAY-90	G-0686-0516-02-1410	
		88 900		19 400	MG/L	17-MAY-90	G-0686-0516-02-1410	V
		88 900		5000 000	MG/L	17-MAY-90	G06860516021410	V
MANGANESE	0 213	0 388		1 000	MG/L	17-MAY-90	G-0686-0516-02-1410	
		0 388		1 000	MG/L	17-MAY-90	G-0686-0516-02-1410	V
		0 388		15 000	MG/L	17-MAY-90	G06860516021410	V
MERCURY	0 000	0.001			MG/L	17-MAY-90	G-0686-0516-02-1410	

Report Date: 01-JUL-91

U S DEPARTMENT OF ENERGY
ROCKY FLATS PLANT
GROUNDWATER QUALITY MONITORING - OPERABLE UNIT 7
UPPER FLOW SYSTEM - QUARTERS 1,2, and 3 - 1990

WELL IDENTIFICATION CODE 0686

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
MERCURY	0 000	0 001			MG/L	17-MAY-90	G-0686-0516-02-1410	V
		0 001			MG/L	17-MAY-90	G06860516021410	V
NICKEL	0 043	0 401		5 500	MG/L	17-MAY-90	G-0686-0516-02-1410	
		0 401		5 500	MG/L	17-MAY-90	G-0686-0516-02-1410	V
		0 401		40 000	MG/L	17-MAY-90	G06860516021410	V
SODIUM	46 740	420 000		30 400	MG/L	17-MAY-90	G-0686-0516-02-1410	
		420 000		30 400	MG/L	17-MAY-90	G-0686-0516-02-1410	V
		420.000		5000 000	MG/L	17-MAY-90	G06860516021410	V
SULFATE	67 080	1170 000		500 000	MG/L	17-MAY-90	G-0686-0516-02-1410	V
TOTAL DISSOLVED SOLIDS	388 760	3000 000		10 000	MG/L	17-MAY-90	G-0686-0516-02-1410	
		3000 000		10 000	MG/L	17-MAY-90	G-0686-0516-02-1410	V

WELL IDENTIFICATION CODE· 0786

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
BICARBONATE AS CACO3	249 350	920 000			MG/L	02-FEB-90	G07860190001	
		620 000		10 000	MG/L	01-MAY-90	G-0786-0501-02-0950	
CALCIUM	62 590	295 000		5000 000	MG/L	31-JAN-90	G07860190001	V
CHLORIDE	10 670	410 000			MG/L	02-FEB-90	G07860190001	
		222 000		25 000	MG/L	01-MAY-90	G-0786-0501-02-0950	

Report Date 01-JUL-91

U S. DEPARTMENT OF ENERGY
ROCKY FLATS PLANT
GROUNDWATER QUALITY MONITORING - OPERABLE UNIT 7
UPPER FLOW SYSTEM - QUARTERS 1,2, and 3 - 1990

WELL IDENTIFICATION CODE 0786

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
IRON	0.944	3 760		100 000	MG/L	31-JAN-90	G07860190001	V
MAGNESIUM	16 090	94 700		5000 000	MG/L	31-JAN-90	G07860190001	V
NICKEL	0 043	0.795		40 000	MG/L	31-JAN-90	G07860190001	V
SODIUM	46.740	253 000		5000 000	MG/L	31-JAN-90	G07860190001	V
SULFATE	67 080	380 000			MG/L	02-FEB-90	G07860190001	
		206 000		100 000	MG/L	01-MAY-90	G-0786-0501-02-0950	
TOTAL DISSOLVED SOLIDS	388 760	2000 000			MG/L	02-FEB-90	G07860190001	
		1300.000		10 000	MG/L	01-MAY-90	G-0786-0501-02-0950	

WELL IDENTIFICATION CODE 1086

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
NITRATE/NITRITE	3 430	4 300			MG/L	26-JAN-90	G10860190001	
		3 600			MG/L	24-SEP-90	GW00365IT	

WELL IDENTIFICATION CODE- 4287

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
CALCIUM	62 590	68 600		5000 000	MG/L	21-MAR-90	G42870390001	V

Report Date 01-JUL-91

U S DEPARTMENT OF ENERGY
ROCKY FLATS PLANT
GROUNDWATER QUALITY MONITORING - OPERABLE UNIT 7
UPPER FLOW SYSTEM - QUARTERS 1,2, and 3 - 1990

WELL IDENTIFICATION CODE 5887

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
NITRATE/NITRITE	3 430	4 400			MG/L	30-JAN-90	G58870190001	
		4 300			MG/L	13-SEP-90	GW00374IT	
		3 800		2 000	MG/L	17-MAY-90	G-5887-0517-02-1218	
		3 800		2 000	MG/L	17-MAY-90	G-5887-0517-02-1218	V

WELL IDENTIFICATION CODE 6087

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
ACETONE	10 000	10 000		10 000	UG/L	06-JUN-90	G-6087-0606-02-1344	
ALUMINUM	0 327	0.398		200 000	MG/L	28-AUG-90	GW00317IT	
BARIUM	0 200	0 214		9 700	MG/L	06-JUN-90	G-6087-0606-02-1344	
		0 214		9.700	MG/L	06-JUN-90	G-6087-0606-02-1344	V
LEAD	0 040	0 045		3 000	MG/L	28-AUG-90	GW00314IT	
NITRATE/NITRITE	3 430	8 200			MG/L	28-AUG-90	GW00312IT	
		7 800			MG/L	28-AUG-90	GW00313IT	
		4 600			MG/L	01-FEB-90	G60870290001	
		4 500		1 000	MG/L	06-JUN-90	G-6087-0606-02-1440	
		4 500		1 000	MG/L	06-JUN-90	G-6087-0606-02-1440	V
		4 400			MG/L	01-FEB-90	G60870290001D	
		4 300		1 000	MG/L	06-JUN-90	G-6087-0606-02-1344	
		4 300		1.000	MG/L	06-JUN-90	G-6087-0606-02-1344	V

Report Date· 01-JUL-91

U S. DEPARTMENT OF ENERGY
ROCKY FLATS PLANT
GROUNDWATER QUALITY MONITORING - OPERABLE UNIT 7
UPPER FLOW SYSTEM - QUARTERS 1,2, and 3 - 1990

WELL IDENTIFICATION CODE 6087

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
TOTAL DISSOLVED SOLIDS	388 760	500 000			MG/L	01-FEB-90	G60870290001	
TRICHLOROETHENE	5.000	160 000		5 000	UG/L	06-JUN-90	FB-6087-0606-02-1226	
		22 000		5 000	UG/L	06-JUN-90	ER-6087-0606-02-1201	

WELL IDENTIFICATION CODE 6187

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
NITRATE/NITRITE	3 430	5 100			MG/L	05-MAR-90	G61870390001	
		4 800			MG/L	05-MAR-90	G61870390001D	
		4 400		1 000	MG/L	08-MAY-90	G-6187-0508-02-1233	
		4 400		1 000	MG/L	08-MAY-90	G-6187-0508-02-1233	JA
		4 300		1 000	MG/L	08-MAY-90	G-6187-0508-02-1410	
		4 300		1 000	MG/L	08-MAY-90	G-6187-0508-02-1410	JA
		4 000			MG/L	23-JUL-90	GW00172IT	

WELL IDENTIFICATION CODE 6287

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
AMERICIUM-241	0 017	3 191			PCI/L	26-FEB-90	G62870290001D	
CESIUM-137	0 506	4 668			PCI/L	26-FEB-90	G62870290001	
NITRATE/NITRITE	3 430	5 200			MG/L	26-FEB-90	G62870290001D	
		4 400			MG/L	26-FEB-90	G62870290001	

Report Date: 01-JUL-91

U S DEPARTMENT OF ENERGY
ROCKY FLATS PLANT
GROUNDWATER QUALITY MONITORING - OPERABLE UNIT 7
UPPER FLOW SYSTEM - QUARTERS 1,2, and 3 - 1990

WELL IDENTIFICATION CODE· 6287

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
NITRATE/NITRITE	3 430	3 500			MG/L	23-AUG-90	GW00286IT	
		3 500			MG/L	23-AUG-90	GW00289IT	
URANIUM-233,234	0 100	1 870			PCI/L	26-FEB-90	G62870290001D	

WELL IDENTIFICATION CODE 6387

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
1,2-DICHLOROETHYLENE	5 000	28 000		5.000	UG/L	18-MAY-90	G-6387-0518-02-0910	
		28 000		5 000	UG/L	18-MAY-90	G-6387-0518-02-1020	
ACETONE	10 000	19 000		10 000	UG/L	13-SEP-90	GW00199IT	
BARIUM	0 200	0 508		200 000	MG/L	12-FEB-90	G63870290001D	
		0 421		200 000	MG/L	13-SEP-90	GW00201IT	
		0 409		200 000	MG/L	13-SEP-90	GW00123IT	
		0 399		5 400	MG/L	18-MAY-90	G-6387-0518-02-0910	
		0 399		5 400	MG/L	18-MAY-90	G-6387-0518-02-0910	V
		0 399		200 000	MG/L	18-MAY-90	G63870518020910	V
		0 397		5 400	MG/L	18-MAY-90	G-6387-0518-02-1020	
		0 397		5 400	MG/L	18-MAY-90	G-6387-0518-02-1020	V
		0 397		200 000	MG/L	18-MAY-90	G63870518021020	V
BICARBONATE AS CACO3	249 350	500 000			MG/L	12-FEB-90	G63870290001	
		408 000		10 000	MG/L	18-MAY-90	G-6387-0518-02-0910	
		408 000		10 000	MG/L	18-MAY-90	G-6387-0518-02-0910	V

Report Date 01-JUL-91

U S DEPARTMENT OF ENERGY
ROCKY FLATS PLANT
GROUNDWATER QUALITY MONITORING - OPERABLE UNIT 7
UPPER FLOW SYSTEM - QUARTERS 1,2, and 3 - 1990

WELL IDENTIFICATION CODE. 6387

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
BICARBONATE AS CACO3	249 350	398 000		10 000	MG/L	18-MAY-90	G-6387-0518-02-1020	
		398 000		10 000	MG/L	18-MAY-90	G-6387-0518-02-1020	V
		380 000		1 000	MG/L	13-SEP-90	GW00123IT	
		380 000		1 000	MG/L	13-SEP-90	GW00201IT	
CALCIUM	62 590	129 000		28 800	MG/L	18-MAY-90	G-6387-0518-02-1020	
		129 000		28 800	MG/L	18-MAY-90	G-6387-0518-02-1020	V
		129 000		5000 000	MG/L	18-MAY-90	G63870518021020	V
		128 000		28 800	MG/L	18-MAY-90	G-6387-0518-02-0910	
		128 000		28 800	MG/L	18-MAY-90	G-6387-0518-02-0910	V
		128 000		5000 000	MG/L	18-MAY-90	G63870518020910	V
		121 000		5000 000	MG/L	12-FEB-90	G63870290001D	
		115 000		5000 000	MG/L	13-SEP-90	GW00201IT	
		114 000		5000.000	MG/L	13-SEP-90	GW00123IT	
CHLORIDE	10 670	48.300		5 000	MG/L	18-MAY-90	G-6387-0518-02-0910	V
		48 100		5 000	MG/L	18-MAY-90	G-6387-0518-02-1020	V
		41 000			MG/L	12-FEB-90	G63870290001	
		38 000			MG/L	13-SEP-90	GW00201IT	
		37 000			MG/L	13-SEP-90	GW00123IT	
IRON	0 944	13 000		16 700	MG/L	18-MAY-90	G-6387-0518-02-0910	
		13 000		16 700	MG/L	18-MAY-90	G-6387-0518-02-0910	V
		13 000		100 000	MG/L	18-MAY-90	G63870518020910	V
		11 000		16.700	MG/L	18-MAY-90	G-6387-0518-02-1020	
		11 000		16 700	MG/L	18-MAY-90	G-6387-0518-02-1020	V
		11 000		100 000	MG/L	18-MAY-90	G63870518021020	V

Report Date. 01-JUL-91

U S DEPARTMENT OF ENERGY
ROCKY FLATS PLANT
GROUNDWATER QUALITY MONITORING - OPERABLE UNIT 7
UPPER FLOW SYSTEM - QUARTERS 1,2, and 3 - 1990

WELL IDENTIFICATION CODE. 6387

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
IRON	0.944	5 290		100 000	MG/L	12-FEB-90	G63870290001D	
MAGNESIUM	16 090	25 100		19 400	MG/L	18-MAY-90	G-6387-0518-02-1020	
		25.100		19 400	MG/L	18-MAY-90	G-6387-0518-02-1020	V
		25 100		5000 000	MG/L	18-MAY-90	G63870518021020	V
		24 800		19 400	MG/L	18-MAY-90	G-6387-0518-02-0910	
		24 800		19 400	MG/L	18-MAY-90	G-6387-0518-02-0910	V
		24 800		5000 000	MG/L	18-MAY-90	G63870518020910	V
		21 100		5000 000	MG/L	13-SEP-90	GW00123IT	
		21 000		5000 000	MG/L	13-SEP-90	GW00201IT	
		19 300		5000 000	MG/L	12-FEB-90	G63870290001D	
MANGANESE	0 213	6 000		1 000	MG/L	18-MAY-90	G-6387-0518-02-0910	
		6 000		1 000	MG/L	18-MAY-90	G-6387-0518-02-0910	V
		6 000		15.000	MG/L	18-MAY-90	G63870518020910	V
		5 380		1 000	MG/L	18-MAY-90	G-6387-0518-02-1020	
		5 380		1 000	MG/L	18-MAY-90	G-6387-0518-02-1020	V
		5 380		15 000	MG/L	18-MAY-90	G63870518021020	V
		2 830		15 000	MG/L	13-SEP-90	GW00201IT	
		2 710		15 000	MG/L	12-FEB-90	G63870290001D	
		2 550		15.000	MG/L	13-SEP-90	GW00123IT	
MERCURY	0 000	0.001			MG/L	18-MAY-90	G-6387-0518-02-0910	
		0 001			MG/L	18-MAY-90	G-6387-0518-02-0910	V
		0 001			MG/L	18-MAY-90	G63870518020910	V
		0 001			MG/L	18-MAY-90	G-6387-0518-02-1020	
		0 001			MG/L	18-MAY-90	G-6387-0518-02-1020	V

Report Date: 01-JUL-91

U S DEPARTMENT OF ENERGY
ROCKY FLATS PLANT
GROUNDWATER QUALITY MONITORING - OPERABLE UNIT 7
UPPER FLOW SYSTEM - QUARTERS 1,2, and 3 - 1990

WELL IDENTIFICATION CODE: 6387

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
MERCURY	0 000	0 001			MG/L	18-MAY-90	G63870518021020	V
TOTAL DISSOLVED SOLIDS	388 760	620 000		10 000	MG/L	18-MAY-90	G-6387-0518-02-0910	
		620 000		10.000	MG/L	18-MAY-90	G-6387-0518-02-0910	V
		576 000		10 000	MG/L	18-MAY-90	G-6387-0518-02-1020	
		576 000		10 000	MG/L	18-MAY-90	G-6387-0518-02-1020	V
		540 000			MG/L	12-FEB-90	G63870290001	
		510 000		10 000	MG/L	13-SEP-90	GW00201IT	
		500 000		10 000	MG/L	13-SEP-90	GW00123IT	
URANIUM-233,234	0.100	0 700			PCI/L	12-FEB-90	G63870290001	
VINYL CHLORIDE	10 000	17 000		10 000	UG/L	12-FEB-90	G63870290001D	
		11 000		10 000	UG/L	13-SEP-90	GW00123IT	
		11 000		10 000	UG/L	13-SEP-90	GW00201IT	

WELL IDENTIFICATION CODE 6487

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
1,1-DICHLOROETHANE	5 000	10 000		5 000	UG/L	15-JUN-90	G64870615020948	V
		6 000		5.000	UG/L	21-SEP-90	GW00368IT	
1,2-DICHLOROETHYLENE	5 000	10 000		5.000	UG/L	21-SEP-90	GW00368IT	
ARSENIC	0 010	0 012		10 000	MG/L	21-SEP-90	GW00368IT	

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U S DEPARTMENT OF ENERGY
ROCKY FLATS PLANT
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UPPER FLOW SYSTEM - QUARTERS 1,2, and 3 - 1990

WELL IDENTIFICATION CODE· 6487

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
BARIUM	0 200	0 697		200 000	MG/L	21-SEP-90	GW00368IT	
		0 213		200.000	MG/L	14-FEB-90	G64870290001	V
BICARBONATE AS CACO3	249 350	270.000		1 000	MG/L	21-SEP-90	GW00368IT	
CALCIUM	62 590	93 300		5000 000	MG/L	21-SEP-90	GW00368IT	
CHLORIDE	10 670	66 000			MG/L	21-SEP-90	GW00368IT	
		36 000			MG/L	14-FEB-90	G64870290001	
COBALT	0 050	0 068		50 000	MG/L	21-SEP-90	GW00368IT	
IRON	0 944	57 100		100 000	MG/L	21-SEP-90	GW00368IT	
		3 480		100 000	MG/L	14-FEB-90	G64870290001	V
MAGNESIUM	16 090	17 300		5000 000	MG/L	21-SEP-90	GW00368IT	
MANGANESE	0 213	4 120		15 000	MG/L	21-SEP-90	GW00368IT	
		1 050		15 000	MG/L	14-FEB-90	G64870290001	V
NICKEL	0 043	0 063		40 000	MG/L	21-SEP-90	GW00368IT	
TOTAL DISSOLVED SOLIDS	388.760	440 000		10 000	MG/L	21-SEP-90	GW00368IT	

WELL IDENTIFICATION CODE 6587

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WELL IDENTIFICATION CODE· 6587

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
1,1,1-TRICHLOROETHANE	5 000	19 000		5 000	UG/L	01-MAY-90	G65870501021529	V
		19 000		5 000	UG/L	01-MAY-90	G65870501021529	V
		14 000		5 000	UG/L	18-JUL-90	GW00019IT	
1,2-DICHLOROETHYLENE	5 000	8 000		5.000	UG/L	18-JUL-90	GW00019IT	
IRON	0 944	1 810		100 000	MG/L	01-MAY-90	G658705010215	V
		1 110		100 000	MG/L	18-JUL-90	GW00019IT	
MANGANESE	0 213	0.584		15 000	MG/L	01-MAY-90	G658705010215	V
		0 567		15 000	MG/L	18-JUL-90	GW00019IT	
		0 361		15 000	MG/L	22-MAR-90	G65870390001	V
NITRATE/NITRITE	3 430	4 600			MG/L	18-JUL-90	GW00019IT	
TRICHLOROETHENE	5 000	26 000		5 000	UG/L	01-MAY-90	G65870501021529	V
		26 000		5 000	UG/L	01-MAY-90	G65870501021529	V
		23 000		5 000	UG/L	18-JUL-90	GW00019IT	

WELL IDENTIFICATION CODE 6687

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
1,1,1-TRICHLOROETHANE	5.000	18 000		5 000	UG/L	24-JUL-90	GW00026IT	
		13.000		5 000	UG/L	12-MAR-90	G66870390001	V
		11 000		5.000	UG/L	02-MAY-90	G6687050201250	V
		11 000		5.000	UG/L	02-MAY-90	G6687050201250	V

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WELL IDENTIFICATION CODE 6687

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
CALCIUM	62 590	208 000		5000 000	MG/L	02-MAY-90	G66870502021250	V
COPPER	0.048	0 053		25 000	MG/L	02-MAY-90	G66870502021250	V
MAGNESIUM	16.090	50 700		5000 000	MG/L	02-MAY-90	G66870502021250	V
NITRATE/NITRITE	3 430	4 300			MG/L	12-MAR-90	G66870390001	
TRICHLOROETHENE	5 000	18 000		5.000	UG/L	24-JUL-90	GW000261T	
		12 000		5.000	UG/L	02-MAY-90	G6687050201250	V
		12 000		5 000	UG/L	02-MAY-90	G6687050201250	V

WELL IDENTIFICATION CODE 6787

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
ACETONE	10 000	22 000		10 000	UG/L	19-FEB-90	G67870290001	V
AMERICIUM-241	0 017	0 047			PCI/L	19-FEB-90	G67870290001	
COPPER	0 048	0 383		25 000	MG/L	22-MAY-90	G678705220211	V
NICKEL	0.043	0 097		40 000	MG/L	22-MAY-90	G678705220211	V
		0 062		40 000	MG/L	21-SEP-90	GW00369IT	
TETRACHLOROETHENE	5 000	51 000		5.000	UG/L	22-MAY-90	G67870522021127	V
		51 000		5 000	UG/L	22-MAY-90	G67870522021127	V

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WELL IDENTIFICATION CODE· 6787

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
URANIUM-233,234	0 100	0 500			PCI/L	19-FEB-90	G67870290001	
ZINC	0 141	0 869		20 000	MG/L	22-MAY-90	G678705220211	V
		0.470		20 000	MG/L	21-SEP-90	GW00369IT	

WELL IDENTIFICATION CODE 6887

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
COPPER	0 048	0 231		25 000	MG/L	31-JUL-90	GW00124IT	
NICKEL	0 043	0 084		40 000	MG/L	31-JUL-90	GW00124IT	
TETRACHLOROETHENE	5 000	27 000		5 000	UG/L	22-MAY-90	G-6887-0522-02-1400	
		27 000		5 000	UG/L	22-MAY-90	G68870522021400	V
		27 000		5 000	UG/L	22-MAY-90	G68870522021400	V
URANIUM-233,234	0 100	0 200			PCI/L	19-FEB-90	G68870290001	
ZINC	0 141	0 599		20 000	MG/L	31-JUL-90	GW00124IT	

WELL IDENTIFICATION CODE 7087

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
BICARBONATE AS CACO3	249 350	260.000		1.000	MG/L	17-AUG-90	GW00239IT	

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WELL IDENTIFICATION CODE· 7087

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
CALCIUM	62 590	77 700		5000 000	MG/L	17-AUG-90	GW00239IT	
CHLORIDE	10.670	43 000			MG/L	17-AUG-90	GW00239IT	
MAGNESIUM	16 090	21 900		5000 000	MG/L	17-AUG-90	GW00239IT	
NITRATE/NITRITE	3 430	5 100			MG/L	17-AUG-90	GW00239IT	
SODIUM	46 740	60 200		5000 000	MG/L	17-AUG-90	GW00239IT	
SULFATE	67 080	87 000		2 000	MG/L	17-AUG-90	GW00239IT	
TOTAL DISSOLVED SOLIDS	388 760	510 000		10 000	MG/L	17-AUG-90	GW00239IT	

WELL IDENTIFICATION CODE 7187

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
AMERICIUM-241	0 017	0 020			PCI/L	15-FEB-90	G71870290001	
CALCIUM	62 590	66 400		28 800	MG/L	27-APR-90	G-7187-0427-02-1147	
		66 400		28 800	MG/L	27-APR-90	G-7187-0427-02-1147	V
URANIUM-233,234	0 100	0 800			PCI/L	15-FEB-90	G71870290001	

WELL IDENTIFICATION CODE 7287

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WELL IDENTIFICATION CODE. 7287

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
BICARBONATE AS CACO3	249.350	270 000			MG/L	20-FEB-90		
		270 000			MG/L	20-FEB-90	G72870290001	
		250 000		1 000	MG/L	17-JUL-90	GW00011IT	
CALCIUM	62 590	86 300		5000 000	MG/L	17-JUL-90	GW00011IT	
		84.000		5000 000	MG/L	20-FEB-90	G72870290001	V
CARBON TETRACHLORIDE	5.000	8 000		5 000	UG/L	20-FEB-90	G72870290001	V
COPPER	0 048	0 106		25 000	MG/L	20-FEB-90	G72870290001	V
		0 089		25 000	MG/L	17-JUL-90	GW00011IT	
NICKEL	0 043	0 067		40 000	MG/L	20-FEB-90	G72870290001	V
TETRACHLOROETHENE	5 000	5 000		5 000	UG/L	20-FEB-90	G72870290001	V
TOTAL DISSOLVED SOLIDS	388 760	420 000			MG/L	20-FEB-90		
		420 000			MG/L	20-FEB-90	G72870290001	
TRICHLOROETHENE	5.000	50 000		5 000	UG/L	20-FEB-90	G72870290001	V
		47 000		5 000	UG/L	17-JUL-90	GW00011IT	
URANIUM-233,234	0 100	1.000			PCI/L	20-FEB-90	G72870290001	
ZINC	0 141	0 645		20 000	MG/L	20-FEB-90	G72870290001	V
		0 298		20.000	MG/L	17-JUL-90	GW00011IT	
		0 149		20 000	MG/L	30-APR-90	G72870430021410	V

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WELL IDENTIFICATION CODE B106089

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
1,1,1-TRICHLOROETHANE	5 000	12 000		5 000	UG/L	07-AUG-90	GW00152IT	
1,1-DICHLOROETHANE	5 000	11 000		5 000	UG/L	07-AUG-90	GW00152IT	
1,2-DICHLOROETHYLENE	5 000	6 000		5.000	UG/L	07-AUG-90	GW00152IT	
ACETONE	10 000	11 000		10 000	UG/L	07-AUG-90	GW00152IT	
BARIUM	0 200	0 316		200 000	MG/L	30-MAY-90	LF01890530021910	V
IRON	0 944	4 040		100 000	MG/L	30-MAY-90	LF01890530021910	V
MANGANESE	0 213	1 060		15 000	MG/L	30-MAY-90	LF01890530021910	V

WELL IDENTIFICATION CODE B206189

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
ALUMINUM	0 327	0 345		200 000	MG/L	22-MAR-90	GLF02890390001	V
BARIUM	0 200	0 330		200 000	MG/L	17-AUG-90	GW00242IT	
BICARBONATE AS CACO3	249 350	570 000		1 000	MG/L	17-AUG-90	GW00242IT	
		390 000			MG/L	22-MAR-90	GLF02890390001	
CALCIUM	62 590	130 000		5000.000	MG/L	17-AUG-90	GW00242IT	
		98 900		5000 000	MG/L	22-MAR-90	GLF02890390001	V

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WELL IDENTIFICATION CODE B206189

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
CHLORIDE	10 670	64 000			MG/L	17-AUG-90	GW00242IT	
		51 000			MG/L	22-MAR-90	GLF02890390001	
MAGNESIUM	16 090	27 600		5000 000	MG/L	22-MAR-90	GLF02890390001	V
		26 500		5000 000	MG/L	17-AUG-90	GW00242IT	
NICKEL	0 043	0 044		40 000	MG/L	22-MAR-90	GLF02890390001	V
SILVER	0 004	0 006		10 000	MG/L	22-MAR-90	GLF02890390001	V
SODIUM	46 740	181 000		5000 000	MG/L	22-MAR-90	GLF02890390001	V
		125 000		5000 000	MG/L	17-AUG-90	GW00242IT	
SULFATE	67 080	140 000			MG/L	22-MAR-90	GLF02890390001	
		70 000		2 000	MG/L	17-AUG-90	GW00242IT	
TOTAL DISSOLVED SOLIDS	388 760	800 000		10 000	MG/L	17-AUG-90	GW00242IT	
		650 000			MG/L	22-MAR-90	GLF02890390001	

WELL IDENTIFICATION CODE B206289

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
BICARBONATE AS CACO3	249 350	340.000			MG/L	09-MAR-90	GLF03890390001	
CALCIUM	62 590	68.800		5000 000	MG/L	01-JUN-90	LF0389BR05310	V

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WELL IDENTIFICATION CODE B206289

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
MAGNESIUM	16 090	17 100		5000 000	MG/L	01-JUN-90	LF0389BR05310	V

WELL IDENTIFICATION CODE B206389

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
BARIUM	0 200	0 594		200 000	MG/L	24-MAY-90	LF04890523021	V
BICARBONATE AS CACO3	249 350	550 000		1 000	MG/L	26-SEP-90	GW00373IT	
CALCIUM	62 590	154.000		5000 000	MG/L	24-MAY-90	LF04890523021	V
CHLORIDE	10 670	21 000			MG/L	26-SEP-90	GW00373IT	
CHLOROFORM	5 000	8 000		5 000	UG/L	24-MAY-90	LF04890523021144	V
		8 000		5 000	UG/L	24-MAY-90	LF04890523021144	V
IRON	0 944	5 500		100 000	MG/L	24-MAY-90	LF04890523021	V
MANGANESE	0 213	2 440		15 000	MG/L	24-MAY-90	LF04890523021	V
TETRACHLOROETHENE	5 000	51 000		5 000	UG/L	24-MAY-90	LF04890523021144	V
		51.000		5.000	UG/L	24-MAY-90	LF04890523021144	V
TOTAL DISSOLVED SOLIDS	388.760	540 000		10 000	MG/L	26-SEP-90	GW00373IT	

WELL IDENTIFICATION CODE B206489

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WELL IDENTIFICATION CODE B206489

Parameter	Background Lmt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
ACETONE	10 000	14 000		10 000	UG/L	20-FEB-90	GLF05890290001	V
BICARBONATE AS CACO3	249 350	310 000			MG/L	20-FEB-90	GLF05890290001	
CALCIUM	62 590	66 900		5000 000	MG/L	22-FEB-90	GLF05890290001	V
CHLORIDE	10.670	14 000			MG/L	20-FEB-90	GLF05890290001	
SODIUM	46.740	52 800		5000 000	MG/L	22-FEB-90	GLF05890290001	V
SULFATE	67 080	81 000			MG/L	20-FEB-90	GLF05890290001	
TOTAL DISSOLVED SOLIDS	388 760	400 000			MG/L	20-FEB-90	GLF05890290001	
TRICHLOROETHENE	5 000	46 000		5 000	UG/L	20-FEB-90	GLF05890290001	V
		25 000		5 000	UG/L	07-AUG-90	GW001531T	
		18 000		5 000	UG/L	31-MAY-90	LF0589BR0530021358	V
		18 000		5 000	UG/L	31-MAY-90	LF0589BR0530021358	V

WELL IDENTIFICATION CODE B206589

Parameter	Background Lmt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
BICARBONATE AS CACO3	249 350	410 000			MG/L	12-MAR-90	GLF06890390001	
		340.000		2 000	MG/L	12-JUN-90	LF06890611020900	V
CHLORIDE	10 670	75 200		5.000	MG/L	12-JUN-90	LF06890611020900	V

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WELL IDENTIFICATION CODE B206589

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
CHLORIDE	10 670	63.000			MG/L	12-MAR-90	GLF06890390001	
TOTAL DISSOLVED SOLIDS	388 760	579 000		10 000	MG/L	12-JUN-90	LF06890611020900	V
		530 000			MG/L	12-MAR-90	GLF06890390001	

WELL IDENTIFICATION CODE B206689

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
URANIUM-233,234	0 100	20 000			PCI/L	15-FEB-90	GLF0889290001	

WELL IDENTIFICATION CODE B206789

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
CALCIUM	62 590	152 000		5000 000	MG/L	11-SEP-90	GW00214IT	
		148 000		5000 000	MG/L	23-MAR-90	GLF09890390001	V
CHLORIDE	10 670	80 000			MG/L	11-SEP-90	GW00214IT	
MAGNESIUM	16 090	42 900		5000 000	MG/L	11-SEP-90	GW00214IT	
		39 900		5000 000	MG/L	23-MAR-90	GLF09890390001	V
NITRATE/NITRITE	3 430	7 700			MG/L	11-SEP-90	GW00214IT	
SELENIUM	0 221	0.821		5 000	MG/L	11-SEP-90	GW00214IT	

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WELL IDENTIFICATION CODE B206789

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
SODIUM	46 740	141 000		5000 000	MG/L	11-SEP-90	GW00214IT	
		139 000		5000 000	MG/L	23-MAR-90	GLF09890390001	V
SULFATE	67 080	640 000		2 000	MG/L	11-SEP-90	GW00214IT	
TOTAL DISSOLVED SOLIDS	388.760	1200 000		10.000	MG/L	11-SEP-90	GW00214IT	

WELL IDENTIFICATION CODE· B206889

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
NITRATE/NITRITE	3 430	160 000			MG/L	08-FEB-90	GLF10890290001	

WELL IDENTIFICATION CODE B206989

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
NITRATE/NITRITE	3 430	61 000			MG/L	07-FEB-90	GLF11890290001	

WELL IDENTIFICATION CODE B207089

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
BICARBONATE AS CACO3	249 350	320 000			MG/L	08-FEB-90	GLF12890290001	
		280 000			MG/L	15-AUG-90	GW00236IT	
CALCIUM	62 590	139 000		5000.000	MG/L	08-FEB-90	GLF12890290001	V

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WELL IDENTIFICATION CODE B207089

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
CHLORIDE	10 670	550 000			MG/L	08-FEB-90	GLF12890290001	
		540.000			MG/L	15-AUG-90	GW00236IT	
MAGNESIUM	16 090	41 800		5000 000	MG/L	08-FEB-90	GLF12890290001	V
SODIUM	46 740	475 000		5000 000	MG/L	08-FEB-90	GLF12890290001	V
SULFATE	67 080	570 000			MG/L	15-AUG-90	GW00236IT	
		520 000			MG/L	08-FEB-90	GLF12890290001	
TOTAL DISSOLVED SOLIDS	388 760	2000 000			MG/L	08-FEB-90	GLF12890290001	
		2000 000			MG/L	15-AUG-90	GW00236IT	

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UPPER FLOW SYSTEM - FOURTH QUARTER - 1990

WELL IDENTIFICATION CODE 1086

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
ACETONE	10 000	42 000		10 000	UG/L	15-NOV-90	GW00675IT	
		11 000		10 000	UG/L	15-NOV-90	GW00677IT	
NITRATE/NITRITE	3 430	4 200		0.020	MG/L	15-NOV-90	GW00674IT	
		4 100		0.020	MG/L	16-NOV-90	GW00676IT	

WELL IDENTIFICATION CODE 6087

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
BARIUM	0.200	0 258		200 000	MG/L	11-OCT-90	GW00481IT	
CALCIUM	62 590	174 000		5000 000	MG/L	11-OCT-90	GW00481IT	
		139 000		5000 000	MG/L	11-OCT-90	GW00482IT	
MAGNESIUM	16 090	48 800		5000 000	MG/L	11-OCT-90	GW00482IT	
		44 700		5000 000	MG/L	11-OCT-90	GW00481IT	
NITRATE/NITRITE	3 430	8 300		0 020	MG/L	11-OCT-90	GW00483IT	
		8 200		0 020	MG/L	11-OCT-90	GW00483IT	
		8 200		0 020	MG/L	11-OCT-90	GW00486IT	
SODIUM	46 740	118 000		5000 000	MG/L	11-OCT-90	GW00482IT	
		113 000		5000 000	MG/L	11-OCT-90	GW00481IT	

WELL IDENTIFICATION CODE 6187

Report Date 25-JUN-91

U S DEPARTMENT OF ENERGY
ROCKY FLATS PLANT
GROUNDWATER QUALITY MONITORING - OPERABLE UNIT 7
UPPER FLOW SYSTEM - FOURTH QUARTER - 1990

WELL IDENTIFICATION CODE. 6187

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
NITRATE/NITRITE	3 430	4 800		0 020	MG/L	19-OCT-90	GW00531IT	
		4 800		0 020	MG/L	19-OCT-90	GW00534IT	

WELL IDENTIFICATION CODE 6387

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
1,2-DICHLOROETHYLENE	5 000	10 000		5 000	UG/L	01-NOV-90	GW00582IT	
		9 000		5 000	UG/L	01-NOV-90	GW00579IT	
BARIUM	0 200	0 502		200 000	MG/L	01-NOV-90	GW00579IT	
		0 481		200 000	MG/L	01-NOV-90	GW00579IT	
		0 461		200 000	MG/L	01-NOV-90	GW00582IT	
BICARBONATE AS CACO3	249 350	390 000		1 000	MG/L	01-NOV-90	GW00579IT	
		390 000		1 000	MG/L	01-NOV-90	GW00582IT	
CALCIUM	62 590	128 000		5000 000	MG/L	01-NOV-90	GW00579IT	
		127 000		5000 000	MG/L	01-NOV-90	GW00582IT	
		126 188		5000 000	MG/L	01-NOV-90	GW00579IT	
CHLORIDE	10 670	38 000		0 200	MG/L	01-NOV-90	GW00579IT	
		35 000		0.200	MG/L	01-NOV-90	GW00582IT	
IRON	0 944	8.290		100.000	MG/L	01-NOV-90	GW00579IT	
		8.167		100.000	MG/L	01-NOV-90	GW00579IT	
		6.120		100.000	MG/L	01-NOV-90	GW00582IT	

Report Date. 25-JUN-91

U S. DEPARTMENT OF ENERGY
ROCKY FLATS PLANT
GROUNDWATER QUALITY MONITORING - OPERABLE UNIT 7
UPPER FLOW SYSTEM - FOURTH QUARTER - 1990

WELL IDENTIFICATION CODE 6387

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
MAGNESIUM	16 090	23 100		5000 000	MG/L	01-NOV-90	GW00579IT	
		22 092		5000.000	MG/L	01-NOV-90	GW00579IT	
		21 900		5000.000	MG/L	01-NOV-90	GW00582IT	
MANGANESE	0 213	3 070		15 000	MG/L	01-NOV-90	GW00579IT	
		3 020		15 000	MG/L	01-NOV-90	GW00579IT	
		2 680		15 000	MG/L	01-NOV-90	GW00582IT	
TOTAL DISSOLVED SOLIDS	388 760	550 000		10 000	MG/L	01-NOV-90	GW00579IT	
		530 000		10 000	MG/L	01-NOV-90	GW00579IT	
		530 000		10 000	MG/L	01-NOV-90	GW00582IT	
VINYL CHLORIDE	10 000	11 000		10 000	UG/L	01-NOV-90	GW00582IT	
		10 000		10 000	UG/L	01-NOV-90	GW00579IT	

WELL IDENTIFICATION CODE. 6487

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
1,1-DICHLOROETHANE	5 000	6 000		5 000	UG/L	20-NOV-90	GW00751IT	
1,2-DICHLOROETHYLENE	5 000	9 000		5 000	UG/L	20-NOV-90	GW00751IT	

WELL IDENTIFICATION CODE. 6587

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation

Report Date: 25-JUN-91

U S DEPARTMENT OF ENERGY
ROCKY FLATS PLANT
GROUNDWATER QUALITY MONITORING - OPERABLE UNIT 7
UPPER FLOW SYSTEM - FOURTH QUARTER - 1990

WELL IDENTIFICATION CODE· 6587

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
1,1,1-TRICHLOROETHANE	5.000	18 000		5.000	UG/L	17-OCT-90	GW00546IT	
TRICHLOROETHENE	5 000	21 000		5 000	UG/L	17-OCT-90	GW00546IT	

WELL IDENTIFICATION CODE 6687

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
TRICHLOROETHENE	5 000	14.000		5 000	UG/L	06-DEC-90	GW00672IT	

WELL IDENTIFICATION CODE 6787

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
NICKEL	0 043	0 076		40 000	MG/L	07-DEC-90	GW00785IT	

WELL IDENTIFICATION CODE 7187

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
CALCIUM	62 590	66.800			MG/L	14-NOV-90	GW00623IT	

WELL IDENTIFICATION CODE. 7287

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
CALCIUM	62 590	77 500			MG/L	08-NOV-90	GW00659IT	

Report Date. 25-JUN-91

U S DEPARTMENT OF ENERGY
ROCKY FLATS PLANT
GROUNDWATER QUALITY MONITORING - OPERABLE UNIT 7
UPPER FLOW SYSTEM - FOURTH QUARTER - 1990

WELL IDENTIFICATION CODE 7287

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
COPPER	0 048	0 077			MG/L	08-NOV-90	GW00659IT	
NICKEL	0 043	0 045			MG/L	08-NOV-90	GW00659IT	
ZINC	0 141	0 433			MG/L	08-NOV-90	GW00659IT	

WELL IDENTIFICATION CODE. B106089

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
1,1-DICHLOROETHANE	5 000	5 000		5 000	UG/L	04-DEC-90	GW00781IT	
TETRACHLOROETHENE	5 000	5 000		5 000	UG/L	04-DEC-90	GW00781IT	

WELL IDENTIFICATION CODE: B206189

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
1,1-DICHLOROETHANE	5 000	5 000		5 000	UG/L	04-DEC-90	GW00782IT	

WELL IDENTIFICATION CODE. B206389

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
1,1-DICHLOROETHANE	5.000	8 000		5.000	UG/L	09-NOV-90	GW00647IT	
1,2-DICHLOROETHYLENE	5.000	26 000		5 000	UG/L	09-NOV-90	GW00647IT	

Report Date: 25-JUN-91

U S DEPARTMENT OF ENERGY
ROCKY FLATS PLANT
GROUNDWATER QUALITY MONITORING - OPERABLE UNIT 7
UPPER FLOW SYSTEM - FOURTH QUARTER - 1990

WELL IDENTIFICATION CODE: B206389

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
CHLOROFORM	5 000	11 000		5 000	UG/L	09-NOV-90	GW00647IT	
TETRACHLOROETHENE	5 000	55.000		5 000	UG/L	09-NOV-90	GW00647IT	
TRICHLOROETHENE	5 000	84 000		5 000	UG/L	09-NOV-90	GW00647IT	

WELL IDENTIFICATION CODE B206489

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
TRICHLOROETHENE	5 000	26 000		5 000	UG/L	20-NOV-90	GW00746IT	

WELL IDENTIFICATION CODE B206589

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
BICARBONATE AS CACO3	249 350	350 000			MG/L	09-NOV-90	GW00649IT	
CALCIUM	62 590	92 100			MG/L	09-NOV-90	GW00649IT	
CHLORIDE	10 670	63 000			MG/L	09-NOV-90	GW00649IT	
MAGNESIUM	16 090	26 500			MG/L	09-NOV-90	GW00649IT	
SODIUM	46 740	70.100			MG/L	09-NOV-90	GW00649IT	
TOTAL DISSOLVED SOLIDS	388 760	599 000			MG/L	09-NOV-90	GW00649IT	

Report Date: 25-JUN-91

U.S DEPARTMENT OF ENERGY
ROCKY FLATS PLANT
GROUNDWATER QUALITY MONITORING - OPERABLE UNIT 7
UPPER FLOW SYSTEM - FOURTH QUARTER - 1990

WELL IDENTIFICATION CODE· B206689

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
CHLORIDE	10 670	83 000		0 200	MG/L	05-DEC-90	GW00784IT	
SULFATE	67 080	130 000		2.000	MG/L	05-DEC-90	GW00784IT	
TOTAL DISSOLVED SOLIDS	388 760	590 000		10 000	MG/L	05-DEC-90	GW00784IT	

WELL IDENTIFICATION CODE B207089

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
BICARBONATE AS CACO3	249 350	290 000		1 000	MG/L	30-OCT-90	GW00612IT	
		280 000		1 000	MG/L	30-OCT-90	GW00612IT	
CALCIUM	62 590	143 000		5000 000	MG/L	30-OCT-90	GW00612IT	
		141 289		5000 000	MG/L	30-OCT-90	GW00612IT	
CHLORIDE	10 670	540 000		0 200	MG/L	30-OCT-90	GW00612IT	
		530 000		0 200	MG/L	30-OCT-90	GW00612IT	
CHROMIUM	0 020	0 024		10 000	MG/L	30-OCT-90	GW00612IT	
		0 021		10 000	MG/L	30-OCT-90	GW00612IT	
MAGNESIUM	16 090	42 134		5000 000	MG/L	30-OCT-90	GW00612IT	
		42 100		5000 000	MG/L	30-OCT-90	GW00612IT	
SILVER	0 004	0 011		10 000	MG/L	30-OCT-90	GW00612IT	

Report Date: 25-JUN-91

U S. DEPARTMENT OF ENERGY
ROCKY FLATS PLANT
GROUNDWATER QUALITY MONITORING - OPERABLE UNIT 7
UPPER FLOW SYSTEM - FOURTH QUARTER - 1990

WELL IDENTIFICATION CODE B207089

Parameter	Background Limt	Result	Qualifier	Detection Limit	Units	Sample Date	Sample Number	Validation
SODIUM	46 740	394 000		5000 000	MG/L	30-OCT-90	GW00612IT	
		383 620		5000 000	MG/L	30-OCT-90	GW00612IT	
SULFATE	67 080	590 000		2.000	MG/L	30-OCT-90	GW00612IT	
		560 000		2 000	MG/L	30-OCT-90	GW00612IT	
TOTAL DISSOLVED SOLIDS	388 760	2100 000		10.000	MG/L	30-OCT-90	GW00612IT	

Report Date: 25-JUN-91

APPENDIX H

Summary of Phase II

Geologic Characterization Data Acquisition Work Plan,

March 1991

The following summary of borehole drilling and data acquisition activities is based on information presented in the Phase II Geologic Characterization Data Acquisition Work Plan, March 1991.

Task 4 of the Work Plan is a multifunctional task involving borehole drilling, data acquisition, borehole plugging and/or well installation Sixty-five boreholes are planned to be drilled to an approximate depth of 160 feet The two boreholes planned in the vicinity of Operable Unit No 7 are shown in Figure H-1 All boreholes will be continuously cored from the ground surface to total depth

A full suite of geophysical logs will be run in each borehole The logging suite will include·

(1) Temperature,
(2) Fluid Resistivity,
(3) Caliper,
(4) Spontaneous Potential,
(5) 16-inch Normal Resistivity,
(6) 64-inch Normal Resistivity,
(7) Natural Gamma Ray,
(8) Neutron,
(9) Gamma-gamma Density, and
(10) Sonic log (Delta-T only)

Following geophysical logging, up to 100 packer tests will be performed in the boreholes to estimate the hydraulic conductivity of selected subsurface zones

Figure H-1

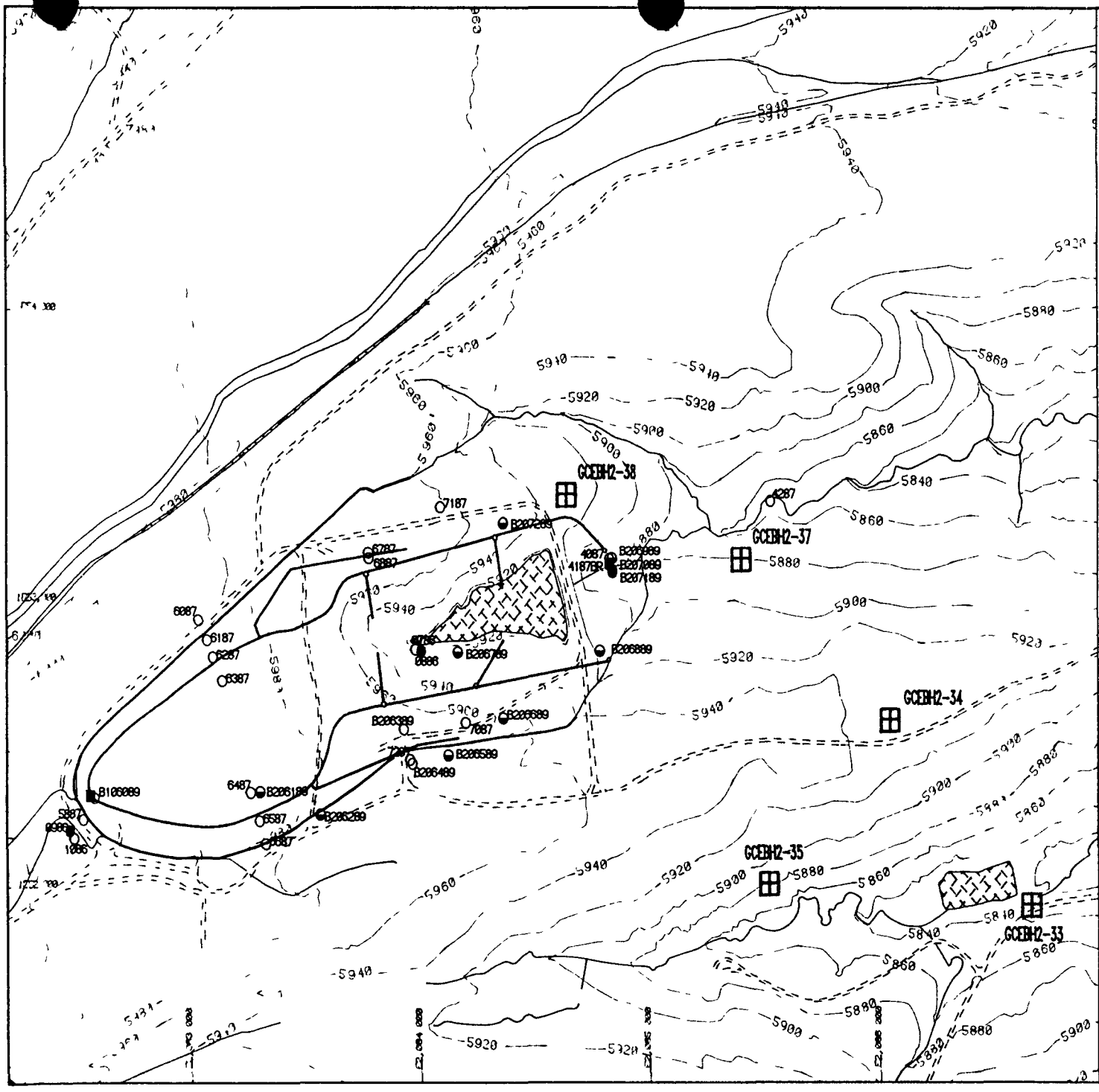
Map Showing Locations of

Selected Boreholes to be Drilled

under the Phase II

Geologic Characterization Data Acquisition Program

(not yet created)



EXPLANATION

- BOREHOLE LOCATION (APPROXIMATE)
- ALLUVIAL WELL
- WEATHERED BEDROCK WELL
- UNWEATHERED BEDROCK WELL
- DECOMMISSIONED WELL
- LANDFILL STRUCTURES
- DIRT ROADS
- STREAMS, DITCHES, DRAINAGE FEATURES
- SURFACE WATER IMPOUNDMENTS

N

0 feet 400 800

CONTOUR INTERVAL = 20 FEET

U.S. DEPARTMENT of ENERGY
Rocky Flats Plant, Golden, Colorado

PHASE II GEOLOGIC CHARACTERIZATION

APPROXIMATE BOREHOLE LOCATIONS IN THE VICINITY OF OU7

Figure H-1

UNITED STATES ATOMIC ENERGY COMMISSION

ALBUQUERQUE OPERATIONS OFFICE
ROCKY FLATS AREA OFFICE
GOLDEN, COLORADO

DESIGN CRITERIA

SANITARY LANDFILL RENOVATIONS

DOW CHEMICAL U S A
ROCKY FLATS DIVISION
BOX 888, GOLDEN COLORADO

DOW AUTH. 44055J

INDEX OF DRAWINGS

SHEET NO.	DRAWING ITLE	DWG. O.	E
	CO ER S EE	D-27296-1	A
2	EA PLOT	2	A
3	SAMPLING STRUCTURE & W TER DIVERSION DETAILS	3	A
4	LANDFILL RING & WATER DIVERSIO DE AILS	4	B

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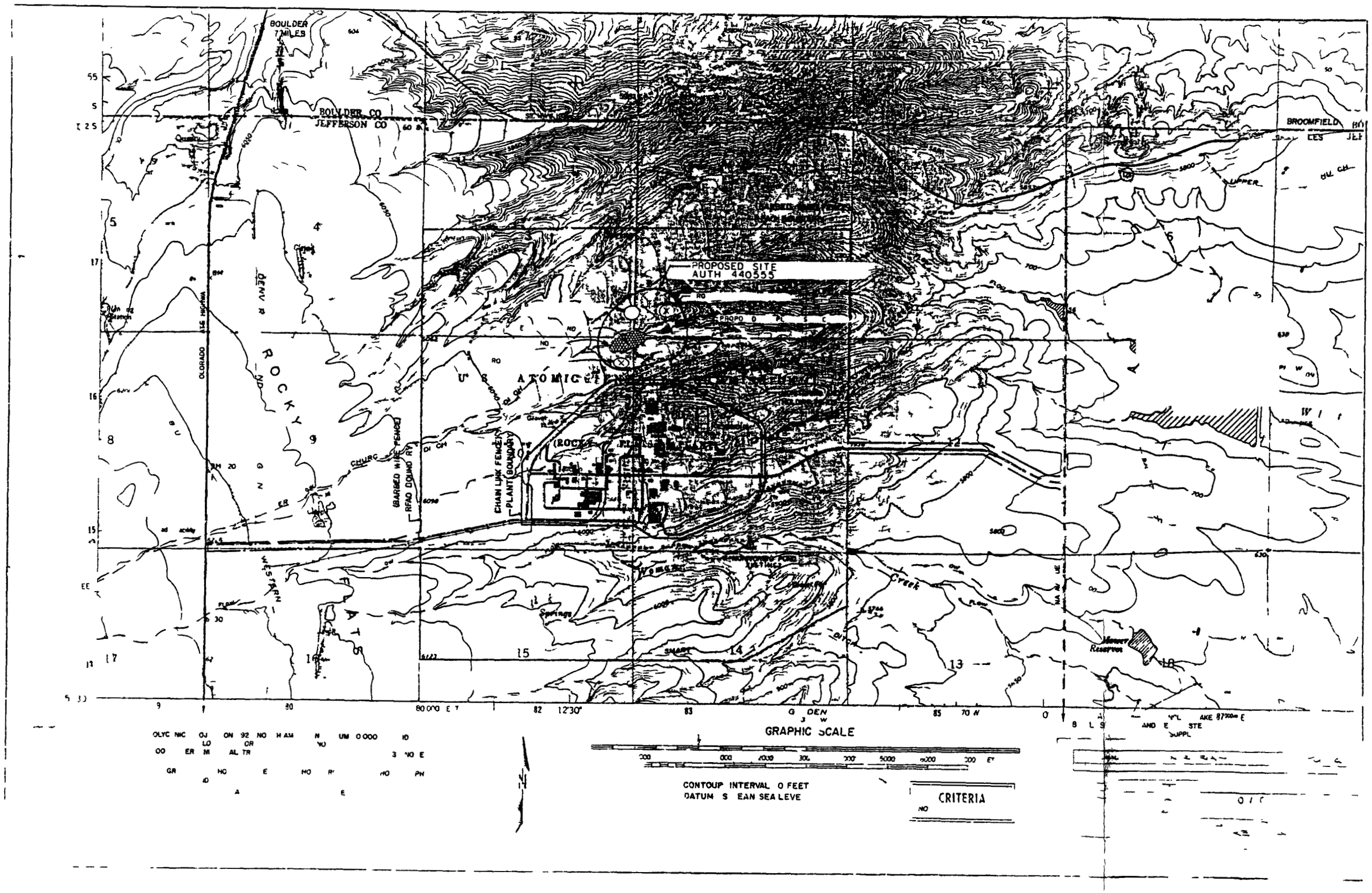
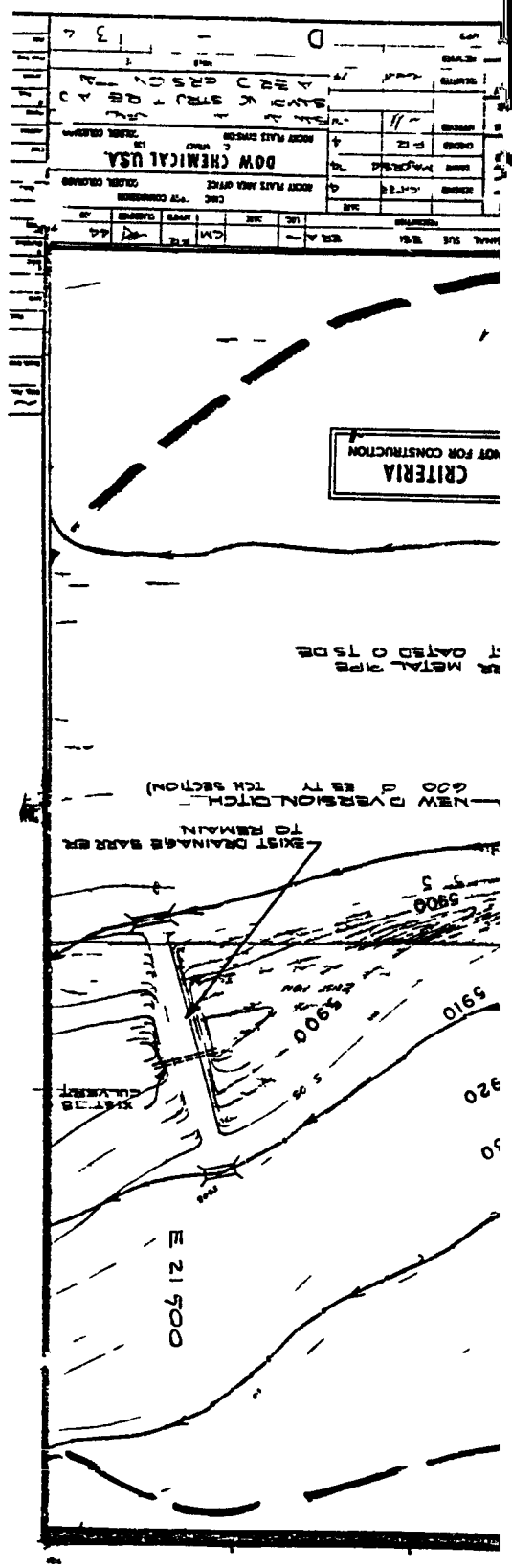
ORIG ENERG COMMISSION
ROCKY FLATS AREA OFFICE GOLDEN, COLORADO

DOW CHEMICAL U.S.A
CONTRACT 175
ROCKY FLATS DIVISION GOLDEN, COLO CO

SANITARY LANDFILL
RENOVATIONS
COVER SHEET

D 272 6 A


BOULDER 7 MILES
BOULDER CO
JEFFERSON CO
BROOMFIELD
PROPOSED SITE
AUTH 440555
ROCKY
FLATS
U S ATOMIC
(BARBED WIRE FENCE)
RFAD BOUND RY
CHAIN LINK FENCE
PLANT BOUNDARY
OLORADO
WESTERN
Creek
Springs
Mower Reservoir
GRAPHIC SCALE
CONTOUR INTERVAL 0 FEET
DATUM S EAN SEA LEVE
CRITERIA


DOW CHEMICAL USA
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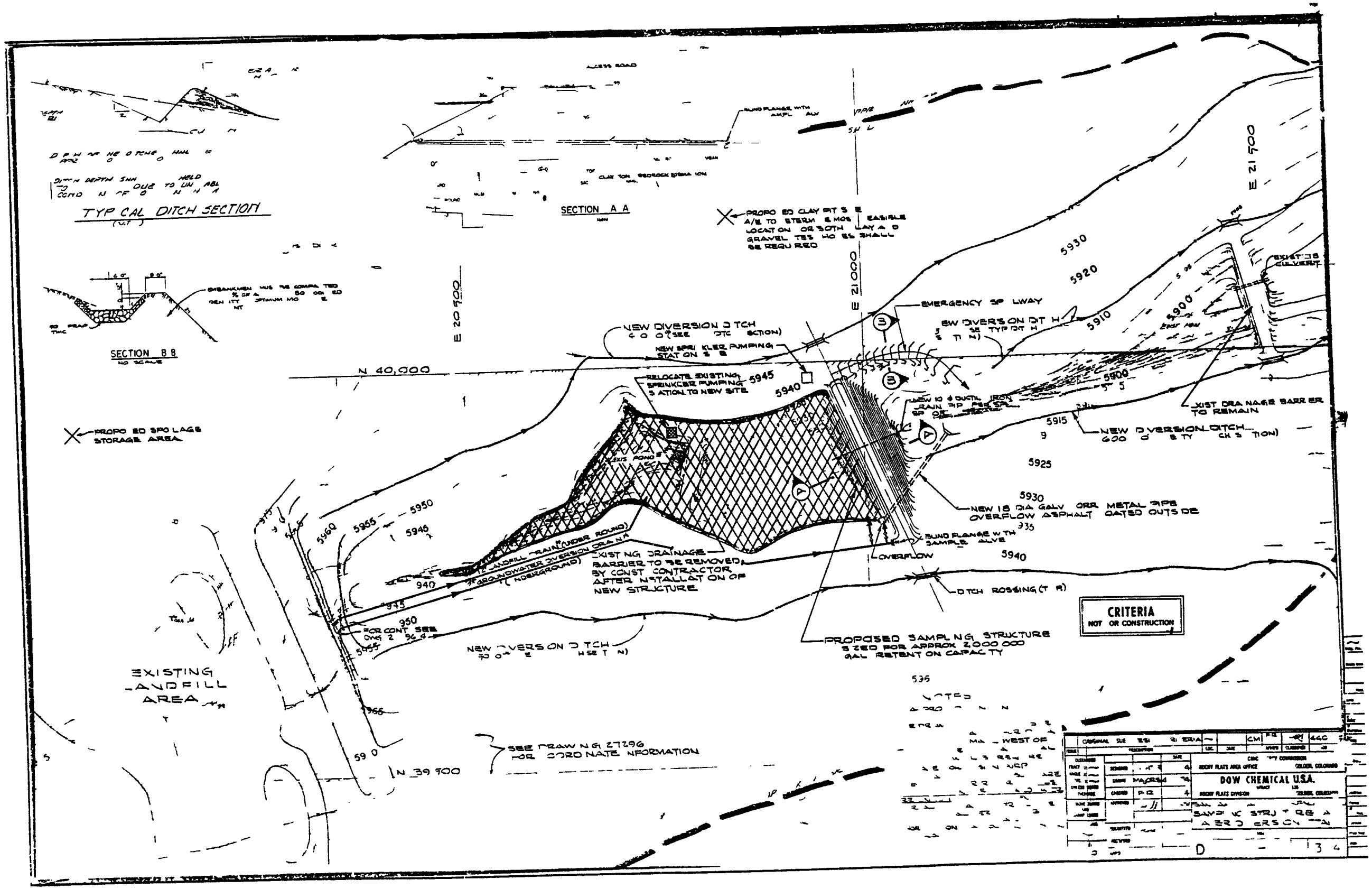
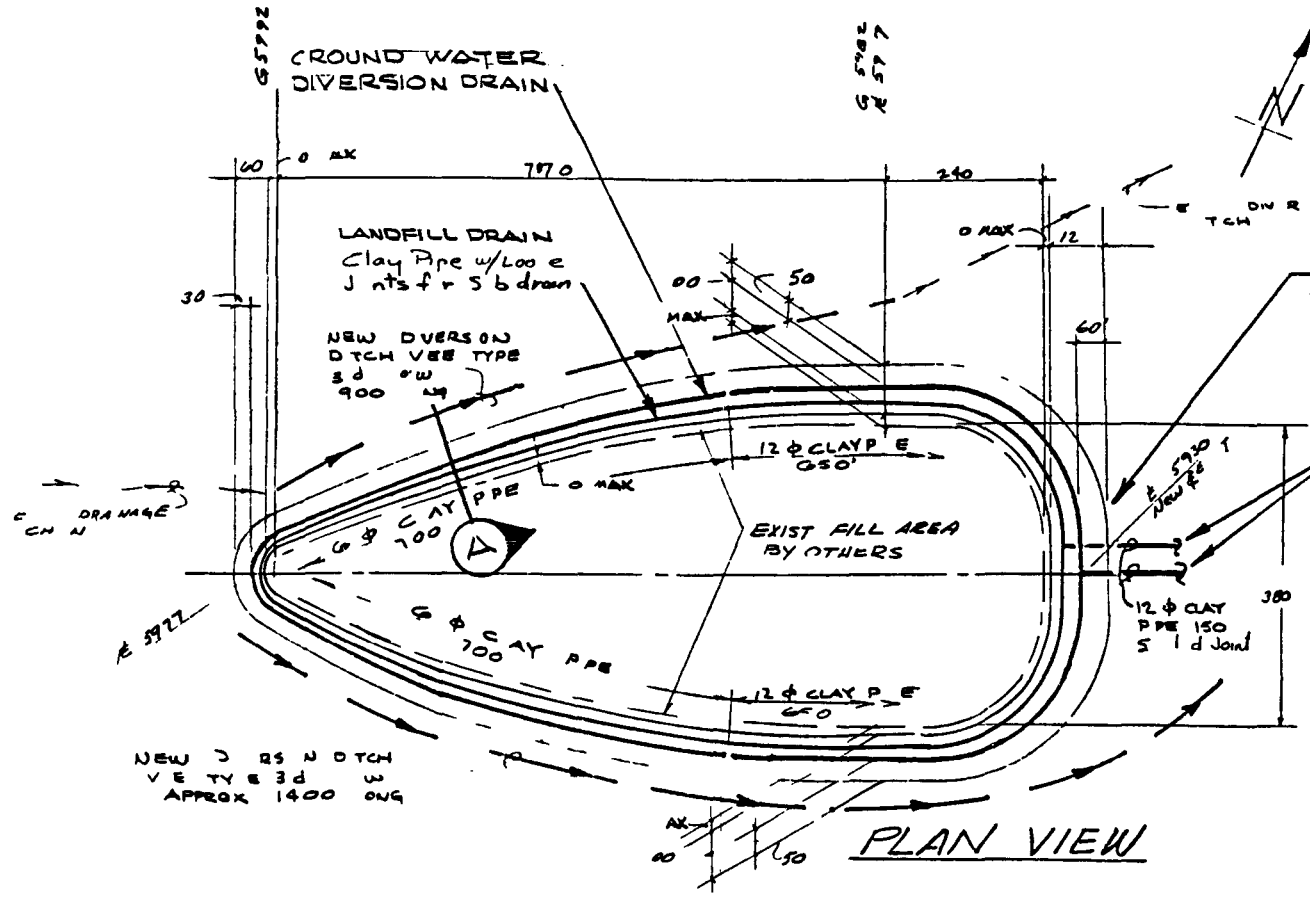
NEW DIVERSION DITCH
EXIST DRAINAGE BARRIER
TO REMAIN
5900
5910
E 21 500



TYPICAL DITCH SECTION
SECTION A A
SECTION B B
NO SCALE
PROPOSED SPOILAGE STORAGE AREA
EXISTING LANDFILL AREA
N 40,000
E 20 500
E 21 000
E 21 500
N 39 500
EMERGENCY SPILLWAY
NEW DIVERSION DITCH
NEW SPRINKLER PUMPING STATION
RELOCATE EXISTING SPRINKLER PUMPING STATION TO NEW SITE
EXISTING DRAINAGE BARRIER TO BE REMOVED BY CONSTRUCTOR AFTER INSTALLATION OF NEW STRUCTURE
NEW 18 DIA GALV CORR METAL PIPE OVERFLOW ASPHALT COATED OUTSIDE
BLIND FLANGE WITH SAMPLE VALVE
OVERFLOW
DITCH CROSSING
PROPOSED SAMPLING STRUCTURE SIZED FOR APPROX 2,000,000 GAL RETENTION CAPACITY
EXISTING DRAINAGE BARRIER TO REMAIN
EXIST 18 CULVERT
CRITERIA
NOT FOR CONSTRUCTION
SEE DRAWING 27296 FOR COORDINATE INFORMATION
DOW CHEMICAL U.S.A.
ROCKY FLATS AREA OFFICE
GOLDEN, COLORADO
ROCKY FLATS DIVISION

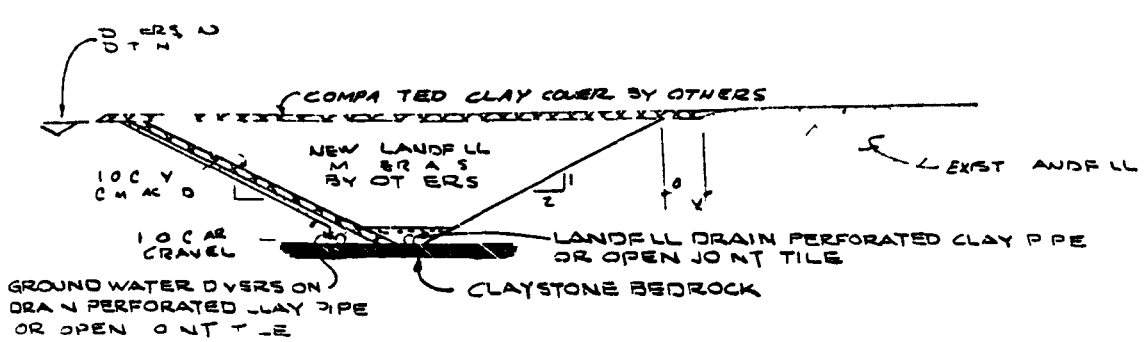
R	O N	DESCRIPTION	MATERIAL



CRITERIA
NOT FOR CONSTRUCTION

LEGEND

G xxx EXIST GRADE ELEV
℄ xxx FLOW LINE ELEV.



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B	ISSUED FOR DESIGN CRITERIA	~	4 30 74	CM	FR		440555
A	ORIGINAL ISSUE DESIGN CRITERIA	~	4 19 74	CM	FR		440555

TOLERANCES		BY	DATE
FRACT ± ~		RICHTER	4 17-74
ANGLE ± ~	DRAWN	MAJORS	4-17 74
DEC ± ~ UNLESS NOTED OTHERWISE	CHECKED	FR	4 7 74
REMOVE BURRS AND SHARP EDGES	APPROVED	Foell	4 17 74
NEXT ASSEMBLY ~	SUBMITTED		4 74
SCALE NO SCALE	RECOMMENDED		
	APP'D REQ		

U. S. ATOMIC ENERGY COMMISSION
ROCKY FLATS AREA OFFICE — GOLDEN, COLORADO

DOW CHEMICAL U.S.A.
A.E.C. CONTRACT AT (29-1)-1106
ROCKY FLATS DIVISION — GOLDEN, COLORADO

SANITARY LANDFILL RENOVATIONS
LANDFILL RING & WATER DIVERSION DETAILS

SIZE	DRAWING NUMBER	ISSUE	SHEET
B	27296 - 4	B	4 OF 4

UNITED STATES ATOMIC ENERGY COMMISSION

ALBUQUERQUE OPERATIONS OFFICE
ROCKY FLATS OFFICE
GOLDEN COLORADO

SANITARY LANDFILL RENOVATIONS
ROCKY FLATS

ZEFF COGORNO & SEALY INC DENVER COLORADO
TRI-CONSULTANTS INC DENVER COLORADO
HYDRO-TRIAD LTD DENVER COLORADO

I hereby er ty hat hese plans for the SANIT RY L DFILL RENOVAT O S ROCKY FLATS, were prepared under my di ec supervision for the owners ereof

5235 Registered Professional Engineer Color do 5235

I hereby ity ha on behalf f he UN TED STATES ATOMIC ENERGY CO MISSION OW ER hose Pro Off address
Roc F Area Offi
P O Box 928
Golden Co orade 80401
D her by prove & ac pt these plan fo he SANITARY LA DFILL RE O T ROCK FLATS

Assistan Manager For Construction
Approved on the 22 day f July 1974

INDEX OF SHEETS

LANDFILL TRENCH		
1	GENERAL PLAN & SECTIONS	27317-1
2	PLAN & PROFILE 0-15+00	27317-2
3	PLAN & PROFILE 15+00 25+75	27317-3
4	PIPING PLANS & PROFILES	27317-4
5	SOUTH INTERCEPTOR DITCH	27317-5
6	NORTH INTERCEPTOR DITCH	27317-6
SAMPLING STRUCTURE		
7	GENERAL PLAN-DAM & RESERVOIR	27318-1
8	PLAN PROFILE & SECTIONS-DAM	27318 2
9	SPILLWAY & OUTLET-PLAN	27318 3
10	SPILLWAY & OUTLET-DETAILS	27318 4
GENERAL		
11	TEST BORING & PIT LOCATION PLAN	27318-5
12	LOGS OF EXPLORATORY BORINGS & TEST PITS	27318-6

INVITATION NO
292-75-3

ORIGINAL ISSUE
ATOMIC ENERGY COMMISSION
ROCKY FLATS AREA OFFICE GOLDEN, COLORADO
ZEFF-COGORNO SEAL INC
TRI CONSULTANTS
HYDRO-TRIAD
SANITAF LANDFILL RENOVATIONS
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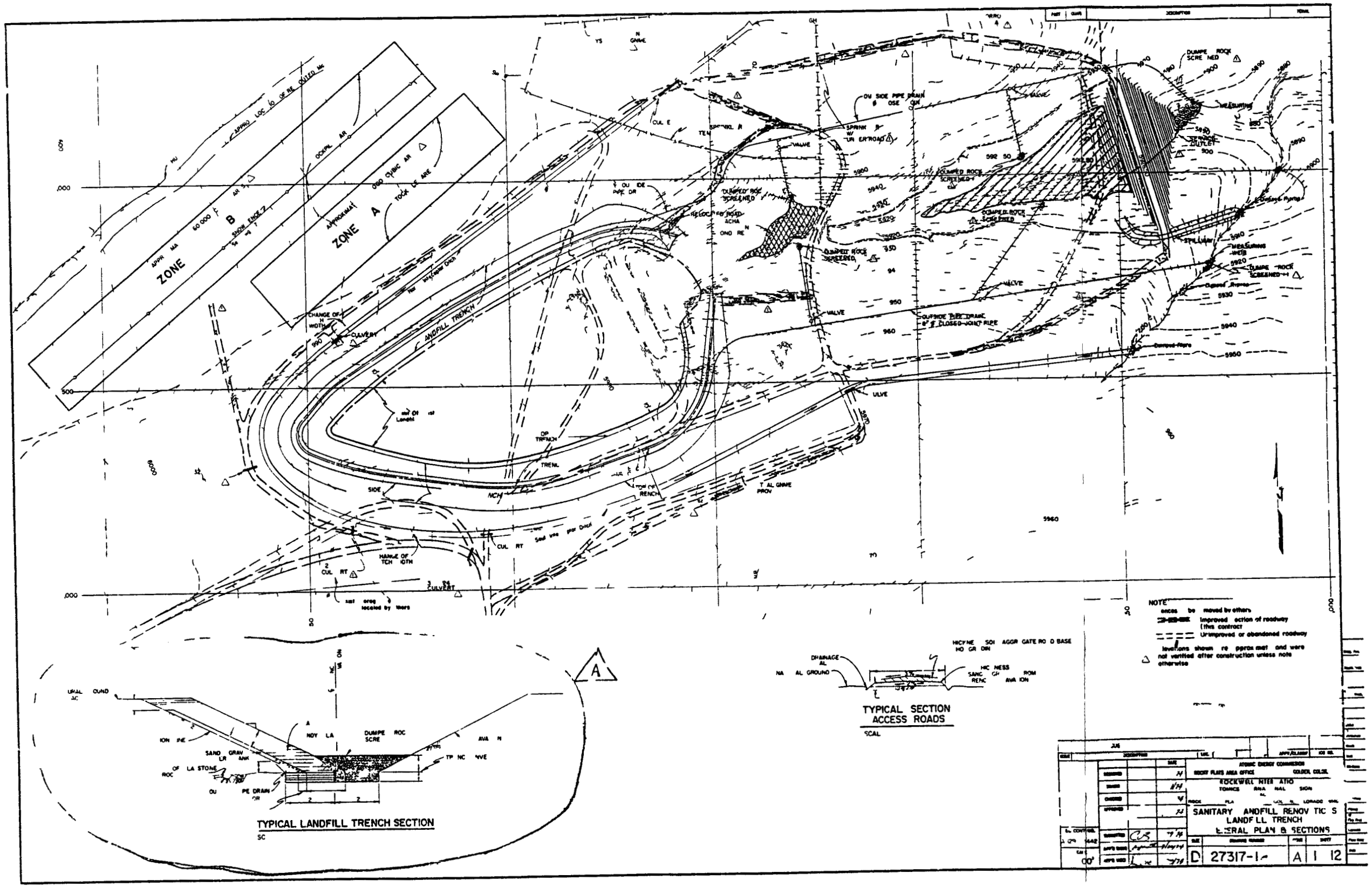
ZONE B
ZONE A
ANDFILL TRENCH
CULVERT
DUMPED ROCK SCREENED
VALVE
OUTSIDE PIPE DRAIN
TYPICAL LANDFILL TRENCH SECTION
TYPICAL SECTION ACCESS ROADS
NOTE
Improved section of roadway (this contract
Unimproved or abandoned roadway
ATOMIC ENERGY COMMISSION
ROCKWELL INTERNATIONAL
SANITARY LANDFILL RENOVATIONS
LANDFILL TRENCH
GENERAL PLAN & SECTIONS
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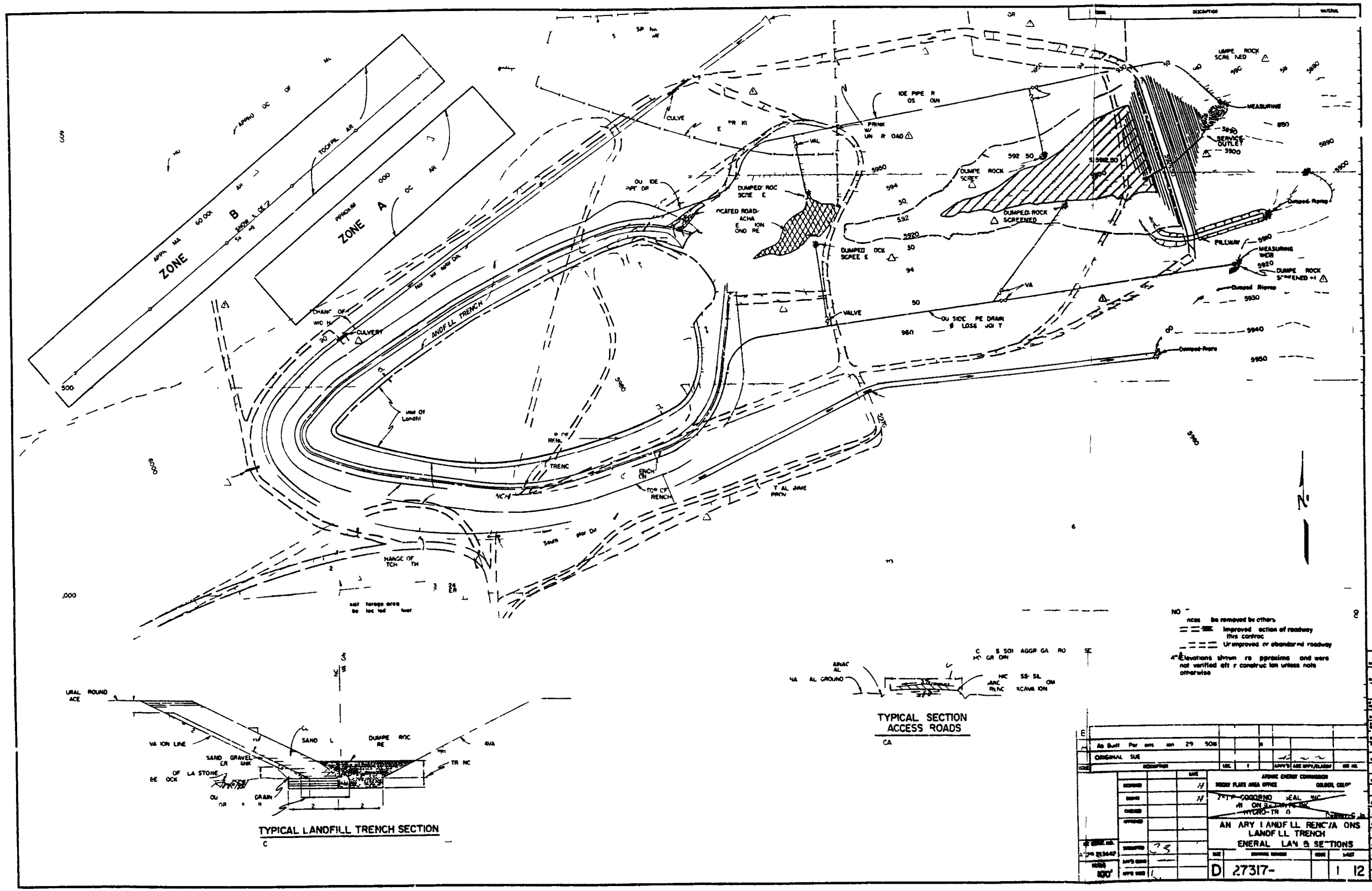
A 1 12


ZONE B
ZONE A
LANDFILL TRENCH
CULVERT
VALVE
MEASURING WEIR
SPILLWAY
DUMPED ROCK SCREENED
Dumped Riprap
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TYPICAL SECTION ACCESS ROADS
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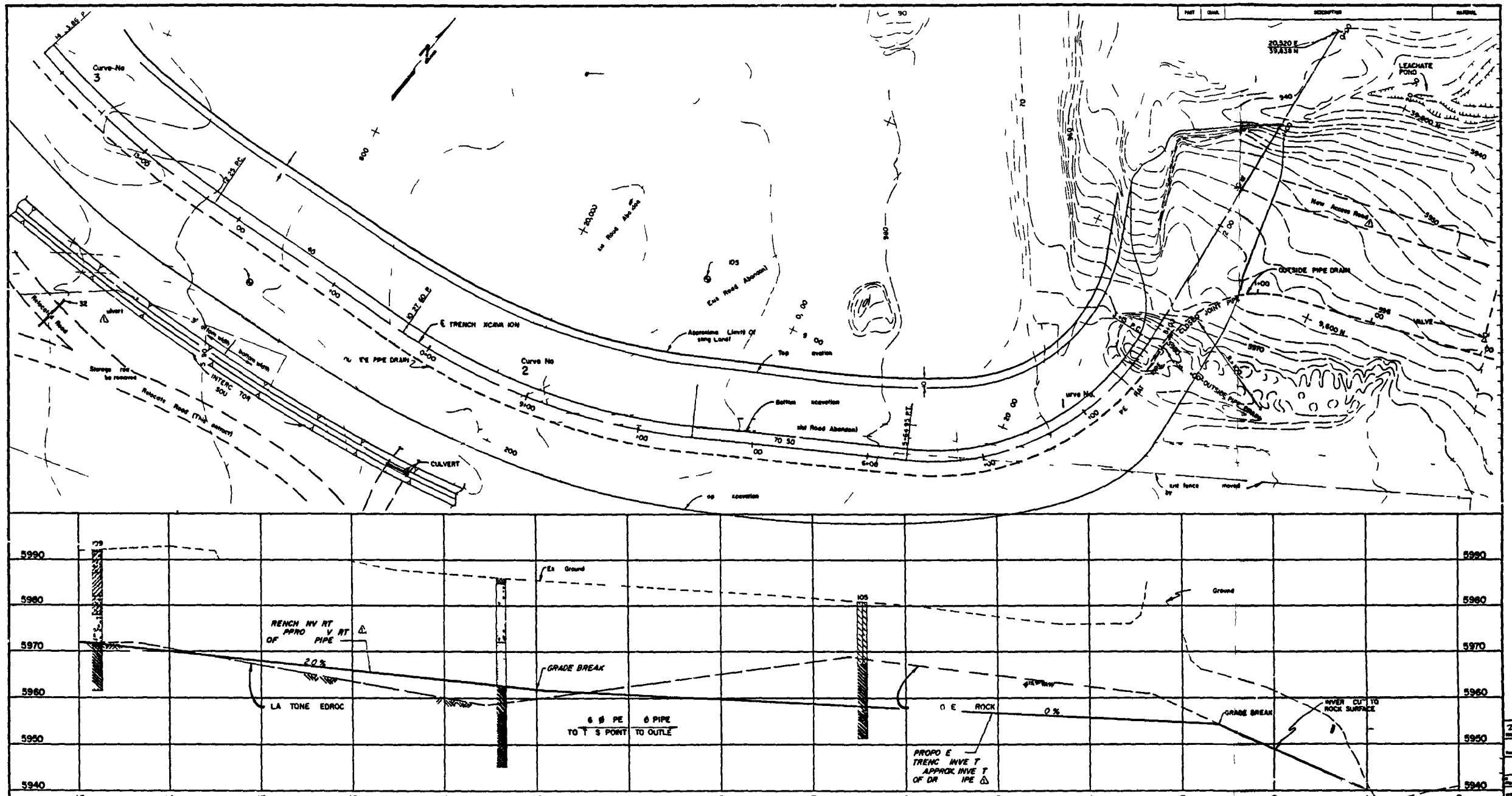

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NOTES
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ONTINUA ION OF OUTSIDE PIPE RAIN PROFIL SHOWN ON DWG

TERC TOR DITCH PROFILE SHOW ON DWG

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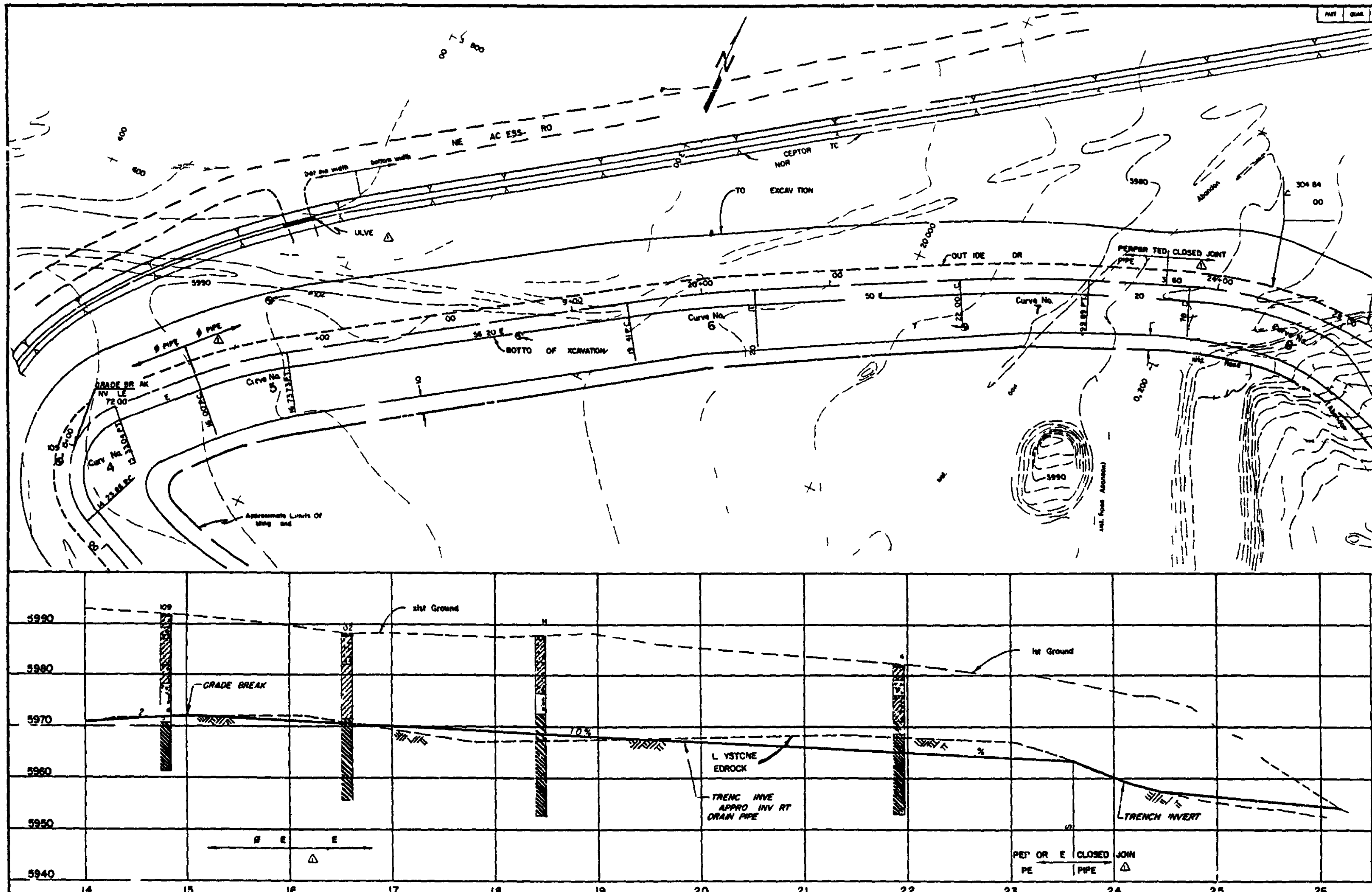
ARCHIVE ENERGY COMMISSION
ROCKY FLATS AREA OFFICE GOLDEN, COLORADO

ZEPP-COGORNO SEAL INC.
RI CONSULTANTS INC.
HYDRO-TRIAD, LTD. Denver, Colo.

SANITARY LANDFILL RF NOVATION
LANDFILL TRENCH
PLAN & PROFILE 0 TO 15+00

ARC CONT. NO. AT129- 3442
SCALE AS HOWN

D 27317 2 2 12



℄ CURVE DATA

4	5	6	7	8
Δ 00'	Δ 00	Δ 30	Δ 30	Δ 30
00	2	'040 94	80 53	2 84
	00	50 00	50 00	100 30
	-00 00	40	00	70 3

SCALES
PLAN 1 0
PROFILE 1 5C HORIZ
10 CRT

NOTES

1. △ PROFILE SHOWS ONLY INVE OF ENCH
2. SECTION OF COMPLETED TRENCH WITH CLAY BARRIE SHOWN ON DWG 317
3. SOUTH DE OF TRENCH SHOWN ON DWG. 7317
4. △ CONTINUATION OF OUTSIDE PE RAIN SHOWN N DWG 31
5. TERCE TOR TCH PROFIL SHOWN ON DWG 2731
6. △ VATIONS SHOWN ARE APPROXIMA AND WE E NO VE AFTE CONS UC UNLE NOTE HERWIS

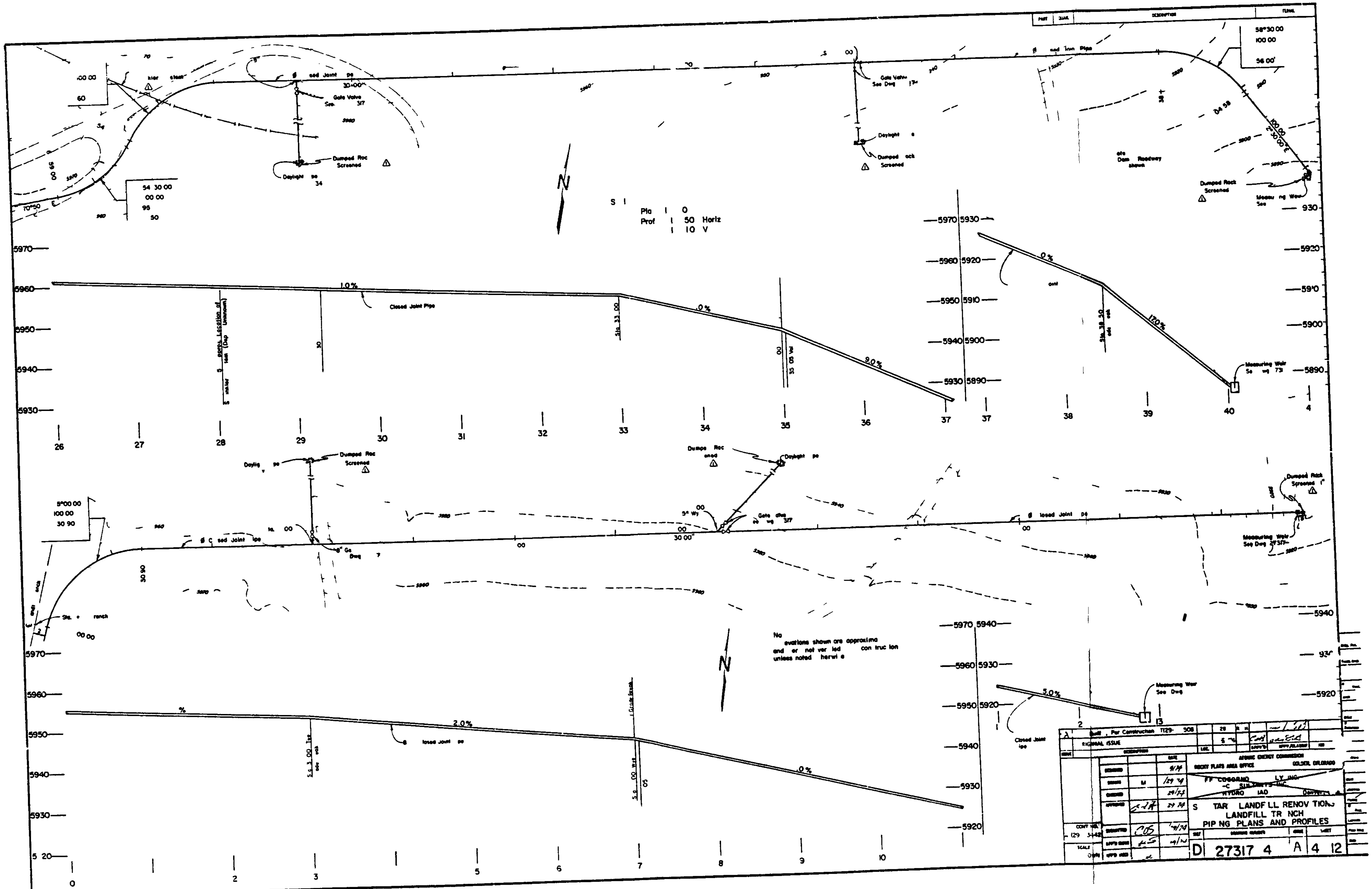
B			4-16		00470
A	For Construction 1129-213506		20-	R.L.H	
RIGINAL			E-6-		45614

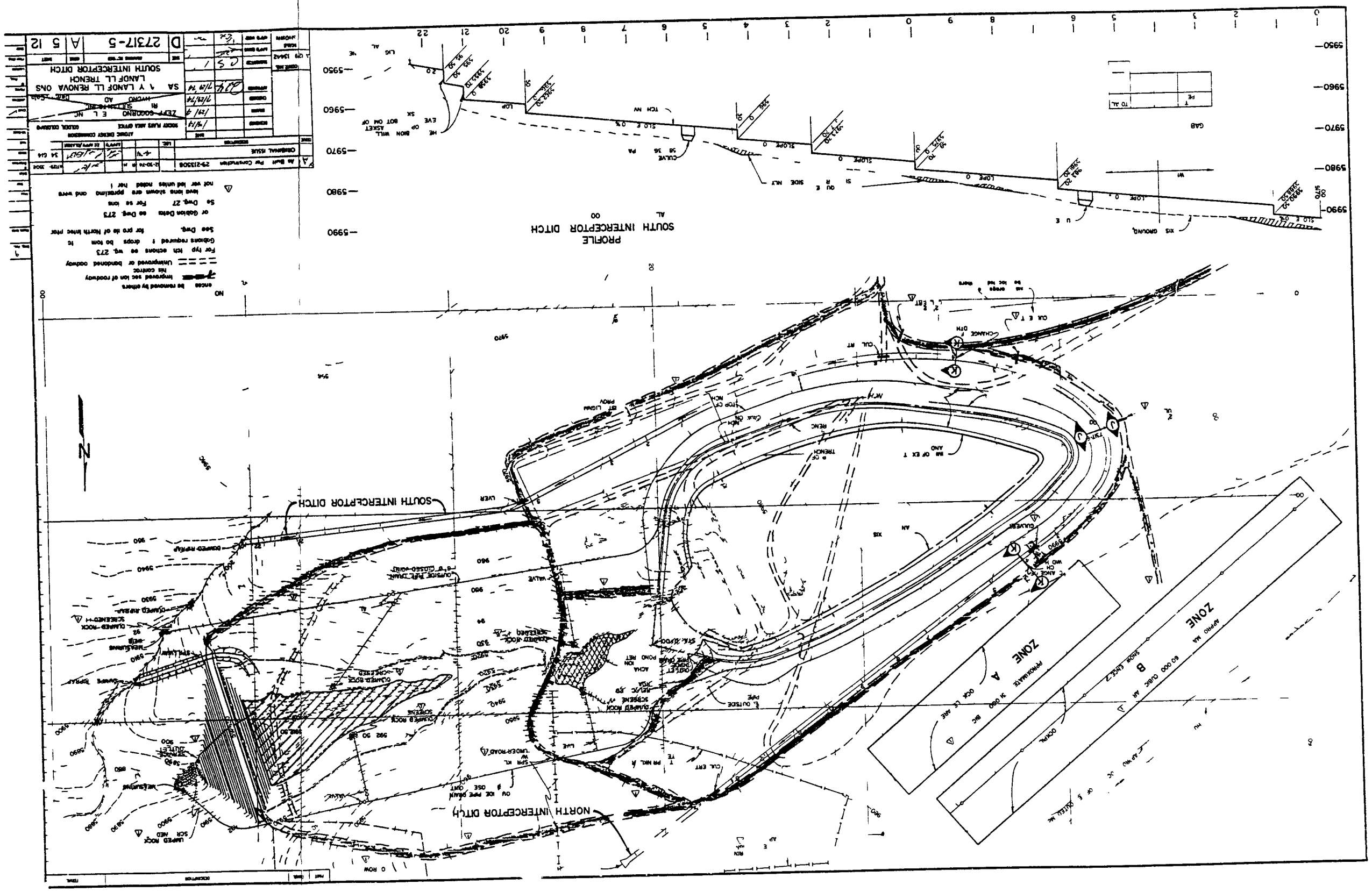
ATOMIC ENERGY COMMISSION
ROCKY FLATS AREA OFFICE GOLDEN, COLORADO

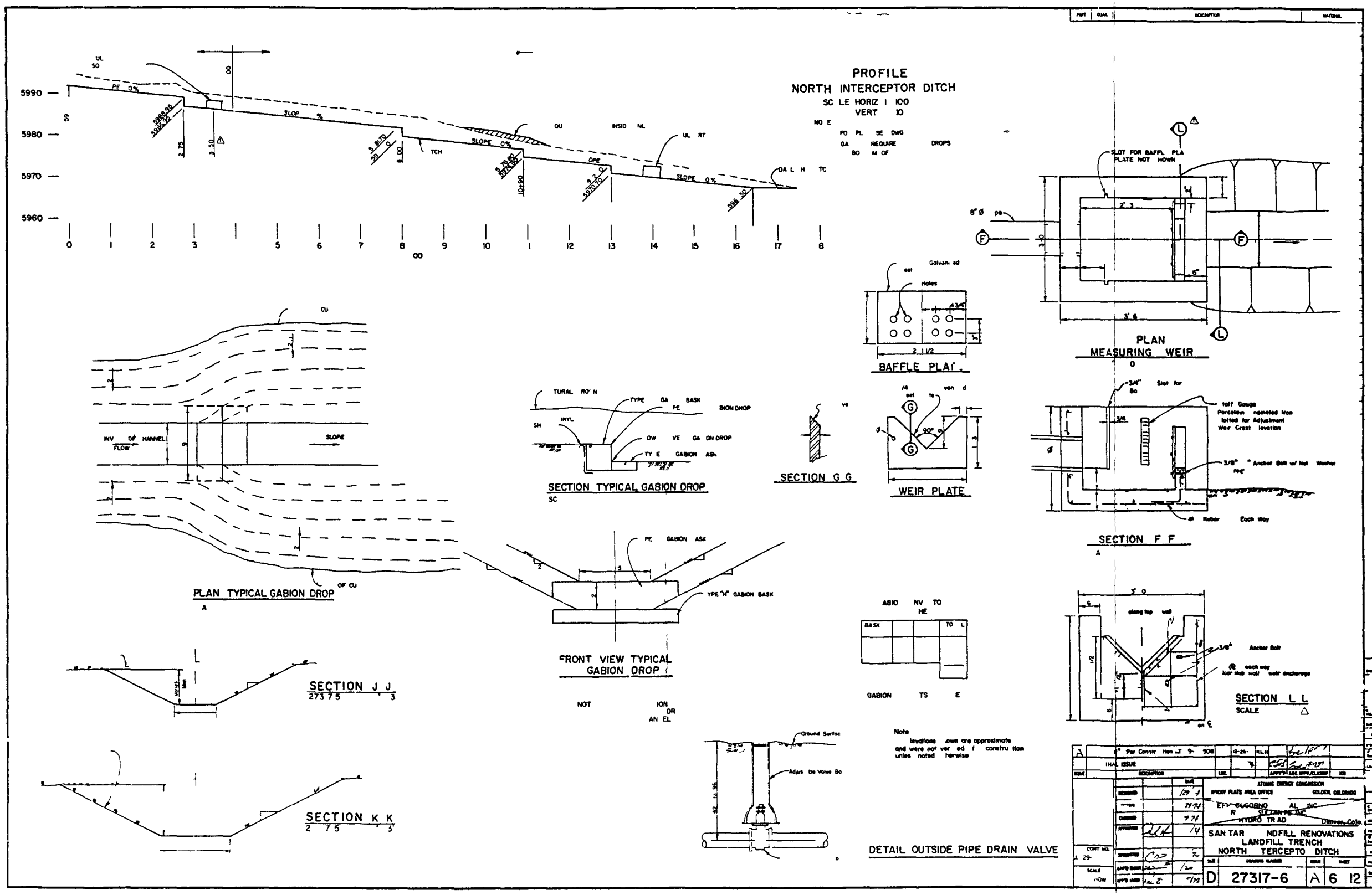
EFT ROCORNO SEAL INC
RI CONSULTIN INC
HYDRO-TRAD TD
Canyon Colo

SANITARY LANDFILL RENOVATIONS
LANDFILL TRENCH
PL N PROF LE 15+00 TO 25 75

AEC CONT NO. AT(29-2)3442
SCALE AS SHOWN
D 27317-3
3 12


Scale
Plan 1" = 50' Horiz
Prof 1" = 50' Horiz
1" = 10' V
Closed Joint Pipe
Gate Valve
Dumped Rock Screened
Daylight
Measuring Weir
No elevations shown are approximate and/or not verified construction unless noted otherwise
ATOMIC ENERGY COMMISSION
ROCKY FLATS AREA OFFICE
GOLDEN, COLORADO
TAR LANDFILL RENOVATION
LANDFILL TRENCH
PIPING PLANS AND PROFILES
D 27317 4 A 4 12


PROFILE
SOUTH INTERCEPTOR DITCH
AL 00
SOUTH INTERCEPTOR DITCH
NORTH INTERCEPTOR DITCH
ZONE A
ZONE B
N


PROFILE
NORTH INTERCEPTOR DITCH
SC LE HORIZ 1 100
VERT 10
5990
5980
5970
5960
PLAN
MEASURING WEIR
SLOT FOR BAFFL PLA
PLATE NOT HOWN
BAFFLE PLAT
WEIR PLATE
SECTION F F
SECTION G G
SECTION TYPICAL GABION DROP
PLAN TYPICAL GABION DROP
FRONT VIEW TYPICAL
GABION DROP
SECTION J J
SECTION K K
SECTION L L
DETAIL OUTSIDE PIPE DRAIN VALVE
Note
levations own are approximate
and were not ver ed f constru tion
unles noted herwise
SAN TAR NDFILL RENOVATIONS
LANDFILL TRENCH
NORTH TERCEPTO DITCH
D 27317-6 A 6 12

UNITED STATES
DEPARTMENT OF ENERGY

ALBUQUERQUE OPERATIONS OFFICE
ROCKY FLATS AREA OFFICE

SANITARY LANDFILL EXTENSION
SLURRY TRENCH

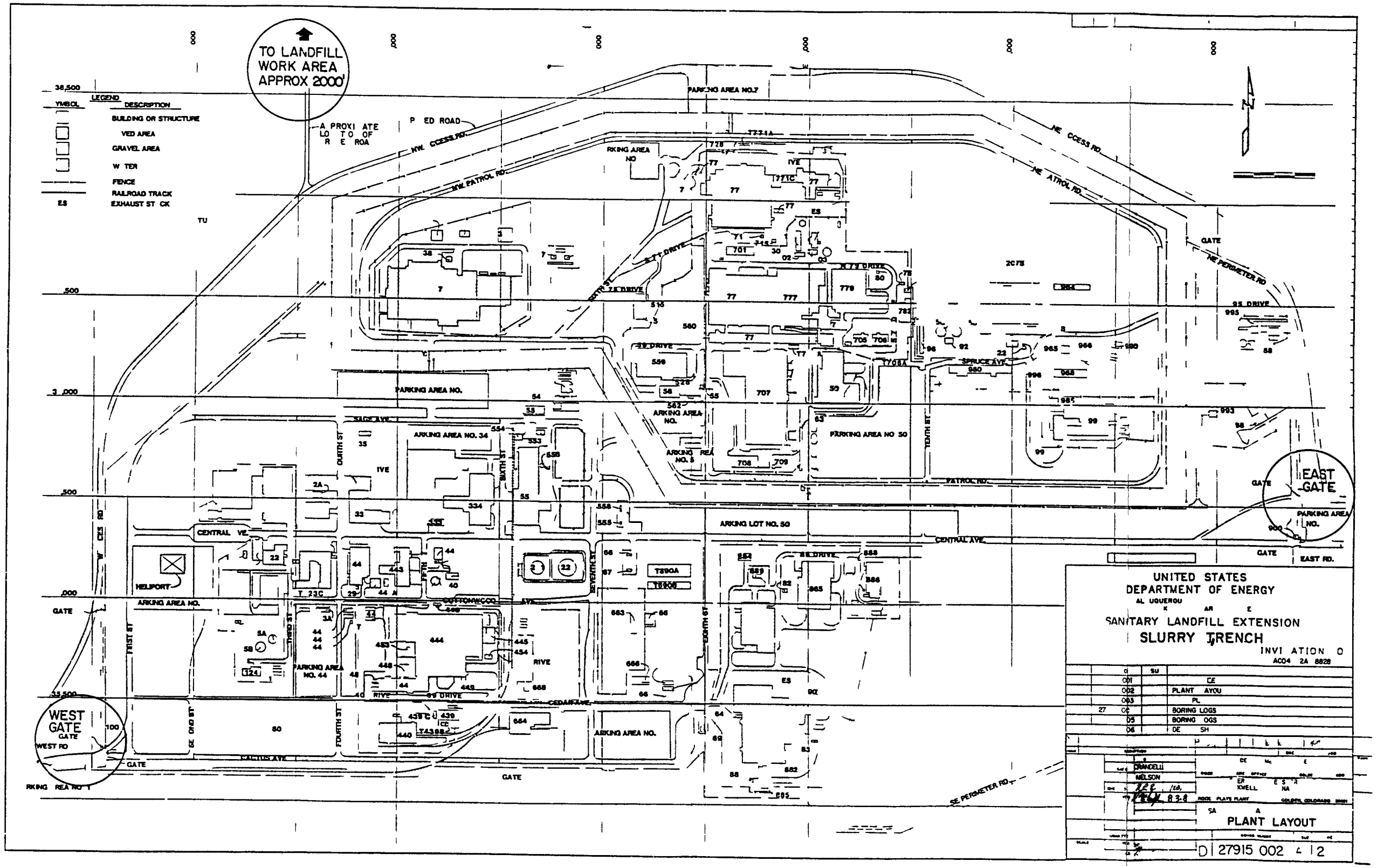
WRIGHT-McLAUGHLIN ENGINEERS
in conjunction with
A G WASSENAAR INC
2420 ALCOTT ST DENVER COLORADO

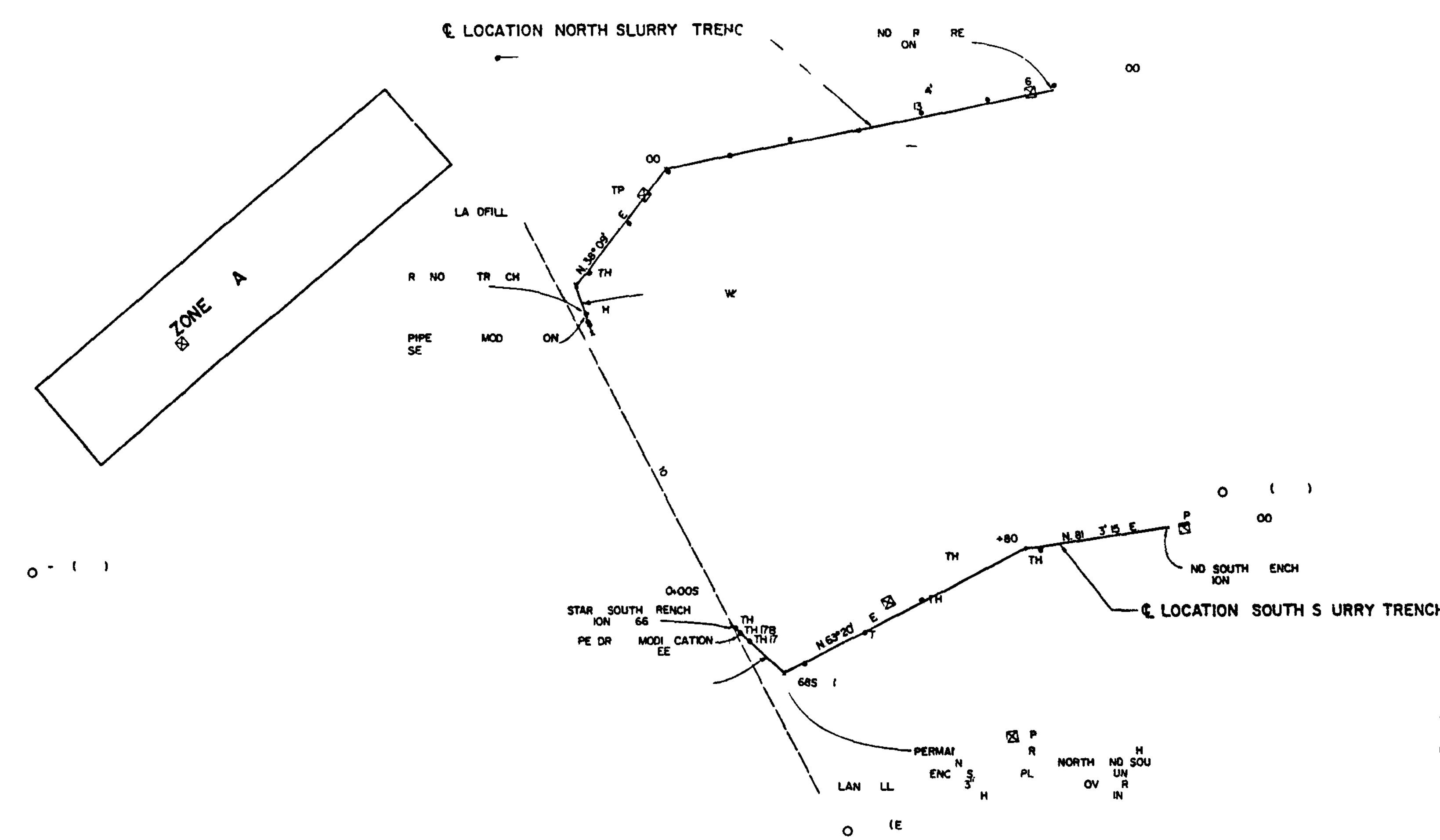
INDEX OF DRAWINGS

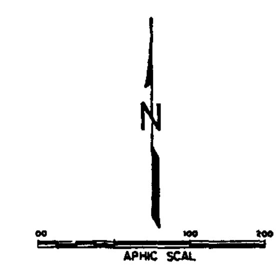
1 TITLE SHEET
2 PLANT LAYOUT
3 SITE PLAN
4 BORING LOGS
5 BORING LOGS
6 DETAIL SHEET

INVITATION NO
DE-AC04-82AL18828

ISSUE	DESCRIPTION	DA		OK	LAB
C	DESIGNER CRANDELL	DEPARTME OF ENERGY			
	DRAWN NELSON				
	CHECK	OC	NA		
	APPROVE 8382	ROCKY FLA PLANT	GOLDEN, COLORADO, 80401		
MOVE		TITLE SHEET			
	SUBMIT				
	APPROVED BY	D	27915 001		1 6
	APPROVE DOE				


TO LANDFILL WORK AREA APPROX 2000'
LEGEND
YMBOL
DESCRIPTION
BUILDING OR STRUCTURE
VED AREA
GRAVEL AREA
W TER
FENCE
RAILROAD TRACK
ES
EXHAUST ST CK
PARKING AREA NO.7
NW. CCESS RD.
NW. PATROL RD.
NE CCESS RD.
NE ATROL RD.
NE PERIMETER RD.
PARKING AREA NO.
ARKING AREA NO. 34
ARKING AREA NO.
PARKING AREA NO 50
ARKING LOT NO. 50
PATROL RD.
CENTRAL AVE.
EAST GATE
PARKING AREA NO.
EAST RD.
HELIPORT
ARKING AREA NO.
PARKING AREA NO. 44
COTTONWOOD AVE.
CEDAR AVE.
CACTUS AVE.
WEST GATE
WEST RD
GATE
SE PERIMETER RD.
UNITED STATES
DEPARTMENT OF ENERGY
SANITARY LANDFILL EXTENSION
SLURRY TRENCH
INVI ATION O
AC04 2A 8828
PLANT AYOU
BORING LOGS
BORING OGS
PLANT LAYOUT
D 27915 002 2





TEST HOLE COORDINATES

LOCA ON	O TH	E ST	ELE ION
[illegible]	[illegible]	[illegible]	[illegible]

TEST PIT COORDINATES

LOC TION	NORTH	EAST	ELE ATION
[illegible]	[illegible]	[illegible]	[illegible]

STATION COORDINATES

ST ION	O TH	EAS	E RKS
[illegible]	[illegible]	[illegible]	[illegible]

BENCH MARK COORDINATES

	NORTH	EAST	ELE ATIO
LANDFILL NORT	[illegible]	[illegible]	[illegible]
LANDF LL SOU	[illegible]	[illegible]	[illegible]

NOTES

LANDFILL NORTH" ... REBAR ... ABOVE HE GROUND ... CULVERT ... ROAD ...

LANDFILL SOUTH" ... REBAR ... ABOVE HE GROUND ... UPPLES

NOTES

SITE CONDITIONS SHOW GHT BAC OU

TO OG HIC ELE IONS E ONL APPROXIMA E

TH S HOLE

ST

W- OUND TER MONITO NG HO E

MPLETION OF RIGINAL SURVEY NE

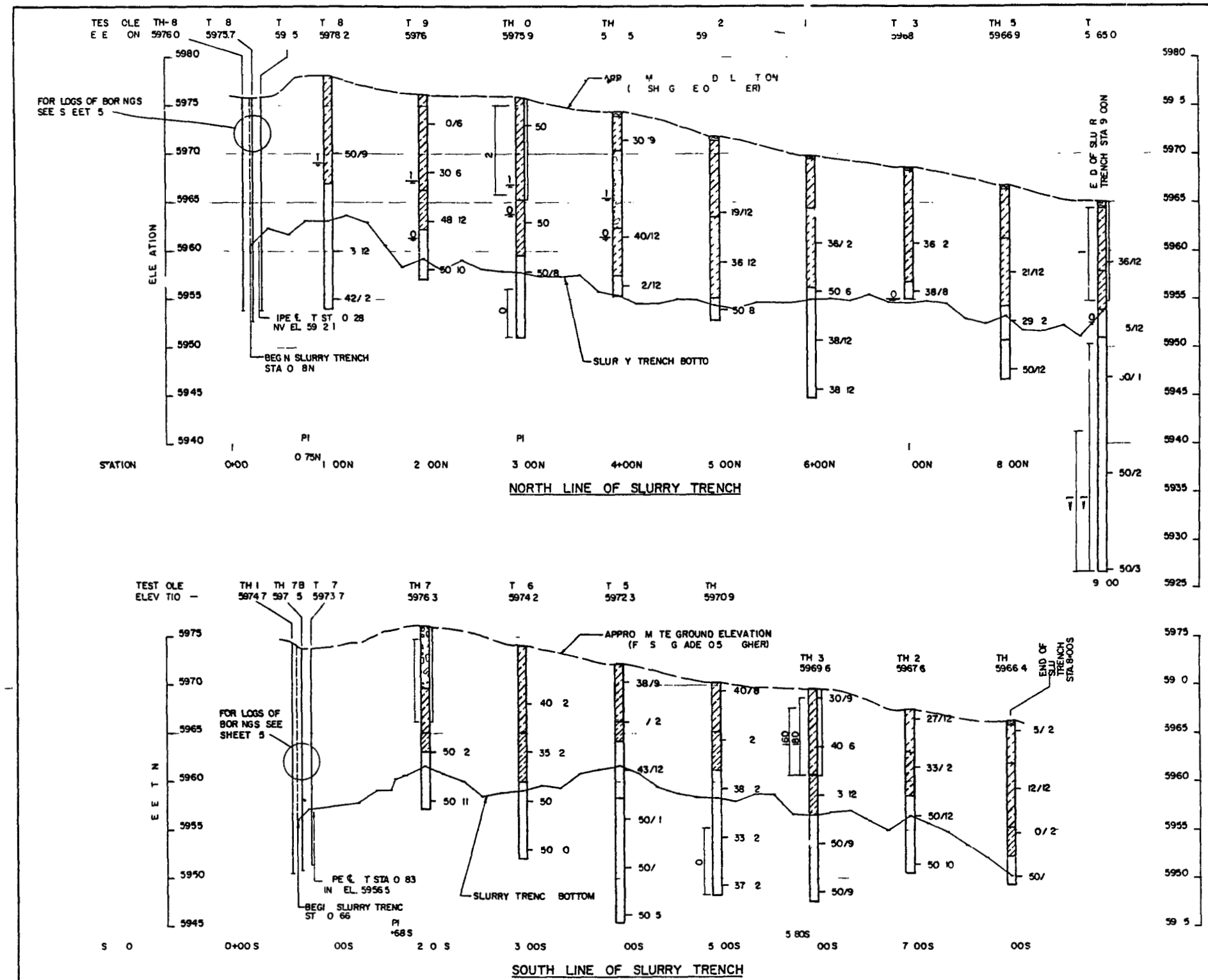
CESARE

FRAGUA 82

ROCKY FLATS PLANT

S TE PLAN

27915 003 A 3



NOTE

EG ON EET

A	AS BUIL				
ISSUE	DESCRIPTION	DA		DOE	CLASS
NG	DESI NED	CESAR			
	AWN	RAGUA			
	HE K				
	APPROVED				
	SUBMITTED				
	APPROVED				
	APP OVE				

U.S. DEPARTMENT OF ENERGY

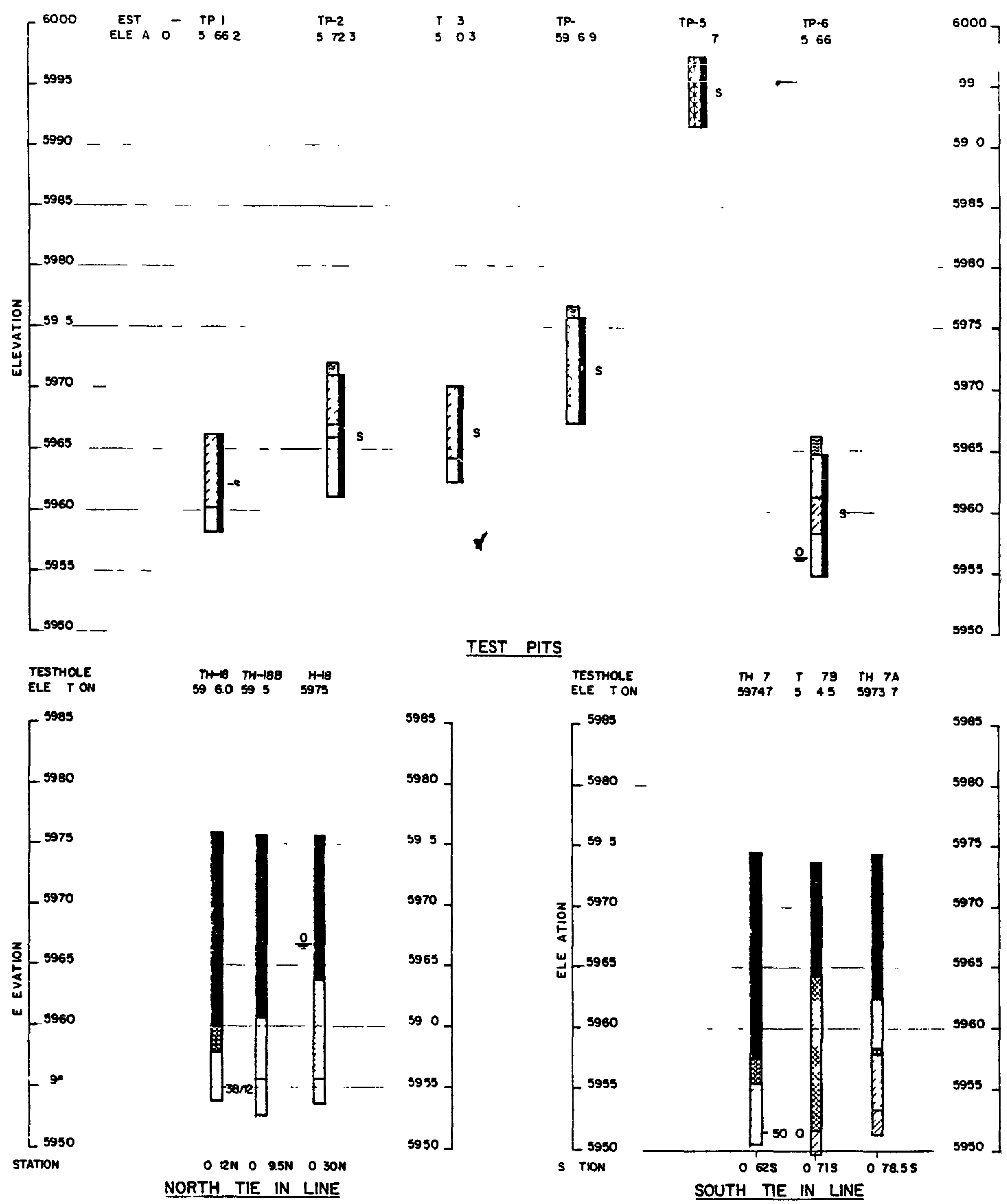
ROCKY FLA REA FICE BL COLOR

ROCKWELL OU NA

ROCKY FLA PLANT GOLDEN, COLORADO

BORING LOGS

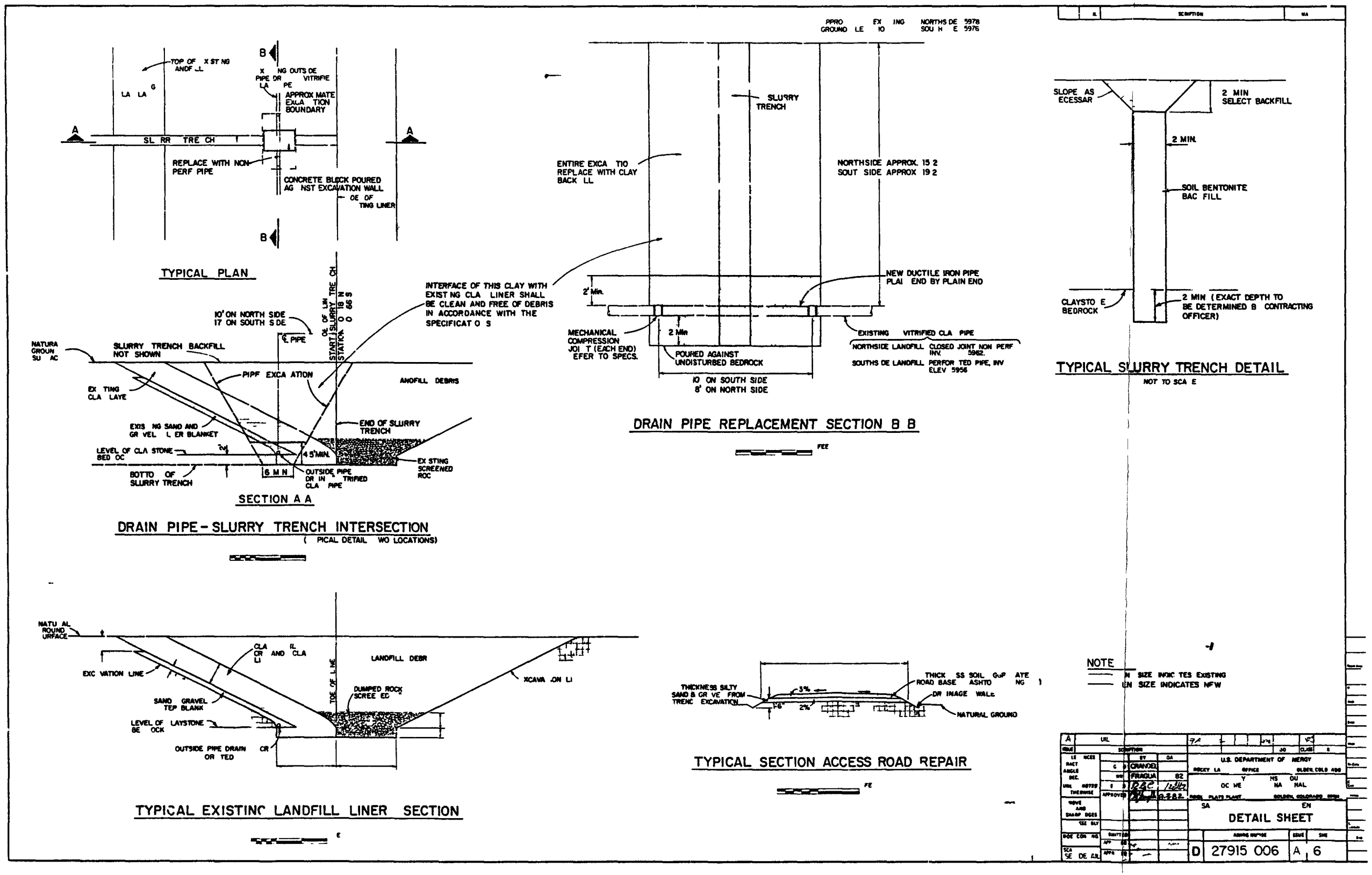
D	27915 C04	A	4



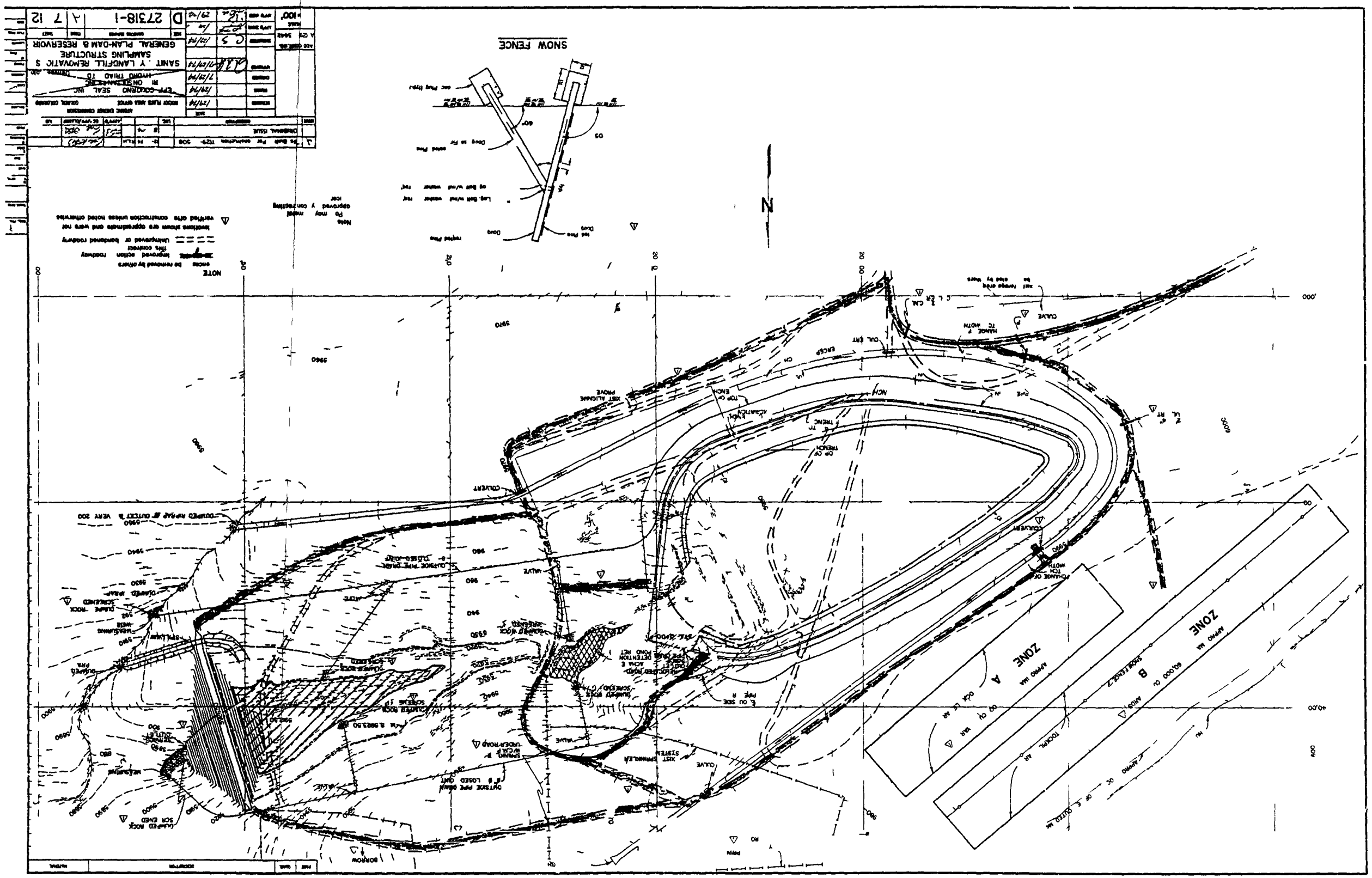
LEGEND

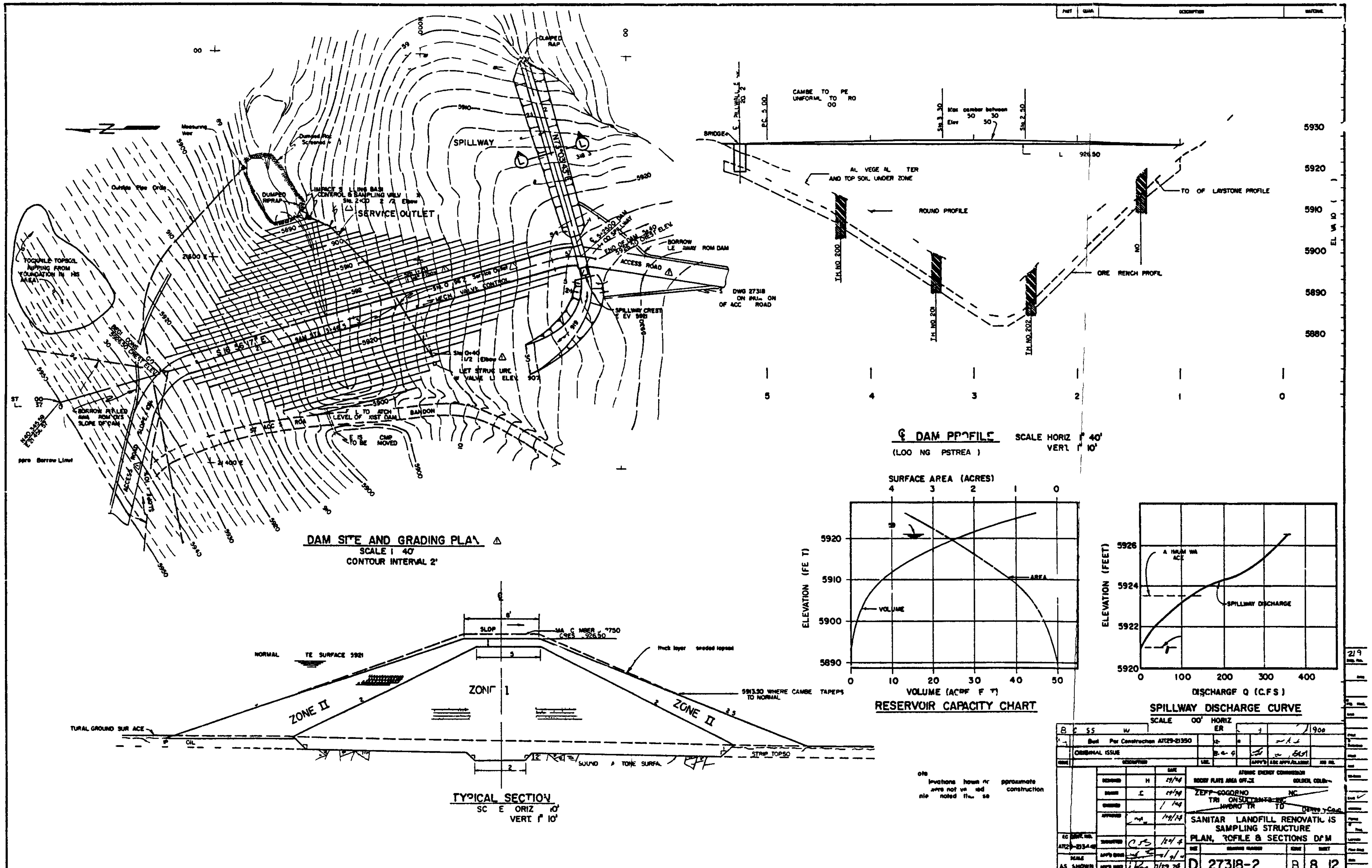
- SOIL — sandy to very sandy ... some gravels and cobbles, dry to moist, brown to dark brown
- FILL — very sandy gravel ... occasional cobbles and boulders, moist, red-brown
- LANDFILL DEBRIS — sandy clayey ... glass, metal and general construction debris, generally unconsolidated
- FILL — clayey, slightly silty, slightly sandy ... probable liner material for landfill trench
- CLAY — very stiff silty sandy ... with occasional gravel lenses
- SAND — medium dense to very dense ... clayey with sandy clay lenses, gravelly
- GRAVEL — very dense, sandy to very sandy, clayey ... Rocky Flats alluvium
- GRAVEL — dense, sandy, clayey, gray, approximately 1/2" to 1 ... probable liner material for landfill trench
- CLAYSTONE — hard, very hard ... occasional sandstone lenses ... Arapahoe Formation
- CLAYSTONE — medium hard, sandy ... occasional sandstone and siltstone lenses ... Arapahoe Formation
- 50/9 — indicates that 50 blows of ... lb weight ... inches
- indicates ... sample
- 8 — indicates large bulk sample of material taken ... designated interval
- indicates ... coefficient of permeability ... results are presented ...
- S — depth and extent of bulk sample
- depth and extent of 2-in diameter PVC piezometer

U.S. DEPARTMENT OF ENERGY	ROCKY FLATS AREA OFFICE
ROCKY FLATS PLANT	GOLDEN, COLORADO
DESIGN	CESARE
	FRAGUA
BORING LOGS	
D	27915 005
SHEET	5 of

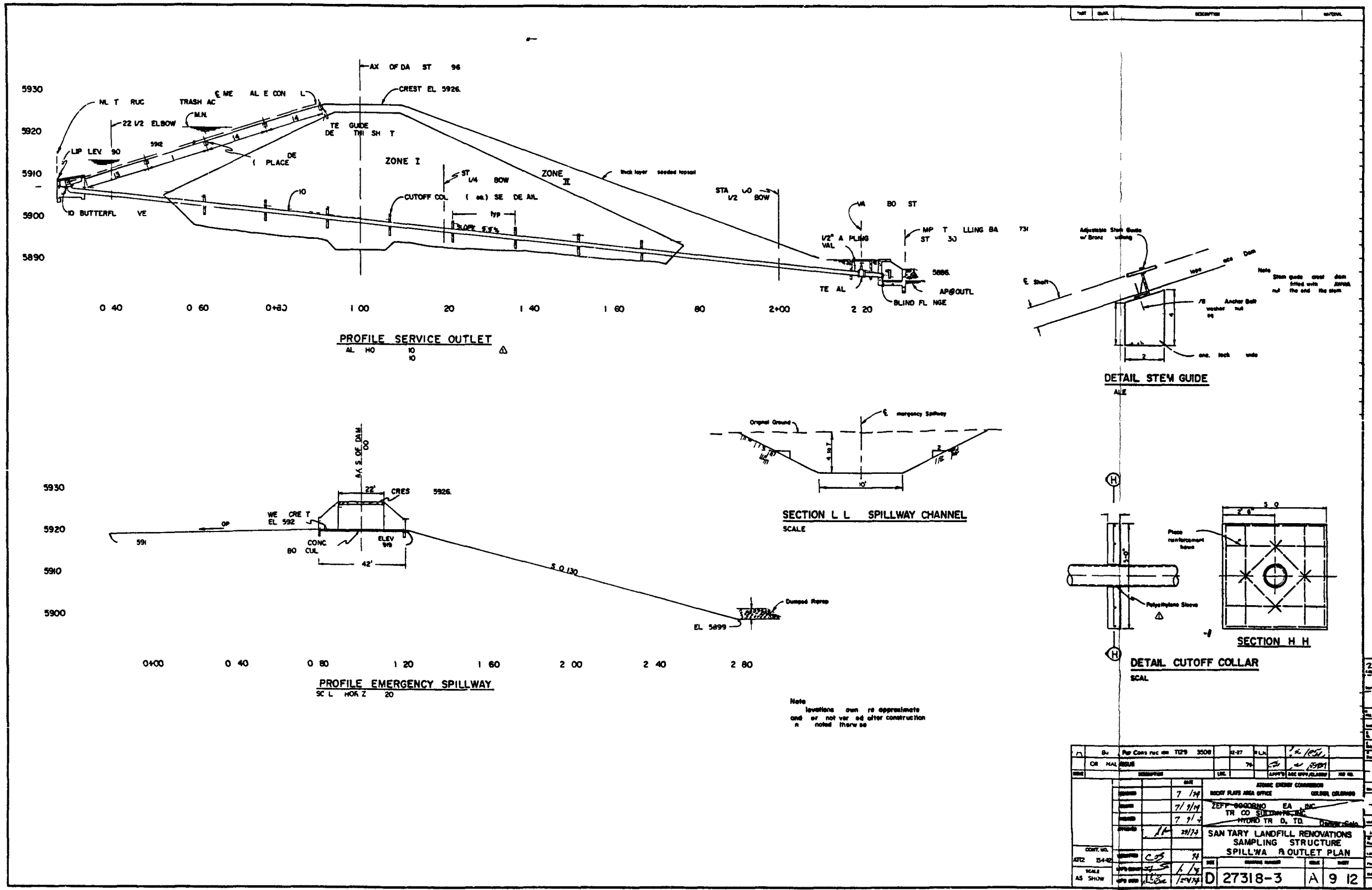


TYPICAL PLAN
SECTION A A
DRAIN PIPE - SLURRY TRENCH INTERSECTION
(PICAL DETAIL WO LOCATIONS)
DRAIN PIPE REPLACEMENT SECTION B B
TYPICAL SLURRY TRENCH DETAIL
NOT TO SCA E
TYPICAL EXISTINC LANDFILL LINER SECTION
TYPICAL SECTION ACCESS ROAD REPAIR
NOTE
U.S. DEPARTMENT OF NERGY
DETAIL SHEET
D 27915 006 A 6

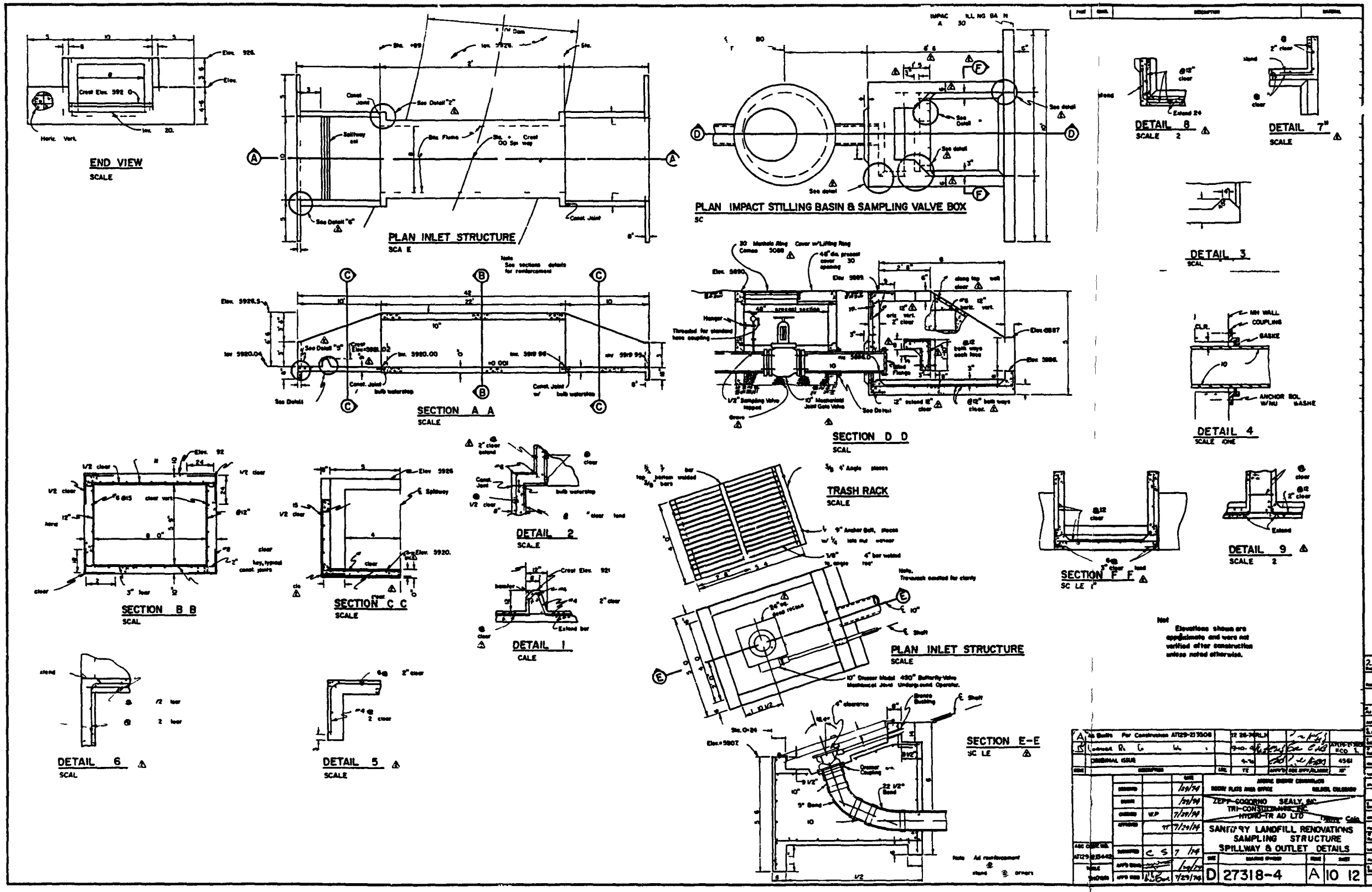

SANT Y LANGFILL RENOVATIC S
SAMPLING STRUCTURE
GENERAL PLAN-DAM & RESERVOIR
D 27318-1
SNOW FENCE
ZONE A
ZONE B
N

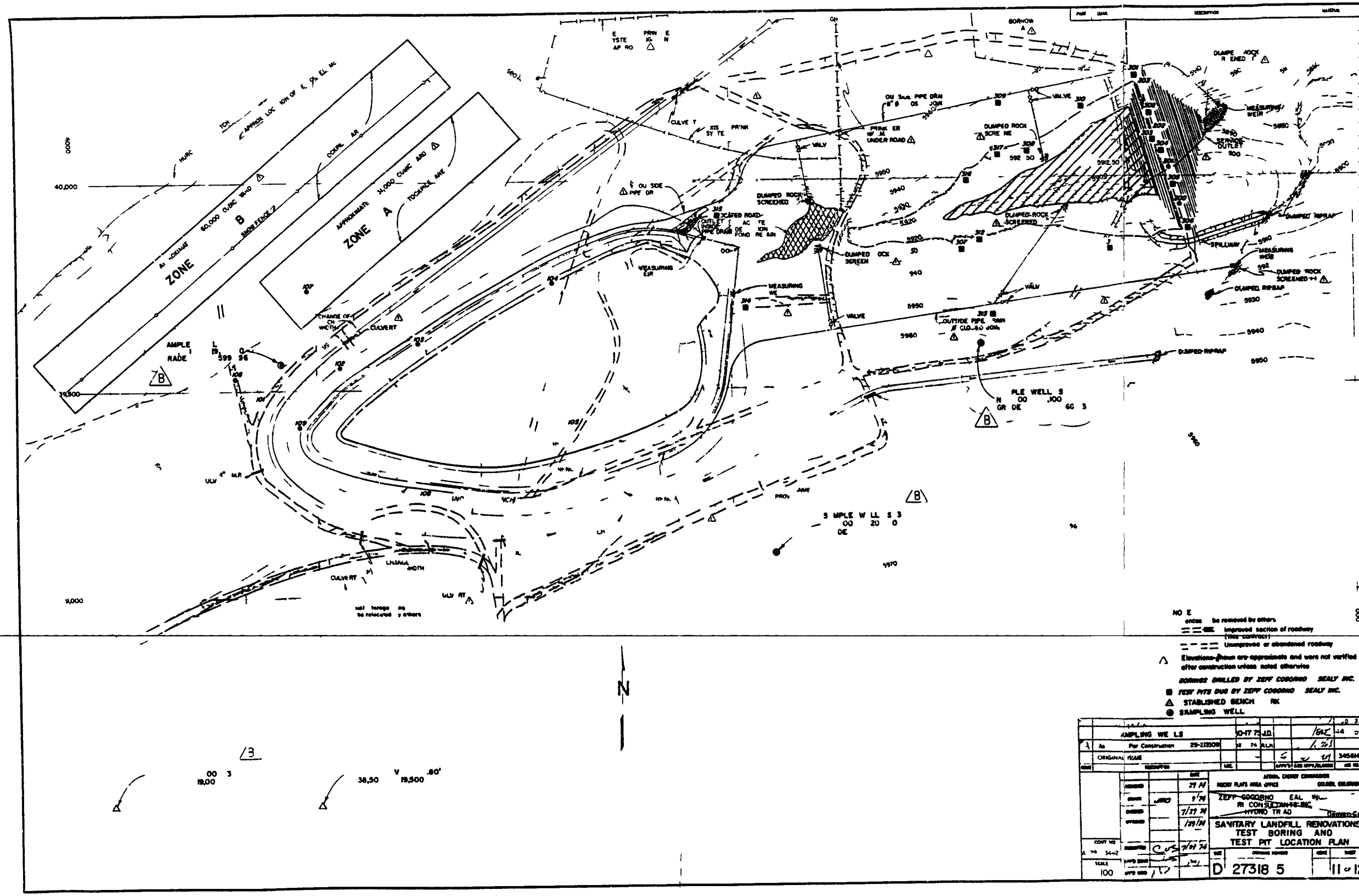


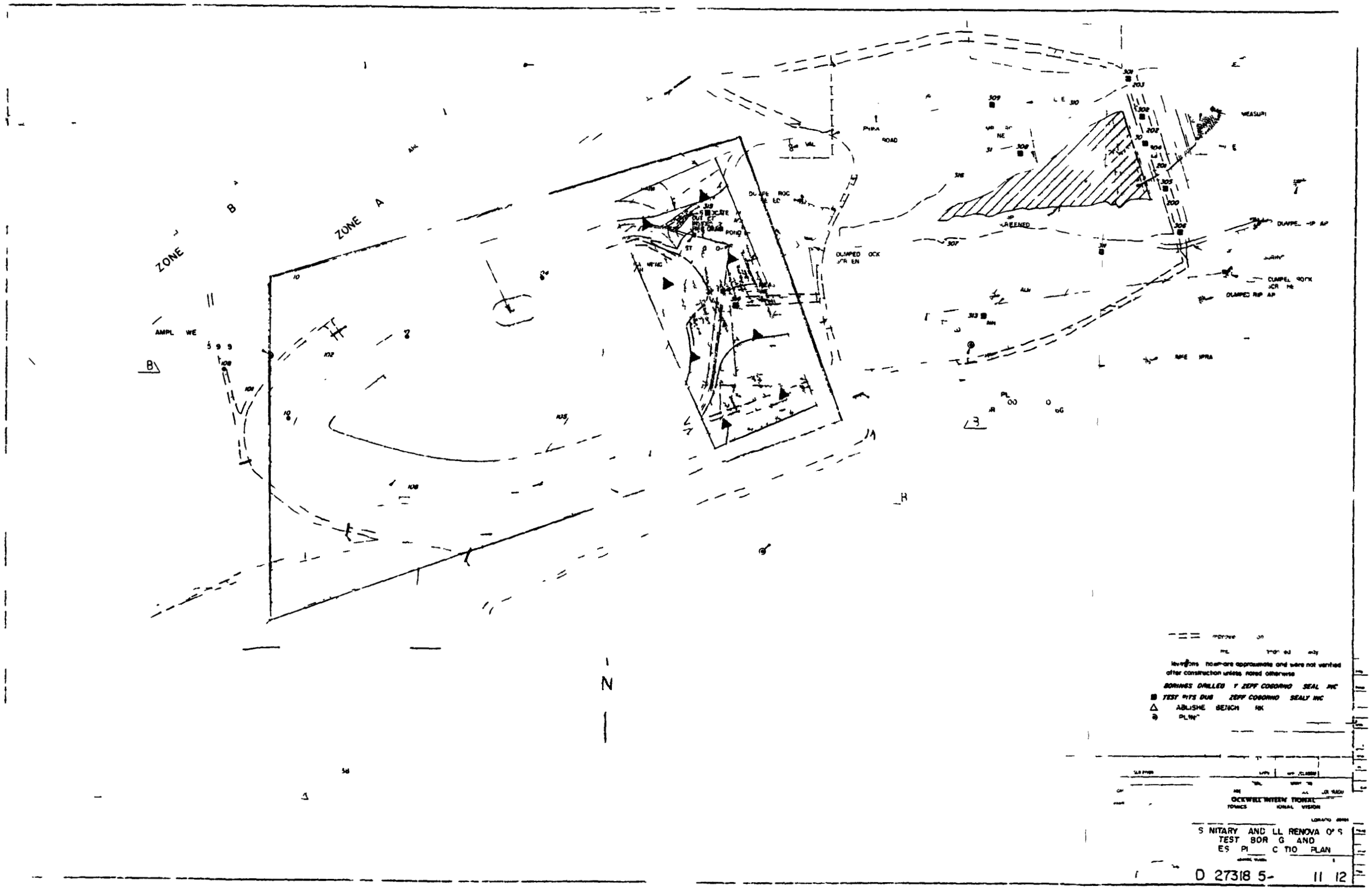
DAM SITE AND GRADING PLAN
SCALE 1" 40'
CONTOUR INTERVAL 2'
SPILLWAY
SERVICE OUTLET
ACCESS ROAD
SPILLWAY CREST
DUMPED RIPRAP
℄ DAM PROFILE
(LOOKING UPSTREAM)
SCALE HORIZ 1" 40'
VERT 1" 10'
GROUND PROFILE
TH NO 200
TH NO 201
TH NO 202
TYPICAL SECTION
ZONE I
ZONE II
NORMAL WATER SURFACE 5921
STRIP TOPSOIL
SURFACE AREA (ACRES)
ELEVATION (FEET)
VOLUME (ACRE FT)
VOLUME
AREA
RESERVOIR CAPACITY CHART
DISCHARGE Q (C.F.S)
SPILLWAY DISCHARGE
SPILLWAY DISCHARGE CURVE
ORIGINAL ISSUE
ATOMIC ENERGY COMMISSION
ROCKY FLATS AREA OFFICE
GOLDEN, COLO.
SANITARY LANDFILL RENOVATIONS
SAMPLING STRUCTURE
PLAN, PROFILE & SECTIONS DAM
AS SHOWN
D 27318-2
B 8 12



PROFILE SERVICE OUTLET
AL HO 10
10
ZONE I
ZONE II
CUTOFF COL
CREST EL 5926.
LIP LEV 90
22 1/2 ELBOW
TRASH AC
M.N.
10 BUTTERFL VE
STA 1/2 BOW
BLIND FL NGE
AP@OUTL
5886.
DETAIL STEM GUIDE
Adjustable Stem Guide w/ Bronz ushing
Anchor Bolt
SECTION L L SPILLWAY CHANNEL
SCALE
Original Ground
Emergency Spillway
10'
PROFILE EMERGENCY SPILLWAY
SC L HOR Z 20
CRES 5926.
WE CRE T EL 592
CONC BO CUL
ELEV 919
42'
S O 130
Dumped Riprap
EL 5899
DETAIL CUTOFF COLLAR
SCAL
SECTION H H
Place reinforcement hawn
Polyethylene Sleeve
Note
levations own re approximate
and or not ver ed after construction
n noted therw se
ATOMIC ENERGY COMMISSION
ROCKY FLATS AREA OFFICE
GOLDEN, COLORADO
ZEFF GOGORNO EA INC
TR CO SUITANTS INC
HYDRO TR D, TD.
Denver, Colo
SAN TARY LANDFILL RENOVATIONS
SAMPLING STRUCTURE
SPILLWA & OUTLET PLAN
D 27318-3 A 9 12
AS SHOW


END VIEW
SCALE
PLAN INLET STRUCTURE
SCA E
PLAN IMPACT STILLING BASIN & SAMPLING VALVE BOX
SC
SECTION A A
SCALE
SECTION D D
SCAL
DETAIL 8
SCALE 2
DETAIL 7
SCALE
DETAIL 3
SCAL
DETAIL 4
SCALE ONE
SECTION B B
SCAL
SECTION C C
SCALE
DETAIL 2
SCALE
DETAIL 1
CALE
TRASH RACK
SCALE
PLAN INLET STRUCTURE
SCALE
SECTION F F
SC LE 1"
DETAIL 9
SCALE 2
SECTION E-E
SC LE
DETAIL 6
SCAL
DETAIL 5
SCALE
Elevations shown are approximate and were not verified after construction unless noted otherwise.
ZEPP-GOGORNO SEALY INC.
TRI-CONSULTANTS INC.
HYDRO-TR AD LTD
SANITARY LANDFILL RENOVATIONS
SAMPLING STRUCTURE
SPILLWAY & OUTLET DETAILS
D 27318-4
A 10 12


ZONE B
ZONE A
APPROXIMATE 31,000 CUBIC ARD
TOCKPILE ARE
SNOW FENCE
CULVERT
MEASURING WEIR
DUMPED ROCK SCREENED
DUMPED RIPRAP
SPILLWAY
VALVE
BORROW
N
NOTE
Improved section of roadway (this contract)
Unimproved or abandoned roadway
Elevations shown are approximate and were not verified after construction unless noted otherwise
BORINGS DRILLED BY ZEFF COGORNO SEALY INC.
TEST PITS DUG BY ZEFF COGORNO SEALY INC.
STABLISHED BENCH RK
SAMPLING WELL
AMPLING WE LS
As Per Construction 29-213508
ORIGINAL ISSUE
345614
ZEFF COGORNO EAL INC
RI CONSULTANTS INC
HYDRO TR AD
SANITARY LANDFILL RENOVATIONS
TEST BORING AND
TEST PIT LOCATION PLAN
D 27318 5
11 of 12
SCALE 100



levations shown are approximate and were not verified after construction unless noted otherwise

BORINGS DRILLED Y ZEPP COBORNO SEAL INC

TEST PITS DUG ZEPP COBORNO SEALY INC

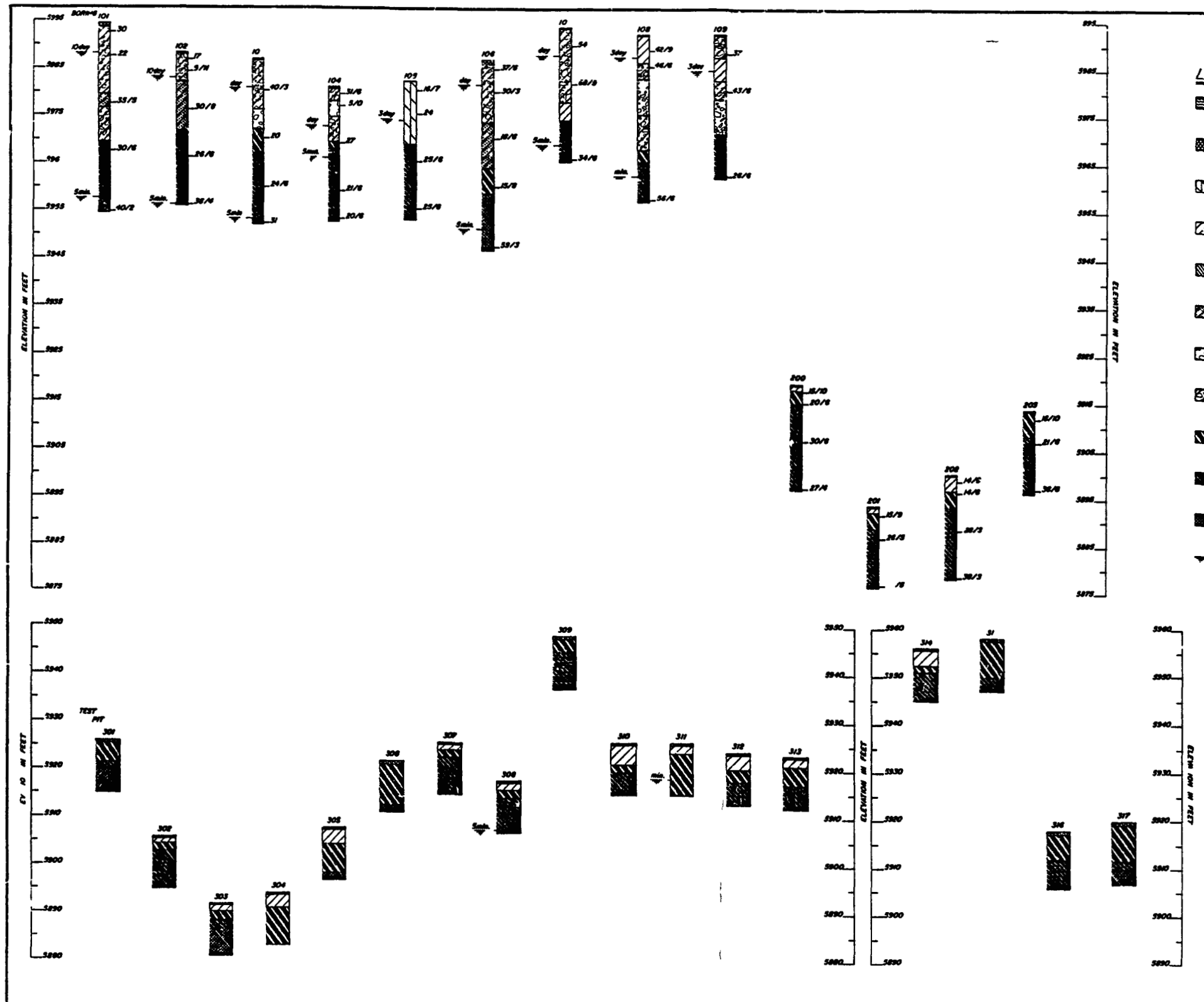
△ ABLISHE BENCH RK

PLAN

ROCKWELL INTERNATIONAL

S NITARY AND LL RENOVA O' S
TEST BOR G AND
ES PI C TIO PLAN

D 27318 5- 11 12



LEGEND

- TOPSOIL
- FILL CLAY SANDY WITH GRAVELS AND COBBLES
- SANITARY LANDFILL
- ALLUVIUM CONSISTING OF MIXTURES OF CLAYS SANDS AND GRAVELS WITH RANDOM AMOUNTS OF COBBLES AND BOULDERS
- CLAY, SANDY TO VERY SANDY SILTY VERY STIFF MEDIUM MOIST TO MOIST BROWN GRAVEL
- SAND CLAYEY WITH CLAY LAYERS MEDIUM DENSE TO DENSE MEDIUM MOIST TO WET RANDOM GRAVELS AND COBBLES
- SAND AND GRAVEL DENSE TO VERY DENSE MEDIUM MOIST TO WET SOME COBBLES AND BOULDERS
- SAND AND GRAVEL SLIGHTY CLAYEY TO CLAYEY DENSE TO VERY DENSE SOME COBBLES AND BOULDERS
- CLAY (SEVERELY WEATHERED CLAYSTONE) VERY STIFF MOIST
- CLAYSTONE BEDROCK (SHALE) WEATHERED MEDIUM HARD TO VERY HARD MOIST VARICOLORED YELLOW BROWN AND GRAY
- CLAYSTONE BEDROCK (SHALE) WEATHERED HARD TO VERY HARD MOIST YELLOW AND GRAY
- WATER TABLE TIME AFTER DRILLING

NOTES

(1) THE BORINGS WERE DRILLED MAY 28 THROUGH JUNE 1974 WITH 4" DIAMETER CONTINUOUS FLIGHT POWER AUGER

(2) THE TEST PITS WERE DUG MAY 30 AND 31 1974 WITH BACKHOE

(3) 30 INDICATES THAT 30 BLOWS OF 140 LB HAMMER FALLING 30" WERE REQUIRED TO DRIVE THE SAMPLER

(THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL

(5) THE BORING LOGS SHOW SUBSURFACE CONDITIONS AT THE DATES AND LOCATIONS INDICATED AND IT IS NOT WARRANTED THAT THEY ARE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES

REV	ELECTRICAL							
B	E W			06-24-74				900
A	ORIGINAL ISSUE A 3 _T			8-4-74				34 614

ATOMIC ENERGY COMMISSION
ROCKY FLATS AREA OFFICE GOLDEN, COLORADO

DESIGNED	L.H	1/29/74
DRAWN	JTRO	1/29/74
CHECKED	R.L.	7/29/74
APPROVED		1/29/74
SUBMITTED	C.B	7/29/74
APP'D CODE		1/29/74
APP'D SIZE		7-3-74

ZEFF-SOGORNO EA INC
TR CONSULTANTS, INC.
HYDRO-TR AD, TD.

SANITARY LANDFILL RENOVATIONS
LOGS OF EXPLORATORY BORINGS
AND TEST PITS

SIZE	DRAWING NUMBER	SHEET	SHEET
D	27318-6	8	12 12

AEC CODE NO. AT129-233-4-42