Geologic Characterization Report

Appendix F

Volume III

ADMIN RECORD

A-SW-000274

GEOLOGIC CHARACTERIZATION REPORT

For U.S. DOE-Rocky Flats Plant

EG&G ROCKY FLATS

APPENDIX F

(VOL. 3)

July 31, 1991

ADMIN RECORD

REVIEWED FOR CLASSIFICATION/UCNI

LOG OF BORING NO. 6U 3088

PAGE 1 OF 2

GEOLOGIST(S): [illegible]
DATE: 8/28/89

PROJECT NO: 6607-1122

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION (matrix color, etc)
0.0 ↓	0.0 -1.2	(1) 0.6				Gravel = 60% CLAY = 25% SAND = 15%	GC	1		Sandy clayey Gravel, dark reddish brown (10 R 3/4), subangular - sub rounded, mod - poorly graded, max frag = 5 cm, S-d is FG-CG
	1.2-2.0	∅								NO SAMPLE
	2.0 -4.8	(1) 3.4				Gravel = 50% SAND = 30% CLAY = 20%	GC	2, 3, 4		Same as above, increased sand fraction, max gravel = 7 cm, some cobble, other white "powdery" mineralization that is not calc.
	4.8-5.0	∅						5		NO SAMPLE
	5.0-6.5	∅						6		NO SAMPLE - Split Spoon
	6.5-8.5	(1) 2.2				Sand = 60% Clay = 40%	SC	7, 8		Clayey SAND, moderate orange pink (5 YR 8/4), subangular - subrounded, poorly - mod graded, sand is FG - MG, trace of gravel
	8.5-10.0	(1) ∅.6				Sand = 60% Clay = 40%	SC	9		Same as above
↑ 10.0										

Box 1 of 3

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. EU 3088

GEOLOGIST(S): Day
DATE: 8/28/89

PROJECT NO: 667-1122

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
10.0 ↓	10.0-11.5	Ø						11		NO SAMPLE - SPLIT SPOON
	11.5-13.5	(1) 2.8				60% GRAVEL 30% SAND 10% CLAY	CL	12, 13		CLAYEY SANDY GRAVEL, matrix color is pale yellowish orange (10 YR 8/6) and moderate orange pink (5 YR 8/4), angular - subangular, mod-well graded, max size = 8 cm, sand is FG-CG, some white, non calc. mineralization
Box 2 of 3	13.5-15.0	(1) 1.85				55% GRAVEL 35% SAND 10% CLAY 15	CL	14		Same as above, increased sand & clay fraction
	15.0-16.5	Ø						15, 16		NO SAMPLE
↑ 18.5	16.5-18.5	(1) 3.3				50% GRAVEL 45 40% SAND 15% CLAY	CL	17, 18		Same as above; increased sand & clay fraction
18.5 ↓ Box 3 of 3 ↑ 20.0	18.5-20.0	(1) 2.3				30% CLAY 40% GRAVEL 30% SAND	CL	19		Same as above; dark yellowish orange (10 YR 6/6), increase clay fraction. BOTTOM 2 IN: VFG-FG SANDY CLAYSTONE, dark yellowish orange (10 YR 6/6) and light gray (N7), non-apparent bedding, well weathered, mod friable, some iron staining as mottles, Mg staining.

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
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(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. EU 31 BB

DATES DRILLED:
ELEVATION:
GEOLOGIST(S): DC8/GCE USCS & Manual
DATE 7/21/89
CHECKED BY: DATE:

PROJECT NO. 667-11.22

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF CORE (in ft. from ground surface)	SAMPLE NUMBER	FEET OF CORE (Length of core in feet)	USCS	FRACTURES PER FOOT	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 1&3 (Top)	0.0 to 1.2		.55' (1)	GW				Gravel >50%	1.0		Gravel, medium light gray (N6) angular, moderately well graded, trace of silt and clay
	1.2 to 2.0		.4'						2.0		
	2.0 to 4.8		3.0' (1)	GW				Gravel >50%	4.0		Clayey gravel, darkish yellowish orange (10 YR 6/6), and light gray (N7), angular to subangular, well graded, tr silt and sand. 2.8' color change to red yellowish brown (10YR 5/4). 4.65'-4.8' caliche
	4.8 to 6.5								6.0		[NO SAMPLE]
Bottom of Box (12.0)	6.5 to 8.5		[3.0'] (1)	GP				Gravel >50%	8.0		6.5' Sandy Gravel, light gray (N7) angular to sub angular, moderately graded, some clay. coarse to fine grain
	8.5 to 10.0		1.7' (1)	SP GW				Sand >50%	10.0		Sand, grayish orange (10YR 7/4), angular to subangular, well graded, some gravel and clay. 9.1 gradational change to gravel, lt gray (N7) angular to subangular, well graded

NOTES: General: The USCS is modified for this log as follows: some clay material amounts are estimated by percent volume instead of percent weight.
(1) Badly broken core, accurate footage measurement not possible.
(2) Core breaks cannot be matched, accurate footage measurement not possible.

ROCKY FLATS PLANT

FIGURE NO.

$\beta\gamma$ BACKGROUND 50 - cpm
BOX 1 50 - 120 cpm
BOX 3 30 - 130 cpm

LOG OF BORING NO. EU 3188

DATES DRILLED:
ELEVATION:
GEOLOGIST(S): DCB/GCE
DATE 7/24/89
CHECKED BY:
DATE:

USCS SYMBOL

PROJECT NO. 667-11.22

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF CORE IN RUN (INTERVAL)	SAMPLE NUMBER	FEET OF CORE (INCHES)	FEET OF CORE IN RUN	FRACTURES PER FOOT	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
11.5 ↓ Bottom of Box 1	10.0 to 11.5		NO SAMPLE				GCE	GRAVEL >50%	11		NO SAMPLE
Top of 2 (11.5) Box 2 of 3	11.5 to 13.5 GCE		N.D.	G_W				GRAVEL >50%	12, 13		SANDY CLAYEY GRAVEL, DARK YELLOWISH ORANGE (10 YR 6/6) TO GRAYISH ORANGE (10YR 4/6) ANGULAR TO SUBROUNDED, MODERATELY GRADED, SOME SILT. AT 13.3 AN INCREASE IN % AGE OF GRAVEL PRESENT AND GRAVEL SIZE INCREASES, TREND RUNS TO 15 ft.
	13.5 to 15.0		N.D.	G_W				"	14, 15		
	15.0 to 16.5		NO SAMPLE						16		NO SAMPLE
↑ 18.5	16.5 to 18.5		N.D.	G_W				GRAVEL >50%	17, 18		SANDY GRAVEL, DARK YELLOWISH ORANGE (10 YR 6/6), ANGULAR TO SUBANGULAR, MODERATELY GRADED, SOME CLAY AND SILT,
Box 3 of 3	18.5 to 20.0 Bottom of Box		N.D.					CLAY >50%	19		CLAY, LIGHT OLIVE GRAY (5Y 6/1) MOTTLED TO DARK YELLOWISH ORANGE (10 YR 6/6) MODERATE PLASTICITY, TRACE OF SILT, FINE SAND + GRAVEL

NOTES: General: The USCS is modified for this log as follows: Material amounts are estimated by percent volume instead of percent weight.
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ROCKY FLATS PLANT

FIGURE NO.

βγ box 3 50 cpm
βγ BACKGROUND 50 - 100 cpm

NOTE: INT 200 to 21.5 IS NOT PRESENT IN BOX 3/3

LOG OF BORING NO. EU 32-88

GEOLOGIST(S): DCB/GCE
DATE: 7/21/89

PROJECT NO: 6607-11.22

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
0.0 ↓	0.0 to 1.7	(1) 1.5				>50% Gravel	GW	1		Clayey Gravel, grayish red (5R 4/2) to pale yellowish brown (10 YR 6/2), to light gray (N7), subangular to subrounded, well graded, some silt.
	1.7 to 2.0	0						2		No Sample
	2.0 to 4.0	(2) 1.7				>50% Gravel	GW	3		Sandy Clayey Gravel, moderate reddish brown (10 R 4/6) and moderate yellowish brown (10 YR 5/4), angular to subangular, moderately graded.
Box 1 of 3	4.0 to 5.0	(1) 1.0				>50% Clay	Cl	4		Gravelly clay, moderate yellowish brown (10 YR 5/4), low plasticity some sand and silt.
	5.0 to 6.5	(1) 1.6				Fines >50%		5, 6		Caliche, white (N9), changes to sandstone, grayish orange (10 YR 7/4) weathered, slightly friable fine grain and angular, moderate sorting and abundant clay.
↑ 8.5	6.5 to 8.5	(1) 0.4				VCG -FG		7, 8		Same as above, alternating interims of caliche and sandstone, with abundant clay. Bottom 0.3 ft. is sandstone, dark yellowish orange (10 YR 6/6), weathered, moderately friable, very coarse to fine grain, angular to subangular.
8.5 Box 2 of 3	8.5 to 10.0	(1) 2.0				Sand >50%	GW	9		Clayey, gravelly sand, dark yellowish orange (10 YR 6/6), angular to subangular, well graded, localized carbonate mineralization.

NOTES: General USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

This log has been re-copied to include correct graphic lithologic log. CKF

ROCKY FLATS PLANT

FIGURE NO.

B & Background - 0-100 cpm
Box 1 50-110 cpm

LOG OF BORING NO. EU 32-88

GEOLOGIST(S): DeB/GCE
DATE: 7/21/89
PROJECT NO: 6677-11.22

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 2 of 3	10.0 to 11.5	(1) 0.6				Gravel >50%	GW	11		As above
	11.15 to 13.5	(1) 3.4					GW	12, 13		Clayey Gravel, light gray (N7), angular to subangular, moderately graded, some silt, black, iron-manganese? staining on gravel fraction, grades to a sandy gravel lower 0.5 ft of interval.
↑ 16.5	13.5 to 16.5	(1) 2.8				Gravel >50%	GW	14, 15, 16		Upper 0.25 ft of interval as above, gradational change occurs - sandstone light gray (N7), weathered, slightly friable, fine grained, angular, well sorted, localized iron staining, gradational change at 0.9 ft. (Lithology is same as upper 0.25 ft of interval).
16.5 ↓ Box 3 of 3	16.5 to 17.7	(2) 1.4						17		Upper 1.2 ft as above. (reference lower 0.9 ft of interval), siltstone in lower 0.2 ft of interval (into next interval), yellowish orange (10 YR 6/6) and very light gray (N8), highly weathered, moderately friable, black carbonaceous mineralization and iron staining on partings.
	17.7 to 18.5	(1) 1.2						18		
↑ 20.0	18.5 to 20.0	(2) 1.7						19		Same as above, at 19.0 - 19.5, fine grain sand fraction (~ 10% of siltstone). (Bottom of box)

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ROCKY FLATS PLANT

FIGURE NO.

B8 Background (See previous page)
Box 2 (See prev page)

LOG OF BORING NO. EU 32-88

DATES DRILLED:
ELEVATION:
GEOLOGIST(S): DCB/GEE
DATE: 7/21/89
CHECKED BY: DATE:

USCS SYMBOL

PROJECT NO. 667-11.22

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF CORE IN RUN (FT/FT)	SAMPLE NUMBER	FEET OF CORE IN BOX (FT/FT)	FEET OF CORE IN RUN	FRACTURES PER FOOT / FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
0.0	0.0 to 1.7		(1) 1.5'	GW			>50% Gravel	1		Clayey Gravel, grayish red (5R 4/2) to pale yellowish brown (10 YR 6/2), to light gray (N7), subangular to subrounded, well graded, same silt.
	1.7 to 2.0		0					2		No Sample
	2.0 to 4.0		(2) 1.7'	~~GP~~ GW			>50% Gravel	3		SANDY CLAYEY GRAVEL, MODERATE REDDISH BROWN (10R 4/6) AND MODERATE YELLOWISH BROWN (10 YR 5/4), ANGULAR TO SUBANGULAR, MODERATELY GRADED.
Box 1	4.0 to 5.0		(1) 1.0	Cl			>50% CLAY	4		GRAVELLY CLAY, MODERATE YELLOWISH BROWN (10 YR 5/4), LOW PLASTICITY, SAND AND SILT.
	5.0 to 6.5		(1) 1.6'				FINES >50%	5 6		CALICHE, WHITE (N9), CHANGES TO SANDSTONE, GRAYISH ORANGE (10 YR 7/4), WEATHERED, SLIGHTLY FRIABLE, FINE GRAIN AND ANGULAR, MODERATE SORTING AND ABUNDANT CLAY.
8.5	6.5 to 8.5		(1) .4'				MCS-FS	7 8		SAME AS ABOVE, ALTERNATING INTERVALS OF CALICHE AND SANDSTONE, WITH ABUNDANT CLAY. DARK YELLOWISH ORANGE (10 YR 6/6) BOTTOM .3 IS SANDSTONE/WEATHERED, MODERATELY FRIABLE, VERY COARSE TO FINE GRAIN, ANGULAR TO SUBANGULAR
8.5 Box 2	8.5 to 10.0		(1) 2.0	GW			SAND >50%	9		CLAYEY, GRAVELLY SAND, DARK YELLOWISH ORANGE (10 YR 6/6), ANGULAR TO SUBANGULAR, WELL GRADED, LOCALIZED CARBONATE MINERALIZATION

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ROCKY FLATS PLANT

FIGURE NO.

β γ BACKGROUND 0-100 cpm
BOX 1 50-110
BOX 2 50-150 cpm

LOG OF BORING NO. BU32-88

DATES DRILLED:
ELEVATION:
GEOLOGIST(S): DCB/GCE
DATE: 7/21/89
CHECKED BY: DATE:

USCS symbol

PROJECT NO. 667-11.22

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF CORE IN RUN (FT/BOX)	SAMPLE NUMBER	FEET OF CORE IN BOX (FEET OF CORE IN RUN)	USCS SYMBOL	FRACTURES PER FOOT	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 2 of 3	10.0 to 11.5		5' (1)	GW			GRAVEL >50%		11.00		AS ABOVE
	11.5 to 13.5		3.4' (1)	GW					13.00		CLAYEY GRAVEL, LIGHT GREY (NT), ANGULAR TO SUBANGULAR, MODERATELY GRADED, SOME SILT, BLACK IRON-MANGANESE? STAINING, ON GRAVEL FRACTION, GRADES TO A SANDY GRAVEL LOWER .5 FT OF INTERVAL.
Bottom	13.5 to 16.5		2.8' (1)	GW			GRAVEL >50%		16.00		UPPER .25 ft OF INTERVAL AS ABOVE, GRADATIONAL CHANGE ~~OCCU~~ OCCURS - SANDSTONE, LIGHT GRAY (NT), WEATHERED, SLIGHTLY FRIABLE, FINE GRAINED, ANGULAR, WELL SORTED, LOCALIZED IRON STAINING, GRADATIONAL CHANGE AT .9 ft. (LITHOLOGY IS SAME AS UPPER .25 ft OF INTERVAL)
Box 3 of 3	16.5 to 17.7		1.4' (2)						17		UPPER 1.2' AS ABOVE. REFERENCE LOWER .9 ft OF INTERVAL, SILTSTONE IN LOWER .2 ft OF INTERVAL, DARK YELLOWISH ORANGE (10YR 6/6) AND VERY LIGHT GRAY (N8), HIGHLY WEATHERED, MODERATELY FRIABLE [INTO NEXT INTERVAL]
	17.7 to 18.5		1.2' (1)						18		BLACK CARBONACEOUS MINERALIZATION AND IRON STAINING ON PARTINGS.
	18.5 to 20.0		1.7' (2)								SAME AS ABOVE, AT 19.0-19.5, FINE GRAIN SAND FRACTION (~10% OF SILTSTONE).

Bottom of Box

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ROCKY FLATS PLANT

FIGURE NO.

pγ BACKGROUND (SEE PREVIOUS)
BOX 2 " "
BOX 3 30-210

LOG OF BORING NO. EU 33 88

GEOLOGIST(S): NAJ
DATE: 8/16/89

PROJECT NO: 667-11.22

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION (Erasure NAJ)
0.0 ↓	0.0 -2.0	(1) 1.7				GP →	55% SAND ← 30% CLAY 15% GRAVEL; 50% GRAVEL ← 30% SAND 20% CLAY	1		TOP 3IN - GRAVELLY CLAYEY SAND moderate yellowish brown (10 YR 5/4), ~~sub~~angular - subrounded, max gravel size = 6.5 cm, poorly graded, Sand is MG - FG, matrix color is Bottom of interval; Sandy Gravel, dark reddish brown (10 R 3/4), angular - subangular, mod grading, max size = 6.5 cm, Sand size is FG - CG, Some clay
Box 1 of 2	2.0 -2.5							2		NO SAMPLE - SHELBY
	2.5 -4.0	(1) 0.4				GP →	100% GRAVEL	3		GRAVEL, NO MATRIX COLOR, GRAVEL COLOR is very light grey (N7), subangul - angular, max size = 3cm,
	4.0 -6.0	(1) 0.5				GC →	60% GRAVEL ← 30% SAND 10% CLAY	4, 5		SANDY GRAVEL, light brown (5 YR 5/6) ~~sub~~angular - subrounded, mod-well graded, max size = 7.5, Some clay Sand is FG - CG, Some Clay
	6.0 -8.0	(1) 2.9				GC →	50% GRAVEL ← 40% SAND 10% CLAY; 40% SAND ← 25% GRAVEL 15% CLAY	6, 7		TOP 6IN: CALCAREOUS SANDY GRAVEL, very pale orange (10 YR 8/2), angular - sub angular, mod grading, max size = 3 cm, Some clay Bottom of interval CLAYEY GRAVELLY SAND, dark yellowish orange (10 YR 6/6), mod grading, max size = 4 cm, Some calcite, matrix is non-calc.
	8.0 -10.0	(1) 2.9				GC	50% SAND ← 35% GRAVEL 10% CLAY	8, 9		SAME AS ABOVE: increased amount of gravel, some carb material — bottom of interval (Erasure NAJ)

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ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. EU 3388

GEOLOGIST(S): DAY
DATE: 8/16/89

PROJECT NO: 667-11.22

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 1 of 2 ↑ 11.5	10.0 -11.5	∅						11		NO SAMPLE - SPLIT SPOON
Box 2 of 2	11.5 -13.5	(1) 2.8				55% SAND 30% GRAVEL 15% CLAY	~~GC~~ SC	12, 13		CLAYEY GRAVELLY SAND, dark yellowish orange (10 YR 6/6), mod grading, max size = 5 cm, angular-sub angular, sand is FG-CG
	13.5 -15.0	(1) 2.8	DAT #9			65% SAND 20% GRAVEL 15% CLAY 80% SAND 20% GRAVEL	~~GC~~ SC	14, 15		Same as above TOP 1FT: Sand is VFG-FG in top 3 in ∅ Bottom 1.8 FT: CLAYEY SAND, moderate yellowish brown (10 YR 4/2), subangular-subrounded, mod. poorly graded, some non staining as mottles, trace of carb. material, trace of gravel. Sand is VFG-FG
	15.0 -16.8	(1) ~~2.7~~ 1.7					SC	16		CLAYEY GRAVELLY SAND, moderate dark yellowish orange (10 YR 6/6), angular-subangular, mod grading, max gravel size = 4 cm, sand size is FG-CG,
	16.8-17.0	∅						17		NO SAMPLE
	17.0 -19.5	∅						18, 19		NO SAMPLE - SHELBY
END OF BOXES										

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Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. EU 3488

GEOLOGIST(S): Lay
DATE: 8/16/88

PROJECT NO: 667-11.22

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
0.0	0.0 -1.2	(1) 0.6					GC	1		SANDY GRAVEL, dark yellowish brown (10 YR 2/2 subangular - subrounded, mod. well graded, max size = 6 cm, some clay
	1.2-2.0	Ø						2		NO SAMPLE
	2.0 -4.0	(1) 1.4					SC	3		Gravelly Clayey Sand, light brown (5 YR 5/6), Sub angular - Sub rounded, mod. poorly graded, max size of gravel = 3cm. Top 3 mod interval is dark reddish brown (10 R 3/4), bottom 1 ft is dark yellowish orange (10 YR 6/6).
	4.0 -5.0	(2) 1.9						4 5		Same as above some calcareous material
Box 1 of 2	5.0 -6.5	Ø						6		NO SAMPLE
	6.5 -8.5	(1) 2.7					SC	7 8		CLAYEY SAND, moderate yellowish brown (10 YR 5/4), subangular - subrounded, Sand is VFG - FG, poorly graded, some calc. material in fractures, trace of carb material, ~~trace~~ of iron staining as mottles, well consolidated
	8.5 -11.0							9		NO SAMPLE - SHELBY

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(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. EU 3488

GEOLOGIST(S): [illegible]
DATE: 8/16/89

PROJECT NO: 667-11.22

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 1 of 2	8.5 -11.0							11		No Sample - Shelby
↑ 12.5	11.0 -12.5							12		No Sample - Split Spoon
12.5	12.5 -15.0	(1) 1.7					CL GC	13 14		30 YR FT: Sandy Clay, yellowish grey (5 Y 8/1), est. mod. plast, some gravel, trace light ~~greyish green~~ greenish grey staining (5 G 8/1) mottles, trace iron staining, trace gravel. Bottom 1 FT: Clayey Sandy Gravel, matrix is greyish orange (10 YR 7/4), angular-subrounded, max size = 5cm, some light greenish grey (5 G 8/1) staining, trace of carb material
Box 2 of 2	15.0 -16.5	~~NO~~ Ø						15 16		No Sample - Split Spoon
	16.5 -18.5	(1) 1.5					GC CL	17 18		Same as above: increased clay fraction
	18.5 -19.7	(1) 3.2					CL GC	19		Top 1.5 ft. Same as above, less clay fraction, trace of micaceous minerals. Bottom 1.5 ft. Gravelly clay, greyish orange (10 YR 7/4), mod plast., trace of carb material, some iron staining as mottles
	19.7-21.2	Ø								No Sample - Split Spoon

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Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. EU 3488

GEOLOGIST(S): dly
DATE: 8/16/89

PROJECT NO: 667-11.22

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 2 of 2								21		No Sample - SS
End of Boxes								22		
								23		
								24		
								25		
								26		
								27		
								28		
								29		

NOTES: General USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. EU35-88

GEOLOGIST(S): TSD
DATE: 7/21/89

PROJECT NO:

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
0.0 ↓	0.0 TO 1.2	(1) 0.6				>80% gravel	GC	1		Clayey gravel - medium dk gray (N4) (predominantly), angular to subrounded, poorly graded some sand, trace of silt.
	1.2 TO 2.0	0					–	2		NO SAMPLE
	2.0 TO 5.0	(1)(2) 3.8					GW/GP CL	3 4		Sandy gravel - predominantly pinkish gray (5YR 8/1), angular to subangular moderately graded, some clay (moderate reddish brown (10 R 4/6)). At approximately 1.5 ft from the top of the interval it grades into a V.C.G. to fine sandy clay dark yellowish orange (10 YR 6/6) to a dark yellowish brown (10 YR 4/2), high plasticity, some fine gravel.
Box 1 of 1	5.0 TO 6.5	(1) 1.85					SW	5 6		Clayey F.G. to V.C.G. sand, grayish orange (10 YR 7/4) subangular to subrounded, moderatelly well graded some gravel & calcareous mineralization.
	6.5 TO 8.5	0					SW	7 8		Same as above w/ a decreased amount of calcareous mineralization
↑ 9.7	8.5 TO 9.7	(2) 1.05					SC/GC	9		Calcareous clayey sand & gravel, white (N9) to yellowish gray (5Y 8/1).
9.7	9.7-10.1	0.85					CL			See Next page.

NOTES: General USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ft background = 0-100cpm
ft Log 1 = 50-175cpm
Box 2 = 50-200cpm
Box 3 = 50-150cpm

This log has been re-copied to include correct grafic lithologic log. CKF

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. EU 35-88

GEOLOGIST(S): TSD
DATE: 7/21/89

PROJECT NO: 6617-1127

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
	10.1 to 11.5	0						11		Sandy clay yellowish gray (5Y 8/1) high plasticity, some gravel + calcareous mineralization. No Sample
	11.5 to 13.5	(1) 3.0				75% CG	SC	12, 13		Clayey sand yellowish gray (5Y 8/1) subangular to subrounded moderately sorted, some gravel + silt + calcareous material.
Box 2 of 3	13.5 to 15.0	(2) 2.0				75% c. Sand	SW	14		Fine to very coarse sand dark yellowish orange (10YR 6/6) + very light gray (N8), subangular to subrounded, well graded, some gravel + clay.
Box 2 of 3 ↑ 18.5	15.0 to 18.5	(2) 2.5					CL, GP, ~	15, 16, 17, 18		Top of interval is a silty clay dark yellowish orange (10YR 6/6) + very light gray (N8), high plasticity, there's a vertical tube in the center of the clay that consists of sand + gravel. This grades into a sandy gravel - predominantly light gray (N7) angular to subrounded, poorly graded, some clay. Sand + clay fraction have the same colors as above. At approximately 17.5 ft this changes to a claystone very light gray (N8) to dark yellowish orange (10YR 6/6) well weathered, slightly friable, some carbonized material.
18.5 ↓ Box 3 of 3	18.5 to 20.0	(2) 1.4						19		Claystone light olive gray (5Y 6/1) that grades into a yellowish gray (5Y 8/1) + dark yellowish orange (10YR 6/6).

NOTES: General USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. EW 35-88

DATES DRILLED:
ELEVATION:
GEOLOGIST(S): TJO
DATE:
CHECKED BY: DATE: 7/21/88

PROJECT NO. 667-11.22

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF CORE IN FEET	SAMPLE NUMBER	FEET OF CORE RECOVERED	USCS SYMBOL	FRACTURES PER FOOT / FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
20.0 to 21.5	20.0 TO 21.5		0.3 (1)					21		Shaley, highly weathered moderately-highly friable some carbonaceous material & iron oxide staining. moist.
								22		Siltstone yellowish gray (5Y 8/1) & dark yellowish orange (10 YR 6/6) highly weathered, moderately friable, some fine grained sand

NOTES: General: The USCS is modified for this log as follows: Material amounts are estimated by percent volume instead of percent weight.
(1) Badly broken core, accurate footage measurement not possible.
(2) Core wreaths cannot be matched, accurate footage measurement not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. EU 35-88

DATES DRILLED:
ELEVATION:
GEOLOGIST(S): TSD
DATE.
CHECKED BY:
DATE. 7/21/88

USCS SYMBOL

PROJECT NO. 667-11.22

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF CORE IN RUN (INTERVAL)	SAMPLE NUMBER	FEET OF CORE IN BOX (INTERVAL)	FEET OF CORE IN RUN	FRACTURES PER FOOT / FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
0.0 ↓	0.0 TO 1.2		(1) 0.6	GC			>50% gravel	1		Clayey gravel-medium dark gray (N4) (predominantly), angular to subrounded, poorly graded some sand, trace of silt
	1.2 TO 2.0		0					2		No Sample
Box 1 of —	2.0 TO 5.0		(1)(2) 3.8	GW/GP CL			>50% gravel	3, 4, 5		Sandy gravel-predominantly pinkish gray (5YR 8/1), angular to subangular, moderately graded, some clay (moderate reddish brown (10 R 4/6)). At approx 1.5 ft from the top of the interval it grades into a v. coarse to fine sandy clay dark yellowish orange (10YR 6/6) to a dark yellowish brown (10YR 4/2), high plasticity, some fine gravel
	5.0 TO 6.5		(1) 1.85	SW			>50% VCG	6		Clayey fine to v. coarse grained sand, grayish orange (10YR 7/4), subangular to subrounded, moderately well graded, some gravel + calcarious mineralization.
	6.5 TO 8.6		0	SW				7, 8		Same as above w/ a decreased amount of calcareous mineralization.
↑ 9.7	8.5 TO 9.7		(2) 1.05	SC/GC			>50% MGS	9		Calcarious clayey sand + gravel white (N9) to yellowish gray (5Y 8/1)
9.7	9.7 TO 10.1		0.85	(2) CL						See next page.

NOTES: General: The USCS is modified for this log as follows: Material amounts are estimated by percent volume instead of percent weight.
(1) Badly broken core, accurate footage measurement not possible.
(2) Core breaks cannot be matched, accurate footage measurement not possible.

ROCKY FLATS PLANT

FIGURE NO.

Bγ Background = 0 - 100cpm
Bγ Box 1 = 50-175cpm
Box 2 = 50 - 200cpm

LOG OF BORING NO. EU 35-88

DATES DRILLED:
ELEVATION:
GEOLOGIST(S): TSO
DATE:
CHECKED BY:
DATE: 7/21/89
PROJECT NO. 667-11.22

USCS symbol

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF CORE IN FEET (INTERVAL)	SAMPLE NUMBER	FEET OF CORE IN BOX	FEET OF CORE IN RUN	FRACTURES PER FOOT / FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
	10.1 TO 11.5		0					11		Sandy clay yellowish gray (5Y 8/1), high plasticity, some gravel & calcarious mineralization. NO Sample
	11.5 TO 13.5		3.0 (1)	SC			750% CG	12, 13		Clayey sand yellowish gray (5Y 8/1) subangular to subrounded, moderately sorted, some gravel & silt, & calcarious material.
	13.5 TO 15.0		2.0 (2)	SW ~~SP~~ TBD			750% c. sand	14		fine to v coarse sand dark yellowish orange (10YR 6/6) & very light gray (N8), subangular to subrounded, well graded, some Gravel & clay.
BOX 2 of 3 ↑ 18.5	15.0 TO 18.5		2.5 (2)	CL GP ~				15, 16, 17, 18		TOP of interval is a silty clay dark yellowish ~~clay~~ orange (10YR 6/6) & very light gray (N8), high plasticity, there's a vertical tube in the center of the clay that consists of sand & gravel. This grades into a sandy gravel - predominantly light gray (N7), angular to subrounded, poorly graded, some clay. ~~sand & gravel~~ TBD & clay fraction have the same colors as above. At approximately 17.5 ft this changes to a claystone very light gray (N8) to dark yellowish orange (10YR 6/6) well weathered, slightly friable, some carbonized material.
18.5 ↓ BOX 3 of 3	18.5 TO 20.0		1.4 (2)					19		claystone light olive gray (5Y 6/1) that grades into a yellowish gray (5Y 8/1) & dark yellowish orange (10YR 6/

NOTES: General: The USCS is modified for this log as follows: Material amounts are estimated by percent volume instead of percent weight.
(1) Badly broken core, accurate footage measurement not possible.
(2) Core breaks cannot be matched, accurate footage measurement not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 01-89A/BH01 PAGE 1 OF 6

GEOLOGIST(S): DCB
DATE: 9/26/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
0.0 ↓	0.0 to 0.9'	(1) .75				~65% gravel ~20% clay ~15% sand	GC			Gravel, dominantly light gray (N7), matrix is mod. brown (5 YR 3/4), angular to subangular, moderately graded, max size ~6.5 cm, some clay and sand, plant debris present
	0.9' to 1.6	0				fg-cg		1	X	~~[illegible]~~ DCB No Sample
	1.6 to 2.5	.9				~30% gravel ~40% fg-cg sand ~30% clay + silt	CL ~~GC~~ ~~[illegible]~~ DCB	2		Clayey Sand and Gravel, dark reddish brown (10 R 3/4), sand and gravel are angular to subangular, poorly graded sand is mg to cg, ~~gravel~~ DCB max. gravel size is ~1.5 cm, trace of silt.
	2.5 to 3.6	1.3						3		
	3.6 to 5.0	(2) 1.1				~65% gravel ~20% sand fg-cg ~15% clay + silt	GC	5		Sandy Gravel, dominantly light gray (N7), matrix is light brown (5 YR 6/4), angular to subangular, poorly to moderately graded, max size ~5 cm, some clay and silt, sand is fg-cg.
	5.0 to 5.6	0							X	No Sample
	5.6 to 6.3	(1) .6				~65% gravel ~20% sand fg-cg ~15% clay + silt	GC	6		Sandy Gravel as above (reference interval 3.1 to 5.0 ft.) with increase in sand component from ~6.4 to 6.6'
	6.3 to 6.8	(2) .7								
	6.8 to 7.6	0						7	X	No Sample
Box 1	7.6 to 9.1	(1) 1.0				~65% gravel ~20% sand fg-cg ~15% clay + silt	GC	8		Sandy Gravel as above (reference interval ~~[illegible]~~ DCB (3.1 to 5.0 ft).
	9.1 to 10.1	(1) 1.7				~45% gravel ~30% fg-cg sand ~25% silt + clay	GC	9		Sandy Gravel, dominantly dark gray (N4) matrix is light brown (5 YR 5/6), poorly graded, subangular, max size ~2.5 cm, some silt and clay, sand is fg-cg.

NOTES General: USCS is modified for this log as follows:)
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 01-89A/BH01 PAGE 2 OF 6

GEOLOGIST(S): DCB
DATE: 9/26/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
10.1	10.1 to 11.7	(1) 1.8				~45% gravel ~30% fg-mg sand ~25% silt-clay	GC	11		Sandy Gravel as above (reference ~~[illegible]~~ DCB increase in max size to ~5cm. below 10.1 ft.
	11.7 to 12.1	0						12	X	No Sample
	12.1 to 13.8	(1) 1.9				~55% Gravel ~25% fg-mg sand ~20% silt-clay	GC	13		Sandy Gravel as above (reference interval 9.1 to 11.7) with local increases in gravel fraction, max. size ~6cm
	13.8 to 14.1	0						14	X	No Sample
	14.1 to 15.3	(1) 1.1				~55% Gravel ~25% fg-mg sand ~20% silt-clay	GC	15		Sandy Gravel as above (reference interval 9.1 to 11.7) with increase in Gravel fraction, max. size ~~[illegible]~~ DCB ~~[illegible]~~ 6cm
	15.3 to 16.1	0						16	X	No Sample
	16.1 to 16.8	(1) .6				~60% gravel ~25% fg-mg sand ~15% silt-clay	GC	17		Sandy Gravel as above (reference interval 9.1 to 11.7) with increase in gravel fraction, max size ~5cm
	16.8 to 17.3	(1) .3								
	17.3 to 18.1	0						18	X	No Sample
	18.1 to 19.0	(1) .9				~70% Gravel ~15% sand fg-cg ~10% clay ~5% silt	GC	19		Gravel, light gray (N7), angular, poorly graded, max size ~6cm. some sand + clay, trace of silt, sand is fg to cg.
	19.0 to 20.0	(1) 1.7								

Firmness of DCB corrected interval [illegible]

Box 2 of 5

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
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ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 01-89A/DH01 PAGE 3 OF 6

GEOLOGIST(S): DCB
DATE: 9/26/89

PROJECT NO: 667-165

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
										No Sample
20.1	20.1 to 22.0	(1) 1.7				~50% Gravel ~30% f-c sand ~20% clay-silt	GC	21 22		Sandy Gravel, dominantly light gray (N7) matrix is light brown (5YR 6/4), angular, poorly graded, max. size ~5.5 cm. some clay-silt.
										No Sample
Run 5	22.1 to 23.1	(1) 1.8				~50% Gravel ~30% f-c sand ~20% silt	GC	23		Sandy Gravel as above (reference interval 20.1 to 22.0 ft)
	23.1 to 24.1	(1) .9				~85% gravel ~10% f-c sand ~5% silt	GC	24		Gravel, light gray (N7), angular, poorly graded, max. size ~6.5 cm., some sand, trace of clay and silt.
Run 6	24.1 to 24.8	(1) .7					GC			Sandy Gravel, dominantly med. gray (N5) matrix is light brown (5YR 5/6), angular to subangular, poorly graded, max size ~6 cm., some clay and silt.
	24.8 to 25.9	(1) 1.0				60% gravel ~25% ~25% f-c sand ~15% clay-silt		25		Gravel fraction increases in both amount and size locally.
		0						26		No Sample
	26.1 to 26.8	(2) .6				~50% ~40% gravel				Sandy Gravel as above (reference interval 24.1 ft to 25.9 ft).
	26.8 to 27.1	.9 (1)				~35% ~25% f-c sand ~15% clay-silt	GG	27		
28.1	27.1 to 28.1	.85						28		
28.1 Run 7	28.1 to 29.0	0						29		No Sample
	29.0 to 29.6		(1) .7			See interval 20.1-22.0	GC			Sandy Gravel as above (reference interval 24.1 to 25.9 ft).
	29.6 to 31.5	0								No Sample

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 01-89A/BH01

GEOLOGIST(S): DCB
DATE: 9/26/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
	29.6 to 31.5	0			Erasures 9/26/89 DCB corrected lithometry			31		No Sample
	31.5 to 32.5	(1) 1.0			~65% Gravel ~25% Sand fg-cg ~10% clay + silt		GC	32		Sandy Gravel, dominantly light gray (N7), matrix is dominantly light brown (5 YR 6/4), angular, poorly graded, max. size ~7 cm, some clay and silt. Sand is fg to cg, gravel fraction varies locally
	32.5 to 33.0	(1) .5						33		
	33.0 to 41.0	0						34, 35, 36, 37, 38, 39		No Sample

NOTES General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 01-89A/BH01

GEOLOGIST(S): PCB
DATE: 9/26/89

PROJECT NO: 667-165

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
	33.0 to 41.0	0						41	X	No Sample
	41.0 to 42.0	(1) 1.2				see interval 31.5-33.0	GC			Sandy Gravel as above (reference interval 31.5 to 33.0 ft.)
	42.0 to 43.0	(1) 1.4				~95% fg-mg sand ~5% silt clay	SP	42		Sandy light brown (5 YR 5/6), subangular poorly graded, fg to mg, trace of silt and clay.
	43.0 to 44.0	(1) 1.6				>50% clay	CL	43		Interval grades to Clay mottled mod. yellowish brown (10 YR 5/4) and light olive gray (5 Y 6/1), mod. high plasticity, trace of sand and gravel
	44.0 to 45.0	(1) .85				~55% Gravel ~30% fine sand ~15% clay	GC	44		Interval grades to Sandy Gravel, dominantly light gray (N7), matrix is light brown (5 YR 5/6), subangular to subrounded, poorly to moderately graded, max. size ~3.5 cm, some clay. ~~Gravel fraction increases in both size and percent~~
	45.0 to 46.0	(1) .95						45		
46.0	46.0 to 47.0	(2) .95'						46		
	47.0 to 48.0	(1) .85'						47		
	48.0 to 49.0	(1) 1.1'				~60% fg-veg sand ~25% clay ~15% gravel	SC	48		Clayey Sand, light brown (5 YR 5/6), angular to subangular moderately well graded, fg to veg, some clay and gravel.
	49.0 to 50.8	(1) 1.6'						49		

NOTES General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 01-89A/BH01 PAGE 6 OF 6

GEOLOGIST(S): DCB
DATE: 9/26/89

PROJECT NO: 667-11-5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 5 of 5	49.0 to 50.8	(1) 1.6				>50% Clay	CL			Below 50' interval grades to clay, light olive gray (5Y6/1) to med. light gray (N6), moderately high plasticity, trace of gravel. Probably reworked weathered claystone.
	50.8 to 52.0	0						51	X	No Sample
	52.0 to 53.0	(1) 1.6'				>50% Clay		52		Clay as above (reference interval 50.0 to 50.8 ft.). TOP OF ROCK - Claystone, med. light gray (N6), bedding not apparent, highly weathered, slightly friable
↑ 54.0	53.0 to 54.0	0						53	X	No Sample
								54		Bottom of Box 5 of 5 at 54.0 ft.
								55		

NOTES General. USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. SEP 06-89 PAGE 1 OF 2

GEOLOGIST(S): DCB
DATE: 9/26/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
0.0 ↓	0.0 to 1.0	(1) .9				~70% Gravel ~25% clay ~5% [illegible]	GC	1		Gravel, med. light gray (N7), subangular to subrounded, moderately graded, max. size ~7.5 cm, some clay, trace of sand.
	1.0 to 2.3	0						2	X	No Sample
	2.3 to 4.5	(1) 2.0				>50% clay ~75% gravel ~10% sand 15% caliche	GC	3, 4		Clay, moderate brown (5YR 4/4), mod. plasticity, trace sand and gravel. Interval grades to caliche, white N9, and gravel with caliche rind, subangular to subrounded, poorly graded, max size ~5 cm, some sand to sandy.
	4.5 to 5.5	(1) 1.3						5		
	5.5 to 6.5	0						6	X	No Sample
	6.5 to 7.4	(1) .8				~40% sand ~20% gravel ~20% clay	SC	7		Clayey Sand, moderate yellowish brown (10YR 5/4), angular to subrounded, poorly graded, fg-mg, some clay, gravel and caliche
	7.4 to 8.5	0				~20% caliche		8	X	? No Sample
	8.5 to 10.5	2.2'				>50% clay		9		TOP OF ROCK Claystone, mottled grayish orange (10YR 7/4) to light gray (N7), bedding not apparent, slightly friable, locally iron stained, caliche occurs

Box 1 of 1

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. SEP 06-89

GEOLOGIST(S): DCB
DATE: 9/26/89

PROJECT NO: 667-11-5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 1 of 1 10.5	8.5-6 10.5	2.2'				250' Clay			--- +1-1- ---	(cont'd from previous page) irregularly shaped bodies
										Bottom of Box 1 of 1 at 10-5 ft.

NOTES. General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. SEP 07-89 BR PAGE 1 OF

GEOLOGIST(S): DCB
DATE: 9/27/89

PROJECT NO: 667-11-5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
0.0	0.0 to 2.1	(1) 1.6				~75% Gravel ~20% Clay ~5% fg sand	GC	1, 2		Gravel, dominantly light gray (N7), poor to moderate sorting, subangular, max size ~ 6.5 cm., some clay, trace of fg sand. Below ~ 1.6 ft. clay is replaced with caliche and gravel has caliche rind.
	2.2 to 3.4	(1) 1.2				~65% gravel ~35% sand + caliche	GC	3		Gravel, dominantly light gray (N7) poorly graded angular to subrounded, max. size ~6 cm., matrix is caliche, sand fg to cg sand to sandy, caliche rind on gravel.
	3.4 to 4.2	0						4	X	No Sample
M	4.2 to 6.2	(1) 1.6				~55% gravel ~45% fg-cg sand	GP	5, 6		Sandy Gravel, dominantly light gray (N7), poorly graded, subangular to subrounded, max. size ~6 cm., caliche occurs in sand matrix and as a rind on the gravel, sand is fg to cg
1	6.2 to 8.2	(1) 2.1				>50% Clay		6, 7, 8		TOP OF ROCK Claystone, light gray (N7) to light olive gray (5Y 6/1), bedding not apparent, highly weathered, slightly friable, local iron staining, caliche occurs as fracture fillings.
X	8.2 to 10.2	(2) 1.9						9		
2										
3										

NOTES. General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. SEP 07-89 DR PAGE 2 OF

GEOLOGIST(S): DCB
DATE: 7/27/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
[illegible] 10.2	8.2 to 10.2	1.9(2)				>50% clay				Claystone as above caliche component decreases below 10 ft. and localized iron staining increases in frequency.
10.2 ↓	10.2 to 12.2	(1) 1.9						11, 12		
	12.2 to 14.2	(1) 1.9						13, 14		
Box 2 of 3	14.2 to 16.2	(1) 1.9						15, 16		
	16.2 to 18.2	(1) 1.9						17, 18		
	18.2 to 20.2	(2) 1.9						19		claystone as above, heavily iron stained from ~18.2 to ~18.3' with poorly developed iron rich nodules, and some ~~[illegible]~~ calcitic mineralization.

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
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(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. SEP 07-89 OR PAGE 3 OF

GEOLOGIST(S): DCB
DATE: 9/27/89

PROJECT NO: 667-115

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
20.2 ↑	18.2	1.5 (2)				>50% clay				claystone as above, color grades to med. light gray (N6), trace of carb. material is evident in interval from 20.2 to 22.2
	20.2 to 22.2	1.8						21		
								22		Trace of silt below ~22 ft.
	22.2 to 24.2	(1) 1.2						23		
								24		Interval grades to well weathered below ~24.4 ft and exhibits iron stained fractures.
	24.2 to 26.2	(1) 1.8						25		
								26		Bottom of Box 3 of 3 at 26.2 ft.
								27		

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. SP 08-89

GEOLOGIST(S): WGY
DATE: 9/27/89

PROJECT NO: 667-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
00 ↓	00	1.75				10% SAND 5/6 CLAY		1		TOP 0.2 FT OF INTERVAL CLAY, dusky yellowish brown (10 YR 2/2), sat. mod plast, ~~TOP 0.2 FT~~ Sand, trace gravel. Base of interval CLAYEY SAND, dark yellowish orange (10 YR 6/6) grading to yellowish brown (5 YR 5/6), massive bedding, highly weathered, mod thinly bedded, sand is FG, mod-well sorted, abundant Fe at top
	1.6									
	2.1	0						2		NO SAMPLE
	3.7	0.85						3		SANDY CLAY, grayish orange (10 YR 7/4), mod plast, sand is VFG-FG, some silt. Core is broken-up — possibly SLIFF
	4.2	0						4		NO SAMPLE
	6.0	1.85				5% 60% CLAY 25% SAND 20% GRAVEL		5		TOP 0.5 FT - Same as above. Base of Interval GRAVELLY, SANDY CLAY (10 YR 6/6) dark yellowish orange, mod plast, sand is VFG-MG, max gravel size = 5.5 cm
	6.2	0						6		NO SAMPLE
	8.7	2.2						7 8		Same as above: decreased gravel fraction - SANDY CLAY, highly sand at 6.8 ft - med, VCG-FG sand w/ abunc. micaceous material
	9.0	1.3						9		CLAY, grayish orange (10 YR 7/4), sat. mod plast, some sand, some iron staining as mottles
		0								NO SAMPLE

NOTES. General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. SP 08-89

GEOLOGIST(S): [illegible]
DATE: 9/27/89

PROJECT NO: 667-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
	10.2	Ø								NO SAMPLE
	10.6	0.4								CLAYEY GRAVEL, matrix colors dark yellowish brown (10 YR 4/2), Subangular Subrounded, mod-poorly graded, max size 6cm, some silt, trace sand
↑ 12.2	12.2	0						11 / 12		NO SAMPLE (possibly well weathered CLAYSTONE)
Box 2 of 2	12.2 / 13.9	1.7						13		CLAY, dark yellowish orange (10 YR 6/6) est mod-high plast. Some calc material at base, some sand - FG-MG
	14.2	0						14		NO SAMPLE
	15.7	1.0						15		TOP OF ROCK: CLAYSTONE, grayish orange (10 YR 7/4), no apparent bedding, highly weathered, mod friable, broken texture, some VFG sand, some iron staining as mottles, trace of Mg staining
	16.2	Ø						16		NO SAMPLE
	17.9	1.6				60% CLAY 25% SAND 15% SILT		17		SANDY CLAYSTONE, yellowish gray (5 Y 8/1), non-apparent bedding, well weathered, mod friable, sand is VFG-FG, trace of carb material, some silt
	18.2	Ø						18		NO SAMPLE
	20.2	1.3						19		SILTY CLAYSTONE, yellowish gray (5 Y 8/1) non-apparent bedding, well weathered mod friable, trace of sand, trace of iron staining as mottles, trace of carb

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Material amounts are estimated by % volume instead of % weight.
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(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. SP08 89

GEOLOGIST(S): Day
DATE: 9/27/89

PROJECT NO: 667-1150

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 2 of 2	20.2									See previous page
	21.6	1.8						21		SILTY CLAYSTONE, pale yellowish brown (10 YR 6/2) non-apparent bedding, highly weathered, mod-poorly-friable, some iron staining in possible micro-fractures. Some carb. material
↑ EL.2	22.2	∅						22	X	NO SAMPLE
END OF BOXES								23		
								24		
								25		
								26		
								27		
								28		
								29		

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. SEP 04-89 BR PAGE 1 OF 4

GEOLOGIST(S): DCB
DATE: 9/27/89

PROJECT NO: 667-11-5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
0.0 ↓	0.0 to 2.2	DCB ~~1.85~~ 2.3'				>30% clay ~80 to 90% clay ~20% to 10% fg sand	CL	1, 2		Silty Clay dark yellowish brown (10 YR 4/2), low plasticity, trace of gravel, plant roots and debris. Clay, mottled light gray (N7) to grayish orange (10 YR 7/4), mod. high plasticity, some sand to sandy, locally fg. calcareous. Possibly highly weathered claystone
	2.2 to 4.5	(2) 1.9						3, 4		
Box 1 of 4	4.5 to 6.5	(1) 1.8				~65% clay ~30% gravel ~5% silt + fg sand		5, 6		~~Clayey~~ Gravelly Clay, light brown (5 YR 5/6) and light gray (N7), mod. high plasticity, trace of silt and fg sand, gravel is subangular to subrounded, max. size ~6 cm.
	6.5 to 8.5	(2) 2.3						7, 8		Possibly reworked claystone or fill.
↑ 9.1	8.5 to 9.1	.6						9		
9.1 ↓ Box 2 of 4	9.1 to 10.5	(2) 1.6								

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. SEP 09-89BR PAGE 2 OF 4

GEOLOGIST(S): DCB
DATE: 9/27/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
	9.1 to 10.5	(2) 1.6				~75% clay				Gravelly Clay as above gravel fraction decreases.
	10.5 to 12.5	(1) 1.8				~20% gravel ~5% silt ~5% sand; Clay ~80% sand		11, 12		Silty Clay, grayish black (N2), low plasticity, trace of fg sand, some decomposed root fragments. Possibly top of original grade.
X	12.5 to 14.5	(2) 1.9				~15% sand/clay fraction varies locally		13, 14		Clay dark yellowish orange (10 YR 6/6), moderate plasticity, some sand to sandy (sand fraction is med. grained and rounded to well rounded) sand fraction decreases with depth, some irregular caliche bodies, clay is calcareous to ~13.5 ft. Possibly highly weathered claystone.
Bot 2 of 4	14.5 to 16.5	1.9				~90% clay ~10% fg sand		15, 16		TOP OF ROCK Claystone, light olive gray (5Y 6/1) to med. light gray (N6), OCB bedding not apparent, highly weathered, moderately friable, some fg sand trace of caliche as irregular bodies (< 2mm in diam.) iron staining locally and on fractures.
	16.5 to 18.1	(2) 1.4						17, 18		
Bot 3 of 4	18.1 to 18.5	.4				>50% clay				Claystone, light olive gray (5Y 6/1), bedding not apparent, highly weathered, mod. friability, trace of carb. material, some silt, iron staining on fractures.
	18.5 to 20.5	2.0						19		

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Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. SEP 09-89 BR PAGE 3 OF 4

GEOLOGIST(S): DCB
DATE: 9/27/89

PROJECT NO: 667-11-5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
	18.5 to 20.5	2.0				>50% clay				claystone as above
	20.5 to 22.5	(1) 2.0						21		
								22		
	22.5 to 24.5	(2) 1.8		~35° ~90°				23		
								24		claystone as above, color grades to med light gray (N6), increase in amount of carb. material from ~24 ft. to ~26.0 ft. Interval from ~26.0 ft to 26.5 is heavily iron stained.
	24.5 to 26.5	(2) 2.0						25		
								26		
26.5	26.5 to 28.5	2.0						27		claystone, dark gray (N3), badly ~~fr~~ apparent, well weathered, moderately friable, some carb. material, iron stains on fractures.
								28		
	28.5 to 30.5	(1) 2.5						29		claystone as above, color grades to med light gray (N6) below ~28.0'

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(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. SEP 09-89BR PAGE 4 OF 4

GEOLOGIST(S): DCB
DATE: 9/27/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
4	28.5 to 30.5	(1) 2.5								Clystone as above
	30.5									
Box	to	(1) 2.0						31		
↑								32		
32.5	32.5									
								33		Bottom of Box 4/4 at 32.5 ft. DCB

NOTES General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. SEP 10-89 PAGE 1 OF 2

GEOLOGIST(S): [illegible]
DATE: 9/28/89

PROJECT NO: 667-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
0.0 ↓	0.0 -1.9	1.75						1		CLAY, light olive gray (5 Y 6/1), est mod-high plast, trace of gravel at top of interval, some roots, surficial grass
	1.9-3.9	1.9						2, 3		TOP OF ROCK: CLAYSTONE, light olive gray (5 Y 6/1), massive bedding, highly weathered, mod friable, some iron staining as mottles & as fracture filling
Box 1 of 2	3.9 -5.9	1.7				--		4, 5		SILTY CLAYSTONE, light olive gray (5 Y 6/1), more apparent bedding, highly weathered, mod-highly friable, some VFG sand esp in middle of interval
	5.9 -7.9	1.85						6, 7		CLAYSTONE, moderate olive brown (5 Y 4/4) massive bedding, mod-highly weathered, mod friable, some iron staining as mottles, trace of Mg staining, silt layer at ≈ 6.0 ft, trace of silt
↑ 9.9	7.9 -9.9	1.7						8, 9		SILTY CLAYSTONE, med light gray (N6) massive bedding, mod-highly weathered, mod friable, some iron staining as mottles
										Same as above, top of interval is ≈ has abundant silt & some sand w/ flavy texture

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. SEP 10-89

GEOLOGIST(S): DAY
DATE: 9/28/89

PROJECT NO: 667-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 2 of 2	9.9 -11.9							11		See previous page
	11.9 -13.9							12		Top 0 4 FT is same as above
								13		CLAYSTONE, olive black (5 Y 2/1), massive bedding, well weathered, mod-highly friable, top has flowing texture, some iron staining along possible fracture planes, some silt
	13.9 -15.6							14		Same as above: brownish gray (5 YR 4/1), some carb material, fracture at ≈ 14.2 is ≈ 70° & shows slickensides, some iron staining as mottles, trace silt
								15		
	15.6 -15.9									Same as above
	15.9 -17.9							16		Same as above: some silt, trace of white, bladed mineralization, (possibly gypsum)
								17		
↑ 19.0	17.9 -19.0							18		Same as above ~~but~~ some if possible mult-directional fracturing
								19		

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. SP 11-89

GEOLOGIST(S): LAJ
DATE: 9/28/89

PROJECT NO: 667-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
0.0	0.0 -1.5							1		CLAY, mod brown (5 YR 3/4), mod - high plast, trace of gravel, some roots, trace of sand
	1.5-2.2	0							X	NO SAMPLE
	2.2							2		Same as above. moderate yellowish brown (10 YR 5/4), some sand, some calc material
	3.7							3		
	4.3							4	X	NO SAMPLE
Box 1 of 2						30% SAND 70% CLAY		5		SANDY CLAY, moderate yellowish brown (10 YR 5/4), est mod plast, some gravel, some calc. material, sand w/ FG-MG, max gravel size = 4cm
	6.3							6		TOP OF ROCK: CLAYSTONE, light olive gray (5 Y 6/1), massive bedding, highly weathered, mod friable, abundant iron staining as mottles, abundant calc. material possibly concentrated in fractures (≈ 30-90°)
	8.3							7		
								8		Same as above some Mg staining
								9		
9.9	9.9									See next page

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. SP 11-89

GEOLOGIST(S): DLY
DATE: 9/28/89

PROJECT NO: 667-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 2 of 2	9.9-10.3									CLAYSTONE, light olive gray (5 YR 3/4), massive bedding, mod-highly weathered, mod friable, abundant some calc material, some iron staining as mottles calc is concentrated along possible fracture
								11		Same as above. at base - iron staining increases & some Mg staining, decreases to some calc material
	12.3							12		
								13		Same as above: trace of calc material at top of interval, more at base, decrease iron staining & Mg staining at base
	14.3							14		
				50°				15		Same as above fracture w/ possible Mg smeared at ~ 50°
16.3	16.3							16		
End of Boxes								17		
								18		
								19		

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 11-89/BH 12-89A PAGE 1 OF

GEOLOGIST(S): DCB
DATE: 9/27/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
0.0 ↓	0.0 to 1.8'	(1) 1.8'				>50% clay	CL	1		Clay, moderate brown (5 YR 3/4), moderately high plasticity, some silt, trace of v fg sand and plant debris and roots.
	1.8'									Internal grades to Silty Clay, moderate
	1.8-2.0'	0						2		No Sample (cont'd from 1.6' above)
	2.0' to 3.5'	(1) 1.8				>50% clay	CL	3		yellowish brown (10 YR 5/4), moderate plasticity, some of v fg sand and plant roots, slightly calcareous with localized bodies of caliche. Probably highly weathered Claystone
	3.5 to 5.4	0						4, 5		No Sample Silty
	5.4 to 6.0	(1) .9				>50% caliche	CL	6		Clay, yellowish brown (10 YR 5/4) mod. plasticity and Caliche.
	6.0 to 7.0	0						7		No Sample
	7.0 to 9.0	(1) 1.9				~65% fg-vfg sand ~35% clay		8		~TOP OF ROCK clay/sandstone ~~Claystone~~, pale yellowish brown (10 YR 6/2), bedding not apparent, highly weathered, slightly friable, local iron staining, sand is v fg to fg, moderately sorted and angular to subangular, slightly calcareous.
	9.0 to 11.0	(1) 1.9						9		

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 11-89/SH 12-89A PAGE 2 OF

GEOLOGIST(S): DCB
DATE: 9/27/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 1 of 2	9.0 to 11.0	(1) 1.9				~65% Sand ~35% Clay				clayey sandstone as above
11.0 ↓ Box 2 of 2	11.0 to 13.0	(1) 1.9						11, 12		
	13.0 to 14.0	(1) 1.1						13, 14		clayey sandstone as above, calcareous cement is absent below ~13.2', some gravel occurs below ~13.6'
								15, 16, 17, 18, 19		

NOTES General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. SEP 12-89 PAGE 1 OF 4

GEOLOGIST(S): DCB
DATE: 9/25/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
0.0 ↓	0.0 to 2.1	2.1				>50% clay	CL	1, 2		Clay, grayish brown (5 YR 3/2), moderately high plasticity, trace of silt, some root fragments and organic debris from 0.0' to 0.7'; interval is locally calcareous. ~~and exhibits caliche precip. [illegible]~~
	2.1 to 4.2	(2) 2.1				>50% clay	CL	3, 4		Clay, moderate yellowish brown, (10 YR 5/4), moderate plasticity, some gravel to gravelly, some silt, trace to some sand, interval is locally calcareous and exhibits poorly developed caliche precipitation in gravelly zones and along fractures.
Box 1 of 3	4.2 to 6.2	2.0				>50% clay ~20% sand	CL	5, 6		Silty Sandy Clay ~~[illegible]~~, pale yellowish brown (10 YR 6/2) to dark yellowish orange (10 YR 6/6), mottled, moderate plasticity, locally calcareous
	6.2 to 7.6	(1) 1.4						7		
	7.6 to 8.2	0						8	X	No Sample
	8.2 to 10.2	(1) 1.95				>50% clay ~20% sand	CL	9		Silty Sandy Clay as above (reference interval 4.0 to 7.6).

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. SEP 12-89 OR

GEOLOGIST(S): DCB
DATE: 9/25/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
	9.2 to 10.2	1.85								
	10.2 to 12.2	(2) 1.85				75% clay, 20% sand	CL	11		Silty Sandy Clay as above, interval begins to exhibit some characteristics of highly weathered rock as moderately well defined fracture planes, Mg and Fe oxide stains.
	12.2 to 14.2	(2) 1.75						12, 13		weathered slickensides at ~12.2 ft., attitude ~60° with Fe and Mg oxides on slick face.
M	14.2 to 15.8	(1) 1.8				~50% clay, ~50% gravel		14, 15		Silty Sandy Clay as above with some gravel to gravelly and some stringers in gravel zones, max gravel size ~5.5 cm.
	15.8 to 16.2	0						16		No Sample
	16.2 to 18.2	1.9				75% sand	CL	17		Silty Sandy Clay, mottled pale yellowish brown (10 YR 6/2) to dark yellowish orange (10 YR 6/6), moderately high plasticity. TOP OF WEATHERED ROCK ~ 16.7'
	18.2 to 20.2	1.8						18, 19		Claystone medium gray (N5), bedding not apparent, very slightly friable, trace of silt and iron stains, some Mg nodules. Color grades to grayish black (N2) from ~17.8 to 18.2. Slickensides at ~17.3' attitude ~30° At ~19.5' interval is heavily iron stained and to 20.2'

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Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO.

GEOLOGIST(S):
DATE:

PROJECT NO:

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 3 of 4 20.2	18.2 to 20.2	1.8'				>50% clay				cont'd. from previous page) exhibits iron nodules ~1cm to 2mm in diameter and exhibits calcite fracture fillings.
20.2 ↓	20.2 to 22.2	(2) 1.85						21		Claystone med. light gray (N6) massively bedded, slightly weathered slightly friable, local iron staining, some carb material, trace of silt
	22.2 to 24.2	1.9						22, 23		slickensides at ~22.0'; attitude ~30°
	24.2 to 26.2	(2) 1.9						24, 25, 26		
	26.2 to 29.2	0						27, 28, 29		No Sample
	29.2 to 31.2	(2) 1.8								Claystone as above (reference interval 20.2 to 26.2) Slickensides at ~30.0'; attitude ~30°

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ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. SEP 12-89 PAGE 4 OF 4

GEOLOGIST(S): DCB
DATE: 9/25/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 3 of 3	29.2 to 31.2	(2) 1.8				>50 clay		31		Claystone as above. Slickenside at ~31.1', attitude ~70°, abundant iron staining on face of slick
	31.2 to 33.2	(2) 1.8						32		
								33		
								34		Bottom of Box 3 of 3 at 33.2 ft.

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ROCKY FLATS PLANT

FIGURE NO.

DCB - 10/2/89

LOG OF BORING NO. SEP 13-89

PAGE 1 OF 1

GEOLOGIST(S): DCB
DATE: 9/27/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
0.0	0.0 to 0.2					~50% clay	CL		~5'C	silty Gravely, Clay, dusky brown (5YR 2/2), moderate plasticity, some plant debris
	0.2 to 1.6	0				~30% gravel ~20% silt		1	X	No Sample
	1.6 to 2.0					~50% gravel ~50% clay	CL	2		Gravel and Clay, gravel is very light gray (N8), poorly sorted, angular to subangular, max. size ~6 cm. Clay is pale yellowish brown (10YR 6/2), low to moderate plasticity, DCB trace fg sand
	2.0 to 3.6	0				~5% fg sand		3	X	No Sample
	3.6 to 4.4					>50% clay	CL	4		Clay, pale yellowish brown mod. high plasticity trace of silt.
	4.4 to 5.6	0						5	X	No Sample
	5.6 to 6.6					>50% clay	CL	6		Clay as above (reference interval 3.6 to 4.4 ft.)
	6.6 to 7.6	0						7	X	? No Sample
	7.6 to 9.6					>50% clay		8 9		TOP OF ROCK Claystone, light gray (N7), bedding not apparent, highly weathered, moderately friable, trace of silt and carb. material, localized iron staining.
										Bottom of Box 1 of 1 at 9.6 ft.

Box 1 of 1

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ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. LF 13-89 BR

PAGE 1 OF

GEOLOGIST(S): DCB
DATE: 10/25/89

PROJECT NO: 667-14 11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
0.0 ↓	0.0 to 1.5	1.2				>50% clay	CL	1		Silty Clay, dark yellowish brown (10 YR 4/2), mod. plasticity, some gravel, trace of [illegible].
	1.5 to 3.5	2.3						2		Gravel, light gray (N7), angular to subangular, poorly graded, max. size 3.5 cm., graded to some clay, trace of silt, locally calcareous.
4	3.5 to 4.5	0						4	X	No Sample
10 ft	4.5 to 5.5	1.1						5		Clayey Gravel, light gray (N7), matrix is dark yellowish brown (10 YR 4/2), subangular to subrounded, well graded, max. size ~ 6.5 cm., some sand and silt. locally calcareous
Bot	5.5 to 7.5	2.1						6, 7		TOP OF WEATHERED ROCK Claystone mottled dark yellowish orange (10 YR 6/6) and light gray (N7), bedding is thin (<2 mm) where apparent and exhibits deformation, highly weathered, mod. friable, trace to some carb. material and small bodies of calcite (<3 mm diam.) trace of silt and v fg sand.
↑ 9.5	7.5 to 9.5	2.4						8, 9		Color grades to med. light gray (N6) below ~ 7.5 ft. and silt content increases.
9.5 ↓	9.5 to 11.5	1.5								Claystone, olive gray (5Y 4/1), thin bedding (<2 mm) where apparent, well weathered,

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ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. LF 13-89 BVR PAGE 2 OF

GEOLOGIST(S): DCB
DATE: 10/25/89

PROJECT NO: 667-14.11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
	9.5 to 11.5	1.5				>50% clay		11		moderately friable, some silt to silty, some carb material and Mg and Fe oxides, locally ~~DCB~~ calcareous.
	11.5 to 13.5	2.3						12, 13		color grades to med. gray (N5) below ~11.7 ft. and carb material, Mg and Fe oxides diminish. Mg oxides ~~and~~ DCB ~~DCB~~ are absent below ~13.0 ft., vfg sand occurs locally and is disseminated in irregular "pockets". Sand fraction diminishes with depth and is absent below ~14.5 ft.
	13.5 to 15.5	2.2						14, 15		
	15.5 to 17.5	2.4						16, 17		
	17.5 to 19.5	2.9						18, 19		
	19.5 to 21.5	2.3								silt fraction increases at

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ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. LF 13-89 BR PAGE 3 OF

GEOLOGIST(S): DCB
DATE: 10/25/89

PROJECT NO: 667-1411

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF MATERIAL	FEET OF CORE IN MATERIAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Bot ↑	19.5 to 21.5	2.3				>50% clay		21		(cont'd from previous page) approximately 19.8 ft. and varies locally, iron staining occurs on fracture surfaces.
Bot ↑	21.5 to 23.5	2.2						22, 23		
↑ 29.5	23.5 to 24.5	1.0						24		
24.5 ↓	24.5 to 25.5							25		
Bot ↑	25.5 to 27.5							26, 27		
Bot ↑ 29.5	27.5 to 29.5							28, 29		S. Mstone, light gray (N7), poorly bedded, slightly friable, some clay, iron staining on fractures

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ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. LF 13-89 SR PAGE 1 OF 24

GEOLOGIST(S): DCB
DATE: 9/19/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
								26		Core Begins at 29.0 ft.
								27		
								28		
29.0 ↓ Box 1 of 2 ↓	29.0 to 32.1	(1) 3.0'				>50% clay		29		Claystone? (highly weathered), dark yellowish brown (10 YR 4/2), bedding not apparent, highly weathered, moderately friable, slight amount of iron staining locally
								30		
								31		silty claystone, light gray (N7), bedding not apparent, well weathered, slightly friable, on fresh surface color is med gray (N5).
								32		
	32.1	(1) 4.2						33		Claystone, dark yellowish brown (10 YR 4/2), bedding not apparent, highly weathered, moderately friable, iron staining and possible fracture surface at ~33.2
								34		silty claystone, med-dark gray (N4), bedding not apparent, weathered, slightly friable

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ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. LF 13-89 DR PAGE 2 OF 24

GEOLOGIST(S): DCB
DATE: 9/19/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
32.1	32.1 to 36.0	(1) 4.2'				>50% clay				Silty claystone as above
								36		
	36.0 to 37.1	(1) 1.0								
37.1								37		Silty claystone as above bedding is thin <2mm where apparent
37.0	37.0 to 38.5	(1) 1.7'			0°			38		
	38.5 to 39.0	0						39		
	39.0 to 43.0	(1) DCB 3.85						40, 41, 42		claystone dark gray (N3), thin bedded (<2mm) where apparent, weathered, moderately friable moderate silt component, slight amount of carb. material.
	43.0 to 44.4	(1) 1.4'						43, 44		
	44.4 to 46.3	(1) 2.45				50% clay 50% silt				claystone and siltstone interbedded, dark gray (N3) and light gray (N7)

Interval discrepancy of 0.1 ft between Boxes 1/24 + 2/24

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ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO: LF13-89 BA

GEOLOGIST(S): DCS
DATE: 9/19/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
4th Box ↑ 46.3	44.4 to 46.3	(1) 2.45				~50% s.H ~50% clay		46		(cont'd. from previous page) respectively, thin bedded (< 2 mm), soft sediment deformation apparent, slumping beds apparent, slightly weathered, slightly friable, some carb. material, iron staining on fractures and locally as irregular mottling, occasional bodies of coal (< 2mm).
46.3 ↓	46.3 TO 49.0	2.65'						47, 48		
	49.0 to 55.0	4.25'						49, 50, 51, 52		
	55.0 to 55.6	(2) 2.9'						53, 54		

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ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. LF13-89BR PAGE 4 OF 24

GEOLOGIST(S): DCB
DATE: 9/19/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
52.7 ↑ 55.6	52.0 to 55.6	(2) 2.9'				~50% clay ~50% silt				Siltstone and claystone interbedded as above.
55.6 ↓	55.6 to 57.1	(2) 1.7'				>50% clay		56 57		Silt fraction decreases below 56.5'
	57.1 to 61.0	(1) 4.6'						58 59 60		Interval grades to claystone at ~58.5. Claystone, olive gray (5Y 4/1), bedding not apparent, weathered, slightly friable.
	61.0 to 64.3	(1) 3.4						61 62 63 64		Interval grades to dark gray (N3). Iron nodules 1mm in diam. at 62.5 and color grades to olive gray (5Y 4/1) with slight silt fraction.
64.3 ↓ 65.0	64.3 to 65.0	(1) .8								

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(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. LF 13-89BR

GEOLOGIST(S): DCB
DATE: 9/20/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 5 of 24	65.0 to 69.0	(1) 4.7			0° where apparent	>50% Clay		66, 67		Claystone, olive gray (5 Y 4/1), poorly bedded, ~~slightly~~ weathered, moderately friable, moderate silt fraction that decreases with depth. Interval becomes carbonaceous from ~67.3 to ~67.6
								68		Silty Claystone, light gray (N7) to med. dark gray (N4), bedding not apparent, slightly weathered, slightly friable
	69.0 to 73.0	(1) 4.1		~15°		~55% clay ~10% silt ~35% sand		69, 70, 71, 72		Interbedded Silty Claystone and mg to vfg sandstone, ~~bedding~~ thin bedded (<5mm), weathered moderate to slightly friable, abundant carb. material in interval from ~70' to 70.4 ft. Interval grades to interbedded Silty Claystone and Siltstone. Silty Claystone and Siltstone, ~~[illegible]~~ med. dark gray (N4) to very light gray (N8) respectively, thin bedded (< 2mm), bedding exhibits soft sediment deformation, slightly friable, some carb material, slight to abundant vfg sand component.
Box 6 of 24	73.0 to 75.5	(1) 1.55'						73, 74		Claystone, dark gray (N3), bedding not apparent, weathered, moderately friable, moderate silt fraction, moderate carb. material.

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(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. LF 13-89 BR

GEOLOGIST(S): D CB
DATE: 9/20/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
	73.0 to 75.5	(1) 1.55				75% clay				Claystone as above
	75.5 to 76.0	0								No Sample
Box 6 of 24	76.0 to 80.0	(1) 2.2'				75% clay		76, 77, 78, 79, 80		Claystone olive gray (5 Y 4/1), bedding not apparent, weathered ~~[illegible]~~ friable, slight silt fraction increasing to moderate silt fraction with depth. Interval is carbonaceous from ~80 ft. to ~80.3
	80.0 to 81.2	(1) 2.9'						81		
Box 7 of 24	81.2 to 83.0	(2) 1.7'						82, 83		
	83.0 to 86.9	(1) 4.2'						84		

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(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. LF13-89

GEOLOGIST(S): DCB
DATE: 9/20/89

PROJECT NO: 667.11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	DCB LITHOLOGIC DESCRIPTION
Box 7 of 24	83.0 to 86.9	(1) 4.2				70% clay ~10% to 20% vfg sand + silt		86		Claystone, dark gray (N3), interfingering discontinuous beds of silty sandstone <3mm thick, very light gray (N8), slightly friable occasional carb. material and iron stains, sand is fg to vfg., claystone has moderate silt fraction
	86.9 to 90.9	(1) 4.0'						87, 88, 89, 90		
	90.9	0						91		No sample
Box 8 of 24	91.0 To 93.9	(2) 3.2'						92, 93		Claystone as above (reference interval 83.0 to 90.9)
	93.9	0						94		No sample
	94.0 to 97.8	3.9'								claystone as above (reference interval 83.0 to 90.9)

NOTES General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
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(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. LF 13-89 BR PAGE 8 OF 24

GEOLOGIST(S): DCB
DATE: 9/20/89

PROJECT NO: 662-115

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 8 of 24	94.0 to 97.8	(2) 3.9'			~10°	>50% clay; ~55% clay; ~45% sand and silt		96, 97		see previous page
	97.8 to 100.2	(2) 2.6						98, 99, 100		Claystone, med dark gray (N4), bedding not apparent, slightly friable, moderate silt fraction. Silty Claystone and silty sandstone interbedded, med. dark gray (N4) and light gray (N7) respectively, thin bedded (< 4mm) to irregular and distorted bedding (soft sediment deformation), slightly friable, moderate carb. material including occasional bodies of coal (< 2mm diam.), sand is mg to vfg subrounded, poorly sorted. Claystone and silty sandstone interbedded as above with both clay intraclasts and subrounded sandstone clasts, from ~99.5'
Box 9 of 24	100.2 to 102.0	(2) 1.8'						101		DCB Dominantly ~~[illegible]~~ Claystone from ~101.0' to ~101.8'
	102.0 to 105.5	(1) 3.5			~20°	~80% fg-vfg sand; ~20% clay + silt; ~60% silt; ~40% vfg sand		102, 103, 104		Sandstone interbedded with carbonaceous claystone, light gray (N7) to dark gray (N3) respectively, thin bedded (< 4mm), moderately friable, sand is fg to vfg, claystone laminae exhibit soft sediment deformation, moderate silt component in both sandstones. DCB ~~silty~~ sandy siltstone ~~[illegible]~~ with irregularly bedded vfg sandstone, medium gray (N5) and

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(2) Core breaks cannot be matched, accurate footage measurements not possible

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. LF 13-89 BR

GEOLOGIST(S): DCB
DATE: 9/20/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 9 of 24	102.0 to 105.5	3.5				~60% silt ~40% vfg sand				(cont'd from previous page), light gray (N7) respectively, irregularly bedded, soft sed. deformation, occasional iron staining
	105.5 to 106.0	0						106		No Sample
	106.0 to 110.0	DCB (1) 4.1				~60% silt ~40% vfg sand		107, 108		Sandy siltstone as above (reference interval 104.5 to 105.5) small body of coal at ~108 ft
						750% clay		109, 110		Claystone medium dark gray (N4) bedding not apparent, moderately friable slight silt component.
Box 10 of 24	110.0 to 114.3	(1) 4.6						111, 112, 113, 114		
	114.3 to 118.0	(2) 40								

NOTES General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. LF 13-89 BR

GEOLOGIST(S): DCB
DATE: 9/20/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 10 of 24	114.3 to 118.0	(2) 40'				75% clay		116, 117, 118		Claystone — as above
Box 11 of 24	118.0 to 119.1	(1) 1.1						119		
	119.1 to 121.8	(2) 2.9						120, 121		Claystone, light brown (5 YR 6/4), massively bedded, slightly friable, well indurated, with a slight silt fraction.
	121.8 to 122.0	0						122		No Sample
Box	122.0 to 126.0	(1) 4.3'				>50% clay		123, 124		Claystone, med. dark gray (N4), bedding not apparent, moderately friable, slight silt fraction.

NOTES General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. LF 13-89 BR

GEOLOGIST(S): DCB
DATE: 9/20/89

PROJECT NO: 667-11-5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 11 of 24	122 to 126.0	4.3'				>50% clay		126		clay stone as above. slickensides at ~125.5 with ~vertical attitude.
	126.0 to 128.3	(1) 2.3'						127, 128		
↑	128.3 to 129.0	•							X	No Sample
129.3	129.0 to 129.3	.2(1)				>50% clay		129		clay stone as above (reference interval 122.0 to 128.3 ft). color grades to dark gray (N3) to gray black (N2) from ~129.6' to ~130.0'. slight to mod. amount of carb. material below 129.0 ft.
129.3 ↓ Box 12 of 24	129.3 to 133.0	(1) 3.8'						130, 131, 132, 133		
	133.0 To 137.1	(1) 4.1'						134		

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(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. LF 13-89 BR

GEOLOGIST(S): DCB
DATE: 9/20/89

PROJECT NO: 667-11 F

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 12 of 24	133.0 to 137.1	(1) 4.1'				>50% clay		136		Claystone as above
						~50% silt ~40% sand		137		Sandy Siltstone with interbedded claystone light gray (N7) to medium gray (N5) respectively, thin bedded, slightly friable mod. carb. material
	137.1 to 138.8	(1) 1.9'			~10' clay	>50% clay		138		Claystone, med dark gray (N4), bedding not apparent, moderately friable, slight silt component, slight amount of carb material.
138.8	138.8 to 141.2	(1) 2.5'				~30% vfg sand ~40% silt ~30% clay		139 140 141		Interbedded Sandy Siltstone and silty Claystone light gray (N7) and med. dark gray (N4), thin bedded (<3mm), slightly friable, sand fraction is vfg.
Box 13 of 24	141.2 to 145.0	(1) 4.75				>50% clay		142		Interval grades to Claystone, medium dark gray (N4), bedding not apparent, slightly friable, slight to moderate carb material.
						~85% vfg sand ~15% clay silt		143 144		Silty Sandstone ~~and~~ interbedded with claystone very light gray (N8) and med. dark gray (N4) respectively, thin bedded, (<2mm), soft sed. deformation apparent, slight amount of carb material
						~55% silt ~30% clay ~15% vfg sand				Interbedded Siltstone and Claystone ~~with~~ light gray (N7) and medium gray (N5).

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ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. LF 13-89BR PAGE 13 OF 24

GEOLOGIST(S): DCB
DATE: 9/20/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
13 of 24 Box ↑ 148.1	145.0 to 148.1	(2) 3.2				~55' silt ~30' clay ~15' vfg sand		146, 147, 148		(cont'd from previous page) respectively, thin bedded (<4mm) where apparent, interval exhibits, soft sediment deformation - slumping and convolute bedding, slightly friable abundant vfg sand occurs in xx beds and irregular bodies, ~~and fracture appears to decrease below ~146.0 ft~~
148.1 ↓	148.1 to 148.9	.9								
	148.9-149.0	0						149		No Sample
14 of 24 Box	149.0 to 152.7	(2) 3.75			10°	>50% clay		150, 151, 152		Interbedded siltstone and Claystone as above.
	152.7 to 156.7	(1) 3.3'						153, 154		Claystone dark gray (N3), bedding not apparent, ~~slight~~ moderately friable.

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ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. LF 13-89DR

GEOLOGIST(S): DCB
DATE: 9/20/89

PROJECT NO: 667-115

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 14 of 24	152.7 to 156.7	(1) 3.3'				750 cl clay		156		Claystone as above, interval is carbonaceous from ~155.5 ft to 156.3 ft.
	156.7 to 157.0	0						157		No Sample
	157.0 to 157.3					750 cl clay				Claystone as above
	157.3 to 159.1	0						158 159		No Sample
	159.1 to 160.7	7.6	Erasures DCB 9/20/89 corrected interval error			750 cl clay		160		Claystone as above
	160.7 to 161.5	(1) .9						161		Claystone, olive gray (5Y 4/1), bedding not apparent, slightly friable, moderate silt fraction, occasional carb. material. Slickensides at ~161.3 attitude ~~40~~ 20 vertical
Box 15 of 24	161.5 to 165.0	(2) 3.6'						162 163 164		~~Actual~~ From ~161.5 to 162.1 interval is highly weathered ~~[illegible]~~ Claystone, brownish black (5YR 2/1), bedding not apparent, soft & pliable consistency. Claystone, med. dark gray (N4), bedding not apparent, slightly friable, slight to moderate silt fraction. Silty Claystone med. gray (N5) bedding not apparent, slightly friable, occasional carb. material.

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Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. LF 13-89 BR

GEOLOGIST(S): DCB
DATE: 9/21/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 15 of 24	165.0 to 169.0	4.0				>50% clay		166, 167, 168		Silty Claystone as above
	169.0 to 170.0	1.0				~40% silt ~30% sand ~30% clay		169		Interval grades to Clayey Sandy Siltstone light gray (N7) and med. light gray (N6), irregularly bedded where apparent (sand both occ and defines bedding), slightly friable, sand is vfg.
Box 16 of 24	170.0 to 173.0	(2) 3.3			0° to ~15°			170, 171, 172, 173		Clayey Sandy Siltstone as above, moderate amount of carb material, bedding is thin <2mm, soft sediment deformation apparent
	173.0 to 175.3	(1) 2.4				>50% clay		174		Carbonaceous Claystone, black (N1), bedding not apparent, slightly friable.
										Claystone, med. dark gray (N4),

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ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. LF 13-89 B12

GEOLOGIST(S): DCB
DATE: 9/21/89

PROJECT NO: 667-115

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 16 of 24	173.0 to 175.3	(1) 2.4				>50% clay				(cont'd from previous page) bedding not apparent, slightly friable, moderate silt fraction, moderate to abundant carb. material.
	175.3 to 177.0	0						176		No Sample
	177.0 to 179.9	(1) 2.95				>50% clay		177, 178, 179		Claystone as above (reference interval 174.7 to 175.3)
						~60% clay, ~25% silt, ~15% vfg sand				Silty Claystone, med. light gray (N6), bedding not apparent, slightly friable, occasional carb. material, slight to mod. vfg sand component
	179.9	0								NO SAMPLE
↑ 180.9	180.0 to 180.9	.9				~60% clay, ~25% silt, ~15% vfg sand		180		Silty Claystone as above (reference interval 179.0 to 179.9).
Box 17 of 24 ↓ 180.9	180.9 to 183.9	3.1				>50% silt, ~25% sand, ~10% clay, >50% clay		181, 182, 183		Sandy Siltstone, med. light gray (N6), massive bedding with some discontinuous thin beds of vfg sand (<2mm thick), slightly friable, sand is vfg and is disseminated throughout interval and in occasional thin beds, trace of clay ~~[illegible]~~
										Interval grades to Silty Claystone, med. dark gray (N4), poorly bedded, slightly friable, silt fraction varys from claystone, some silt to silty.
	183.9 to 188.0	(1) 4.4						184		Claystone, ~~[illegible]~~ med. dark gray (N4), poorly bedded, slightly to mod. friable, trace of carb material, some to trace of silt.

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ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. LF 13-89 DR

GEOLOGIST(S): DCB
DATE: 9/22/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 17 of 24	183.9 to 188.0	(1) 4.4				750'± clay		186, 187, 188		Erasures 9/22/89 DCB corrected lith descriptor. Clay stone as above. Slickensides at ~187.5', vertical attitude, carbonaceous material is in association with slickensides.
	188.0 to 190.2	2.2						189, 190		
190.2	190.2 to 190.6	.4								
Box 18 of 24	190.6 to 195.0	(1) 5.1'						191, 192, 193, 194		

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ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. LF13-89BR PAGE 18 OF 24

GEOLOGIST(S): DCB
DATE: 9/22/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 18 of 24	195.0 to 196.5	0						196	X	No Sample
	196.5 to 199.5	(1) 3				>50% clay		197, 198, 199		Claystone as above (reference interval 184.2 to 195.0, silt fraction increases with depth. Slickensides @ ~198.0 ft. attitude ~60°.
	199.5 to 200.7	1.2'				~50% vfg sand ~20% silt		200		Silty Sandstone, light gray (N7), thin bedded where apparent, slightly friable, sand is vfg, carb material at ~200.4 ft. in association with slickensides 70°-90° attitude.
200.7	200.7 to 203.0	2.5'				>50% clay		201, 202		Interval grades to Silty Claystone med. light gray (N6), massive bedding, slightly friable, abundant [illegible]
Box 19 of 24	203.0 to 207.0	4.2'			~0°	~65% vfg sand ~35% clay + silt		203, 204		Interval grades to a Silty Sandstone, very light gray (N7), thin bedded (<2mm) bedding exhibits soft sediment deformation, sand is vfg, trace of clay.
						~45% silt				Interval grades to interbedded Clayey Siltstones some vfg sand,

see next page

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ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. LF 13-89 BR

GEOLOGIST(S): DCB
DATE: 9/22/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 19 of 24	203.0 to 207.0	4.2				35% vfg sand, ~20% clay		206, 207		(cont'd from previous page) and silty sandstones, med. gray (N5) and light gray (N7) respectively. ~~Sandy siltstone, some clay~~ Clayey siltstone, some vfg sand, is poorly bedded. Sandstones are thin (<1.5 cm) bedded, silty and exhibit soft sediment deformation, slightly friable, trace of carb material.
	207.0 to 210.0	3.0						208, 209, 210		
Box 20 of 24	210.0 to 211.5	1.4			10°	~85% vfg sand, ~15% silt, clay		211		Sandstone, light gray (N7), thin bedded where apparent (<2 mm), slightly friable, some silt, sand is vfg. trace of clay and carb material.
	211.5 to 215.6	(2) 3.9						212, 213, 214		

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ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. LF 13-89 BR

GEOLOGIST(S): DCB
DATE: 9/22/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 20 of 24	211.5 to 215.5	(2) 3.9					~85% vfg sand ~15% silt and clay			Sandstone as above
	215.5 to 216.0	0						216		No Sample
	216.0 to	4.0					~85% vfg sand ~15% silt and clay	217, 218, 219		Sandstone as above, locally silty
219.9	219.9						~65% vfg sand ~30% silt ~5% clay	220, 221, 222, 223, 224		Interval grades to silty Sandstone interbedded with Sandy Siltstone, light gray (N7) and med. light gray (N6) respectively, thin bedded (<2 mm) to ~1.5 cm, dewatering features apparent, slightly friable, trace of carb material, and clay sand is vfg - fg.
219.9	219.9 to 224.0	(2) 3.9								
	224.0 to 227.9	(2) 3.9								

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(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. LF 13-89 BR

GEOLOGIST(S): DCB
DATE: 9/22/89

PROJECT NO: 667-11-5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 21 of 24	224.0 to 227.9	(2) 3.9				~65% Sand ~30% silt ~5% Clay		226 227		Sandstone as above. Core exhibits multiple small scale displacements of ~2 cm associated with soft sediment deformation as slumps, deformed bedding. Displacement angles ~ 60°
	227.9 to 230.0	(2) 2						228 229		
230.0	230.0 to 232.0	2.0						230 231		
	232.0 to 236	4.0						232 233 234		

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(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. LF 13-89 BR

GEOLOGIST(S): DCB
DATE: 9/22/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 22 of 24	232.0 to 236.0	4.0				~65% sand, ~30% silt, ~5% clay				Silty Sandstone and Sandy siltstone interbedded - as above
	236.0 to 240.0	4.0				~75% clay, ~25% silt + clay		236, 237, 238, 239, 240		Interval grades to Silty Sandstone, light gray (N7) to med. light gray (N6) thin bedded (<2mm), slightly friable, trace of clay and carb material.
240.0	240.0 to 242.6	(2) 2.8				>50% silt, ~10% sand		241, 242		Interval grades to Siltstone light gray (N7), massive bedding, slightly friable, trace of clay and vfg sand.
	242.6 to 247.0	(2) 4.3				>50% clay		243, 244		Interval grades to Silty Claystone, med. dark gray (N4), poorly bedded, slightly friable, slickensides at ~242.8', attitude 40°

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ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. LF 13-89BR PAGE 23 OF 24

GEOLOGIST(S): DCB
DATE: 9/22/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 23 of 24	242.6 to 247.0	(2) 4.3					>50% silt	246		Silty Claystone as above, trace of carb material. Slickensides at ~245.5, attitude vertical + ~38°. Slickensides ~246.5, attitudes ~40° and ~80°.
	247.0 to 249.4	(2) 2.6						247, 248, 249		Slickensides at ~248.8, attitude ~50°. Silty fraction increases in interval from ~248.8 to 249.4.
249.4	249.4 to 251.5	(1) 2.0						250, 251		Silt content decreases below, ~249.5.
Box 24 of 24	251.5 to 255.0	(1) 3.5					>50% vfg sand	252		Sandstone, very light gray (N9), thin bedded, slightly friable, vfg sand.
							>50% clay-coal	252		Carbonaceous Claystone and low grade coal, grayish black (N2), bedding not apparent, slightly friable.
							>50% silt 10'-20% vfg sand	253		Siltstone, med. light gray (N6), poorly bedded, slightly friable, some vfg sand and some clay, trace carb material, locally sandy.
							>50% clay <10% vfg sand	254		Interval grades to Silty Claystone med light gray (N6), poorly bedded, slightly friable some to trace vfg sand.
							>50% clay			Claystone, med. dark gray (N4),

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ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. LF 13-89 BR

GEOLOGIST(S): DCB
DATE: 9/22/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
	255.0					75% clay				(cont'd from previous page) poorly bedded, slightly friable, trace to some silt.
	to	(1) 3.8						256		
						75% clay		257		silty claystone, light gray (N7), poorly bedded, slightly friable, trace of carb. material.
↑ 258.7	258.7							258		
								259		Bottom of Box 24 at 258.7'
								260		

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ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. B-89 BH 14-89A PAGE 1 OF 3

GEOLOGIST(S): Day
DATE: 9/26/89

PROJECT NO: 667-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
0.0	0.0						GC			TOP 0.4 FT: GRAVELLY CLAY, dark yellowish brown (10 YR 4/2), est. mod plast, max gravel size = 6cm, some roots
		1.3					CL	1		SANDY CLAY, moderate yellowish brown (10 YR 5/4), est. mod plast, sand is FG-VFG, some gravel (max size = 2 cm)
	2.0							2		
		1.4					CL	3		Same as above: decreased sand fraction, color is grayish orange (10 YR 7/4), some calc material at base
	4.0							4		TOP OF ROCK
		1.4								CALCAREOUS CLAYSTONE, pinkish gray (5YR 8/1), non apparent bedding, mod highly weathered, mod friable, sandy at base
Box 1 of 3	5.0							5		
		1.6				75% SAND 25% CLAY		6		CLAYEY SANDSTONE, dark yellowish orange (10 YR 6/6), [illegible] (N7), non apparent bedding, highly weathered, mod-poorly friable, VFG-MG, mod sorted, some iron staining at base, trace of carb, some calc.
	7.0							7		
		1.8						8		Same as above: abundant iron staining in top 0.8 FT of section, no calc. material, trace carb, trace some Mg staining
9.0	9.0							9		Same as above: decrease in clay fraction, some iron staining
	(11.0)					65% SAND 35% CLAY				

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Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 13-89BH 14-89 PAGE 2 OF 3

GEOLOGIST(S): DAY
DATE: 9/26/89

PROJECT NO: 667-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
		1.8								See previous page
	11.0							11		CLAYSTONE, brownish gray (5 YR 4/1), massive bedding, mod weathered, mod friable, some micro-fractures some iron staining along fracture planes trace of silt
		1.9						12		
	13.0							13		Same as above. Some silt
		1.95						14		
Box 2 of 3	15.0							15		SILTY SANDSTONE, grayish yellow (5Y 8/4), massive bedding, mod weathered, mod friable, some carb material trace of iron staining as mottles Sand is VFG
		1.6				75% SAND 25% SILT		16		
	17.0							17		Same as above: pinkish gray (5YR 8A) increase in grain size ~~at base~~ to FG, thin 1-5 mm ~~[illegible]~~ silt laminations
		1.8						18		
19.0	19.0							19		Same as above possible ~~[illegible]~~ small scale fracture showing displacement and drag
19.0 Box 3 of 3	20.2									

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 13-89 BH 14-89 PAGE 3 OF 3

GEOLOGIST(S): MY
DATE: 9/26/89

PROJECT NO: 667-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
20.1	20.1									See previous page
END OF BORE								21		
								22		
								23		
								24		
								25		
								26		
								27		
								28		
								29		

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. SEP 15-89

PAGE 1 OF

GEOLOGIST(S): DCB
DATE: 9/28/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
0.0	0.0 to 2.2	(1) 1.6				~80% clay ~10% sand ~10% gravel	CL	1, 2		Clay moderate yellowish brown (10 YR 5/4) to dark yellowish brown (10 YR 4/2), moderate plasticity, trace to some very fine sand, some gravel, not fragments in upper 2.4 ft.
	2.2 to 4.4	1.9						3, 4		Sand fraction varies in amount and size locally, at ~2.4 and 4.0' sand is mod.
N	4.4 to 6.4	(2) 1.1						5, 6		Caliche occurs as small (<2mm diam) bodies and pendate fracture fills from ~4.4 ft to 7.1 ft.
Rock	6.4 to 7.1	(1) .6						7		
	7.1 to 8.4	0						8		No Sample
Rock	8.4 to 8.9	(1) .25				>50% clay	CL	9		Clay, dark yellowish brown (10 YR 4/2), high plasticity, trace of silt.
	8.9 to 10.4	0								No Sample

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. SEP-15-89 PAGE 2 OF

GEOLOGIST(S): DCB
DATE: 9/28/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 1 of 2	8.9 to 10.4	0							X	No Sample
	10.4 to 11.4	(1) .4				>50% clay	CL	11		Clay as above (reference interval 8.4 to 8.9 ft.).
	11.4 to 12.4	0						12	X	? No Sample TOP OF ROCK
↑ 13.6	12.4 to 13.6	1.0				>50% clay		13		Claystone, dark yellowish orange (10YR 6/6), bedding not apparent, highly weathered, slightly friable, some silt, trace of caliche as small irregular bodies (<2mm diam).
13.6 ↓ Box 2 of 2	13.6 to 14.1	(1) .7						14		
14.4	14.1 to 14.4	0							X	No sample
								15		
								16		

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. SEP 16-89 3R

GEOLOGIST(S): DCB
DATE: 10/24/89

PROJECT NO: 667-14.11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
										Possible top of Rock @ 0.0
0.0 ↓	0.0 to 1.0	.8				>50% clay	CL	1		Clay, dark yellowish brown (10 YR 4/2), moderately high plasticity, small bodies of caliche (<1mm diam.) disseminated within matrix, probably highly weathered bedrock
	1.0 to 2.5	1.5						2 3		Abundant caliche occurs at ~ 1.5 to 2.5 ft.
	2.5 to 5.5	2.1				>50% clay		4 5		Claystone, med. light gray (N6), bedding not apparent, highly weathered, slightly friable, calcareous with irregular bodies of caliche
	5.5 to 7.5	1.7				~95% silt ~5% sand		6 7		Siltstone, very light gray (N8), bedding not apparent, well weathered, friable, trace of f.g. sand, some iron staining
	7.5 to 9.5	1.8						8 9		
	9.5 to 11.5	1.0								

DCB 10/24

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. SEP 16-89BR PAGE 2 OF 11

GEOLOGIST(S): DCB
DATE: 10/24/89

PROJECT NO: 667-14.11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 1 of 5 ↑ 11.5	9.5 to 11.5	1.0				~95% silt ~5% sand		11		Siltstone as above
11.5 ↓	11.5 to 13.5	1.9				>50% clay		12, 13		Siltstone, yellowish gray (5Y 7/2), bedding not apparent, moderately friable, well [illegible] some clay, trace of sand-v/fg, local iron staining.
	13.5 to 15.3	1.4						14, 15		
	15.3 to 15.5	0								No Sample
	15.5 to 17.5	1.8				~55% silt ~35% v/fg sand ~10% sand v/fg		16, 17		Siltstone as above (reference interval 12.0 to 15.3 ft.).
	17.5 to 19.5	1.1						18, 19		
	19.5 to 21.5	1.4								

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. SEP 16-89 DR

GEOLOGIST(S): DCB
DATE: 10/24/89

PROJECT NO: 667-14.11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 2nd ↑ 23.5	19.5 to 21.5	1.4				Clay >50%		21		Siltstone, light olive gray (5Y 6/1), bedding not apparent, moderately friable, well cemented, silt fraction decreases with depth.
	21.5 to 23.5	1.2						22, 23		Claystone, light olive gray (5Y 6/1), moderately friable, well cemented, bedding not apparent, trace to some silt, local iron staining
23.5 ↓ Box 3rd	23.5 to 25.5	1.8						24, 25		
	25.5 to 26.5	1.0						26		Claystone as above, med. light gray (N6), trace of silt.
Box 4th	26.5 to 27.5	0						27	X	No Sample
	27.5 to 29.5	2.5						28, 29		Claystone as above (recovered interval 25.0 to 26.5 ft.).
	29.5 to	2.3								Claystone, dark yellowish orange (10YR 6/6), bedding not apparent, well cemented, moderately friable, some iron staining, trace of dark mineral stain

NOTES. General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. SEP 16-89 BR PAGE 4 OF 11

GEOLOGIST(S): DCB
DATE: 10/24/89

PROJECT NO: 667-14.11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Bot 4	29.5 to 31.5	2.3				>50% clay		31		clystone as above
Bot	31.5 to 33.5	1.6						32, 33		clystone as above color grades to med. light gray (NG) below 31.7 ft.
Bot 4	33.5 to 35.5	1.6						34, 35		
Bot	35.5 to 37.5	1.8						36, 37		silty clystone, med. light gray (NG), thin bedded where appropriate, slightly friable, trace to some silty sand as thin beds.
	37.5 to 38.5	~1.0						38		
	38.5 to 40.5	~2.0						39		

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. SEP 16-89 BR

GEOLOGIST(S): DCB
DATE: 10/24/89

PROJECT NO: 667-14.11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 4/4 ↓ 41.5	38.5 to 40.5	2.0								Interbedded, silty claystone and vfg sandstone, med. gray (N5) and light gray (N7) respectively, slightly friable thin bedded (<2mm) sand blebs appear laterally discontinuous, interval exhibits slight rxn with HCL locally, beds exhibit soft sediment deformation.
	40.5 to 40.7	1.2								
40.7 ↓	40.7 to 43.6	2.0			~0°	~55% clay ~15% silt ~30% vfg sand		41 42 43		
	43.6 to 44.7	0						44		No Sample
7 Top	44.7 to 48.1	4.3			~0°	~55% clay ~15% silt ~30% vfg sand		45 46 47 48		Interbedded silty claystone and vfg sandstone as above (reference interval 40.7 to 43.6)
Bot	48.1 to 50.2	2.1						49		

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

Box 4/4 and Box 1/7 overlap on footage.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. SEP 16-89 BR PAGE 2 OF 11

GEOLOGIST(S): DCB
DATE: 10/24/89

PROJECT NO: 667-14.11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 1 of 7	48.1 to 50.8	2.1			~0°	~55% clay ~15% silt ~30% vfg sand				Interbedded Silty Claystone and vfg sandstone as above (reference interval 40.7 to 43.6).
50.8 ↓	50.8 to 52.7	1.9						51, 52		
Box 2 of 7	52.7 to 56.7	4.0				>50% clay		53, 54, 55, 56		Interval grades to Silty Claystone at ~52.8'. Silty Claystone, med. dark gray (N4), thin bedded where apparent, slightly friable, trace to some of vfg sand occurs as thin (<1mm) lenses, trace of carbonaceous material.
	56.7 to 60.4	3.9						57, 58, 59		

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. SEP 16-89 BR

DCB

GEOLOGIST(S): DCB
DATE: 10/24/89

PROJECT NO: 667-14.11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 56.7 to 60.4	56.7 to 60.4	3.9								Silty Claystone as above sand and silt fraction decreases with depth.
60.4 ↓	60.4 to 60.7	.4								
	60.7 to 64.7	4						61, 62, 63, 64		
	64.7 to 67.6	3.9						65, 66, 67		Interval grades to claystone med. dark gray (N4), poorly bedded, slightly to moderately friable, some silt, trace of carb material.
	67.6 to 68.7	0						68	X	No Sample
	68.7 to 70.8	2.2						69		Claystone as above (reference interval 66.0 ft. to 67.6 ft.)

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. SEP 16-89 BR

GEOLOGIST(S): DCB
DATE: 10/24/89

PROJECT NO: 667-14.11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 77 ↑ 70.8	68.7 to 70.8	2.2				>50% clay				claystone as above
70.8 ↓	70.8 to 71.1	.2						71		
	71.1 to 71.7	0							X	
	71.7 to 74.3	2.5				>50% clay		72, 73, 74		claystone as above (reference interval 66.0 to 67.6 ft.)
	74.3 to 77.7	3.8						75, 76, 77		color grades to med. gray (N5) below ~74.5 ft.
	77.7 to 80.7	2.9						78, 79		

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

DCB

LOG OF BORING NO. SEP 16-89 BR PAGE 9 OF 11

GEOLOGIST(S): DCB
DATE: 10/24/89

PROJECT NO: 667-14.11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 4 of 7 80.7	77.7 to 80.7	2.9				>50% clay				claystone as above
80.7 ↓	80.7 to 81.7	.9						81		
	81.7							82		
	to	4.5			~0°	~65% silty clay ~35% vfg sand		83 84		Silty Claystone and interbedded vfg sandstone, med dark gray (N4) and light gray (N7), thin bedded (<2mm), slightly friable.
↑								85		
Box 5 of 7	85.7					>50% clay silt <10% sand		86		Claystone, med. gray (N5), poorly bedded, slightly friable, some silty, trace of vfg sand, disseminated locally or in thin beds (<1mm).
	85.7 to	4.0						87 88		
↑								89		
89.8	[illegible]	.15								
[illegible]	[illegible]									slickensides at ~90 ft, attitude ~55°

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. SEP 16-89 DR PAGE 10 OF 11

GEOLOGIST(S): DCB
DATE:

PROJECT NO: 667-14.11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
	89.8 to 93.7					~90% clay/silt ~10% fg sand		91, 92, 93		Interbedded silty Claystone and ~~sandy~~ siltstone, med. light gray (N6) and very light gray (N8) respectively, bedding is thin (< 2mm), slightly friable, some carb. material, trace of vfg sand, occurs dominantly within siltstone beds
	93.7 to 97.7					~95% clay/silt ~5% vfg sand		94, 95, 96, 97		Silty Claystone med/light gray (N6), thin bedded (< 2mm) where apparent, slightly friable
	97.7 to 98.3							98		
	98.3 to 101.2	0						99	X	No Sample

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

Box 6/7 not accounted for as of 10/24/89, location unknown

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO.

GEOLOGIST(S):
DATE:

PROJECT NO:

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 6 of 7	98.2 to 101.2	0						101	X	No Sample
101.2	101.2 to 101.5	0							X	No Sample
101.5	101.5 to 102.2	.4						102		Claystone, med. dark gray (N4), poorly bedded, slightly friable, trace of s.A.
Box 7 of 7	102.2 to 103.7	0						103	X	
Box 7 of 7	103.7	1.3						104		Claystone, med. dark gray (N4), poorly bedded, slightly friable, trace of s.A.
105.1	105.1							105		Bottom of Box 7/7 at 105.1
								106		

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 24-89

GEOLOGIST(S): DAY
DATE: 9/27/89

PROJECT NO: 667-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
0.0	0.0 – 1.5	1.3				45% CLAY 35% SAND 20% GRAVEL		1		GRAVELLY SANDY CLAY, dark yellowish brown (10 YR 4/2), mod plast, sand is FG-MG, max gravel size 7cm
	1.5 – 2.1	Ø						2		NO SAMPLE
	2.1 – 4.7	1.8				70% CLAY 30% SAND; 50% GRAVEL 30% SAND 20% CLAY		3, 4		SANDY CLAY, dark yellowish brown (10 YR 4/2), mod plast, sand is FG-MG, trace of gravel. Bottom 0.4 FT of interval: Clayey SANDY GRAVEL, matrix color is moderate yellowish brown (10 YR 5/4), angular, mod-well graded, max gravel size = 7cm, trace of calc. material
	4.7 – 6.2	1.8						5, 6		Same as above top. 6in has flowing texture
	6.2 – 7.5	1.6				GRADED (1) 40% GRAVEL 30% SAND 30% CLAY		7		Same as above: increase in clay fraction at base
	7.5 – 8.2	Ø						8		NO SAMPLE
	8.2 – 8.8	0.6				SAME AS ABOVE				Same as above
	8.8 – (12.2)	Ø						9		NO SAMPLE

NOTES General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 24-89

GEOLOGIST(S): [illegible]
DATE: 9/27/89

PROJECT NO: 667-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 1 of 2								11		NO SAMPLE
	12.2							12		
13.0	13.0									TOP OF ROCK. CLAYSTONE, light olive gray (5Y 6/1), apparent massive bedding, type of contact is undeterminable, mod-highly weathered, mod friable, some silt, some iron staining as mottles
13.0								13		
Box 2 of 2	14.2							14		Same as above. Some FG-MG sand, some Mg staining, some iron staining as mottles and as nodules, trace of carb material, [illegible]
								15		TOP OF INTERVAL same as above increase in silt content to SILTY CLAYSTONE, ~~[illegible]~~
16.2	16.2							16		Base of interval: SANDY CLAYSTONE, light olive gray (5Y 6/1), apparent massive bedding, mod weathered, mod friable. Sand is FG & appears to be in bodies, some iron staining as mottles, ~~some~~ trace Mg staining
END OF BOXES								17		
								18		
								19		

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 34-89 BR PAGE 1 OF 4

31 [illegible] 11/6/89

GEOLOGIST(S): [illegible]
DATE: 9/25/89

PROJECT NO: 667-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
0.0 ↓	0.0 -2.2	1.9				>80% CLAY; 65% CLAY; 35% GRAVEL		1, 2		TOP 1FT: CLAY, moderate brown (5 YR 3/4) mod plast., some gravel (max size = 2.5 trace of sand; unconsolidated some roots. BASE OF INTERVAL: GRAVELLY CLAY: [illegible] increase in gravel fraction, max gravel size = 6cm
	2.2									
	2.3	1.8				60% CLAY; 40% GRAVEL		3, 4		GRAVELLY CLAY, dark reddish brown (10 R 3/4), mod plast., max gravel size = 5cm, some sand, trace of roots, sand is FG-MG, base of interval is very calcareous
Box 1 of 4	4.6									
		1.8				75% CALICHE; 25% GRAVEL		5, 6		GRAVELLY CALICHE, ~~[illegible]~~ Very pale orange (10 YR 8/2), max. gravel size = 5cm, top 1 FT of interval has low fraction of gravel
	6.6									
		0.9						7, 8		CALCAREOUS GRAVEL, matrix color is very pale orange (10 YR 8/2), angular-subangular, mod-poorly graded, max size = 6.5 cm, trace of sand
	8.6									
	9.2	0.75						9		CALCAREOUS GRAVELLY SAND, matrix color is dark yellowish orange (10 YR 6/6), angular-subangular, sand is FG-VCG, mod-well graded, max gravel size = 3cm, [illegible]
	(10.4)									

See next page

NOTES General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 39-89 BR

GEOLOGIST(S): Lay
DATE: 9/25/89

PROJECT NO: 667-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 10 of 4	10.6	1.0	DAT #20			>80%	SAND			SAND, grayish orange (10 YR 7/4), angular-subangular, ~~poorly~~ well graded, sand is FG-VCG, some granular size gravel
	12.6	0.8				65% SAND 35% GRAVEL		11, 12		GRAVELLY SAND, grayish orange (10 YR 7/4), angular-subangular, mod-well graded, max size = ~~[illegible]~~ 6.5 cm, trace of clay, unconsolidated, sand is ~~FG~~-VCG.
12.6	14.6	0.9				55% SAND 45% GRAVEL		13, 14		Same as above. SANDY GRAVEL very pale orange (10 YR 8/2), increase in gravel fraction
	16.6	0.9						15, 16		Same as above
	18.6	0.7				70% SAND 30% GRAVEL		17, 18		Same as above. light brown (5 YR 5/6 Same as above: decrease in gravel fraction, trace of clay sand is FG-MG
	(20.7)	1.0						19		~~Same as above~~ Lay (for 20.2-21.3) SAND, grayish orange (10 YR 7/4) angular-subangular, well graded, sand is FG-VCG, some gravel max size = 6cm

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 39-89 BR PAGE 3 OF 4

GEOLOGIST(S): Day
DATE: 9/25/89

PROJECT NO: 667-1150

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 2 of 4	20.2									
	21.3	1.0						21		See previous page
										TOP OF ROCK
	24.6	1.9						22, 23, 24		CLAYSTONE, light olive gray (5Y 6/1), massive bedding, mod-highly weathered, contact is sharp with top 0.5 FT of Claystone being highly weathered, mod friable, some iron staining as mottles, core is moist, some silt
	26.6	1.8						25, 26		Same as above
26.6	27.6	1.2						27		Same as above. dusky yellow (5Y 6/4), highly weathered, top of interval has flowing texture
	28.6	1.7						28		Same as above middle-base of interval is highly iron stained and increased silt fraction and VFG sand as lenses
	29.6	1.2				50% CLAY 50% SAND		29		CLAYSTONE/SANDSTONE, dusky yellow (5Y 6/4), iron apparent bedding, highly weathered, highly friable, some iron staining as mottles sand is VFG.
	(30.0)	0.45				40% CLAY 60% SAND				Same as above increase in sand fraction

NOTES. General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 39-89 B2 PAGE 4 OF 4

GEOLOGIST(S): [illegible]
DATE: 9/25/89

PROJECT NO: 667-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
	30.0 – 30.6	1.3								~~See previous page~~ CLAYSTONE/SANDSTONE, dusky yellow (5 Y 6/4), non apparent bedding, highly weathered, highly-mod friable, Sand is VFG. increase clay fraction at base of interval
↑ 31.6		1.25				20% SAND 20% SILT 10% CLAY		31		
31.6 ↓	32.6	0.7						32		SANDSTONE, dusky yellow (5 Y 6/4), apparent massive bedding, mod-highly weathered, mod-highly friable, some silt, trace of clay, VFG, well sorted
	33.6	1.0				50% CLAY 50% SAND		33		Same as above very light gray (N8) abundant iron staining along horizontal planes (bedding? or fractures)
	34.6	1.3				50		34		SANDSTONE / CLAYSTONE, light olive gray (5 Y 6/4), non-apparent bedding, highly weathered, mod-highly friable, Sand is VFG, abundant iron staining as mottles
Box 4 of 4	35.6	1.1						35		Same as above some lense of silty claystone w/ iron staining along bedding planes, consolidated texture
	36.6	1.3						36		Same as above. no claystone lenses, Sand is FG-MG
										SANDSTONE, pinkish gray (5 YR 8/1), apparent massive bedding, mod-highly weathered, mod friable, MG grading to FG at base, well sorted, angular-sub angular, iron staining as mottles, some silt
↑ 37.3	37.3	1.0						37		Same as above very light gray (N8), MG-FG, some ~~[illegible]~~ interlamine of siltstone (≈ 5mm - 1/4cm)
								38		
								39		

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 32-89 BR PAGE 1 OF 4

GEOLOGIST(S): DCB
DATE: 9/25/89

PROJECT NO: 667-11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
0.0 ↓	0.0 to 1.7'	(1) 1.7				>50% gravel	GC	1		Clayey Gravel, very light gray (N8) matrix is mod. brown (5 YR 3/4), sub angular poorly graded, max size ~5 cm, some silt, trace of sand, some plant detritus.
	1.7' to 3.2	(1) 1.7						2, 3		
	3.2 to 3.7	0							X	No Sample
	3.7 to 5.2	(1) 1.7				>50% caliche		4, 5		Gravely Caliche, white (N9), max. gravel size 6 cm., caliche rind on gravel.
Box 1	5.2 to 5.85	(1) 1.0				~45% fg-cg sand ~35% gravel	SP			Interval grades to Gravelly Sand ~~[illegible]~~ yellowish brown (10 YR 5/4) to grayish orange (10 YR 7/4), sub angular to subrounded ~~[illegible]~~ graded fg to cg sand, some silt, calcareous trace of clay,
	5.85 to 6.7	0				~20% silt + clay		6	X	No Sample
	6.7 to 7.1	.9 (1)				As above	SP	7		Gravelly sand as above (reference interval 5.0 to 5.85)
↑ 8.7	7.1 to 8.7	0						8	X	No Sample
8.7 ↓ Box 2 of 5	8.7 to 10.2	(1) 1.6				~40% fg-cg sand ~40% gravel ~20% silt + clay	SP	9		Gravel and Sand, med. light gray (N6) light brown (5 YR 5/6) respectively, gravel is mod. graded, angular to sub~~[illegible]~~ DCB max size 7 cm, sand is well graded, subangular to subrounded fg to cg, some silt and trace of clay

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Material amounts are estimated by % volume instead of % weight.
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(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 32-89 BR PAGE 2 OF 4

GEOLOGIST(S): DCB
DATE: 9/25/89

PROJECT NO: 667011.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
	8.7' to 10.2'	1.6 (1)				Same	SP			Gravel and Sand as above
	10.2' to 10.7'	0								No Sample
	10.7' to 11.7'	(1) 1.2'				~40% gravel ~40% sand ~20% silt + clay		11		Gravel and Sand as above (reference interval 8.7 to 10.2) with increase in clay fraction to some clay
	11.7' to 12.7'	0						12		No Sample
Sand	12.7' to 14.7'	.05'				~40% fine sand ~40% Gravel ~20% silt + clay	SP	13 14		As above (reference interval 8.7 to 10.2). Very poor sample recovery
	14.7' to 16.0	(1) 1.7'				~60% gravel ~30% sand ~10% clay + silt	GP	15 16		Sandy Gravel, dominantly light gray (N7), matrix is mod. yellow-brown (10 YR 5/4), angular to subrounded, poor to moderately sorted, max size ~7 cm., ~~trace~~ clay and silt.
Bot	16.0' to 16.7'	0								No Sample
↑ 18.1	16.7' to 18.1'	(1) 1.7				~60% gravel ~30% sand ~10% clay + silt	GP	17 18		Sandy Gravel as above (reference interval 14.7 to 16.0 ft.) matrix color is grayish orange (10 YR 7/4) gravel is light gray (N7)
18.1 ↓	18.1 to 18.7'	0								No Sample
Bot Sand	18.7' to 20.1	(1) 1.8				~60% gravel ~30% sand ~10% clay + silt	GP	19		Sandy Gravel as above

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ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 32-89-BR

GEOLOGIST(S): DCB
DATE: 9/25/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
	19.1-20.1	1.8 (1)				[illegible]	[illegible]			As Above - Sandy Gravel
	20.1 to 22.7	(1) 1.9				DCB ~65% f.g.-c.g. sand ~20% clay ~[illegible]% silt, gravel	SC	21, 22		Clayey Sand, pinkish gray (5 YR 8/1) subangular to subrounded, well graded, f.g. to c.g., some silt, trace of gravel
	22.7 to 23.6	.9'				55% gravel ~35% sand [illegible]	GP	23		Interval grades to Sandy Gravel, med light gray (N6) matrix is light brown (5 YR 5/6), moderately graded, angular to subangular, max size ~9 cm, some clay
	23.6 to 24.7	0						24	X	No Sample
	24.7 to 25.9	.8				~50% gravel ~30% sand ~20% clay	GP	25		Sandy Gravel as above (reference interval 22.7 to 23.6 ft) with increase in clay fraction
	25.9 to 28.7	0						26, 27, 28	X	No Sample
	28.7 to 29.3	.6				>50% clay		29		Claystone, light gray (N7) mottled dark yellowish orange (10 YR 6/6), bedding not apparent, highly weathered moderately friable to slightly plastic, trace of silt
	29.3 to 30.7	(2) 1.7								

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ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 32-89 BR PAGE 4 OF 4

GEOLOGIST(S): DCB
DATE: 9/25/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 5 of 5 ↑ 30.7	29.3' to 30.7'	(2) 1.7								Claystone as above color grades to light olive gray (5 Y 6/1). occasional Mg oxide stains.
30.7 ↓	30.7' to 32.6'	1.85'						31, 32		
	32.6' to 32.7	.35'								
	32.7 to 33.5	(1) .8'						33		
	33.5 to 34.7	1.1'						34		Claystone as above, color grades to olive gray (5 Y 4/1) Mg oxides are absent.
	34.7 to 35.2	.5'						35		
	35.2 to 36.2	(1) 1.65'						36		
	36.2 to 36.7	0							X	No Sample
↑ 37.7	36.7 to 37.7	(1) 1.8						37		Claystone as above color grades to greenish black (5GY 2/1).
37.7 ↓ Box 5 of 5 ↑ 39.2	37.7 to 39.2	(1) 1.9						38, 39		
										Bottom of Box 5 of 5 at 39.2 ft.

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ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 32-89

Series of boxes start
for box 6 of 23 at 400 FT

GEOLOGIST(S): MSH & DAT
DATE: 9/19/89

PROJECT NO: 661-11.5[illegible]

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
400 ↓	400 – 415	0						41		NO SAMPLE
	415 – 425	2 40				10 60% CLAY 30 40% SILT		42		[illegible]
Box 6 of 23	425 – 465	0						43, 44, 45, 46		NO SAMPLE
	465 – 485	(2) .55				60% SILT 40% CLAY		46, 48		[illegible] mod friability increase in silt fraction, possible soft sed deformation, trace of VFG sand in lenses, trace of carb, trace of iron staining as mottles.
	485 – 48.7	2.25								CLAYSTONE, light brownish gray (5YR 6/1) non-apparent bedding, mod weathering, mod friability, trace of silt, carb, & iron staining as mottles
	48.7 – 505	(2) 1.7						49		CLAYSTONE Same as above: massive bedding, base of interval contains possible interclasts, clay, #1 & 2 mm

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(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 32-89 BR

GEOLOGIST(S): MJH & DAT
DATE: 9/19/89

PROJECT NO: 667-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 6 of 23	50.5									See previous page
	51.5	(2) 1.0						51		Claystone, light brownish gray (5 YR 6/1), ~~non apparent~~ massive bedding, mod weathered, mod friable, trace of silt, trace of iron staining as matrix
	52.3	(2) 0.8						52		Same as above:
	53.5	(2) 1.2						53		Same as above:
	54.0	(2) 0.5								Same as above some silt
	55.5	(2) 1.1		90°				54 55		Same as above fracture @ 90°
54.5 →	56.0	Ø						56		NO SAMPLE
	56.5	(2) 1.55								Same as above: no apparent bedding, gloomy texture, trace of carb
Box 7 of 23	57.8	1.9 (2)						57		Same as above olive black (5 Y 2/1) massive bedding, consolidated texture
	58.0	0						58		NO SAMPLE
	59.8	1.75 (2)						59		Same as above: trace of silt
	61.6	1.8								See next page

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(1) Badly broken core, accurate footage measurements not possible
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 32-89 BR

GEOLOGIST(S): MJH & DBJ
DATE: 9/19/89

PROJECT NO: 6607-11.22

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 7 of 23		1.5 (2)						61		CLAYSTONE, olive black (5Y 2/1), massive bedding, mod weathered mod friable, trace of silt, trace of carb, trace of iron staining as mottles
	61.6									Same as above
	61.0	1.2 (2)						62		Same as above: no iron staining, mod-low friability, trace micro-fracture
	62.6	0.6 (2)								Same as above: no silt, some iron staining as mottles
		1.8 (2)						63		
								64		
62.4 ↑	62.4									Same as above trace of silt, trace of micro-fracturing
62.4 ↓	62.4	1.75 (2)						65		
	64.0							66		Same as above. olive gray (5Y 4/1)
		1.8 (2)						67		
	67.8									
		1.8 (2)						68		Same as above! No iron staining
								69		
	69.6									
	70.0	.95 (2)								Same as above. Some carb material light olive gray (5Y 5/1)

NOTES General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 32-89 BE

GEOLOGIST(S): LW + MJK
DATE: 9/19/89
PROJECT NO: 5167 41.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
										Olive Gray (5Y 4/1)
Box 8/23	70.0 – 70.8	.85 (2)								Claystone, massive bedding, mod weathered, mod friability, some carb. material trace of silt
	70.8 – 72.5	1.85 (2)						71, 72		Same as above: Some carb material, grades to Olive Black at base of interval (5Y 2/1)
	72.5 – 73.4	1.6 (2)						73		Claystone, Brownish Black (5YR 2/1) massive bedding, moderately friable, mod weathered, Carbonaceous, for top 5', grading to some carb at base, some silt, trace of coal, flowery texture for top .25'
	73.4 – 74.0	0								No Sample
Box 9/23	74.0 – 75.6	1.8 (2)						74, 75		Claystone, Dark green sh gray (5G 4/1) massive bedding, mod weathering, mod friability, trace of silt
	75.8 – 77.15	1.35 (2)						76		Same as above: light olive gray (5Y 6/1), No silt, Trace of carb material
	77.15 – 78.0	.25 (2)						77		Same as above: Trace of silt
	78.0 – 79.40	1.4 (2)						78, 79		Same as above: some silt, Some carb material
	79.4	1.75								Same as above: Trace of Carb Material

NOTES General: USCS is modified for this log as follows:
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(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 32-89 B12 PAGE 5 OF 17

GEOLOGIST(S): MJH
DATE: 9/-0/89

PROJECT NO: 667-11,50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
↑ 81.2										-- Previous page
								81		
8 -	81.2	1.2 (2)								Claystone, light olive gray (5Y 6/1) massive bedding mod weathering mod fr... Some ... some carb material, ~~...~~
								82		
	82.0	1.8 (2)								Silty Claystone, light olive gray (5Y 6/1) Massive bedding, mod weathering mod friability, Some carb material
								83		Same as above: Some carb material at top grading to trace at base of interval
								86		
	84.4									
	86.4	1.75 (2)								Claystone, light olive gray (5Y 6/1) Massive bedding, mod weathering, mod friable, trace of carb, trace of silt
								85		
Box 10/23	86.0									
	86.0	1.75 (2)						86		Same as above: Some silt, mod to high friable
								87		
	87.8									
	87.8							88		Same as above: Trace of silt, flowery texture abundant microfractures
↑ 89.7								89		
89.7	89.7									
89.7	89.7	.4 (2)								Same as above: Some silt, Mod friable, conso...

NOTES General USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 32-89 BR PAGE 6 OF 17

GEOLOGIST(S): [illegible]
DATE: 9/20/89

PROJECT NO: 667-[illegible]

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
	93	1.4 (2)		65				91		Claystone Olive black (5Y 2/1), massive bedding, mod weathering, mod friable some silt Fracture at 45°, Trace of carb
	92	1.9 (2)						92		Same as above no distinct fracture
	93.2	7.5 (2)						93		Same as above Olive gray (5Y 4/1) Slight mod silt
	94.0	1.0 (2)						94		Same as above
	95.0	1.1 (2)						95		Same as above: No carb material
	96.0	.7 (2)						96		Same as above: trace of interclastic clay 1-2mm
	96.7	1.8 (2)						97		Same as above Some carb material, Trace of coal -2mm thick, Trace of iron staining as mottles
98.5	98.5							98		
98.5	98.5	1.5 (2)						99		Silty claystone Olive gray (5Y 4/1), massive bedding, mod weathering, mod friable, Some carb material, trace of iron staining as mottles, trace of coal 1-2mm thick trace of lenticular VFG sand
Box 14-23	100									

NOTES General. USCS is modified for this log as follows:
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(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 32-89 BR

GEOLOGIST(S): MJH
DATE: 7/20/89

PROJECT NO: 667-115

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 12 of 23	100.0	25 (2)								Silty Claystone, Olive gray (5Y 4/1) Non apparent bedding, mod to high, [illegible] Mod to highly friable, Silt occurs as [illegible] as a matrix trace of carb material
	100.3	185 (2)						101		Same as above [illegible] texture, no silt lenses, some iron staining as mottles abundant micro fractures
	102.1							102		
	102.1	19 (2)						103		Same as above: Floury texture, Abundant iron staining as mottles, Trace of carb materials, Trace of Calcareous material
	104.0							104		
	104.0	175 (2)						105		Same as above: Some iron staining as mottles,
	105.7									
	105.7	18 (2)						106		Same as above: abundant iron staining as mottles, trace of coal <1mm
↑								107		
107.6	107.6									
107.6	107.6	15 (2)		~~[illegible]~~ 90°						Same as above: trace iron staining, well consolidated mod to highly friable, fractures along slickensides at ~90°
	108.0							108		
	108.0	1.25		90°						Same as above: Floury texture, abundant slickensides fracturing at 90°, No Iron staining lower fraction of silt
	109.2							109		
	109.2	1.8 (2)								Same as above

NOTES General: USCS is modified for this log as follows.
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 32-89 BR

GEOLOGIST(S): MJH
DATE: 9/20/89

PROJECT NO: 667-11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
										See Previous page for description
	111.0									
	111.0 / 112.7			90°				111, 112		Silty Claystone, Olive gray (5Y 4/1) Massive Bedding, Mod to highly weathered, Mod to Highly Friable, flaky texture, abundant microfractures fractured by slickensides at 90°, Trace of Carbonaceous material
	112.7	0								No Sample
Box 13/23		1.65 (2)		90°				113, 114		Same as above: Claystone, Some Silt
	114.8									
	114.8	1.70 (2)						115, 116		Same as above: Trace of Carb material No Slickensides.
116.5	116.5									Same as above: Trace of Silt
1.5	116.5	.7 (2)						117		Same as above: Trace of iron staining as mottles
		1.1 (2)						118		Same as above: Some iron staining at top of interval grading to trace at bottom
Box 14/23		1.85 (2)						119		
	119.5									See Following page for description

NOTES General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 32-89 BR

GEOLOGIST(S): MJH
DATE: 9/20/89

PROJECT NO: 667-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 1 of 5	121	1.3 (2)						120		
	121.5	.5 (2)						121		Claystone, Olive gray (5 Y 4/1), Massive bedding, Mod. to hg, Weathered, Mod to highly friable, Trace of silt
	123.4	1.85 (2)						122		Same as above: Some carb material, trace of coal
	123.8	.25 (2)						123		Same as above:
	125.0	.8 (2)						124		Same as above: Some coal
125.5	125.5	.5 (2)				65 silt 35 clay		125		Clayey Siltstone, light olive gray (5 Y 6/1) No apparent bedding, Mod weathering Some VFG Sand as lenses and in matrix Some carb material, some iron staining as mottles
125.5	125.5	1.85 (2)						126		Same as above: olive gray (5 Y 4/1) Massive bedding, Some carb material, White mineralization (needlike xstals < 1mm) associated with larger carb deposits Trace of iron staining
	127.3	1.85 (2)			55 silt 45 clay			127		Same as above: Some iron staining no VFG sand, greater portion of clay trace of yellow mineralization assoc. w/ carb material
		1.85 (2)						128		Claystone, Olive gray (5Y 4/1) massive bedding Mod to highly weathered, Mod to highly friable Some carb material, white and yellow mineralization abundant in top 3' Trace of silt, trace of slickensides.
								129		

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 32-[illegible] PAGE 10 OF 17

GEOLOGIST(S): MJH
DATE: 9/21/89

PROJECT NO: [illegible]

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 15 or 23	130.8	1.85 (2)								See [illegible] for description
	132.2	.40 (2)						131		Claystone, olive gray (5Y 4/1) Massive bedding [illegible] weathering, Mod to high friable, Some carb material, Some iron staining, some silt
	132.6	1.4 (2)						132		Silty claystone, olive gray (5Y [illegible]), Massive bedding, Mod weathering, Mod friable, Trace of carb
		.8 (2)						133		Same as above; Some carb, Trace of iron staining as mottles
134.0	134	1.0 (2)						134		Same as above;
[illegible]	135	1.00 (2)				70% S [illegible]				Clay [illegible] Silty [illegible] Olive [illegible] (5Y 4/1) [illegible] apparent bedding, Mod weathering, Mod [illegible], Some carb material, trace of VFG sand [illegible]
	135.0	6 (2)				70% S 70% [illegible]		135		Same as above; Soft sand deformation trace of carb Some VFG as lenses, [illegible]
		1.75 (2)				70% Clay 30% S		136		Same as above; Some carb, [illegible] Con ~~[illegible]~~
Box 16	137.5					30% silt 70% Clay ~~[illegible]~~ silt [illegible]		137		Bottom [illegible] silty claystone, olive gray (5Y 4/1), Nonapparent bedding, Mod weathering, Mod to high friable, Some carb material, trace of iron staining as mottles
	138	[illegible] (2)						138		Same as above; Mod silty
	139	~~[illegible]~~ ~~[illegible]~~ ~~[illegible]~~ 0								
		1.1				70% Clay 30% Silt		139		Same as above less silty, trace of carb material

NOTES General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 32-89 BR

GEOLOGIST(S): NJH
DATE: 8/21/89

PROJECT NO: 667-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 1 of 2	140.1									See previous page for description
	14	1.1 (2)		37%				141		Claystone, Olive black (5 Y 2/1), Massive [illegible], Mod-highly weathered, Mod to hard friable, Some carb material, Some slickensides [illegible], [illegible] silt, abundant micro fractures
	141.7	.7 (2)								
		1.6 (2)		80%				142		Same as above; No slickensides, no micro fractures, Mod weathering, trace of coal
										Same as above, Some slickensides ~80%, Some coal, Some micro fractures
143.3	143.3							143		
143.3		1.9 (2)		80%						Same as above No apparent coal, No apparent carb material Some iron staining as nodules, and as mottles
								144		
Box 17 of 23	145							145		Same as above; Silty Claystone Some carb material, some slickensides at ~90%, trace of iron staining
		1.8 (2)		90%						
								146		
	146.8									
		.7 (2)						147		Same ~~as above~~! No apparent slickensides some iron staining as mottles at base of interval
								148		
	148.5									
		.65								Same as above! trace of iron staining as mottles, increased silt fraction, trace of coal, trace of carb material
	149.0							149		
		1.1								Same as above Some carb material, Some iron staining as mottles

NOTES. General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 32-89 BR PAGE 12 OF 17

GEOLOGIST(S): MJH
DATE: 9/21/89

PROJECT NO: 667-11 SC

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 17 ↑	152.1	1.8 (2)						151		See previous page for description Silty Claystone, Olive gray (5Y 4/1), Massive bedding, Mod Weathered, Mod friable, Some iron staining as mottles, trace of carb material, Trace of white mineralization associated w/ carb and iron needlelike [illegible] < 1mm
151.9	151.9									
151.4 ↓	152.4	.65 (2)						152		Same as above: Some carb, Some microfracture
	153.0	.7 (2)								Same as above
	153.3	.30						153		Same as above: Trace of coal, iron staining surrounds 1-2mm thick coal layer
	155.1	1.8 (2)						154		Same as above: No apparent coal, trace iron staining as mottles, carb material occurs often as leaf fossils, Top of section less silty than base of section
Box 18/23	157	1.95 (2)						155		Same as above Some iron staining as fracture fill in top .4 ft, Trace of iron staining as mottle below, Some carb material
	158.8	1.8 (2)						157		Same as above: Greater silt fraction some iron staining (mottles) in top 1/2 grading to trace, trace of coal, yellow mineralization often assoc with coal
		1.8 (2)						158		Same as above: No apparent coal Some iron staining as mottles more abundant in middle of section.

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 32-89 BR

GEOLOGIST(S): MJH
DATE: 9/21 90

PROJECT NO: 663-1 50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
160.6	160.6									See [illegible]
160.6	161.0	.6 (2)						161		Silty Claystone, Olive gray (5Y 4/1) massive bedding, Mod weathered, [illegible] friable, Trace of iron staining as mottles, trace of carb material
	162.0	1.1 (2)						162		Same as above: Trace of VFG [illegible]
	163.8	1.8 (2)		30°				163		Same as above: No apparent VFG sand fractures at 30°
Box 19 23	165.0	1.6 (2)						164		Same as above, No apparent fracture angle Some Carbon material, Some iron staining as mottles, greater clay fraction on basal .3 feet
	165.2	.2 (2)						165		Same as above: Clay fraction slightly less
	166.9	1.7 (2)		30° 90°				166		Same as above: Trace of VFG sand on lenses, distinct horizons of more clayey sand, or silty [illegible] angles (soft sed. deformation), Slickensides at base of interval at 30° and ~40° Trace of carb material
168.7	168.7	1.9 (2)						167 168		Same as above: Mod-highly friable trace of lenticular VFG sand, no apparent soft sed. deformation Significant slickensides, mod microfracturing, abundant large iron stains in middle 1/3 of interval
168.7 Bot 20 of 23	168.7 (170.8)							169		CLAYEY SILTSTONE, olive gray (5Y 4/1), apparent massive bedding, mod weathered, mod friable, some iron staining as mottles, trace of carb material

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Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 32-89 BR

GEOLOGIST(S): DAJ
DATE: 9/22/89

PROJECT NO: 667-1122

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 20 of 23	170.8	1.8								See previous page
	172.3	1.5				75% CLAY 35% SILT 25		170, 172		SILTY CLAYSTONE, olive black (5Y 2/1), apparent massive bedding, mod weathered, mod friable, some iron staining as mottles
	173	0.9				65% CLAY 35% SILT				Same as above: increased silt fraction
	173.8	0.8						173		Same as above. Some carb material
	175.7	1.8						174, 175		CLAYEY SILTSTONE, olive gray (5Y 4/1), massive bedding, mod weathered, mod-poorly friable, some iron staining as mottles, some carb, mod VFG sand at top to ~~abundant~~ some VFG sand (~20 ~~[illegible]~~) at base of interval in matrix (some lenses of mudstone) and bodies
	177.0	1.4						176		~~SILTY CLAYSTONE~~, SANDY ~~CLAYSTONE~~ SILTSTONE, olive gray (5Y 4/1), massively bedded, mod weathered, mod friable, some carb material, trace of iron staining as mottles, 40° fracture showing possible slickensides
↑ 177.3	177.3	0.3						177		SILTY SANDSTONE, light olive gray (5Y 6/1), massive bedding, mod weathered, mod-poorly friable, some carb material, sand is VFG, mod-well sorted
	179	1.8						178		SANDY SILTSTONE, olive gray (5Y 6/1), massive bedding, mod weathered, mod-poorly friable, sand is VFG and is in matrix and lenses, some carb material, some fractures at 20-50° showing slickensides
	180.8	1.85		20-50°				179		Same as above: increased sand fraction in middle of interval & increased clay at base of interval.

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 32-89 B2

GEOLOGIST(S): Day
DATE: 9/22/89

PROJECT NO: 1607-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 21 of 23										See previous page
	180.8									Clayey SILTSTONE, olive gray (5 Y 4/1), non-apparent bedding, highly weathered (Henry Lentine), mod friable
	181.7	0.2						181		SANDY SILTSTONE, olive black (5 Y 2/1) massive bedding, mod weathered mod-poorly friable, sand is VFG increasing fraction toward base of interval, occurring in mostly as bodies
		1.5						182		
	182.5									Same as above: olive gray (5 Y 4/1)
		1.75						183		
	184.2							184		Same as above: light olive gray (5 Y 6/1)
	184.8	0.6								
	185.0	0.1						185		SILTY SANDSTONE, light olive gray (5 Y 6/1), massive bedding, mod weathered, mod-poorly friable, Some bodies of yellowish gray VFG sand, sand is VFG, Mod-well sorted
Box 22 of 23	186.1	0.9						186		Same as above: (1-2 mm) laminations show poss. slight soft-sed deformation, Some carb material
		1.8						187		
	187.9							188		Same as above: trace of clay
	188.0	1.1						189		Same as above: silt is as interlam laminations, trace of non-as PG silt nodules
	189.5	0.5								Same as above. increase in silt ~~interlamination~~ abundant carb material in top 1 ft of interval
	190.3	1.35								

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 32-89 BR

GEOLOGIST(S): [illegible]
DATE: 9/25/89

PROJECT NO: 667-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 22/23										See previous page
	191.3					60% SILT 40% SAND		191		SANDY SILTSTONE, olive gray (5 Y 4/1) w/ pockets (1in-5cm diameter) of yellowish gray (5 Y 6/1) SANDSTONE, apparently laminated, mod weathered, mod-poorly friable, SANDSTONE is well sorted, VFG. Some carb material, some non appar. w/ carb and as mottled staining. Top 0.5 FT: Same as above, base is sandy. Base of interval: SILTY CLAYSTONE, olive gray (5 Y 4/1), more apparent bedding, sharp contact with above. 0.5 FT below contact is highly weathered, base is mod-highly weathered, mod friable, some carb material
		1.0						192		
	193.0							193		
		1.0						194		
194.8	194.8									
								195		Same as above
	195.7	0.9								
		∅						196		NO SAMPLE
	197							197		CLAYSTONE, olive gray (5 Y 4/1), more apparent bedding, mod-highly weathered, mod friable, some silt (quarter inch in top of interval)
	197.6	0.6								
		∅						198		NO SAMPLE
	199.0							199		Same as above: some carb material
		1.1								
	200.0									

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

LOG OF BORING NO. 32-89 BR

GEOLOGIST(S): [illegible]
DATE: 9/25/89

PROJECT NO: 667-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 23 of 23	200	0.6								Claystone, olive gray (5Y 4/1), mor apparent bedding, mod weathered, mod friable, some small slickensides
	201							201		Same as above: some carb, trace of coal seam (≈ 1-3mm)
		1.0						202		
203	203							203		
END OF BOXES								204		
								205		
								206		
								207		
								208		
								209		

NOTES General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 33-89 BZ

GEOLOGIST(S): [illegible] + MJH
DATE: 9/19/89

PROJECT NO: 667-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
	0 1.15	~~0.4~~ 1.4 (2)				25% 55% clay 30% sand 20% gravel		0 1		Gravely Sandy Silt TOP 8" ~~Sandy gravely Clay~~, Moderate Brown (5 YR 3/4) max gravel size 3.5 cm, Some Clay surficial grass w/roots at top of interval, Basal interval Sandy gravely clay, mod plasticity
	1.15 2.2	0						2		No Sample
	2.2 2.7	~~1.7~~ 0.4 (2)				50 clay 30 sand 10 gravel				Same as last interval > sand fraction
	2.7 4.4	1.7 (2)				40 clay 30 sand 30 gravel 20% sand 30% Calc 50% gravel		3 4		Top 1ft Same as above. Increased gravel fraction increased sand fraction max gravel size 4 cm Basal portion Sandy calcareous gravel, Mod orange pink (5 YR 8/4), Angular to subangular, moderately graded, mod to VFG Sand, max gravel 4 cm, Some crazed mat iron staining.
	4.4 6.4	1.4 (2)			crazed mat	30% Sand 30% Calc 40% gravel		5 6		Same as above: Increase in sand fraction
	6.4 8.4	1.5 (2)						7 8		Same as above.
	8.4 to 12.4	0						9		

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 33-89 B2

GEOLOGIST(S): DLJ & MJH
DATE: 9/19/89

PROJECT NO: 667-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
	8.4									
		d						11		NO SAMPLE
								12		
	12.4									
Box 1 of 3	12.4	0.55 (1)						13		Calcareous Sandy Gravel, mod yellowish brown (10 YR 5/4), angular - sub angular, mod grading, max grain size = 7cm
	14.4							14		
	14.4	0.9 (1)						15		Sandy Gravel, grayish orange (10 YR 7/4) angular - subrounded, max size > core barrel diameter, some clay, trace of calc. material
↑ 16.4	16.4							16		
	16.4	(1)				55% sand 45% gravel		17		Gravelly Sand, light brown (5 YR 6/4) angular - subrounded, mod - well graded, sand is VFG - CG, max gravel size = 6.5 cm some clay
	To	1.5						18		
	18.4									Same as above: sand portion greater mod graded
	18.4	(1) 0.5				65% sand 35% gravel		19		
	20.4									

NOTES General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 33-89 B2

GEOLOGIST(S): DAY + MJH
DATE: 9/19/89

PROJECT NO: 6607-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 2 of 3	20.4									
		(1) 1.1						21, 22		Gravely Sand, light brown (5 YR 6/4) Angular to Subrounded Mod graded Sand is VFG to Coarse Grained max gravel size 6.5 cm, Trace clay
	22.4									Same as above: Sand is VFG - Granular max gravel size = 3cm.
		(1) 0.8						23, 24		
	24.4 ~~22.4~~									
	~~22.4~~ 24.4							25, 26, 27, 28, 29		NO SAMPLE
		∅								
	33.4									

NOTES General. USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 33-89 BR

GEOLOGIST(S): [illegible] + MJH
DATE: 9/19/89

PROJECT NO: 667-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
	22.4									
								31		
		Ø								NO SAMPLE
								32		
								33		
	33.4									
Box 2 of 3		(1) 0.55						34		Clay, light olive gray (5 Y 6/1), mod plast, flaky texture, possibly highly weathered claystone.
	34.7									
		(1) 1.7						35		TOP OF ROCK Claystone, light brownish gray (5 YR 6/1) mottled with dark yellowish orange (5 YR 6/6), gradational contact, massive bedding, mod - highly weathered, mod friable, abundant iron staining along micro-fractures and as mottles trace of dark olive brownish gray (5 YR 6/1
	36.7							36		
	36.7	(1) 0.4								
		(1) 1.3						37		~~Same as above; trace of iron staining~~ Same as above. Some carb material. Some grading to trace of iron staining as mottles
38.0	38.0									
38.0	38.0 TO 38.7							38		Same as above. abundant iron staining as mottles,
Box 3 of 3	38.7 TO 39.4							39		Same as above. brownish gray (5 YR 4/1) trace of iron staining
	39.4 TO 40.7									Same as above. Some silt

NOTES General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 3389 BR

PAGE ~~3X~~ #5 OF 16

GEOLOGIST(S): DAT/MJH
DATE: 9/18/89

PROJECT NO: 667-11,5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
								40		See previous page (Box screw changes from 1/3-3/3 to 1/11. 11/11 - same bore hole
40.7 ↓	40.7 to 44.0	1.75 (2)				>50% clay		41, 42		~~Claystone (possibly highly weathered claystone)~~ Light olive gray (5Y 6/1), mottled with Dusky yellow (5Y 6/4), Nonapparent bedding, highly weathered moderate to highly friable, abundant iron staining, trace of carb. material some silt, some fracturing ~65° 90° and other microfractures, some fractures show iron staining
	42.5 to 44.0	1.85 (2)				>50% clay		43		Claystone Same as Above
Box 1 of 11	44.0 to 47.0	0 (2)						44, 45, 46		No Sample
	47.0 to 48.0	0 (2)						47		No Sample
	48.0 to 50.0	0.3 (2)				>50% clay		48, 49, 50		~~Clay~~ Siltyclaystone Olive Gray (5Y 4/1), nonapparent bedding, well weathered moderately to highly friable, some iron staining as mottles, Trace of carb material

NOTES General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
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(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. ~~33-59~~ LCB

PAGE ~~2~~ 8 OF 16

Das 6

GEOLOGIST(S): DAT/MJH

DATE: 9/18/89

PROJECT NO:

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 1 of 11	50.0 to 51.4	1.4 (2)				75% clay		51		Silty claystone Olive gray (5Y 4/1) nonapparent bedding, well weathered, mod. to highly friable some iron staining as mottles, ~~trace of~~ some carb materials, Trace of very fine grained sand at base of interval
	51.4 to 52.0	.45 (2)				75% clay		52		Same as above; Trace of 1-2mm coal seam
	52.0 to 53.3	1.4 (2)				75% clay		53		Same as above No apparent coal
↑ 55.0	53.3 to 55.0	1.55 (2)				75% silt		54		Clayey siltstone light olive gray (5Y 6/1) non apparent bedding mod to highly weathered, mod to poorly friable some carb material base of interval has some very fine grained sand fraction, trace iron nodules
55.0 ↓	55.0	0.3 (2)				75% silt		55		Same as above: Yellowish Gray (5Y 8/1)
	to 55.3	1.3 (2)				75% silt		56		Same as above: Base of inverval grades to olive gray (5Y 4/1) ~~tag~~ increasing clay fraction, and carb material
	55.3 to 56.7									
Box 2/11	56.7 to 57.4	0.85 (2)				75% clay		57		Silty claystone olive gray (5Y 4/1) massive bedding, mod. to highly weathered, mod friable, abundant carb material trace iron staining as mottles
	57.4 to 59.3	0						58		No Sample
	59.3 to 62.3	0						59		No Sample

NOTES. General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 33-89

GEOLOGIST(S): DAT/MJH
DATE: 9/18/89

PROJECT NO: 667-115

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 2 of 11	59.3 to 62.3	0						61, 62		No Sample
	62.3 to 63.3	3 (2)				75% Clay		63		Claystone olive gray (5 Y 4/1) massive bedding, Mod to highly weathered, Mod to highly friable, some silt, trace carb material trace coal
	63.3 to 63.6	0.3 (2)								Same as above
	63.6 to 65.4	1.75 (2)						64, 65		Same as above: Some Carb material to abundant carb material at middle of interval
	65.4 to 66.2	.70 (2)						66		Same as above: light olive gray (5 Y 6/1) trace carb material
	66.2 to 69.0	0						67, 68		No sample,
	69 to 73.0	.90 (2)						69, 70		Same as above: Olive gray (5 Y 4/1)

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 33-89

GEOLOGIST(S): LAY + MJH
DATE:

PROJECT NO:

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 2 of 11	73.0							71, 72		See Previous Page
	73.0 to 73.3	4 (2)						73		Carbonaceous Claystone brownish black (5 Y 2/1), No apparent bedding, highly weathered, mod. friable, trace yellow mineralization, some silt
	73.3 to 74.0	.5 (2)								
	74.0 to 74.3	0.7 (2)						74		Claystone, olive gray no apparent bedding, mod weathered mod friable, some carb material, ~~[illegible]~~
74.7 ↑										
74.7 ↓	74.7 to 76.0	1.25						75		Same as above: ~~Carbonaceous olive black increased carb content~~ SAME AS ABOVE. abundant carb material at base, coal seam ≈3-2 mm, possible sulfur assoc w/ coal
Box 3 of 11	76.0 to 78.0	1.27						76, 77		SAME AS ABOVE: light brownish gray (5 YR 6/1), trace of iron staining as modules, some carb. material
	78.0 to 78.5	0.4						78		Same as above: light olive gray (5 Y 6/1) no apparent iron staining, some silt, trace of carb material
	78.5 to 79.4	1.3		50°				79		Same as above. trace of iron staining as modules, fractures at 50°
	79.4 to 80.0	∅								No Sample

NOTES General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 33-89 BR

PAGE ~~8~~ 8 9 OF 16

GEOLOGIST(S): DAJ & MJH

DATE: 9/10/89

PROJECT NO: 667-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 3 of 11	80.0 to 80.3	(2) 0.3						80		Claystone, light olive gray (5 Y 6/1), non apparent bedding, mod weathered, mod friable, some silt, some carb. material
	80.3 to 81.8	(2) 1.6						81		Same as above, olive gray (5 Y 4/1), trace of silt
	81.8 to 82.0	0						82		NO SAMPLE
	82.0 to 84.0	(2) 1.9				>50% Clay		83		~~Same as above~~ SILTY CLAYSTONE: light gray (N7), ~~non stained as modules~~ massive bedding, mod weathered, mod friable, trace of iron staining as modules, trace of carb material
BAD										
BAD	84.0 to 85.8	(2) 1.85				>50% SILT		84		CLAYEY SILTSTONE, light olive gray (5 Y 6/1), massive bedding, mod weathered, mod friable, more clay fraction in middle of interval, trace of VFG sand dikes, ~~iron~~ trace of iron modules.
								85		
Box 4 of 11	85.8 to 87.0	(2) 1.2						86		Same as above no sand dikes, higher clay fraction at base of interval.
	87.0 - 87.5	(2) 0.4						87		SILTY Claystone: Same as above
	87.5 - 89.1	(2) 1.6						88		CLAYSTONE: Same as above, trace of silt
								89		Same as above: Trace of carb. material
	89.1 to 91.0	(2) 1.8								

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(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 33-89-BR

PAGE ~~8~~ 9 OF 16

GEOLOGIST(S): DAJ - MJK

DATE: 9/18/89

PROJECT NO: 667-11 SO

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 4 of 11 → 92.3	89.0 -91.0					>50% CLAY		91		See previous page
	91.0 -92.7	(2) 1.7				>50% CLAY		92		CLAYSTONE, light olive gray (5Y 6/1), massive bedding, mod weathering, mod friable, trace of silt, trace of carb, vertical view of coal
92.7	92.7 -94.5	(2) 1.8				>50% CLAY		93, 94		Same as above: at ≈ 93.0 - 93.4 is coal seam, ≈ 4-12mm in width at 80°
	94.5 -95.0	.7 (2)		90°		>50% CLAY		95		Same as above: fracture ≈ 90°, trace of carb material occurs as coal.
Box 5 of 11	95.0 -96.0	(2) 1.0				>50% CLAY		96		Same as above: no silt, bedding is iron-apparent, mod-highly weathered, mod-highly friable, trace of iron.
	96.0 -97.8	(2) 1.7						97		SILTY CLAYSTONE olive gray (5Y 4/1), massive bedding, low-mod weathered, mod-low friable, slickensides w/ fracture at 45°,
	97.8-98.0	0						98		NO SAMPLE
	98.0 -99.7	(2) 1.7						99		CLAYEY SILTSTONE, olive gray (5Y 4/1), horizontal laminae in top of section, no apparent bedding at base of interval, mod weathering, mod friable, VFG sand lense at base of interval, trace of iron modules, trace of carb. mat
	99.7-100.5									See next page

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(2) Core breaks cannot be matched, accurate footage measurements not possible

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 33-89 BR

GEOLOGIST(S): LAJ - MJK

DATE: 9/18/89

PROJECT NO: 667-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
5/11	100.5 - 101.5	1.0 (2)						101		Sandy Siltstone, brownish gray (5YR 4/1), horizontal laminations, mod weathered, mod friability, sand is VFG, some iron staining as mottles, trace of carb material, laminations of VFG sandstone (very light gray N8) interbedded.
101.5 ↓	101.5 to 102.3	1.75 (2)		90°	30°			102		Top 2.5 in - Same as above trace of carb. Base of interval: Clayey Siltstone, olive gray (5Y 4/1), no apparent bedding, mod weathered, mod friable, some carb material some iron staining as mottles
	102.3 to 104.0	0.7 (2)						103		Silty Claystone, olive gray (5Y 4/1) moderately weathered, moderately friable some carb material some iron stain as mottles, trace of very fine grained sand fractures ~90° base of interval broken by microfracture
	104.0 to 105.0	1.0 (2)						104		Same as above Massively bedded, trace of Iron staining, trace of Carb, no apparent fracturing
	105.0 to 106.8	1.75 (2)						105		Carbonaceous Claystone (Possibly lignite), Olive black, moderately friable, white needlelike crystal mineralization (some), Yellow mineralization (trace)
	106.8 to 108.0	1.6 (2)						106		Same as above for top 1 foot of interval. Bottom of interval is Claystone, olive gray (5Y 4/1), Massively bedded, mod friable, mod weathered, some carb material, trace of iron as nodules, trace of silt at base of interval, trace of coal.
	108.0 to 112.0	0						107		Same as above: Carb material at top of interval, trace of coal,
								108		
								109		

please page

No Sample

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ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 33-89 BR

GEOLOGIST(S): [illegible] - MJK
DATE: 9/18/89

PROJECT NO: 6667-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
	108.0 to 112.0	0						111		No Sample
	112.0 to 112.4	.45 (2)						112		Claystone, olive gray (5Y 4/1) No apparent, mod to high weathering, mod friability, Some iron nodules
	112.4 to 114.0	0						113		~~Same as above : Some Silt~~ No Sample
	114.0 to 115	.95 (2)						114		Same as above : Some Silt
↑ 115	115 to 116	1.3 (2)						115		Sandy Claystone, Olive gray (5Y 4/1) ~~[illegible]~~ bedding non apparent, mod to highly weathered mod to highly friable, Sand is VF Grained and as lenses at top of interval otherwise exists as matrix Some Carb material trace of coal trace of iron staining
	116 to 116.5	0.45 (2)						116		
	116.5 to 117.0	.7 (2)								Same as above : Abundant Carb material
	117 to 118	1.1 (2)						117		Silty Claystone light olive gray (5Y 6/1) massive bedding mod weathered mod friable Trace of Carb material
										Same as above
	118 to 119.7	1.7 (2)						118		Same as above. Wt @ 118.3, 60° Fracture
								119		
	119.7 to 121.0	1.4 (2)								See previous page

NOTES General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
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ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 33-89 BR PAGE ~~9~~ 12 OF 16

DAY 3

GEOLOGIST(S): [illegible] MJH
DATE: 9/10/89

PROJECT NO: 667-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 7/11 ↑ 122.7	119.7 to 121.0			30°						Silty Claystone, Olive gray (5Y 4/1), massive bedding, Mod. weathering, Mod friable, Trace of carb material, Fracture at 30°
	121.0 to 121.2	.35 (1)						121		Same as above; Flowery texture
	121.2 to 122.7	1.8 (2)						122		Same as above for top 8" Clayey siltstone thereafter light olive gray (5Y 4/1) Massive bedding, Mod. weathered, Mod to poor friability Some carb material, Trace of iron nodules
122.7 ↓	122.7 to 124.5	1.75 (2)						123		Same as above
								124		
Box 8/11	124.5 to 126.9	1.85 (2)						125		Top 1.0 ft VFG Sandstone, Very light gray (N-8) and very light olive gray (5Y 4/1) Horizontal lamination with soft sedimentary deformation present, Mod weathered, Mod to poor friable, Traces of Carb. Iron Staining as mottles (trace)
								126		Base of interval Claystone, Olive black 15Y 2/1) Non apparent bedding, Mod. weathering Mod to high friability, Some Carb material Some Iron staining as mottles, some Silt Trace of VFG sand, Trace of White Mineral, [illegible]
	126.9 to 127.0	0						127		No Sample
	127.0 to 127.3	0.3 (2)								Clayey siltstone, Olive Gray (5Y 4/1), Non apparent bedding, Mod to poor friability, Some carb. material Some iron staining as mottles, Some VFG sand
	127.3 to 129.1	1.55 (2)						128		Same as above Mod friable, Trace Carb material VFG sand in lenses at base of interval as well as throughout matrix, White mineral [illegible] (trace)
	129.1 to 131.0	0						129		No Sample

Sharp contact w/sand above, Flowery texture at ba[illegible]

NOTES General USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 33-89 BR

GEOLOGIST(S): [illegible] / MSH
DATE: 9/18/89

PROJECT NO: 667-1150

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 8/11	129.1 to 131.0	0								No Sample
	131.0 to 132.0	0.9 (2)						131		Same as above; including basal sand lenses
↑ 133.4	132 to 133.4	1.4 (2)						132, 133		Sandy Siltstone, Yellowish gray (5Y 8/1) bedding non-apparent mod to highly weathered Mod to Poorly friable, Some iron staining as mottles, Some carb material, VFG sand
133.4 ↓	133.4 - 134.0	(2) 85				Erase [illegible] 45% clay 40% silt 15% sand				Silty Claystone, light olive gray (5Y 6/1), laminar bedding, low-mod weathering, mod-low friability, some VFG sand, some carb material, some iron staining as mottles, sand in matrix & as lenses.
	134-135	(2) 95				Same as above		134		Same as above mod friability, iron staining assoc w/ carb material
	135-136.8	(2) 1.8				Same as above		135, 136		Same as above. non-apparent bedding. Base of interval has greater clay fraction, trace of carb material
Box 9 of 11	136.8 - 138.0	∅						137		No Sample
	138-139.1	1.1 (2)				55% clay 45% silt		138		Erase Same as above; olive gray (5Y 4/1), trace of sand
	139.1 - 140.5	(2) 2.6				Same as above		139		Same as above. mod-highly friable along micro fractures

NOTES General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 33-89 BR

GEOLOGIST(S): LDY & MJH

DATE: 9/19/89

PROJECT NO: 667-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 9/11	140.5 - 142.0 (2) 1.54			80°		58% clay 42% silt		141		Silty Claystone, Olive gray (5Y 4/1), No apparent bedding, mod friable, mod weathered, Some carb material, Some iron staining assoc w/ carb and as mottles, trace of VFG sand fractures at 80°
142.0	142.0 - 142.5	0.6						142		SAME AS ABOVE base of interval - trace of carb, ~~fractures at 80°~~ no fracture
	142.5 - 143.7	1.15						143		SAME AS ABOVE massive bedding, silt in matrix and as clasts
	143.7 - 145.3	1.7				40% clay 30% silt 30% sand		144, 145		SANDY SILTY CLAYSTONE, olive gray (5Y 4/1), Slab shows soft sed deformation, mod weathered, mod friable, sand is VFG, sand & silt are clastic & in matrix, trace of carb & trace of assoc w/ carb & in mottles
	145.3 - 146.3	0								NO SAMPLE
Box 10 of 11	146.3 - 147.2	1.75						146, 147		SILTY CLAYSTONE, olive gray (5Y 4/1), massive bedding, mod weathering, mod friable, top 8in - some carb, some iron staining as mottles & assoc w/ carb, below 8in - trace of carb & iron stain, Some sand throughout in matrix and clasts
	147.2 - 149.5	1.87						148, 149		SAME AS ABOVE Some carb material & some iron staining assoc w/ carb in bottom 1 ft, trace of sand
	149.5 - 149.8	0.45								Same as above. See next page

NOTES General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. SEP 33-89 BR PAGE 3 OF 3

GEOLOGIST(S): DCB
DATE: 9/28/89

PROJECT NO: 667-115

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 2 of 3	20.1 to 22.1	(1) 1.8				>50% dry		21, 22		Claystone, light olive gray (5Y 6/1), well weathered, mod. friable, iron staining locally and on fractures, trace of silt to some silt
Box 3 of 3	22.1 to 24.1	(1) 1.8						23, 24		
	24.1 to 26.1	(1) 1.9						25, 26		
	26.1 to 28.1	(1) 1.8						27, 28		Claystone as above color grades to dark gray (N3) below 26.1 ft.
								29		Bottom of Box 3 of 3 at 28.1 ft.

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 34-89 BR

GEOLOGIST(S): LAS
DATE: 9/20/89

PROJECT NO: 6667-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 2 of 6		1.7				50% GRAVEL 30% SAND 20% CLAY	GC	11		CLAYEY SANDY GRAVEL, matrix color is grayish orange (10 YR 7/4), sub angular-angular, max. size = 6 cm, sand is FG-CG, mod-well graded
	11.3-11.8	Ø								NO SAMPLE
	11.8-12.7	1.1				50% CLAY 50% SAND 15% GRAVEL	SC	12		~~Same as above except~~ CLAYEY SAND, matrix color is light brown (5 YR 5/6) ~~grayish orange (10 YR 7/4)~~, sub angular-subangular, mod-poorly graded, sand is MG-CG, some gravel (max size = 1 cm)
	12.7-13.8	~~1.5~~ 0						13		NO SAMPLE
	13.8-14.9	1.3				50% SAND 30% CLAY 20% GRAVEL	SC	14		Same as above. increase in gravel fraction
	14.9-15.8	0						15		NO SAMPLE
	15.8-16.8	1.0				55 60% GRAVEL 30 30% CLAY 15% SAND	GC	16		CLAYEY GRAVEL, matrix color is grayish orange (10 YR 7/4), angular-subangular, mod graded, max size = size of core barrel (7-8 cm), some MG-CG sand
	16.8-17.8	Ø						17		NO SAMPLE
19.1	17.8-19.1	1.4				55 50% GRAVEL 25 30% CLAY 20% SAND	GC	18 19		Same as above. increase in sand fraction
19.1 ↓	19.1-19.8	Ø								DISCREPANCY BETWEEN BOXES

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(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 34-89 BR PAGE 3 OF 17

GEOLOGIST(S): [illegible]
DATE: 9/21/89

PROJECT NO: 1667-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 3 of 6	(19.8) 21.0	2.8				50% Gravel 30% Sand 20% Clay	GC	21		CLAYEY SANDY GRAVEL, mainly color is dark yellowish orange (10 YR 6/6). Subangular - subrounded, max size = 5 cm, sand is FG-VCG, mod-well graded. Bottom 0.5 FT is very pale orange (10 YR 8/2)
	21.8 to 23.9	1.8				55% Sand 30% Clay 15% Silt		22		Same as above, dark yellowish orange (10 YR 6/6)
	23.9 24.3	1.7						23		TOP 1 FT: Same as above. Bottom of interval: TOP OF ROCK. CLAYEY SANDSTONE, very light gray (N8) and grayish orange (10 YR 7/4) non-apparent bedding, contact w/ above shows a 0.1 FT of gravel imbedded in the stone and is possibly a scour surface, mod weathered, mod-highly friable, VFG, mod sorted, some silt, abundant staining as mottles, trace of coal, core is moist
↑ 25.3	25.3	1.0						24		
25.3 ↓ Box 4 of 6	26.3	1.0						25		
	27.3	1.3						26		Same as above: this interval has probable stuff of above gravelly interval in top 1 FT and in the bottom of the box. The described core is consolidated
	28.3	1.2						27		Same as above: increased clay content at base of interval
	29.3	1.0						28		Same as above: clay content is Same as interval 23.3-24.3
	(30.3)	1.0						29		Same as above: (26.3-27.3) TOP 1 FT Same as above, increased clay fraction. Base of interval: CLAYSTONE, brownish gray (5 YR 4/1), non-apparent bedding, mod-well weathered, mod friable, trace of silt

28.3-29.3 → Same as above: Some silt trace of VFG sand, abundant iron staining at base of interval w/ color changing to grayish orange (10 YR 7/4)

29.3-30.3 → Same as above, abundant staining in middle of interval

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 34-89 BR

GEOLOGIST(S): JAY
DATE: 9/21/89

PROJECT NO: 6667-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
30.3										See previous page
30.3	30.3 -31.3	1.5			45 20	55% CLAY 45% SAND 20% SILT		31		SANDY CLAYSTONE, dark yellowish gray (10 YR 6/6) mottled with light olive gray (5 Y 6/1), highly weathered, non apparent bedding, core is moist, sand is VFG, some silt, Honey texture.
Box 5 of 6	31.3 -32.3	1.8				60% SAND 35% CLAY 20% SILT		32		Same as above
	32.3 -33.3	1.3						33		CLAYEY SANDSTONE, dusky yellowish brown (10 YR 2/2), non apparent bedding, highly weathered, mod-high friable, sand is VFG, some silt Honey texture.
	33.3 - 34.3	1.7				same		34		Same as above. consolidated texture
35.3	35.3	1.6						35		Same as above. Honey Texture
36.3	36.3	1.3			65 20	55% SAND 30% CLAY 20% SILT		36		Same as above: decreased amt of clay, sand is VFG-FG, color is light gray (N7)
	37.3	1.1						37		Same as above: sand is FG-MG, highly friable
Box 6 of 6	38.3	0.6				55% SAND 35% CLAY 20% SILT		38		Same as above: ~~increased clay~~ fraction sand is VFG, color is medium gray (N5), increase in clay fraction, mod friable
		1.0						39		VFG SANDY SILTSTONE, mod light gray (N6) non apparent bedding, ~~is~~ highly weathered (Honey texture), mod friable, clay, trace of sand
	39.3 (40.3)	0.75								SILTY CLAYSTONE, olive gray (5 Y 4/1) non-apparent bedding, highly weathered, mod-highly friable, Honey texture.

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Material amounts are estimated by % volume instead of % weight.
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(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. ~~39~~ 34-89 BR PAGE 5 OF 17

GEOLOGIST(S): DAY
DATE: 9/21/89

PROJECT NO: 667-11.00

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 6 of 6										See previous page
	41.3	1.2						41		SILTY CLAYSTONE, olive gray (5Y 4/1), mon - apparent bedding, mod - highly weathered, mod - highly friable, ~~some silt~~
↑ 42.0	42.0	1.1						42		Same as above: some sand
	43.0	Ø						43		NO SAMPLE - Discrepancy between Boxes
43.0 ↓	45.0	0.9						44		SILTY SANDSTONE, yellowish gray (5Y 8/1), mon apparent bedding, mod - highly weathered, mod - poorly friable, broken texture
	49.0	Ø						45 46 47 48		NO SAMPLE
	49.6	0.6						49		CLAYSTONE, olive black (5Y 2/1), massive bedding, mod weathered, mod - highly friable, trace of silt, trace of carb
HM (50.5)	~~(51.0)~~	1.1								Same as above, trace of vertical fractures showing slickensides

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Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 34-89 BR

GEOLOGIST(S): MJ
DATE: 9/21/89

PROJECT NO: 6667-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
	50.5									See previous page
	50.0	∅								NO SAMPLE
	51.0	0.6						51		SILTY CLAYSTONE, olive gray (5 Y 4/1), massive bedding, mod weathering, mod friable, some carb material, trace of iron staining as nodules & mottles
	53.4	1.8						52 53		~~Topsoil~~ Same as above. Some sand from @ 52.0' to 53.4'
	54.0	0.5								Same as above
	55.0	1.15						54 55		NO SAMPLE
	56.2	0.45						56		CLAYEY SILTSTONE, olive gray (5 Y 4/1), massive bedding, mod weathered, mod-poor friability, some carb material, trace of VFG sand, fracture @ ~~30°~~ 45° at @ 55.2 FT
	56.7	0.65								Same as above. Some VFG sand in matrix
	57.0	∅						57		NO SAMPLE
	58.0	0.3				5 ~~30%~~ SILT ~~70%~~ SAND				SILTY SANDSTONE, pinkish gray (5 YR 8/1), non-apparent bedding, mod weathered, mod friable, broken fracture, VFG - FG, mod-well sorted
58.3	58.3					~~50% SILT~~ ~~50% SAND~~		58		Same as above: increase in silt fraction
58.3 ↓	(60.7)	1.8						59		CLAYEY SILTSTONE, olive gray (5 Y 4/1), massive bedding, mod weathered, mod-poorly friable, trace of VFG sand

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Material amounts are estimated by % volume instead of % weight.
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(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 34-89 B2

GEOLOGIST(S): [illegible]
DATE: 9/29/89

PROJECT NO: 6607-11.50-13

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
										See previous page
	61.3	1.2						61		SILTY CLAYSTONE, olive gray (5 Y 4/1), massive bedding, mod weathered, mod friable, some carb material, trace VFG Sand
	62.0	Ø						62		NO SAMPLE
	62.5	0.5								Same as above.
Box 8 of 20	63.3	1.8						63		Same as above decreased silt fraction at base
	65.4	1.0						64 65		Same as above
	66.0	Ø						66		NO SAMPLE
	66.5	0.5								Same as above.
↑ 68.3	68.3	1.8						67 68		SILTSTONE, olive gray (5 Y 4/1), massive bedding, mod weathered, mod-poorly friable, trace VFG Sand
	~~68.9~~ 68.3 69.9	1.6						69		Same as above: some carb, some clay at base of interval
										See next page

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(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 34-89 BR

GEOLOGIST(S): [illegible]
DATE: 9/29/89

- 14.11

PROJECT NO: 667-~~1150~~/3

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
		1.8				10% SILT 90% CLAY		71		CLAYSTONE, olive gray (5 Y 4/1), massive bedding, mod weathered, mod friable, some silt, trace of iron as mottles, vertical fracture at top
	71.8									
		1.8						72		Same as above
								73		
	73.6									Same as above
	74.0	0.3						74		Same as above
Box 9/20		1.4						75		
	75.4									
		1.8				15% SILT 85% CLAY		76		Same as above: light olive gray (5 Y 6/1), increased silt content
77.2	77.2							77		SILTY CLAYSTONE, olive gray (5 Y 4/1), massive bedding, mod weathered, mod friable,
77.2	77.2 - 78.0	1.0				30% SILT 70% CLAY				
Box 10 of 20	78.0 - 78.7	0.7				85% SILT 15% CLAY		78		~~[illegible]~~: SILTSTONE, olive gray (5 Y 4/1), massive bedding (from slab), mod weath v. poorly friable, some clay, trace of iron staining as mottles, base of interval there increased clay fraction
	78.7 - 80.5	1.75				30% SILT 70% CLAY		79		
										See next page

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ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. ~~[illegible]~~ 34-89 BR PAGE 9 OF 17

GEOLOGIST(S): [illegible]
DATE: ~~9/28/89~~ 10/23/89

PROJECT NO: 1/1/7-~~1150~~/13 (14 11)

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 10 of 20	78.7-80.5					30% silt 70% clay				Silty CLAYSTONE, olive gray (5 Y 4/1), massive bedding, mod weathered, mod friable,
	80.5-82.0	1.65						81		Same as above: trace of coal
	82.5-83.8	1.75				30 30% clay 60% silt 10		82 83		CLAYEY SILTSTONE, olive gray (5 Y 4/1), massive bedding, mod weathered, mod-poorly friable
	83.8-85.5	1.7						84 85		Same as above: trace of carb. material, fracture of at ∠ 85.0, ∠ vertical, showing slickensides
85.5	85.5-86.0	0.8				35% clay 65% silt		86		Same as above: increase in clay fraction, trace carb material, fracture at 90° & ∠ 30° showing slickensides
	86.0-87.0	0.9				25% silt 75% clay				SILTY CLAYSTONE, olive gray (5 Y 4/1), massive bedding, mod weathered, mod-~~[illegible]~~ friable, trace of carb material,
	87.0-88.6	1.6				15% silt 85% clay		87 88		CLAYSTONE, olive gray (5 Y 4/1), massive bedding, mod weathered, mod friable, some silt, trace of carb. material.
	88.6-90.4	1.75						89		Same as above

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ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 34-89 BR

GEOLOGIST(S): [illegible]
DATE: 10/23/89

PROJECT NO: 667-14.11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 11 of 20	88.6 - 90.4									See previous page
	90.4 - 91.0	0.55				15% CLAY	SILT			CLAYSTONE, olive gray (5 Y 4/1), massive bedding, mod weathered, mod friable, some silt, trace of carb. material
	91.0-91.2	1.1'						91		Same as above, no silt
	91.2-93.1	1.7						92		Same as above
93.1								93		
93.1	93.1 -95.0	1.8				30% CLAY 75% SILT		94		CLAYEY SILTSTONE, mod light gray (N6), massive bedding, mod-poorly friable, trace of carb material
Box 12 of 20	95.0 -96.7	1.7				10% SAND 90% SILT		95, 96		SILTSTONE, light brownish gray (5 YR 6/1), massive bedding, mod weath mod. poorly friable, some carb material, some VFG sand as sand dikes ≈ 0.7-1 cm thick & vertical throughout interval
	96.7 -98.5	1.8				25% SAND 75% SILT		97, 98		Top of interval: Same as above. At ≈ 97.5 - SANDY SILTSTONE, light gray (N7), slab shows massive bedding, mod weathered, mod-poorly friable, sand is VFG, some iron staining along horizontal planes, some ~~iron staining~~ carb. material
	98.5 -99.0	0.55								Same as above: light olive gray (5 Y 6/1), no iron staining
	99.0 -100.0	1.15				35% SAND 65% SILT		99		Same as above - increase in sand fraction

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(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 34-89 BR

GEOLOGIST(S): [illegible]
DATE: 10/23/89

PROJECT NO: 67-14.11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
↑ 101.8	100-101.8	1.75				35% SAND 65% SILT		100		~~INTERBEDDED~~ SANDY SILTSTONE ~~AND SANDSTONE~~, yellowish gray (5 Y 8/1) to light olive gray (5 Y 6/1), slab shows lamina bedding w/ abundant possible soft sed deformation burrows (filled) bioturbation, possible roots ~~[illegible]~~ mold, mod weathered, mod-poorly friable, ~~[illegible]~~ VFG sand, some VFG sand lenses @ 1-3 cm thick, some carb material
Box 13 of 20	101.8-103.6	1.8				35% SILT 65% SAND		102		
								103		SILTY SANDSTONE, yellowish gray (5 Y 8/1) to light olive gray (5 Y 6/1), slab shows ~~[illegible]~~ SILTSTONE lenses (@ 1/2-1 cm thick) bioturbation, possible burrows, clay filled root molds, mod weathered, mod-~~poorly~~ friable, VFG, mod sorted
	103.6-104.0	0.35				30% SILT 70% SAND		104		
	104.0-105.2	1.25						105		Same as above: increase in sand fraction
	105.2-107.0	1.8			0° & 20°			106		Same as above: Slab shows thinly hor & at 20° laminated sandstone w/ some @ 1cm siltstone lense, silt in matrix, possible burrowing structures
	107.0-108	1.0						107		SANDY SILTSTONE, light gray (N7) and very light gray (N8), ~~[illegible]~~ bedding is non-apparent, mod weathered, mod-poorly friable, sand is VFG, mod sorted, sand is as mottles & lenses, trace of iron stain as mottles, trace of carb material - [illegible]
	108.0-108.8	0.8						108		CLAYSTONE, light olive gray (5 Y 6/1) [illegible] massive bedding, mod weathered, mod friable,
	108.8-110.5	1.8						109		Same as above
										Same as above

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 34-89

GEOLOGIST(S): [illegible]
DATE: 10/23/89

PROJECT NO: 667-14.11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
110.5 ↑										See previous page
110.5 ↓	110.5 -112	~~1.9~~ 2.4						110		CLAYSTONE, light olive gray (5 Y 6/1), massive bedding, mod weathered, mod friable, at base of interval - some carb material, some silt grading to abundant silt.
	112-113.4	1.4				85% SILT 15% CLAY		112		SILTSTONE, olive gray (5 Y 4/1), massive bedding, mod weathered, mod-poorly friable, some clay, trace of VFG sand, trace of carb material
	113.4 -114.6	0.65				80% SILT 20% CLAY		113		Same as above. ~~Some clay~~ Some iron staining as mottles, base of interval is possibly stuff
	114-115.1	1.10				85% SILT 15% CLAY 80% SILT 20% CLAY		114		Same as above: Some carb material, clay fraction increases at base of interval, ~~top of interval has some VFG sand~~
	115.1 -116.9	1.85				85% SILT 20% CLAY		115		Same as above: Clay fraction decreases in middle of interval & increases at base
	116.9 -118	1.25		90°				116		CLAYSTONE, olive gray (5 Y 4/1), massive bedding, mod weathered, mod friable, trace of iron as modules & assoc w/ some carb material, 90° fract w/ slickensides ~~Some~~ trace white mineralization assoc w/ carb & iron
118.5	118.-118.5	0.55		90°				117		Same as above: Some white mineralization
	118.5 -119.7	1.1						118		Same as above: Some silt
	119.7 -120	Ø						119		NO SAMPLE

Box 14 of 20

Eraser [illegible]

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(1) Badly broken core, accurate footage measurements not possible.
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ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 34-89 BR

PAGE ~~12~~ 13 OF 17

GEOLOGIST(S): [illegible]
DATE: 10/23/89

PROJECT NO: 667-14.11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 15 of 20	120-120.7	0.75								SILTY CLAYSTONE, olive gray (5 Y 4/1), massive bedding, mod weathered, mod friable, abundant carb material, trace of coal
	120.7 -122.4	1.8						121 122		SILTSTONE grading (top 1 FT), yellowish gray (5 Y 8/1), mon apparent bedding, mod weathered, mod-poorly friable, some carb material. Bottom of interval (121.5 - 122.6), SILTY SANDSTONE - same as above, trace carb material, sand to VFG
	122.4 -123.6	1.35						123		SANDY SILTSTONE, yellowish gray (5 Y 8/1), mon apparent bedding, mod weathered, mod-poorly friable, grading to SANDSTONE at base of interval
	123.6 -124.0	Ø								NO SAMPLE
	124.0 -124.3	0.35						124		SANDY SILTSTONE, yellowish gray (5 Y 8/1), massive bedding, mod weathered, mod-poorly friable.
	124.3 -126.1	1.85				25% SILT 75% SAND		125 126		Top 4.N - same as above. Base of interval, SILTY SANDSTONE, yellowish gray (5 Y 8/1), massive bedding, mod weathered, mod friable, mod-well sorted, VFG - FG.
	126.1 -126.5	0.3								same as above, decrease in silt fraction, larger FG fraction
	126.5 -128.0	Ø						127		NO SAMPLE
↑ 129.2	128.0 -129.2	1.25						128 129		SILTSTONE, yellowish gray (5 Y 8/1) massive bedding, mod weathered, mod-poorly friable, some VFG sand as mottles
	129.2 -131.0									NO SAMPLE - DISCREPENCY BETWEEN BOXES

NOTES. General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 34-89 BR

GEOLOGIST(S): Day
DATE: 10/25/89

PROJECT NO: 6607-14.11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
	129.2 -131.0	0								NO SAMPLE: Discrepancy between Boxes
131.0 ↓	131.0 -132.7	1.7						131, 132		CLAYSTONE, light olive gray (5 Y 6/1), massive bedding, mod weathered, mod friable, ~~some coal~~, trace of carb material, color grades to olive gray (5 Y 4/1) at base
	132.7 -134.5	1.8						133, 134		Same as above: olive gray (5 Y 4/1), silt fraction decreases to trace at base of interval, trace of coal
	134.5 -135.0	1.0						135		CLAYSTONE, olive black (5 Y 2/1), massive bedding, mod weathered, mod friable, trace of coal, some carb material
	135.0 -135.7	0.6								Same as above increase in carb. material
	135.7 -137.4	1.7						136, 137		Same as above: olive gray (5 Y 4/1) Some carb material, trace of non stained, trace of white of mineralization assoc. w/ non & carb
	137.4 -139.0	1.7						138		Same as above: same color
139.0 ↑								139		Same as above
139.0 ↓	139.0 -140.8									

Box 16 of 20

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 34-89 B2

GEOLOGIST(S): MY
DATE: 10/25/89

PROJECT NO: 6607-14.11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 17 of 20	(139 - 140.8 - 143)									See previous page
	140.8 - 142.6					85% clay 15% silt		141, 142		CLAYSTONE, olive black (5Y 2/1), massive bedding, mod weathered, most of silt friable, some carb material, trace of iron as nodules, trace of white mineralization
	142.6 - 143									Same as above
	143 - 144.4							143, 144		Same as above: trace of carb, no apparent iron or white mineralization,
	144.4 - 146.2					35% silt 65% clay		145		Same as above: silt fraction increased to SILTY CLAYSTONE
	146.2 - 147					25% silt 75% clay		146		Same as above: silt fraction decreased
	147.0 - 148.							147		Same as above: broken texture
148	148.0 - 149.8	1.8						148, 149		Same as above: olive gray (5Y 4/1)
	149.8 - 151.0	1.85								Same as above. Some SILT-VFG Sand concentrated as nodules

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 34-89 BR

GEOLOGIST(S): NIY
DATE: 10/25/89

PROJECT NO: 1667-14.11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 18 of 20								151		See previous page
	151.5 152	0.55				25% SILT 75% CLAY		152		SILT) CLAYSTONE, olive gray (5 Y 4/1), massive bedding, mod weathered, mod friable, some carb material, some SILT - VFG sand as mottles
	152. -153.2	1.2				30% SILT 70% CLAY		153		Same as above: increase in silt fraction
	153.2 -155.0	1.7						154		Same as above.
	155.0 -156.0	1.1						155		Same as above.
156.55	156.0 -156.55	.55				35% SILT 65% CLAY		156		Same as above. increase in silt fraction
156.55 Box 19 of 20	156.55 -158.3	1.75						157		Same as above
	158.3 -160	1.8						158		Same as above: base of interval grades to olive black (5 Y 2/1), trace of coal
								159		

NOTES. General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 34-89BR

GEOLOGIST(S): AAY
DATE: 10/25/89

PROJECT NO: 667-1411

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 19 of 20	160-161.8	1.7						161		Silty Claystone, olive gray (5 Y 4/1), massively bedded, mod weathered, mod friable, trace of carb material, trace of iron as a modules as mottled staining
	161.8 -163.6	1.75		68				162, 163		Same as above fracture at 163' at 60°
	163.6 -164.0	0.6								Same as above. no apparent fracture
	164.0 -165.2	1.15						164, 165		Same as above
165.2 → Box 20 of 20 → 168.0	165.2 -167.0							166		Same as above. Some iron as modules & as mottled staining
	167.0 -168.0							167, 168		Same as above
End of Boxes								169		

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 35-89 BR

PAGE 1 OF

GEOLOGIST(S): DCB
DATE: 9/25/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
0.0	0.0' to 2.2'	(1) 1.9				>50% clay	CL	1, 2		Clay, dark yellowish brown (10 YR 4/2) to moderate yellowish brown (10 YR 5/4), moderate to moderately high plasticity, some gravel to gravelly, some silt, plant debris + roots from 0.0 to ~1.2'.
	2.2' to 4.3'	(2) 1.9 2.2				>50% clay		3, 4		TOP OF ROCK AT ~1.7 FT. Claystone, med dark gray (N4), bedding not apparent, highly weathered, slightly to moderately friable, trace of carb. material, localized iron staining, trace of silt.
	4.3' to 6.3'	(2) 1.9						5, 6		
	6.3' to 8.3'	2.0						7, 8		
	8.3' to 9.5'	(1) 1.4						9		
9.5 Box ↓	9.5 to 10.5	(1) 1.0								

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 35-89 BR PAGE 2 OF

GEOLOGIST(S): DCB
DATE: 9/25/89

PROJECT NO: 667-11-5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 2 of 5	9.5 to 10.3	1.8'				750' clay				Claystone as above
	10.3 to 12.3	(1) 2.4'						11		
								12		
	12.3 to 14.3	(1) 1.9'						13		
								14		
	14.3 to 16.3	(1) ~~1.85~~ 2.0						15		
								16		
	16.3 to 18.3	(1) 1.7'						17		claystone as above with some Mn oxide stains, calcareous fracture filling and increase in vein staining from ~16.5' to 18.5' Below 18.5 vein staining occurs dominantly on fractured faces.
								18		
Box 3 of 5	18.3 to 20.3	1.9'						19		

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 35-89 BR PAGE 3 OF

GEOLOGIST(S): DCB
DATE: 9/25/89

PROJECT NO: 667-11-5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
	18.3 to 20.3	1.4 (2)				>50' clay				Claystone as above
	20.3 to 22.3	(2) 2.2		~18°				21, 22		
	22.3 to 24.3	(2) 2.3		~70°				23, 24		
	24.3 to 26.3	(1) 2.0		~90°				25, 26		Slickensides at ~26.0', attitude ~60°, iron staining on slick.
Box 5	26.3 to 27.6	(2) .6'						27		Slickensides at ~27.4' attitude ~50°, iron staining on slick
27.6	27.6 to 28.3	(2) 1.7 DCB						28		
Box 6	28.3 to 30.3	(1) DCB 1.9		~65°				29		

NOTES General: USCS is modified for this log as follows:
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ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 35-89-BR PAGE 4 OF

GEOLOGIST(S): DCB
DATE: 9/28/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 4 of 5	28.3 to 30.3	1.9 (1)				>50% Clay				Claystone as above
	30.3 to 32.3	1.9						31, 32		
	32.3 to 34.3	1.9		55° - +70°				33, 34		
	34.3 to 36.3	(2) 1.8		90°				35, 36		Claystone as above, interval grades to Black (N1) below 35 ft. and rock becomes carbonaceous, calcareous fracture filling occurs at ~36.1'.
36.0 ↓ Box 5 of 5 0.3' over lap	36.3	<.3'								Carbonaceous material decreases to some carb material below 36.0'
	36.3 to 38.3	2.0'						37, 38		Claystone as above, trace of carb. material below 38.0 ft.
	38.3 to 39.3	(1) ~1.0'						39		
										Bottom of Box 5 of 5 at 39.3'

Ens 9/25/89 DCB correct lith. description

NOTES. General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 35-89BR

GEOLOGIST(S): DCB
DATE: 9/28/89

PROJECT NO: 6667-165

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
40.5	40.5 to 43.7	(2) 3.0				>50% clay		41, 42, 43		Claystone, olive gray (5Y 4/1), poorly bedded, moderately slightly to moderately friable, some silt
	43.7 to 44.0	0						44	X	No Sample
	44.0 to 47.9	(2) 4.1				>50% clay		45, 46, 47		Claystone as above (reference interval 40.5 to 43.7 ft).
	47.9 to 48.0	0						48	X	No Sample
49.9	48.0 to 49.9	(1) 1.9				>50% clay <20% fine sand		49		Interval grades to Claystone as above with some fine sand (reference interval 40.5 to 43.7 ft).

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Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 35-89 BR

GEOLOGIST(S): DCB
DATE: 9/28/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
	49.9 to 50.9	1.0				>50% clay				Claystone as above
	50.9 to 52.0	0						51	X	No Sample
	52.0 to 52.7	(1) .6				>50% clay		52		Claystone as above (reference interval 40.5 to 43.7 ft.) sand fraction decreases with depth
	52.7 to 54.0	1.8						53		
	54.0 to 55.8	0						54 55	X	No Sample
	55.8 to 56.3	.5 (2)				>50% clay		56		Claystone, med. dark gray (N4), poorly bedded, weathered slightly to moderately friable, some silt.
	56.3 to 57.4	(2) 1.0						57		
	57.4 to 59.2	1.7						58 59		
	59.2 to 59.8	0							X	No Sample
	59.8-61.6	1.8 (2)				>50% clay				Claystone as above (reference interval

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(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 35-89DR

GEOLOGIST(S): DCB
DATE: 9/28/89

PROJECT NO: 667-11-5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Top of Box ↑ 61.6	59.8 to 61.6	(2) 1.8				>50% clay		61		(cont'd from previous page) 55.8 to 59.2 ft.) trace of carb. material with below ~60 ft.
61.6 ↓	61.6 to 62.8	(1) 1.0						62		
	62.8 to 63.8	0	X					63	X	No Sample
↑	63.8 to 64.4	.65				>50% clay		64		Clay Stone as above (reference interval 55.8 to 59.2 ft.)
N	64.4 to 66.2	(2) 1.8						65		
of								66		
8	66.2 to 67.2	1.1						67		
Bot	67.2 to 67.8	0							X	No Sample
	67.8 to 68.4	.6				>50% clay		68		Clay Stone as above (reference interval 55.8 to 59.2 ft.). Trace of clay sand at ~68.4 ft.
	68.4 to 70.1	1.7						69		

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Material amounts are estimated by % volume instead of % weight.
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ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 35-89 BR PAGE 4 OF 18

GEOLOGIST(S): DCB
DATE: 9/28/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
6 of 8 of 24	68.4-70.1	1.7								
	70.1 to 70.7	.6				>50% clay				Claystone as above, carb material is absent
	70.7 to 71.8	0						71	X	No Sample
↑ 72.7	71.8 to 72.7	.85				>50% clay		72		Claystone med dark gray (N4) poorly bedded weathered, slightly to moderately friable, some silt
72.7	72.7-72.8	0								No Sample
↓	72.8 to 74.8	1.9				>50% clay		73, 74		Claystone as above (reference interval 71.8 to 72.7)
8 of 24	74.8 to 75.8	0						75	X	No Sample
	75.8 to 77.6	1.9				>50% clay		76, 77		Claystone as above (reference interval 71.8 to 72.7 ft.)
	77.6 to 79.4	1.8						78, 79		
	79.4 to 79.8	1.7 (1)								
	79.8-80.4	0							X	No Sample

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Material amounts are estimated by % volume instead of % weight.
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(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 35-89BR

GEOLOGIST(S): DCB
DATE: 9/28/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
1 of 24	79.8 to 80.9	0							X	No Sample
Box ↑ 81.7	80.9 to 81.7	1.7				750 Clay		81		Claystone, med dark gray (N4), bedding not apparent, slightly weathered, slightly friable, some silt, trace of carb. material.
81.7 ↓	81.7 to 82.2	.4						82		
	82.2 to 83.0	1.1						83		Slickensides at ~ 82.4' (DCB), attitude ~24° and at ~ 82.6' attitude ~65°.
	83.0 to 84.9	1.9						84		Slickensides at ~83.5', attitude ~60°
Box 10 of 24	84.9 to 85.8	1.2						85		
	85.8 to 86.6	.5						86		
	86.6 to 88.4	1.6						87		
	88.4 to 89.6	1.4						88		Slickensides at ~88', conical surface.
	89.6 to 89.8	0						89	X	No Sample
Box 11 of 24	89.8 to 91.7	1.9				750 Clay				Claystone as above (reference interval)

Erasure 9/28/89 DCB corr. Intense marker error

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 35-89 BR

GEOLOGIST(S): DCB
DATE: 9/28/89

PROJECT NO: 667-11-5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
	89.8 to 91.7	1.9				Clay >50%		91		(cont'd. from previous page) 80.9 to 89.6 ft.)
	91.7 to 93.6	1.8						92, 93		
	93.6 to 93.8	.4								
	93.8 to 93.9	0						94		NO SAMPLE
	93.9 to 95.0	(2) 1.3				>50% Clay		95		Claystone as above reference Interval 80.9 to 89.6 ft.)
	95.0 to 97.0	1.9						96, 97		
	97.0 to 97.8	0								No Sample
	97.8 to 99.6	(2) 1.6				>50% Clay		98, 99		Claystone as above (reference Interval 80.9 to 89.6 ft.)
	99.6 to 101.8	0								No Sample

NOTES General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 35-89 BR

GEOLOGIST(S): DCB
DATE: 9/28/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 11 Key ↑ 101.8	99.6 to 101.8	0						101	X	No Sample
101.8 ↓	101.8 to 102.5	.6				>50% clay		102		Claystone, med. dark gray (N4), poorly bedded, slightly weathered, slightly friable, some silt
	102.5 to 103.8	0						103	X	No Sample
Box 12 of 24	103.8 to 104.8	1.0				>50% clay		104		Claystone as above (reference interval 101.8 to 103.8 ft.).
	104.8 to 105.2	.8 (1)						105		
	105.2 to 105.7	.9 (2)								
	105.7 to 106.0	.3						106		
	106.0 to 107.0	(2) 1.4			~20°	vf sand ~65% ~35% silt + clay		107		Silty sandstone, light gray (N7), soft sediment deformation out thin beds (<1cm.), sand and silt are interbedded, slightly friable, trace of clay.
	107.0 to 107.2	.1								
	107.2 to 107.8	.3								
	107.8 to 108.1	.05						108		
	108.1 to 111.8	0						109	X	No Sample

DCB to med. gray (N

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 35-89 BR

GEOLOGIST(S): DCB
DATE: 9/28/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 12 of 24	108.1 to 111.8	0						111		No Sample
112.8	111.8 to 112.8	2.2				~65% vfg sand ~35% silt or clay		112		silty sandstone, light gray (N7) to med. light gray (N6), highly distorted bedding, possible soft sediment deformation or bioturbation, slightly friable, trace of clay
112.8	112.8 to 116.8	3.6				>50' clay		113, 114, 115, 116		Claystone med. dark gray (N4), poorly bedded, slightly weathered, slightly friable, some silt, trace of carb. material
Box 13 of 24	116.8 to 118.6	1.8						117, 118		
	118.6 to 119.9	1.2						119		color grades to light gray (N7) at ~118.6' and interval becomes sandy; sand is vfg. Interval grades back to claystone some silt below ~119.8'
	119.9 to 120.8	0								No Sample

Note: this box has 2.0 ft of core that appear to match with the interval 2.7', 0.4', 1.0' are labeled. This interval was not logged on this sheet.

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Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 35-89BR

GEOLOGIST(S): DCB
DATE: 9/28/89 - 9/29/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 13 of 24	119.9 to 120.8	0							X	No Sample
9/28 ↑ 121.2	120.8 to 121.2	.4				Clay >50%		121		Claystone, med. dark gray (N4), poorly bedded, slightly friable, some silt, ~~trace~~ DCB occasional iron nodule,
9/29 121.2 ↓	121.2 to 129.8	(2) 4.2						122, 123, 124		Trace of yellow mineralization associated with fine white bladed fatals at ~122 ft. Possible sulpher flour and gypsum
Box 14 of 24	124.8 to 125.3	-						125	X	No Sample
	124.8 to 128.0	(2) 3.4				>50% clay		126, 127		Claystone as above (reference interval 120.8 to 129.8 ft.)
↑ 128.8	128.0 to 128.8	1.5				>50% silt, ~25% vfg sand		128		At ~127.7 the interval grades to a sandy siltstone, light gray (N7) to med. gray (N5), distorted bedding - soft sed deformation - slightly friable, trace of clay and carb. material, sand fraction is vfg.
128.8 ↓ 15 Box 15 of 24	128.8 to 131.9	(2) 3.2				>50% clay		129		Interval grades to claystone, med. dark gray (N4), poorly bedded, slightly friable,

Erosives 9/29 DCB corrected lith. desc.

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Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 35-89-BR

GEOLOGIST(S): DCB
DATE: 9/29/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
	128.8 to 131.9	(2) 3.2				>50% clay; ~35% vf sand; ~50% clay		131		(cont'd. from previous page) some silt, trace of carb. material. Interval becomes sandy from ~131.2 to 131.8, sand is vfg and occurs in highly deformed beds
	131.9 to 132.8	0						132	X	No Sample
	132.8 to 136.3	(2) 3.5				>50% clay		133, 134, 135, 136		Claystone, med. dark gray (N4), poorly bedded, slightly friable, some silt, trace of carb. material
	136.3 to 136.8	•							X	No Sample
	136.8 to 139.2	(2) 2.4				>50% clay		137, 138, 139		Claystone as above (reference interval 132.8 to 136.3 ft.) Slickensides at ~137.2 ft, attitude ~60°
139.2 ↓ Box 16 of 24	139.2 to 140.8	(2) 2.3								

B of 15 of 24

NOTES. General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 35-89BR

GEOLOGIST(S): DCB
DATE: 9/29/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
	139.2 to 140.8	2.3				>50% clay				claystone as above
	140.8 to 141.3	0						141	X	No Sample
	141.3 to 144.6	(2) 3.6				>50% clay ~10% vfg sand		142 143 144		claystone, dark gray (N3), poorly bedded, slightly friable, some silt, trace of carb. material, some vfg sand in interval from ~142.2 to 143.0 ft. Interval grades to med. dark gray (N4) below ~142 ft.
	144.6 to 144.8	0							X	No Sample
	144.8 to 145.0	.1				>50% clay		145		claystone as below (sub. int. 141.0-144.8)
	145.0 to 148.0	0						146 147 148	X	No Sample
	148.0 to 149.8	(2) 2.1				>50% clay		149		claystone, med. dark gray (N4), poorly bedded, slightly friable some silt.
149.8	149.8 to 150.2	1.9 (2)								

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 35-89 BR

GEOLOGIST(S): DCB
DATE: 9/29/89

PROJECT NO: 667-11-5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 17 of 24	149.8 to 150.8	(2) 1.9				>50% clay				Claystone as above. Slickensides at ~150; attitude ~60°.
	150.8 to 153.8	0						151, 152, 153		No Sample
	153.8 to 155.8	3.7						154, 155		Claystone, med. gray (N5) to med. dark gray (N4), poorly bedded, slightly friable, some silt. Slickensides occur within interval 153.8 to 155.8 ft, attitude ~60°.
	155.8 to 157.8	2.1						156, 157		Slickensides occur at ~157.6; attitude ~70°.
Box 18 of 24	157.8 to 159.3	1.4						158, 159		Trace of carb. material and vfg sand below ~159 ft.
	159.3 to 159.8	0								No Sample
	159.8 to 163.8	4.0 (2)								Claystone, dark med. dark gray (N3),

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(2) Core breaks cannot be matched, accurate footage measurements not possible.

Note: intervals 149.8 thru 155.8 contain significantly more core than the interval markers indicate; accurate depth estimates for geologic features are not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 35-89 BR

GEOLOGIST(S): DCB
DATE: 9/29/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 18 of 24	159.8 to 163.8	(2) 4.6				>50% clay		161, 162, 163		(cont'd. from previous page), poorly bedded, slightly friable, some silt to silt trace of carb material and vf. sand sand s locally dissem [illegible] locally [illegible] and occurs in small pockets < 2mm in diam. sand fraction decreases with depth
	163.8 to 167.8	0						164, 165, 166, 167		No Sample
168.3	167.8 to 168.3	3.1				>50% clay		168		claystone as above (reference interval 159.8 to 163.8 ft.) [illegible] vfg sand fraction varies locally. from trace to none.
Box 19 of 24	168.3 to 170.8	(2) 3.9						169		

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(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 35-89 BR

GEOLOGIST(S): DCB
DATE: 7/29/89

PROJECT NO: 667-11.5 1-13

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
19 of 24	168.3 to 170.8	(2) 3.9				75% clay				Claystone as above
	170.8 to 174.8	4.1						171, 172, 173, 174		
	174.8 to 176.2	(2) 1.4						175, 176		Interval grades to Claystone, med. dark gray (N4), poorly bedded, slightly friable, trace of silt
20 of 24	176.2 to 177.3	.8						177		
	177.3 to 177.8	0							X	No Sample
	177.8 to 178.1	.2(1)				95% clay		178		Claystone as above (reference interval 174.8 to 177.3 ft).
	178.1 to 181.8	0						179	X	No Sample

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Material amounts are estimated by % volume instead of % weight.
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(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 35-89BR PAGE 15 OF 18

GEOLOGIST(S): DCB
DATE: 7/29/89

PROJECT NO: 667-11-5 /13

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 20 of 24	178.1 to 181.8	0						181		No Sample
	181.8 to 182.8	2.9				>50% clay		182		Claystone, med. dark gray (N4), poorly bedded, slightly friable, trace of silt
	182.8 to 185.8	3.1						183, 184, 185		color grades to dark gray (N3) below 183 ft. silt fraction increases below ~184.4'
	185.8 to 187.4	1.6						186, 187		Silty Claystone, light gray (N7), massive bedding, slightly friable, trace of ~~clayey~~ vfg sand.
Box 21 of 24	187.4 to 189.8	2.8				~55% vfg sand ~25% clay ~20% silt		188, 189		color grades to med. dark gray (N4), trace of carb. material from ~188.9 to 188.8 ft. Interval grades to silty Clayey Sandstone, thick bedded where apparent (<3mm), majority of bedding is highly deformed, slightly friable, trace
	189.8 to 193.8	4.0								

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(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 35-89BR

GEOLOGIST(S): DCB
DATE: 9/29/89

PROJECT NO: 667-11.5/13

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 21 of 24	189.8 to 193.8	4.0				~55% vfg sand, ~25% clay, ~20% silt; >50% clay		191, 192		(cont'd from previous page) carb. material, sand is vfg. Interval grades to Silty Claystone, med. gray (N5) massive bedding, slightly friable, trace of vfg sand.
						>50% silt, ~15% vfg sand		193		Interval grades to Clayey siltstone, yellowish gray (5 4 8/1), massively bedded with thin beds (<2mm) of vfg sand locally, slightly friable. Trace to ~~some~~ DCB vfg sand, sandy.
	193.8 to 195.7	1.7				>50% clay, ~10% vfg sand		194, 195		Interval grades to Silty claystone, yellowish gray, thin bedded where apparent to poorly bedded, slightly friable, trace to some vfg sand. color grades to med. gray (N5) below ~195.5 ft. and trace of carb. material is present below ~195.5 ft. sand and silt fraction diminish with depth
Box 22 of 24	195.7 to 197.8	2.3				>50% clay		196, 197		Interval grades to Claystone med. dark gray (N4), poorly bedded, slightly friable, some silt trace of carb. material.
	197.8 to 201.8	4.2						198, 199		

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(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 35-89 BR

GEOLOGIST(S): DCB
DATE: 9/29/89

PROJECT NO: 667-11.5 / 13

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Bot 22 of 24	197.8 to 201.8	4.2				>50% clay				Claystone as above
	201.8 to 204.5	(2) 2.2				40% silt 60% vfg sand	pcs	201, 202, 203, 204		Interval grades to interbedded silty sandstones and sandy siltstones, med. very light gray (N8) and med. light gray (N6) respectively, thin bedded where apparent, otherwise beds are highly distorted by soft sediment deformation, slumping, dewatering structures, slightly friable, sand is vfg.
204.5 ↓	204.5 to 205.8	(2) 1.5				>50% clay		205		Interval grades to claystone med. dark gray (N4), thin bedded where apparent (2mm), slightly friable, some silt to silty, trace to some vfg sand, trace of carb. material, silt and sand fraction decreases with depth.
Bot 23 of 24	205.8 to 209.7	(2) 3.7						206, 207, 208, 209		Claystone, med dark gray (N4) to dark gray (N3), poorly bedded, slightly friable, some silt, trace of carb. material, occasional, associated with iron staining.
	209.7 to 213.2	3.7								

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(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 35-89 BR

GEOLOGIST(S): DCB
DATE: 9/29/89

PROJECT NO: 667-11-5/13

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 23 of 24	209.7 to	3.7				>50% clay		211		claystone as above
						~50% sand		212		Clayey sandstone, very light gray (N8) to med. light gray (N6), thin bedded (<2mm) where apparent, slightly friable
↑ 213.3	213.3					>50% clay		213		Claystone, med gray (N5), poorly bedded, slightly friable, trace to some silt, trace of carb. material!
213.3 ↓	213.3 to 213.8									
Box 24 of 24	213.8 to							214		color grades to dark gray (N3) below 214.5
								215		
								216		
↑ 212.8	217.8							217		Claystone, med gray (N5), poorly bedded, slightly friable, trace of carb. and vfg sand, some silt
								218		Bottom of Box at 217.8 ft
								219		

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(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 36-89 BR

GEOLOGIST(S): DAS
DATE: 9/20/89

PROJECT NO: 667-1150

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
0.0	0.0 -1.3	(1) 1.1				>50% CLAY		1		CLAY, moderate brown (5 YR 3/4), mod plast, trace of sand, trace of gravel, some roots
	1.3-1.5	0								NO SAMPLE
	1.5-3.4	(1) 1.8				SAME AS ABOVE		2, 3		CLAY, dark yellowish brown (10 YR 4/2) mod-high plast, some calc. material as irregular bodies 3-5cm, some gravel (max size = 2cm), trace of roots, trace of clay.
	3.4-3.5	0								NO SAMPLE
Box 1 of 11	3.5-5.5	(1) 1.8				>50% CLAY		4, 5		Same as above. brownish gray (5 YR 4/1), possibly a transition between clay & claystone, ie. possibly highly weathered claystone at base of interval. Base of interval shows iron staining micro-fractures
	5.5-7.5	(1) 1.8				>50% CLAY		6, 7		TOP OF ROCK CLAYSTONE(?), olive gray (5 Y 4/1), gradational contacts, highly weathered, mod-highly ~~weathered~~ friable, some iron staining in micro-fractures, trace of calc material ~~[illegible]~~ filling fractures
9.5	7.5-9.5	(1) 1.8		60°		>50% CLAY		8, 9		Same as above. top of interval is highly weathered, no apparent calc material, base of interval has broken texture - possibly highly fractured. fracture at base of interval ≈ 60°
9.5 -11.5										Same as above flaury texture at ≈10.0 FT to base, some Mg staining, trace calc ~~[illegible]~~ material

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Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 36-89BR

GEOLOGIST(S): [illegible]
DATE: 9/20/89

PROJECT NO: 6667-1150

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 2 of 11	9.5 -11.5	(2) 1.8						11		See previous page
	11.5 -13.5	(2) 1.9						12, 13		CLAYSTONE, olive gray (5 Y 4/1), massive bedding, mod weathered, mod.-high friability, some iron staining as mottles and along fractures, some Mg staining. ~~[illegible]~~ some fractures oriented in all directions, trace of silt
	13.5 -15.5	(2) 1.9						14, 15		Same as above: increased amt of silt at base of interval
	15.5 -17.5	(2) 1.75						16, 17		Same as above: fracture # at 50° @ ≈ 16 FT., no apparent silt
↑ 19.5	17.5 -19.5	(2) 1.7						18, 19		Same as above: broken texture showing slickensides, probably highly fractured.
										See next page

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(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 36-89

GEOLOGIST(S): DAY
DATE: 9/20/89

PROJECT NO: 6667-1150

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 3 of 11	19.5 TO 21.5	1.7						21		CLAYSTONE, olive gray (5 Y 4/1) grading to pale yellowish brown (10 YR 6/2), apparent massive bedding, mod - highly weathered, some iron staining on fractures, base of interval - some carb material, possibly coal seam, low grade 1/2-1 cm thick at ≈ 20.5 ft
	TO 23.5	1.8		≈ 90°				22, 23		Same as above, highly iron stained fractures ≈ 90°, some silt, trace of VFG sand bodies
	TO 25.5	1.6						24, 25		Same as above: no apparent sand, trace of Mg staining
	TO 27.5	1.8						26, 27		Same as above, calcareous material (calcite?) ≈ 1-5 mm filling 60° fracture, highly iron stained as mottles & along fracture plane, some carb material
	TO 29.5	1.8						28, 29		Same as above increased silt fractures
29.5 ↑	29.5 - 29.5									See next page

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(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 36-89 B2

GEOLOGIST(S): DLY
DATE: 9/20/89

PROJECT NO: 6667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 4 of 11	(29.5) TO 31.7	1.8						31		CLAYSTONE pale yellowish brown (10 YR 6/2), massive bedding, mod weathering, mod friable, some iron staining, mottled, trace of Mg staining, trace of carb material, trace of VFG sand in lenses and some — mostly at base of interval
	TO 33.5	1.5						32, 33		Same as above increase in VFG sand content showing horizontal lamination, iron staining is also along bedding planes
	TO 35.5	1.8						34, 35		Same as above no apparent sand, broken texture at middle to base of interval = indicates highly fractured w/ abundant iron staining along fracture planes
	TO 37.5	1.8						36, 37		Same as above, ~~[illegible]~~ Some fractures w/ iron staining as above Some FG sand in matrix, iron staining as mottles, also
	TO 39.5	1.7						38, 39		Same as above. trace of sand
39.5'	39.5 – 41.5									See next page

NOTES General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 36-89 B2

GEOLOGIST(S): [illegible]
DATE: 9/20/89

PROJECT NO: 667-7150

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 5 of 11	41.5	1.9						41		CLAYSTONE, olive gray (5 Y 4/1), massively bedded, mod weathered mod friable; some iron staining along some fractures traced carb at base of interval
	43.5	1.9						42, 43		Same as above mod-highly friable in top 1 ft of interval
	45.5	1.8						44, 45		Same as above: mod friable some carb material w/ assoc. iron staining coal seam @ ≈ 44 ft, ≈ 1-2 mm, low grade (≈ ad in 45 ft)
	47.5	1.75						46, 47		Same as above: flaky texture & mod-high friability from ≈ 46 to 47 ft, trace of carb material.
49.6	49.5	1.0						48, 49		Same as above. light olive gray (5 Y 6/1), some silt.
DISCREPENCY BETWEEN BOXES									X	NO SAMPLE

NOTES General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 36-89 BR

GEOLOGIST(S): [illegible]
DATE: 9/20/89

PROJECT NO: 667-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Descrepency Between Boxes										No Sample.
50.7 ↓	50.7 TO 52.7					55% Clay 45% Silt		51, 52		Silty Claystone, light olive gray (5 Y 6/1) and olive gray (5 Y 4/1), apparent massive bedding, mod-highly weathered, some iron staining in fractures, trace of carb material in some VFG sand bodies
	53.2	0						53		No Sample
	54.0					50% Clay 50% Silt				Same as above increase in silt & sand
	54.7					65% Silt 35% Clay		54		Clayey Siltstone, light olive gray (5 Y 6/1) massive bedding, mod weathered, mod-low friability, trace of carb material trace of [illegible]
Box 6 of 11	55.7	0						55		No Sample
	59.2					60% Clay 40% Silt		56, 57, 58, 59		Silty Claystone, light olive gray (5 Y 6/1), massive bedding, mod weathering, mod friability, trace of iron as module. Bottom 6in of interval has some VFG sand & some silt
	60.0									VFG Sandy Siltstone, yellowish gray (5 Y 8/1), massive bedding, mod weathered, poorly friable,

NOTES. General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 36-89 BR

GEOLOGIST(S): DAJ
DATE: 9/20/89

PROJECT NO: 667-1150

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
60.0 ↓	60.0 -61.2	0.7						61		VFG SANDY SILTSTONE, yellowish gray (5Y 8/1) massive bedding, mod weathering, poorly friable
	61.2 -64.0	2.8						62, 63		TOP: 0.8 FT VFG SANDSTONE, very light gray (N8), v thinly horizontal laminated, mod weathered, mod-poorly friable Bottom: 2 FT: SILTY CLAYSTONE, olive gray (5 Y 4/1), bedding non-apparent, mod weathered, mod friable, some carb material, trace of iron as modules, trace of VFG sand bodies in top of 2 ft interval, trace of iron staining as modules
Box 7 of 11	64.0 -65.2	0						64, 65		NO SAMPLE
	65.2 -69.2	4.1						66, 67, 68, 69		Same as above. Some sand in matrix and as mottles (bodies), some iron staining as mottles
	69.2 -70.2	1.0								VFG SANDSTONE, very light gray (N8), v horizontal laminated, interbedded w/ siltstone & clay, mod weathered, mod-poorly friable, trace of iron modules, trace of carb material

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO.

GEOLOGIST(S): Day
DATE: 9/20/89

PROJECT NO: 6667-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
70.2	70.2 -71.2	1.1				10% CLAY 90% SILT		71		Silty Claystone, olive black (5 Y 2/1), massive bedding, mod weathered, mod friable, some iron stains as mottles, trace of sand in bedding
	71.2 73.2	1						72, 73		NO SAMPLE
	73.7	0.6								Same as above: increased silt content
	75.2	1.2						74, 75		Same as above trace of carb
	75.7	0.4								VFG SANDSTONE, olive ~~gray (5 Y 4/1)~~ black (5 Y 2/1) very light gray (N8), v thinly laminated, mod weathered, mod friable, well sorted,
End 8 of 11	77.8	1.9						76, 77		SILTY CLAYSTONE (v silty on top 0.3 ft), massive bedding, well weathered, mod friable, some carb material
	78.5	0.9						78		Same as above
	79.2	1						79		NO SAMPLE
	80.1	1.1								Same as above

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 36-89 BR

GEOLOGIST(S): [illegible]
DATE: 9/20/89

PROJECT NO: 667-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
										CLAYEY Same as previous page
↑ 81.1	80.1 - 80.9	1.0								VFG SANDSTONE light gray (N7), non apparent bedding, mod-well weathered, mod friable, well sorted, trace of silt trace of coal
	81.1	0.8			-	60% SAND 40% CLAY		81		
Box 9 of 11	82.8	1.8				60% SAND 40% CLAY		82		SAME AS ABOVE SLAB shows soft-sed deformation, possible slump structure, clay is as lenses ~~and~~, ~~as~~ in matrix and as clasts
	83.9	1.25						83		Same as above
	84.7	0						84		NO SAMPLE
	85.2	0.5						85		Same as above - increased clay fraction at base of interval
	87.0	1.85			10-20°	65% CLAY 35% SAND		86		VFG SANDY CLAYSTONE, light olive gray (5Y 6/1), laminated bedding ~ 10-20°, mod weathered, mod-poorly friable, sand is as ~ 1-5 mm bodies, ~~not~~ as ~~a~~ lenses and throughout matrix, trace of carb material, trace of iron as nodules and as mottled staining
	88.7	1.7				55% CLAY 45% SAND		87		Same as above increased sand fraction
	(90.6)	1.0				65% CLAY 35% SAND		88		Same as above: sand fraction is decreased

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 36-89 RK

GEOLOGIST(S): LMY
DATE: 9/21/89

PROJECT NO: 667-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
90.6										See previous page
90.6	90.6	1.8				60% silt, 40% clay		91, 92		CLAYEY SILTSTONE, olive gray (5 Y 4/1), apparent massive bedding, mod weathered, mod-poorly friable, some VFG sand as bedded in 1-15 mm ML,
	92.4									
	92.9	0.5								Same as above increased sand content in matrix
	94.1	1.3				60% silt, 40% clay		93, 94		SILTY VFG SANDSTONE, grayish orange pink (5 YR 7/2), dully horizontally laminated, mod-highly weathered, mod friable, some clay, silt fraction increases at base of interval.
	95.8	1.8						95		TOP 1.3 FT of interval same as above w/ increase of silt content. Base of interval: CLAYSTONE, olive black (5 Y 2/1), non-apparent bedding, highly weathered, highly friable, flaky texture, trace of coal, some shard chaos shows shiny coatings
	96.7	0.6						96		Same as base of above interval
	96.9	0								NO SAMPLE
	98.0	1.1						97, 98		Same as above trace of VFG sand in top of interval, fracture at 97.5 FT at ≈ 70° showing slickensides
	99.7	1.8						99		Same as above. Some silt, abundant fractures showing slickensides, trace of iron staining as mottles, trace of carb material quartz to some at base of interval
99.7										See next page

Box 10 of 11

NOTES General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 36-89 BR

GEOLOGIST(S): [illegible]
DATE: 9/21/89

PROJECT NO: 667-11.SD

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 11 of 11	(99.7) 100.9	1.5								CLAYSTONE, olive black (5Y 2/1), non apparent bedding, highly-mod weathered, mod friability, some silt in top of interval, flavory texture in middle of interval showing slickensides, trace white v small needle-like mineralization
	100.9 101.9	1.0						101		
	104.9	Ø						102 103 104		NO SAMPLE
	105.1	0.4						105		Same as above: consolidated texture, no white mineralization, trace of iron staining as mottles
	107.1	1.85						106		Same as above
↑ 107.9	107.9	0.95						107		Same as above
End of Boxes								108 109		(There are two blocks at the end of the interval - one is 107.9, the other is 106.9 (which is written on the outside of the box))

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 37-89 BR PAGE 1 OF 5

(NOT A DEEP BOREHOLE)

GEOLOGIST(S): DAJ
DATE: 9/25/89

PROJECT NO: 667-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
0.0	0.0						GP/GW			TOP 6IN. GRAVEL, matrix color as dark yellowish brown (10 YR 4/2), angular - subangular, max size = 7cm, some sand, surficial quartz, some roots
	2.3	1.5					GC	1, 2		Base of interval Gravelly Clay, dark reddish brown (10 R 3/4), est. mod plast, some sand, max gravel size = 3cm, ~~trace of~~ roots
	4.0	1.5						3		TOP 0.5 FT = ~~same~~ same as above. CALICHE, pale yellowish orange (10 YR 8/6) trace of gravel
	4.3	0.3						4		Same as above. Some gravel
	4.6	0								NO SAMPLE
Box 1 of 5	5.9	1.2					SP/SW	5		TOP 0.4 FT: Same as above. Base of interval Gravelly SAND, dark yellowish orange (10 YR 6/6), angular-subangular, mod-well graded, sand is FG-CG, max gravel size = 3cm
	6.6	0.7					GP/GW	6		CALCAREOUS GRAVEL, pale yellowish orange (10 YR 8/6) matrix, angular-subangular, ~~poorly~~ mod graded, max size = 5cm
	7.3	0.7					SP/SW	7		SAND, dark yellowish orange (10 YR 6/6), angular-subangular, mod graded, FG-CG, ~~some gravel - max size = 5cm~~
	8.3	0.8					GP/GW	8		TOP 0.3 FT - Same as above, grayish orange (10 YR Base = CALCAREOUS GRAVEL, matrix color is pale yellowish orange (10 YR 8/6), angular - subangular, mod graded, max size = 4cm
	8.6									NO SAMPLE
	10.6	0.7					GP/GW	9		Same as above; flowing texture

NOTES General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 37-87 BR

GEOLOGIST(S): [illegible]
DATE: 9/28/89

PROJECT NO: 667-1150

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
↑ 10.6										See previous page
10.6	10.6 - 12.6	1.0				70% SAND 30% GRAVEL	SP/SW	11, 12		GRAVELLY SAND, dark yellowish orange (10 YR 6/6), angular-subangular, mod-well graded, sand is FG-VCG, max gravel size = 4.5 cm
	12.6 - 13.0	0.4								Same as above: light brown (5 YR 6/6) trace of clay
	13.0 - 14.6	0.9						13, 14		Same as above: increase in size of sand - MG - VCG, mod graded, bottom of interval is 2 large (>7 cm) gravel.
Box 2 of 5	14.6 - 16.6	0.9				>80% G	GP	15, 16		GRAVEL, trace of matrix color is grayish orange (10 YR 7/4), angular-subangular, poorly graded, max size > 6 cm (size of core barrel), trace of FG-MG sand.
	16.6 - 18.6	1.5				65% SAND 35% CLAY	SC	17, 18		CLAYEY SAND, matrix color is yellowish gray (5 Y 7/2), subangular-subrounded, mod graded, sand is FG-CG, trace of gravel w/ abundant gravel in top 0.2 FT of interval. Base of interval (0.4 FT) is as below.
	18.6 - 19.0	0.3				80% G 20% SAND	GW			SANDY GRAVEL, grayish orange (10 YR 7/4), subangular-subrounded, mod-well graded, max size = 6 cm
	19.0 - 19.6	0.4				100% GRAVEL	GW	19		5 pieces of GRAVEL, no matrix, core has cut, >6 cm max size
	(20.6)									NO SAMPLE

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Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 37-89BR

GEOLOGIST(S): [illegible]
DATE: 9/26/89

PROJECT NO: 667-1150

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 2 of 5	(19.6) 20.6	∅								NO SAMPLE
	22.6	0.3				75% Gravel 25% Sand	GP/GW	21, 22		Sandy Gravel, pale yellowish orange (10 YR 8/6), Subangular-subrounded, mod graded, max sing = 5cm, trace of clay, sand is VFG NOTE small recovery
	23.6	1.0					GP/GW	23		Same as above dark yellowish orange (10 YR 6/6), some clay, sand is FG-CG
	23.9	0.5								Same as above
	24.6	∅						24		NO SAMPLE
	26.0	1.3						25, 26		Same as above
Box 3 of 5	26.5	0.4 ~~1.2~~ [illegible]						27, 28		CLAY, yellowish gray (5 Y 7/2), est. mod plast, some gravel. (~~[illegible]~~ possibly re-worked claystone), broken-up texture
	28.6	1.2 ~~0.4~~ [illegible]						29		CLAYSTONE, light olive gray (5 Y 6/1), apparent massive bedding, top of interval is highly weathered grading to mod. weathered at base. Some silt as layers & in matrix, some non staining as matter
	29.8									Same as above

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 37-89 BR

GEOLOGIST(S): [illegible]
DATE: 9/26

PROJECT NO: 667-1150

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 3 of 5	30.6	0.8								See previous page
	31.4	0.9						31		CLAYSTONE, dark yellowish orange (10 YR 6/6) and light gray (N7) mottled, mod - highly weathered, massive bedding, mod - highly friable, abundant iron staining and mottles, some silt increasing at base, trace of Mg staining
	32.5	1.1						32		Same as above: SILTY CLAYSTONE
	32.9	0.4								Same as above. Some VFG sand
	34.5	1.5						33 34		Same as above: trace of VFG sand at top of interval, decreasing to some iron staining at base of interval
	36.2	1.6		90°				35 36		Same as above: base of interval in 35.0-36.5 is olive black, some carb material, some iron assoc. w/ carb material, 2 vertical fractures, mod weathered
Box 4 of 5	36.8	0.2								Same as above no apparent fractures
	38.0	1.3		90				37		Same as above: 90° fracture filled w/ iron
	38.5	0.6						38		Same as above. no apparent fractures
	39.5	0.9						39		Same as above: ~~yellowish~~ gray to yellowish gray (5 Y 7/2) at base of interval, some iron staining as mottles
	(40.5)	1.05								Same as above: color grading to olive gray (5 Y 4/1) at base, trace of VFG sand at base of interval

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Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

LOG OF BORING NO. 37-89 BE

GEOLOGIST(S): DAJ
DATE: 9/26/89

PROJECT NO: 667-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 4 of 5	40.5									See previous page
	41.1	0.6				50% CLAY 30% SILTY 20% SAND		41		SILTY ~~SANDY~~ ~~SILT~~ CLAYSTONE, yellowish gray (5Y 7/2) mottled w/ very light gray (N8), massive bedding, mod-highly weathered mod friable, some VFG sand, trace iron staining as mottles
	42.5	1.6			at base	60% CLAY 30% SILT 10% SAND		42		Same as above: abundant iron staining and decreased sand fraction from middle to base of interval
↑ 44.5	44.5	1.8				75% SAND 25% CLAY		43 44		TOP 1 FT of interval: Same as above, possible sand dike. Base of interval: CLAYEY SANDSTONE, yellowish gray (5Y 8/1), non apparent bedding, highly weathered, mod-highly friable, flowing texture, contact is gradual to 0.4 FT, VFG, mod-well sorted, ~~slow~~ possible clay interbeds.
Box 5/5 44.5 ↓ ↑ 45.5	45.5	1.1						45		Same as above: FG, yellowish gray (5Y 2 mottled w/ very light gray (N8)
END OF BOXES								46 47 48 49		

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 37-89 BR

PAGE 1 OF

(Deep Borehole)

(Boxes 1/2, 2/2 & 1/22 - 22/22)

GEOLOGIST(S): [illegible]

DATE: 9/27/89

PROJECT NO: 667-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
								11		
								12		
								13		
								14		
								15		BEGINNING TOP OF BOXES
15.5 ↓	17.0	1.8				60% SAND 25% CLAY 15% SILT		16		CLAYEY SANDSTONE, pinkish gray (5YR 8/1) bedding is more apparent, highly weathered, mod friable, broken-flowery texture at top of interval grading to consolidated at base, Clay fraction increases at base, some iron staining as mottles. Sand is VFG-FG, mod sorted
Box 1 of 2	18.5	1.75				60% SAND 20% CLAY 20% SILT		17 18		Same as above increased silt fraction at base, decreased clay fraction - abundant Fe at top - base grades to a SILTY SANDSTONE
	20.0	1.7				25% SILT 75% SAND		19		SILTY SANDSTONE, pinkish gray (5YR 8/1) mod-highly weathered, ~~mod bedding~~ sandstone is massively bedded w/ clay laminations & 1-2 mm thick every 1 cm, mod friable, top of interval [illegible] texture, FG, mod-well sorted, subangular-subrounded, some iron staining as mottles

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 37-89

GEOLOGIST(S): DAY
DATE: 9/27/89

PROJECT NO: 667-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 1 of 2	22.0	1.8				30% SILT 70% SAND		21		SILTY SANDSTONE, light gray (N7) grading to grayish orange (10YR 7/2) thinly laminated, mod weathered, mod friable, broken texture, FG, subangular, subrounded, mod-well sorted, iron staining as mottles & along laminations
23.0	23.0	1.65				20% CLAY 25% SILT 55% SAND		22		Same as above ~~grayish orange (10YR 7/4)~~ pale yellowish brown (10 YR 6/2), some clay
DISCREPANCY		Ø						23	X	NO SAMPLE - DISCREPENCY BETWEEN BOXES
24.0	24.0					Same as above		24		Same as above ~~[illegible]~~ brownish gray (5 YR 4/1), no apparent bedding, highly weathered, flowy texture, VFG, ~~[illegible]~~ trace of iron staining
	25.5							25		
	26.0								X	NO SAMPLE
Box 2 of 2	27.0					50% SILT 70% SAND		26		Same as above: very light gray (N8), trace of clay
						55% Sand 25% SILT 20% CLAY		27		Same as above: light brownish gray (5 YR 6/1), some clay
29.0								28		
								29		

NOTES. General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 37-89BR

PAGE 1 OF ~~14~~ 20

GEOLOGIST(S): LSR

DATE: 10/24/89

PROJECT NO: 667.14.11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
29.0	29.0-30.0	0								No sample
↓	30.0-34.0	4.35 (2)			9°		CL	31, 32, 33		Clay light brown (5YR 5/6) to a grayish brown (5YR 3/2), some silt moderately high plasticity, one 7cm ø cobble at top. (Top 6"). V.F.G sandstone very pale orange thin horizontal laminae, bedding (siltstone + claystone) interbedded planes contain carbonaceous material, sample ~~contain~~ becomes more clayey at the bottom of sample (1' foot)
							Base LSR 10/24/89	33		Silty claystone olive gray (5Y 4/1) massive bedding, slightly friable, trace of V.F.G sand, some carb. material
BOX 1 of 22	34.0-37.1	ND						34, 35, 36, 37		Claystone olive gray (5Y 4/1) massive bedding, slightly friable, some f.g. to very fg sand, trace of carb. material
	37.1-38.0	ND								Same as above with the addition of some silt
↑ 38.8	38.0-38.8	ND						38		V.F.G to fine grained sandstone yellowish gray (5Y 8/1) slightly friable well sorted, some clay.
38.8 ↓ BOX 2 of 22	38.8 TO 42.0	1.1 (2)						39		Same as above (Top 6")

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 37-89BR PAGE 2 OF ~~14~~ 20

GEOLOGIST(S): ZLD
DATE: 10/24/89

PROJECT NO:

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
BOX 2 of 22	38.2 TO 42.0	~~2.5~~ 2.0						41	NOT SURE WHAT PART OF THE SAMPLE IS MISSING	BOTTOM 6" - Claystone olive gray (5Y 4/1), slightly friable, some carb. material, trace silt.
	42.0 TO 44.0	2.5						42, 43		Silty claystone olive gray (5Y 4/1) to brownish black, massive bedding slightly friable, trace of carb material
	44.0 TO 48.0	ND						44, 45, 46, 47		Same as above w/ slickensides bottom foot contains some u.f.g. sand.
	48.0-48.52	0						48		NO SAMPLE
↑ 49.0	48.52-49.0	0 (2)								u.f.g. sandy claystone olive gray (5Y 4/1) bedding nonapparent, trace of carb. material
49.0 ↓		49.0 TO 52.0						49		See ~~prev~~ next page

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 37-89BR PAGE 3 OF ~~14~~ 26

GEOLOGIST(S): ZSO
DATE: 10/24/89

PROJECT NO: 1667.14.11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
	49.0 TO 52.0	(2) 2.65						51		Silty claystone lt olive gray (5Y 6/1) massive bedding, some carb material
	52.0 TO 55.0	ND						52, 53, 54		Same as above w/ an increased amount of carb material @ to 53.5-54.5 ft.
BOX 3 of 22	55.0 TO 58.3	ND		45°				55, 56, 57, 58		Claystone olive gray (5Y 4/1) to olive black (5Y 2/1), some silt, iron staining in fractures, slickensides present, trace of fig. sand.
58.3	58.3 TO 59.0	ND ~~0.75~~						59		Claystone lt. olive gray (5Y 6/1) iron stains, some silt & carb material slightly friable.
BOX 4 of 22	59.0 TO 59.9	0.9		70°						Silty claystone olive gray (5Y 4/1) Thin horizontal bedding, slightly friable, some carb material, slickensides present trace iron staining

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 37-89BR

GEOLOGIST(S): LJD
DATE: 10/24/89

PROJECT NO: 667.14.4

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
BOX 4 of 22 ↑ 67.0	59.9 TO 62.0	1.9		40°	12°-15° 8°-10°			61		Silty Claystone lt olive gray (5Y 6/1) to olive gray (5Y 4/1) thin horizontal bedding slightly friable, some carb material trace iron staining
	62.0 TO 63.0	1						62		Claystone olive gray (5Y 4/1), slightly friable some silt, trace iron staining
	63.0 TO 67.0	4.0						63, 64, 65, 66		Silty claystone lt. olive gray (5Y 6/1) to olive gray (5Y 4/1) slightly friable, some fine grained sand & carb material, trace iron stains & concretions. Some of the sand & carb. materials occure on bedding planes.
67.0 ↓ BOX 5 of 22	67.0 TO 71.0	4.0						67, 68, 69		Same as above except only a trace of carb material & no iron nodules

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 37-89BR

PAGE 5 OF 20

GEOLOGIST(S): ZSO
DATE: 10/24/89

PROJECT NO. 667.14.11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 5 of 22					15°					
	71.0 TO 75.0	2.35			8°-10°			71, 72, 73, 74		Interbedded VFG sandstone & silty claystone c/c pinkish gray (5 YR 8/1) to olive black (5Y 2/1) bedding is thin laminae (<1mm to a few mm), carb. material is also interbedded in layers
	75.1 - 75.5	0.3						75		as above
↑ 77.3	75.5 TO 77.3	1.85						76, 77		as above
77.3 ↓ Box 6 of 22	77.3 TO 78.0	0.70								as above w/ colors = pinkish gray (5 YR 8/1) to olive gray (5Y 4/1), & no carb. material & a trace more sand.
	78.0 TO 82.0	4.0						78, 79		TOP 9' is a VFG sand stone, pinkish gray (5 YR 8/1), thinly laminated, moderately friable, trace of interbedded claystone. 79'-81' V.F.G. sandstone, pinkish gray (5 YR 8/1) interbedded w/ coal, bedding is thin laminae (<1mm to a few mm) well sorted

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 37-89BR

GEOLOGIST(S): ZSR/DAJ
DATE: 10/24/89

PROJECT NO: 667.14.4

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
BOX 6 of 22 ↑ 86.0								81		interbedded Claystone + VFG. sandstone, pinkish gray (5YR 8/1) + olive gray (5Y 4/1), thin laminae (<1mm to a few mm), slightly friable, some carbon.
	82.0 TO 84.0	2.0						82		as above w/ the top 8" being a claystone some silt + carb. material trace of clay
	84.0 TO 86.0	1.7						84		Same as interval from 81 to 82 feet
	86.0 -88.0	1.7						86		SANDSTONE, light gray (N7), massive bedding, mod weathered, mod-highly friable, top 6in (86.0-86.5) & bottom 4in (87.5-88.0) is VF-NG, poorly sorted, subangular - subrounded, some rom as modules, interval 86.5-87.6 is silt-VFG sing, well sorted, no yen - all has some carb material, & trace of coal
	88.0 -90.0	1.8						88		Top 6in of interval (88.0-88.5): same as above 86.0-86.5 Base of interval (88.5-90.0): same as 86.5-87.5, thinly horizontal laminated with interbedded (±0.5-1 cm thick) of clay
								89		

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 37-89 BR

GEOLOGIST(S): [illegible]
DATE: 10/26/89

PROJECT NO: 1607-14.11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 7 of 22	90 -91.3	1.9						91		CLAYEY SILTSTONE, dark greenish gray (5 GY 4/1), massive bedding, mod weathered, ~~poo~~ mod-poorly friable, trace VFG sand, traced carb material, increasing clay fraction at base of interval
	91.3 -99.0	3.0						92 93		CLAYSTONE, dark greenish gray (5 GY 4/1), massive bedding, mod weathered, mod friable, some silt
	99.0 -95.0	0.8						94		Same as above: color grades to olive black (5 Y 2/1) at base
	95.0 -95.4	0.3						95		Same as above: olive black (5 Y 2/1)
Box 8 of 22	95.4 -99.0	4.0		90°				96 97 98		Same as above grading to light olive gray at base (5 Y 6/1), some silt ~~at middle~~ ~~at base~~, some carb material ~~throughout~~ → grading to a SILTY CLAYSTONE at base vertical fracture showing slickensides at ≈ 97.5'
	99.0 -103	3.9				35% 65%	SMD SMY	99		SANDY SILTSTONE ~~SILTY SANDSTONE~~, pink-gray (5 YR 8/1), bedding ≈ 10° ~~[illegible]~~ abundant soft sed deformation (fine slab), mod weathered, mod-poorly friable, VFG sand, well sorted, trace of carb material, lensed of clay ≈ 0.5cm-2cm thick

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 37-89B2

GEOLOGIST(S): [illegible]
DATE: 10/26/89

PROJECT NO: 667-14 11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 8 of 22	99.0 -103.0							101, 102		See previous page
	103.0 -104.2	1.15				35% SAND 65% SILT		103, 104		SANDY SILTSTONE ~~SILTY SANDSTONE~~, pinkish gray (5 YR 8/1), apparent thinly laminated & horizontal, mod weathered, mod-poorly friable, VFG-FG, well sorted, some thin clay ~~laminae~~ laminae, trace iron assoc. w/ trace of carb material.
104.2	104.7 -107	1.9						105, 106		Same as above: increased sand fraction
Box 9 of 22	107 -109	1.9						107, 108		Same as above: increased silt fraction at base
	109 -110	1.05						109		SILTY CLAYSTONE, olive gray (5 Y 4/1), massive bedding, mod weathered, mod friability, some carb material, trace some iron assoc w/ carb material

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 37-89BR PAGE 9 OF 19/20

GEOLOGIST(S): [illegible]
DATE: 10/26/89

PROJECT NO: 667-14.11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 9 of 22	110-112.4	2.6						111, 112		~~See previous page~~
	112.4-113	0.5				30% CLAY 70% SILT				CLAYEY SILTSTONE, olive gray (5 Y 4/1), massive bedding, mod weathered mod friable, clay content decreases at base, some carb material, trace of iron as nodules
	113-113.8	1.15				30% SILT SAND 70% SILT		113		Same as above
113.8	113.8-115.7	1.9				35% SAND 65% SILT		114, 115		SANDY SILTSTONE, pinkish gray (5 YR 8/1) massive bedding, mod weathered mod friable, some clay, some carb material. Sand is VFG. Same as above. Sand fraction increases at base
Box 10 of 22	115.7-117.0	1.35						116		Same as above: ~~[illegible]~~ some clay at base of interval.
	117.0-119.0	2.3						117, 118		SILTY CLAYSTONE, olive gray (5 Y 4/1), massive bedding, mod weathered, mod friable, some carb material, some trace iron staining as mottles, at a 118' - interbed of SANDY SILTSTONE, pinkish gray (5 YR 8/1), massive bedding, sand is VFG, some carb & 6 in THICK (to 118.5')
	119.0-121	1.9						119		SILTY CLAYSTONE Same as above (no Siltstone)

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(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 37-89 BR

GEOLOGIST(S): LAY
DATE: 10/26/89

PROJECT NO: 1667-14 11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box Number 22										See previous page
	121-122.4	1.7						121, 122		SILTY CLAYSTONE, olive gray (5 Y 4/1) massive bedding, mod weathered, mod friable, trace of iron staining as mottles
122.4	122.4 -124.5	1.8		75°				123, 124		CLAYSTONE, olive gray (5 Y 4/1) massive bedding, mod weathered mod friable, some silt, @ 75° fractures showing slickensides
	124.5 -125.0	0.8								Same as above: trace of coal material, no apparent fractures
	125.0 -129.0	2.8		75°				125, 126, 127, 128		Same as above: some coal material, fractures @ 127.5' @ 75° showing slickensides
	129.0 -132.0	3.4						129		Same as above: highly weathered with silt & VFG sand as mottles between 0 & 40 degrees, sand & silt are unconsolidated

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Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 37-89 BR

GEOLOGIST(S): WAY
DATE: 10/26/89

PROJECT NO: 6607-14.11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
↑ 132.0	(129.0 - 132.0)							131		SILTY CLAYSTONE, olive gray (5Y 4/1), massive bedding, mod weathered, mod friable, some carb material, trace of VFG sand
132.0 ↓	132.0 - 134.0	1.8						132, 133		Same as above: trace iron as nodules & assoc w/ carb.
Box 12 of 20	134.0 - 136.0	2.0 ~~1.9~~						134, 135		Same as above
	136.0 - 137.0	1.6						136		Same as above: decrease in silt fraction at base
	137.0 - 140.0	2.5						137, 138, 139		CLAYSTONE, olive gray (5Y 4/1), massive bedding, mod weathered, mod friable, top of interval has some carb & trace of coal grading to trace of carb, trace of iron staining as mottles, vertical fraction at ≈ 139.0 FT

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(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 37-89 BR

GEOLOGIST(S): [illegible]
DATE: 10/26/89

PROJECT NO: 667-14.11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
↑ 140.9	140.0 -140.9	0.9								CLAYSTONE, olive gray (5Y 4/1), massive bedding, mod weathered, mod friable, some silt, some carb, trace of coal
140.9 ↓	140.9 -143	1.95						141, 142		SILTSTONE, light olive gray (5Y 6/1) massive bedding, mod. weathered, poor friability, some carb material,
	143.0 -144.0	1.0						143		Same as above: trace of coal,
	144.0 -148.3	0.85						144, 145, 146		Same as above: some VFG sand mod-poorly friable
	146.3 -148.0	1.6						147		Same as above (146.3-148.0) SILTY CLAYSTONE, olive gray (5Y 4/1) massive bedding mod weathered mod friable, becoming silicier at base
	148.0 -149	2.75				[illegible] 25% SILT 75% CLAY		148		
↑ 149.7	149.0 -149.7	0.65						149		SANDY SILTSTONE, light olive gray (5Y 6/1), no bedding is non-apparent, possible soft sed deformation, mod weathered, mod friable, sand is VFG
149.7 ↓	149.7-155.0									See next page

Box 13 of 22

NOTES: General: USCS is modified for this log as follows:
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ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 37-89BR

PAGE ~~12~~ 13 OF ~~19~~ 20

GEOLOGIST(S): [illegible]
DATE: 10/26/89

PROJECT NO: 667-14.1

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 14 of 22	149.7 -153.0	2.6				30% CLAY 70% SILT		151, 152		CLAYEY SILTSTONE, olive gray (5 Y 4/1) massive bedding, mod weathered, mod-poorly friable, some carb material, some VFG sand as mottles
	153.0 -154	0.95				35% CLAY 65% SILT		153		Same as above: decrease clay fraction
	154 -155.7	1.9						154, 155		CLAYSTONE, olive black (5 Y 2/1), massive bedding, mod weathered, mod friable, some carb, some silt
	155.7 -157.0	1.35						156		Same as above:
	157.0 -158.6	2.25						157, 158		Same as above: grading to light olive gray (5 Y 4/1) at base, ~~some~~
158.6 ↑ Box 15 of 22	158.6 -161	2.3						159		CLAYEY SILTSTONE, dark greenish gray (5 GY 4/1), massive bedding, mod weathered, mod-poorly friable, some VFG sand as mottles

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(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 37-89 BR

GEOLOGIST(S): DAJ
DATE: 10/26/89

PROJECT NO: 667-14.11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 15 of 22										See previous page
	161.0 -164.	3.1				30% CLAY 70% SILT		161, 162, 163		CLAYEY SILTSTONE, greenish gray (5 GY 6/1), massive bedding, mod weathered, mod-poor friability, some carb material, some VFG sand as mottles, trace of iron as mottled staining & as nodules
	164.0 -165.0	0.95				20% CLAY 80% SILT		164		Same as above: decreased clay fraction, trace of VFG sand as mottles
	165.0 -167.6	2.65				25% CLAY 75% SILT		165, 166, 167		Same as above: trace of carb material, increase in clay fraction
167.6 Box 16 of 22	167.6 -170.0	2.5				20% CLAY 80% SILT		168, 169		Same as above. decreased clay fraction

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ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 37-89BR

GEOLOGIST(S): DAS
DATE: 10/26/89

PROJECT NO: 667-1411

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 16 of 22	170 -174	3.9				25% CLAY 75% SILT 35% SAND 15% CLAY 50% SILT (SAND IS SILT+CLAY % NOT SEPARATED)		171 172 173		170-172.5' CLAYEY SILTSTONE, olive gray (5 Y 6/1), apparent massive bedding, mod weathered, mod-poorly friable, some carb material, some iron staining as mottles 172.5-174.0' SANDY SILTSTONE, yellowish gray (5 Y 8/1), massive bedding w/ some thin laminations, mod weathered, poorly friable, some clay, sand is VFG & well sorted and is in matrix & as lenses.
	174.0 -176.7	2.85				40% SAND 15% CLAY 45% SILT		174 175 176		Same as 172.5-174.0; increase in VFG sand fraction
↑ 176.3	176.7 -178.0	1.3						177		Same as above. Slab shows VFG sand lenses (0.1 mm-2 cm) & sand in matrix, soft sed deformations and possible dewatering structures
	178.0 -180.1	2.3				30% SAND 15% CLAY 55% SILT		178 179		Same as above: decrease in sand fraction, sand is as mottles

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(2) Core breaks cannot be matched, accurate footage measurements not possible.

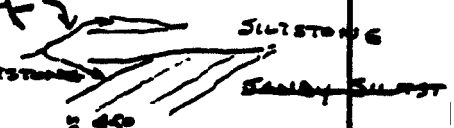
ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 37-89 BR

GEOLOGIST(S): [illegible]
DATE: 10/26/89

PROJECT NO: 6617-14.11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 17 of 22	180.1 -182.0	1.85						181		~~Sandy~~ SILTSTONE, light olive gray (5 Y 6/1), ~~bedding~~ slab shows interbeds of SILTSTONE & SANDY SILTSTONES, possible ripple laminations, mod weathered, mod-poorly friable, ~~some~~ some VFG sand in matrix ~~and~~ as lenses (i.e. lenses of SANDY SILTSTONE in SILTSTONE), ~~trace of~~ trace of iron stain
	182.0 - 183.8	1.8						182, 183		Same as above pinkish gray (5 YR 8/1), some VFG sand in matrix, trace of iron stain as matrix
	183.8 -185.5	1.8			[redacted]			184, 185		Same as 180.1 - 182.0, slab shows ≈ lenticular bedding of SANDY SILTSTONE w/ SILTSTONE, base of slab has an angular unconformity 
↑ 185.5										
185.5 ↓	185.5 -186.0	0.6				30% 70%	Sand SILT			
	186.0 -187.6	0.95						186, 187		SANDY SILTSTONE, pinkish gray (5 YR 8/1), apparent massive bedding, mod weathered, mod-poorly friable, sand is VFG
	187.6 -188.7	1.35						188		Same as above
	188.7 -189.0	1.3						189		Same as above; slab shows a 5° ~~[illegible]~~ laminations, interbeds of siltstone, sand body ≈ 1 cm thick
										Same as above.

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

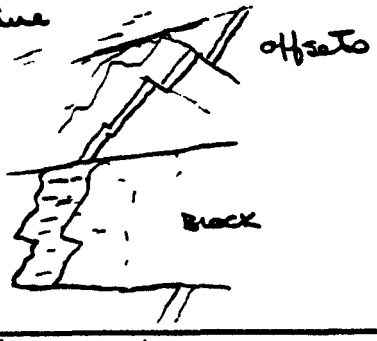
ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 37-89BR

GEOLOGIST(S): DLS
DATE: 10/26/89

PROJECT NO: 1667-14.11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 18 of 21	190.0 -190.4	0.4								SANDY SILTSTONE, light olive gray (5Y 6/1), massive bedding, mod weathered, poorly friable, trace of coal material
	190.4 -192.3	1.8						191		See as above to @ 190.4-191.0 191.0-192.3 SILTY SANDSTONE, pinkish gray (5YR 8/1), apparent massive bedding, mod-highly friable, FG, mod-well sorted, base of interval has increased silt fraction
	192.3 -194.0	1.7				65% SILT 35% SAND		192, 193		SANDY SILTSTONE, yellowish gray (5Y 8/1), apparent massive bedding, mod weathered, mod-poorly friable, sand to VFG, trace of iron staining as mottles
194.0 ↓ Box 19 of 21	194.0 -198.0	4.0						194, 195, 196, 197		See as above. Slab shows ~~one~~ a 90° bedding that has fractures w/ offset blocks. Major fracture at @ 197.5' @ 35° 
	198.0 -200.0	2.0						198, 199		See as above: ~~fractures @ 197.5' @ 35°~~ slab shows similar structure as above ~~w/~~ including small step fractures & offset blocks

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 37-89 BR

PAGE ~~17~~ 18 OF ~~19~~ 20

GEOLOGIST(S): DAJ
DATE: 10/26/89

PROJECT NO: 667 14.11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
		0 ~~1~~						201		See previous page
↑ 203.1	202.0 -203.1	1.0				65% SILT 35% SAND		202		SANDY SILTSTONE, yellowish gray (5Y 8/1) to light olive gray (5Y 6/1) bedding appears to be at a high angle & sandy fraction interbedded w/ silt, mod weathered, mod-poorly friable, sand is VFG, trace of VFG sing iron nodules
Bore 20 of 21	203.1 -206.0	~~1.8~~ 2.3						203 204 205		Same as above: trace of carb material
	206.0 -208.4	3.2				25% SAND 20 ~~15%~~ CLAY ~~45~~ 55% SILT		206 207 208		Same as above: decreased sand fraction, some clay slab shows bedding ≈ 70°, sand as inter~~beds~~ laminae ≈ 0.1 mm, offset fractures, clay fraction increases at base of interval
	208.4 -210.0	1.6				30% CLAY 70% SILT		209		CLAYEY SILTSTONE, olive gray (5Y 4/1), apparent massive bedding, mod weathered, mod friable, some carb material

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Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 37-89BR

GEOLOGIST(S): DAJ
DATE: 10/27/89

PROJECT NO: 0667-14.11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
↑ 212	210-212	1.8						210		SILTSTONE, pinkish gray (5YR 8/1), Slab shows interbedded w/ clay, horizontal, sorrelent, cuber distorted, possible roots, other carb material, mod weathered, mod poorly friable, trace VFG sand, some clay
212 ↓	212-214	2.0				20% SAND 70% SILT 10% CLAY		212, 213		SANDY SILTSTONE, yellowish gray (5Y 8/1), Slab shows laminar bedding w/ possible ripple structures & bounding surfaces, clay lenses, mod weathered, mod friable, some clay,
Box 21 of 21	214-218	4.35				70% SILT 30% CLAY		214, 215, 216, 217		Same as above: ~~top of interval 214-216~~ ~~[illegible]~~ Base of ~~interval 216-218~~: CLAYEY SILTSTONE, olive gray (5Y 4/1), apparent massive bedding, mod weathered, mod-poorly friable, trace of carb material w/ assoc. white bladed mineral
	218-220.5	2.8		50-60°				218, 219		See next page ~~Slick~~ Slickensides at ~~[illegible]~~ 219.5 at ≈ 50-60°

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 37-89 BR

GEOLOGIST(S): [illegible]
DATE: 10/27/89

PROJECT NO: 667-14.11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
218' [illegible] 220.8'	218' 220.8'	2.8'		50°		70% SILT 30% CLAY				CLAYEY SILTSTONE, Light olive gray (5Y 6/1) sub-angular, poorly-mod sorted, Slickensides at 220.2' 50°,
220.8' [illegible] 222'	220.8' 222'	1.3'				90% SILT 10% CLAY		220		SILTSTONE, Pale yellowish brown (10YR 6/2) to Light brownish gray (5YR 6/1) well sorted, sub-angular - sub round, mod - slightly friable with abundant carbonaceous plant fragments, and some iron oxide nodules 1 or 2 mm.
								222		
								223		
								224		
								225		
								226		
								227		
								228		
								229		

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 38-89 BR

GEOLOGIST(S): DAY
DATE: ~~8/~~ 9/26/89

PROJECT NO: 667-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
0.0 ↓	0.0 -2.0	1.8						1		TOP 1.0 FT Clay, dusky yellowish brown (10 YR 2/2) est, mod plast, some gravel, surficial grass, some roots max gravel size = 6 cm, trace of sand TOP OF ROCK Base of interval: Calcareous CLAYSTONE, pinkish gray (5 YR 8/1), non-apparent bedding, gradational contact is ≈0.2 FT, highly weathered, mod friable, some roots broken texture
	2.0 -4.0	1.6						2 3		Same as above flowery texture, trace of iron staining
Box 1 of 3	4.0 -6.0	1.5				5% SAND 30% CLAY 20% CALC		4 5		CLAYEY SANDSTONE, very light gray (N8) non-apparent bedding, highly weathered, highly friable, flowery texture, VFS-FS, mod-well sorted abundant calc material, some iron staining, trace of silt
	6.0 -8.0	1.3				65% SAND 30% CLAY 5% CALC		6 7		Same as above: dark yellowish orange (10 YR 6/6), trace calc material
↑ 10.0	8.0 -10.0	1.6				↓		8 9		Same as above: very light gray (N8) increased clay fraction at base of interval

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 38-89 BR

GEOLOGIST(S): [illegible]
DATE: 9/26/89

PROJECT NO: 6067-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
10.0 ↓	10.0	1.9						11		CLAYSTONE, brownish gray (5 YR 6/1), apparent massive bedding, very top of interval shows sharp contact, mod-highly weathered, mod friable, some silt, ~~trace~~ some iron staining as mottles, ~~trace some carbonate~~ trace grading to some lig staining trace carb material
	12.0							12		
		1.75		90°		75% CLAY 25% SILT		13		SILTY CLAYSTONE, light olive gray (5 Y 6/1), apparent massive bedding, mod weathered, mod friable, some iron staining as mottles, some carb material, some fractures @ 90°, ~~some~~ w/ trace of $CaCO_3$ filling
	14.0							14		
		1.9				70% CLAY 30% SILT		15		Same as above. increase in silt fraction
	16.0							16		
		1.8						17		Same as above. olive gray (5 Y 4/1). iron staining is associated w/ vertical fractures
	18.0							18		
↑		1.9				50% CLAY 30% SAND 20% SILT		19		SANDY CLAYSTONE, Dusky gray (5 YR 3/1), massive bedding, mod weathered, mod-poorly friable, some iron staining as mottles, some carb material, some silt, sand is VFG, sand fraction increases at base of interval
20.0	20.0									

Box 2 of 3

NOTES. General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 38-89 BR

GEOLOGIST(S): [illegible]
DATE: 9/26/89

PROJECT NO: 1607-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
20.0 ↓	20.0	1.9				70% CLAY 30% SAND		21		SANDY CLAYSTONE, pinkish gray (5 YR 8/1) apparent massive bedding, mod weathered, mod friable, some carb material, trace of coal, some silt, some iron staining as mottles at base. Sand is VFG-FG and is suspended in clay.
	21.5	1.1								Same as above; increased sand fraction at base
Box 3 of 3	22.0	0.7				70% SAND 30% CLAY		22		CLAYEY SANDSTONE, very light gray (N8), apparently thinly laminated, mod weathered, mod friable, FG, mod-well sorted, some iron staining along laminations and as mottles, some silt, trace clay as lenses
	23.2	0.4				50% CLAY 30% SAND 20% SILT		23		
↑ 24.0								24		SANDY CLAYSTONE, yellowish gray (5 Y 8/1) apparent massive bedding, mod weathered, mod-poorly friable, some iron staining as mottles, some carb, sand is VFG, some silt
Discrepancy Between Boxes								25		
25.3 ↓	26.9	1.9						26		Same as above. High sand fraction in top 0.5 FT., high silt fraction in base of interval
	27.7	0.9				75% SILT 25% CLAY		27		CLAYEY SILTSTONE, mod dark gray (N4), massive bedding, mod friable, mod weathered, some poorly iron staining as mottles, trace Mg
	28.3	0.55		65°		↓		28		Same as above; some carb material w/ assoc. iron staining, fractured 65°
	(31.7)	1.2				65% SILT 35% CLAY		29		Same as above. increased clay fraction

NOTES. General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 38-89 BR

GEOLOGIST(S): [illegible]
DATE: 9/28/89

PROJECT NO: 667-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 1 of 11										See previous page
	31.7							31		
	32.3	0.45						32		SILTY CLAYSTONE, olive gray (5Y 4/1), massive bedding, mod weathered mod friable, ~~trace of iron staining~~
	33.7	1.7						33		Same as above. trace of iron staining
34A	34.4	1.7						34		Same as above middle grades to olive black (5Y 2/1), some carb material, trace of coal, trace of VFG sand at base
34A ↓ Box 2 of 11								35		Same as above. olive gray (5Y 4/1) trace of carb, no apparent sand
		1.85						36		
	37.2							37		Same as above
		2.85						38		
								39		AT ~ 39.5 ft: Same as above olive black (5Y 2/1), some carb material

NOTES. General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 38-89 BR

GEOLOGIST(S): [illegible]
DATE: 9/20/89

PROJECT NO: 1067-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
										See previous page
		0						41		
	41.7									
Box 2 of 11								42		CLAYSTONE, olive gray (5Y 4/1), massive bedding, mod weathered, mod friable, trace of carb material w/ assoc iron staining & white efflorescence: mineralization
								43		
		1.8								
								44		
↑ 45.1	45.1							45		Same as above trace of silt
	45.7	0.7								Same as above: some silt
								46		
								47		
Box 3 of 11		0.9						48		
								49		
	49.5									Same as above
		0.6								

NOTES. General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 38-89 B2

GEOLOGIST(S): [illegible]
DATE: 9/28/89

PROJECT NO: 667-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 3 of 11	50.2									See previous page
		3.0						51		CLAYSTONE, olive black (5 Y 2/1), massive bedding, mod weathered, mod friable, some carb material, some silt; grading to a quartz (5 Y [illegible]) at base
	52.2							52		SILTY CLAYSTONE, olive ~~black~~ quartz (5 Y [illegible]/1), massive bedding, mod weathered, mod friable, abundant carb material, ~~trace of~~ coal seam ≈ 2 cm wide, 1/2 cm thick
		1.9						53, 54		
	55.2							55		Same as above trace of iron staining as mottles
		1.9						56		
↑ 57.3	57.3							57		Same as above, decreased silt fraction
Box 4 of 11		1.0						58		
	58.7									
		Ø						59		NO SAMPLE

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 38-89 B2

GEOLOGIST(S): DAJ
DATE: 9/28/89

PROJECT NO: 667-11.58

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF MATERIAL	FEET OF CORE IN MATERIAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
	62.7	0						61, 62		No Sample
	63.2	1.0						63		This interval appears as silty CLAYSTONE, olive gray (5 Y 4/1), massive bedding, mod weathered, mod friable, trace of coal
	64.7	1.75						64		
	65.1	0.6						65		Same as above. Some silt Same as above
Box 4 of 11	66.7	1.15						66		SILTSTONE, light olive gray (5 Y 6/1), apparent massive bedding, mod weathered, mod-poorly friable, some clay
	67.4	0.6						67		Same as above
	68.7	1.1						68		Same as above: some clay
	69.2	0.4						69		Silty Cla
	70.5	1.3								See next page

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 38-89 BR

GEOLOGIST(S): NLJ
DATE: 9/27/89

PROJECT NO: 667-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
										CLAYEY SILTSTONE
Box 5 of 11										~~Silty Claystone~~, olive gray (5 Y 4/1) massive bedding, mod weathered, mod friable, trace VFG sand, trace iron nodule
								71		
	72.2							72		Same as above
		5.3'						73		
								74		
								75		
	75.7									Same as above: Some VFG sand as >1mm lenses, & some carb material
								76		
		2.65						77		
								78		
↑ Pd	79.1							79		Same as above
	79.7	0.85								Same as above: trace of white & gold ~~[illegible]~~ w/ carb material
		0.95								

NOTES. General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 38-89 BR PAGE 9 OF 14

GEOLOGIST(S): [illegible]
DATE: 9/29/89

PROJECT NO: 6167-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 6 of 11	80.6									
		4.35						81, 82, 83		CLAYEY SILTSTONE, olive gray (5Y 4/1) massive bedding, mod weathered mod friable, some VFG sand as lenses & laminae > 1mm thick, trace of iron assoc w/ trace of carb material, trace of calcite & gold mineralization assoc. w/ carb. material
	84.7							84		SILTY CLAYSTONE, olive gray (5Y 4/1), massive bedding, mod weathered, mod friable, trace of iron as nodules, trace of carb material
		1.1						85		
	85.5									Same as above
		1.8						86, 87		
87.4	87.4									Same as above. increased silt fraction
		0.85						88		
	88.2									
								89		NO SAMPLE
	(97.7)									

NOTES General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 38-89 BR

GEOLOGIST(S): DLY
DATE: 9/29/89
PROJECT NO: 6067-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 7 of 11	(88.2)	∅						91, 92		NO SAMPLE
	92.7									
	93.2	0.25						93		This interval appears to be slough
	93.3	1.1								SILTY CLAYSTONE, olive gray (5 Y 4/1), massive bedding, mod weathered, mod-poorly friable, some carb material, trace of VFG sand, trace of non-moculiro
		1.25						94, 95, 96		Gradation from SANDY SILTSTONE at top to SILTY SANDSTONE at base, light olive gray (5 Y 6/1), massive to thinly laminated at base, mod weathered, mod-poorly friable, sand is VFG, mod sorted, some carb material
	96.7									
		1.45				55% SAND 45% SILT		97, 98, 99		SILTY SANDSTONE, mod light gray (N6) and pinkish gray (5 YR 8/1), mod light gray is massively bedded, intr bedded with thinly laminated pinkish gray, swirmy possible slump faults & burrowing & brown micro bioturbation (from slab) mod weathered, mod-poorly friable, VFG, mod-well sorted, top of interval has a greater silt fraction
↑ 99.7	99.3									SILTSTONE, olive gray (5 Y 4/1), massive bedding, mod weathered, mod-poorly friable, trace of carb, trace of coal, trace of VFG sand at base of interval
	99.3									
	(101.1)									

★ - SEE BELOW

See next page

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

★ THERE IS ≈ 2.9 FT OF CORE THAT IS BOUNDED BY TWO BLOCKS - BOTH WITH "99.7" - THE DESCRIPTION IS — CLAYEY SILTSTONE, olive gray, massive bedding, mod weathered, mod-poorly friable, same name as mottled staining and as nodules, trace of carb, trace of VFG sand in middle of interval

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 38-89 BR

GEOLOGIST(S): DAY
DATE: 9/29/89

PROJECT NO: 667-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 8 of 11	101.7	1.9						101		SILTY CLAYSTONE, olive gray (5Y 4/1), massive bedding, mod weathered, mod friable, some carb material, some trace non staining as mottles.
	105.0	2.3						102, 103, 104		Same as above trace of coal seam <1mm thick, silt fraction increases at base
	105.7	0.9						105		Same as above
	106.5	2.0						106		(NOTE MEASURED FOOTAGE) TOP 0.5 FT Same as above; 0.5FT-10FT SANDY SILTSTONE, light olive gray (5Y 6/1), massive bedding, mod weathered mod-poorly friable, trace of carb sand fraction increases at base
	107.7	1.25						107		SILTY SANDSTONE, light olive gray (5Y 6/1), massive bedding, mod weathered, mod-poorly friable, VFG-FG, mod-well sorted, when water is put on core - appears to have high permeability
108.1	108.1	0.5						108		Same as above
	110.0	1.9						109		SILTY CLAYSTONE w/ SILTSTONE AND VFG SANDSTONE INTERBEDDED (~1cm-5cm thick), olive gray (5Y 4/1), massive bedding, mod weathered, mod-poorly friable, some carb material, some non staining as mottles

NOTES General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 38-89 BR

GEOLOGIST(S): [illegible]
DATE: 9/29/89

PROJECT NO: 1067-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 9 of 11	111.7	0.7				70% silt 30% clay		111		CLAYEY SILTSTONE, olive gray (5Y 4/1). massive bedding, mod weathered mod-poorly friable, trace of coal
	115.7	4.0				65% silt 35% clay		112, 113, 114, 115		Same as above. increased clay fraction at top of interval, some very fine sand (VFG) in middle of interval as lenses & in matrix, some carb material throughout
	117.3	1.5				spots		116, 117		Same as above. clay fraction is greater, trace carb material
Box 10 of 11 (117.3 →)	119.3	1.2						118, 119		Same as above. No apparent sand
	119.3									Same as above. base of interval has some VFG sand as lenses & in matrix

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 38-89 B2

GEOLOGIST(S): [illegible]
DATE: 9/29/89

PROJECT NO: 6167-1150

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 10 of 11	121.3	2.4						121		See previous page
	122.7	1.3		65				122		SILTSTONE, olive gray (5 Y 4/1), massively bedded, mod weathered, mod-poorly friable, trace of iron staining as mottles, trace of carb material. fracture at ≈ 65° at ≈ 122.5'
	126.1	4.2						123 124 125		SILTY CLAYSTONE, olive black (5Y 2/1), massive bedding, mod weathered mod friable, some iron staining as mottles & as nodules, trace carb material, fracture, ≈ 70°, at ≈ 124.0', silt decreases at base of interval & trace of VFG sand at bottom
Box 11 of 11	126.7	0.5						126		SANDY CLAYSTONE, slightly olive gray (5 Y 6/1), slab shows distorted bedding, mod weathered, mod-poorly friable, some silt
	128.7	0.8						127 128		CLAYSTONE, olive gray (5 Y 4/1), massive bedding, mod-highly weathered, mod friable, some silt, trace of carb material
	130.3	1.6						129		Same as above. Some of interval may be sluff

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 38-89 BZ

GEOLOGIST(S): [illegible]
DATE: 9/29/89

PROJECT NO: 667-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 11 of 11										See previous page
	131.5							131		
↑ 132.7	132.7	1.3						132		SANDY SILTSTONE, light olive gray (5 Y 6/1), apparent massive bedding, mod weathered, mod-poorly friable, some carb material w/ assoc iron staining & white mineralization [illegible] matrix & as clasts
END OF BOXES								133		
								134		
								135		
								136		
								137		
								138		
								139		

NOTES General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 40-89BR PAGE 1 OF 3

GEOLOGIST(S): DCB
DATE: 9/26/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
0 0 ↓	0.0 to 0.7	(1) .6				>50% clay	CL			clay, dusky brown (5YR 2/2), moderate plasticity, some gravel and silt, trace of plant detritus.
	0.7 to 2.0	0						1	X	No Sample
	2.0 to 3.2	(1) 1.0				~75% Gravel	GC	2 3		Clayey Gravel, dominantly light gray (N7), matrix is grayish brown (5YR 3/2), subangular, poorly graded, max. size ~4 cm, some sand in lower portion of interval, slightly calcareous.
	3.2 to 4.0	0							X	No Sample
	4.0 to 6.0	(1) 1.7				~80% Gravel ~15% sand ~5% silt + clay	GC	4 5		Gravel, dominantly light gray (N7), matrix is grayish orange (10YR 7/4), angular, moderately well graded, max. size ~6 cm, some sand, trace of silt and clay, slightly calcareous.
Box 1 of 3	6.0 to 8.0	(1) 1.8				~60% Gravel ~25% sand ~15% clay + silt	GC	6 7		Sandy Gravel, dominantly light gray (N7), matrix is mod. yellowish brown (10YR 5/4), angular, poorly graded, max. size ~6 cm, some clay + silt, trace of caliche as fracture filling. Clay fraction increases with depth.
	8.0 to 9.7	(1) 1.8				>50% clay	CL	8 9		Clay, mod. yellowish brown (10YR 5/4), mod. plasticity, some gravel, trace of silt + caliche. Possibly reworked claystone.
	9.7 to 10.0	0							X	No Sample

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ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 40-89BR

GEOLOGIST(S): DCB
DATE: 9/26/89

PROJECT NO: 667-11-5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
										TOP OF BOX
10.0 to 12.0	10.0 to 12.0	(1) 1.8				>50% clay		11		claystone, mod. yellowish brown (10 YR 5/4), bedding not apparent, highly weathered, soft to moderately friable, trace of silt and iron staining, trace of caliche as irregular bodies.
12.0 ↓	12.0 to 13.6	(1) 1.1						12, 13		caliche is absent below 12.0 ft.
	13.6 to 14.0	0						14		No Sample
	14.0 to 14.5	(1) .4				>50% clay				claystone as above (reference interval 10.0 to 13.6 ft.) color is light olive gray, caliche is absent.
	14.5 to 16.0	(1) 1.5						15, 16		
	16.0 to 18.0	(1) 1.6						17		
	18.0 to 20.0	(1) 1.5						18, 19		claystone as above with trace of lt. sandstone from ~18.0 to 19.2 ft.
										claystone, light gray (N7), bedding not apparent, highly weathered,

Box 2 of 3

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ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 40-89 BR

GEOLOGIST(S): DCB
DATE: 9/26/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
20.3 Bot 22.0	20.0 to 22.0	(1) 1.8				DCB >50% clay		21, 22		(cont'd. from previous page), slightly to moderately friable, trace of silt, locally iron stained.
22.0	22.0 to 23.7	(1) 1.8						23		
	23.7 to 24.0	0						24	X	No Sample
M Bot	24.0 to 26.0	(1) 1.9				>50% clay		25		claystone as above (reference interval 19.5 to 23.7 ft), color grades to med. light gray (N6)
M Bot	26.0 to 28.0	(1) 1.7						26, 27		claystone, med. yellowish brown (10 YR 5/4), bedding not apparent, highly weathered, med. friability, highly iron stained?, some silt to silty.
29.0	28.0 to 29.0	(1) 1.6						28, 29		
										Bottom of Boxes Set 29.0 ft.

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(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 41-89BR

GEOLOGIST(S): JWL
DATE: 10/24/89

PROJECT NO: 667-14.11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
0' 12.1'	0'-.6	.53'			25 Sand	30% SILT 35% Gravel 10% Clay	OL-GM	0'		Clayey gravel, Grayish brown (5YR 3/2) to moderate brown (5YR 3/4), moderately graded, moderate plasticity, max size 3cm Interval is a soil with abundant organic material.
	.6'-2.2'							1 2		NO SAMPLE
	2.2' To 3.7'	1.18'				60% GRAVEL 10% SAND 20% SILT 10% CLAY	GW	3		Silty gravel, Dark yellowish brown (10YR 4/2) to Dark yellowish orange (10 YR 6/6), well graded, moderate plasticity, max size 5.5 cm., sub round, with some sand
	3.7 To 4.4'							4		NO SAMPLE
	4.4' To 5.5'	1.33'				60% GRAVEL 20% SAND 10% SILT 10% CLAY	GW	5		Sandy gravel, Moderate yellowish brown (10 YR 5/4) to Dark yellowish orange (10 YR 6/6) well graded, moderate plasticity, max size 5.5cm. angular - sub angular.
	5.5' To 6.4							6		NO SAMPLE
	6.4' To 8.4'	1.84'				CLAY 60% SAND 30% SILT 10%	CL	7		Sandy clay, Moderate yellowish brown (10 YR 5/4) to Dark yellowish orange (10YR 6/6) well graded, moderate plasticity,
						30% CLAY 20% GRAVEL 10% SILT 10% CLAY	CL	8		Gravelly clay, same as above with max size 6 cm. ← TOP BEDROCK
	8.4' To 10.4'	1.75'				CLAY >50%	CL	9 10		CLAYSTONE, Moderate yellowish brown (10 YR 5/4) to Dark yellowish orange (10 YR 6/6) moderately high plasticity, poorly graded Caliche nodules at 8.8' (3cm). end of 10'

BOX #1 of 5

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ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 41-89BR

GEOLOGIST(S): JWL
DATE: 10/24/89

PROJECT NO: 667-14.11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
6'-12.1'	8.4' To 10.4'							10'		SEE PAGE #1 FOR DESCRIPTION
Box #1 of 5 12.1'	10.4' 12.1'	1.75				CLAY >50%		11' 12'		CLAYSTONE, as above with caliche at 10.4'-10.6' (1 cm) nodules. Highly weathered
										NO SAMPLE
12.4' TO 22.4'	12.4' To 13.6'	.96'				CLAY >50%		13'		CLAYSTONE, Grayish orange (10 YR 7/4) Moderate yellowish brown (10 YR 5/4) fissile, high plasticity, with carbon mineralization on partings. AND IRON OXIDE NODULES AT TOP
	13.6' To 14.4'							14'		NO SAMPLE
	14.4'-14.9'	.69'				CLAY >50% SILT	20%	15'		SILTY CLAYSTONE, GRAYISH ORANGE (10 YR 7/4) TO very light gray (N 8), with carbon mineralization on partings, JWL moved line
Box #2 of 5	14.9' 16.4'	1.5'				CLAY >50%		16'		CLAYSTONE, Brownish gray (5 YR 4/1) To Dark yellowish brown (10 YR 4/2), massive no bedding.
	16.4' 18.4'	1.6'				CLAY >50% SILT 20%		17' 18'		SILTY CLAYSTONE, PALE yellowish orange (10 YR 8/6) To Moderate yellowish brown (10 YR 5/4) massive no bedding
	18.4 20.3'	1.5'				CLAY >50%		19' 20'		CLAYSTONE, very pale orange (10 YR 8/2) To Grayish orange pink (10 R 8/2) massive no bedding.

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ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 41-89 BR

GEOLOGIST(S): JWL
DATE: 10/24/89
PROJECT NO: 667-14.11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
12.4'	18.4' 20.3'							20'		CLAYSTONE SEE Page # 2
										NO SAMPLE
Box 2 of 5	20.4'	1.68'				CLAY >50% 20% SILT		21' 22'		SILTY CLAYSTONE, very pale orange (10YR 8/2) gradually becoming a sandy claystone at the base of the interval. massive no bedding. Sand u v fg, moderately well sorted, sub angular, slightly friable to friable
22.4'	22.4'									
22.4' To 32.4'	22.4'	1.4'				CLAY > 50% 10% SILT		23' 24'		SANDY CLAYSTONE as at base of previous interval. CLAYSTONE, Moderate yellowish brown (10YR 5/4) at base to very pale orange (10YR 8/2) at top. with a trace of silt.
	24.1'									
	24.1' 24.4'									NO SAMPLE
Box 3 of 5	24.4'	1.6'				CLAY >80% 20% SILT		25' 26'		SILTY CLAYSTONE, very light gray (N8) to grayish orange (10YR 7/4), mostly massive bedding, with iron stone concretion at 24.7' (4.5 cm). Slightly friable.
	26.3'									
	26.4'	1.85'				CLAY >75%		27' 28'		NO SAMPLE. CLAYSTONE, Dark yellowish brown (10YR 4/2) to Dark yellowish orange (10YR 6/6) massive no bedding, with iron opale stain.
	28.4'									
	28.4'	1.4'				CLAY >75%		29' 30'		CLAYSTONE AS ABOVE, COLOR CHANGE AT 29.8' to Brownish gray (5YR 4/1)
	30.1'									

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ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 41-89 BR

GEOLOGIST(S): JWL
DATE: 10/24/89

PROJECT NO: 667-14.11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
	28.4'-30.1'							30'		
										NO SAMPLE
Box 3 of 5	30.4 32.4'	1.7'				CLAY >50% SILT 20%		31' 33'		SILTY CLAYSTONE, very pale orange (10YR 8/2) to Grayish orange (10YR 7/4) massive no bedding, with carbon mineralization on breaks. Slightly friable
32.4' To 44.4'	32.4' 33.4'	.97'				CLAY >50% SILT 20%		33		SILTY CLAYSTONE, Pinkish gray (5YR 8/1) to Grayish orange (10YR 7/4) massive no bedding. non friable
	33.4' 34.4'							34		NO SAMPLE
	34.4' 34.9'	.74'				CLAY >50%				CLAYSTONE, Brownish gray (5YR 4/1) with Dark yellowish orange iron stain on fracture surfaces. Fissile,
Box 4 of 5	34.9' 36.4'	.98'				CLAY >50%		35 36'		CLAYSTONE, Dark yellowish brown (10YR 4/2) To Dark yellowish orange (10YR 6/6). massive, some iron stain as above. To silt,
	36.4' 36.9	.64'				CLAY 60% SILT 30%				SILTY CLAYSTONE, very pale orange (10YR 8/2) to Grayish orange (10YR 7/4), fissile,
	36.9' 38.'	1.05'				CLAY >75%		37 38'		CLAYSTONE, Dark yellowish orange (10YR 6/6) Slightly silty, color change at 37.4' to Dark yellowish brown (10YR 4/2) and Dark yellowish brown (10YR 2/2) no silt, massive no bedding.
	38.4'									
*	38.7' 38.9'	.24'				CLAY >75%				CLAYSTONE, Dark yellowish brown (10YR 2/2) organic, fissile,
	40'	1.'						39 40'		CLAYSTONE, pale yellowish brown (10YR 6/2) to Dark yellowish orange (10YR 6/6) at 39.7' only. massive, slightly fissile,

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* wood marker at 38.9' has been marked 39.9'

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 41-89 OR

GEOLOGIST(S): SGL
DATE: 10/24/89

PROJECT NO: 667-14.11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
32.4'	40' 40.4'							40'		NO SAMPLE
Box 4 of 5	40.4' 41.4'	.74'				CLAY >50% SILT 20%		41'		SILTY CLAYSTONE, Pale yellowish brown, (10YR 6/2). fissile,
	41.4' 42.4'							42'		NO SAMPLE
44.4'	42.4' 44.4'	1.9'		50°		CLAY 75% SILT 20%		43' 44'		SILTY CLAYSTONE, Brownish gray (5YR 4/1) to grayish brown (5YR 3/2), fissile to 42.7' massive below 42.7' iron stain on fractures. 50°
44.4'	44.4' 46.4'	1.85'				CLAY >75%		45' 46'		CLAYSTONE, Brownish Black (5YR 2/1) very organic, very fissile, with abundant planes of slickensides throughout. No estimate possible on angle.
Box 5 of 5	46.4' 47.4'	1.3'				CLAY >75%		47'		CLAYSTONE, SAME AS ABOVE
								48'		NO SAMPLE
49.4'	48.4' 49.4'	1.3'				CLAY >75%		49'		CLAYSTONE, As above becoming olive black at base (5YR 2/1)
49.4' Box 1 of 2	49.4 -53.8	02						50'		(NOTE MEASURED FOOTAGE) - See next page

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LOG OF BORING NO. 41-89 BR

PAGE ~~7~~ 6 OF 11

GEOLOGIST(S): WAY
DATE: 10/25/89

PROJECT NO: 667-14.11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 1 of 6	49.3 -53.8	0.2				25% SILT 75% CLAY		51, 52, 53		NOTE MEASURED FOOTAGE SILTY CLAYSTONE, olive gray (5 Y 4/1), massive bedding, mod weathered, mod friable, trace of carb material
	53.8 -54.8	1.2						54		Same as above top of interval appears to be sluff
	54.8 -55.1	0.3						55		SAMPLE APPEARS TO BE SLUFF.
	55.1 -57.8	1.9						56, 57		~~SILT~~ Same as above
	57.8 -60.8	1.9				60% CLAY 38% SILT 10% SAND		58, 59		Same as above. increase in silt fraction, some VFG sand as mottles

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ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 41-89 BE

GEOLOGIST(S): DLY
DATE: 10/25/89

PROJECT NO: 667-11.14

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 1 of 6	60.8 -61.8	1.0						61		SILTY CLAYSTONE, olive gray (5Y 4/1), massive bedding, mod weathered, mod friable, some carb material, trace of coal, fracture @ 70° w/ slickensides
	61.8 -64.2	2.6						62, 63, 64		Same as above; top of interval is olive black (5Y 2/1) grading to yellowish gray (5Y 8/1) at base.
64.2	64.2' 64.8'	.58'				80% CLAY 20% SILT				SILTY CLAYSTONE, LIGHT OLIVE GRAY (5Y 6/1) TO LIGHT BROWNISH GRAY (5YR 6/1) mod. friable, trace horizontal bedding.
Box 2 of 6	64.8'	1.78'			5°-45°	60% SILT 40% CLAY		65		
						>90% CLAY		65.8'		CLAYEY SILTSTONE, yellowish gray (5Y 8/1) to Light brownish gray (5YR 6/1) Thinly crosbedded .5 mm intervals, moderately friable.
						>90% CLAY		66		
						>70% CLAY 20% SILT		67, 68		CLAYSTONE, olive gray (5Y 4/1) to olive black (5Y 2/1) abundant carb material. Massive no bedding. Slightly friable.
	68.4'									CLAYSTONE, dark yellowish orange (10YR 6/2) very hard friable, massive no bedding
	68.4' 69.	.68'				>70% CLAY		69		SILTY CLAYSTONE, LIGHT OLIVE GRAY (5Y 6/1) to olive gray (5Y 4/1) slightly friable, with Trace carb material,
74.9	69' To 70.8'	1.25'				20% SILT		70		

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ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 41-91BR

GEOLOGIST(S): JWL
DATE: 10/24/89

PROJECT NO: 667-14.11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
64.2' Box 2 of 6	69' To 70.8'	1.25'				>70% CLAY 30% SILT		70'		SILTY CLAYSTONE SEE PREVIOUS PAGE
	70.8 71.2'	.42'						71'		SILTY CLAYSTONE AS above, olive gray (5Y 4/1)
	71.2' 73.2'	1.71'						71.6' 71.9' 72' 73'		SILTSTONE, YELLOWISH GRAY (5Y 8/1), mod friable, no bedding. SILTY CLAYSTONE, AS ABOVE IN INTERVAL 70.8' TO 71.2'
	73.2' 74.9'	1.65'				>50 SILT 50% CLAY		74'		CLAY SILTSTONE, olive gray (5Y 4/1) massive no bedding, slightly friable.
74.9' To 84.8' Box 3 of 6	74.9' 78.8'	3.1'			0° To 15°	SILT 55% SAND 35% CLAY 10%		75' 76' 77' 78'		SANDY SILTSTONE Pinkish gray (5YR 8/1) very fine grained sand, sub angular, moderately sorted, slightly friable. Bedding 0° - 15°, with Plant fragments at 77'
	78.8 81.3'	1.93'				SILT 35% SAND 35% CLAY 30%		79' 80'		SANDY SILTSTONE, AS above, very friable

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ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 41-89BR

GEOLOGIST(S): SWL
DATE: 10/24/89 and 10/26/89

PROJECT NO: 667-14.11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
74.9'	78.8'	1.93'				SAND 45% SILT 35% CLAY 20%		80' 81'		SILTY SANDSTONE, Pinkish gray (5YR 8/1) very fined grained, sub angular, moderately sorted, very friable massive, bedding random
Box 3 of 6	81.3'	1.37'				SAND 45% SILT 35% CLAY 20%		82'		SILTY SANDSTONE, AS ABOVE. with carbonaceous material at 82.5' – 82.8'
	82.8'	2.2'				SILT 60% SAND 10% CLAY 30%		83' 84'		CLAYEY SILTSTN, Pinkish gray (5YR 8/1) to Light olive gray (5Y 6/1) to Brownish gray (5YR 4/1), slightly friable, with Carbonaceous material scattered throughout
84.8'	84.8'			CLAY 10%		SAND SILT	60% 30%			SANDSTONE, Pinkish gray (5YR 8/1) v. fg. sub angular, moderate sorting, very friable.
84.8'	84.8'				5°–10°	60% 40%	SILT CLAY	85		CLAYEY SILTSTONE, Pinkish gray (5YR 8/1) not friable, with ripples 65 cm high thinly bedded at 5°–10°.
Box 4 of 6	86.6'	1.82'						85.2' 86'		SILTY CLAYSTONE, Olive gray (5Y 4/1) at Top grades to olive black (5Y 2/1) at base. with carb material on partings.
	86.6' 87.3'	.73'						87'		SAME AS ABOVE WITH IRON OXIDE NODULES Dark yellowish orange (10YR 6/6) AT 87' Nodules are 1 cm x 2 cm.
	87.3'	2.08'			5°			87.5' 88' 89'		SILTY CLAYSTONE, AS ABOVE AT 85.2' with thin 1 mm beds of CLAYEY SILTSTONE interbedded from 87.5' → 91.8' ONE THICK CLAYEY SILTSTONE AT 91.3' IRON OXIDE NODULES AT 88.4' and 88.8'
98.8'	91.8'							90'		

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ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 41-89BR

GEOLOGIST(S): JWL
DATE: 10/26/89

PROJECT NO: 667-11.14

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
84.8' To	87.3'	2.08'						90' 91'		SILTY CLAYSTONE SEE PREVIOUS PAGE
Box 4 of 6	91.8' 91.8 93.8'	1.07'				CLAY >90%		92' 93		CLAYSTONE, OLIVE GRAY (5Y 4/1) with some carb plant material on the partings. massive no bedding. hard, non friable, brittle in part
	93.8' (3) 94.8'	1.2'						94'		CLAYSTONE olive black, (5Y 2/1), to olive gray (5Y 4/1), massive no bedding with carb plant material on partings slightly friable,
96.8'	99.8' 96.8'	1.7'						95' 96'		
96.8' Box 5 of 6	96.8' 98.4'	1.91'				CLAY >80% SILT >15%		97' 98'		SILTY CLAYSTONE, olive gray (5Y 4/1) to brownish gray (5YR 4/1), massive no bedding, with small carb plant material 1mm x .5mm and IRON OXIDE areas light brown (5YR 5/6) scattered throughout. 2mm x 5mm.
105.5	98.4 99.8' 99.8'	1.8'						99' 100'		CLAYSTONE, olive black (5Y 2/1) to olive gray (5Y 4/1) very carbonaceous with abundant plant fragments, soft-med hard, massive no bedding.

CLAYSTONE AS ABOVE, 5mm to about plant frags. CORE BROKEN UP.

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.
(3) wood blocks are not marked correctly: Marked 96.8' should be 99.8'

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 41-89 BR

GEOLOGIST(S): JWL
DATE: 10/26/89

PROJECT NO: 667-1114

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF MATERIAL	FEET OF CORE IN MATERIAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
96.8'	99.8'					CLAY >90%		100'		CLAYSTONE, AS ABOVE, some to abundant plant material, massive no bedding.
								101'		
		3.87'						102'		
Box 5 of 6								103'		
	103.7'									
	103.7									CLAYSTONE, Brownish gray (5YR 4/1) to olive gray (5Y 4/1), with abundant carb. plant material massive no bedding.
	104.3'	.6						104'		
						>90%				
		1.16'						105'		
105.5'	105.5'									
105.5	105.5							106'		CLAYSTONE, OLIVE BLACK (5Y 2/1), with abundant plant material throughout massive no bedding.
								107'		CLAYSTONE, AS ABOVE, OLIVE GRAY (5Y 4/1) to Olive black (5Y 2/1)
Box 6 of 6		3.5'						108'		
109.1	109.1'							109'		
								110'		

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 43-89 BR

PAGE / OF

GEOLOGIST(S): DCB
DATE: 10/23/89

Erasures DCB 10/23/89 corrected USCS symbol location

PROJECT NO: 667-1#11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
0.0 ↓	0.0 to 1.7	1.5'				>50% clay	CL	1		Silty Clay, brownish black (5 YR 2/1), moderate plasticity, trace to some gravel, trace of sand, ~~trace of~~ roots and plant debris occur in upper 4 ft.
	1.7 to 2.2	0						2		No Sample
Bot 1st 4'	2.2 to 4.3	1.8'				>50% clay	CL	3, 4		As above (reduce interval 0.0 to 1.7 ft.) no roots/plant debris.
	4.3 to 6.3	1.6'						5, 6		Interval becomes slightly calcareous at ~5.8 ft.
	6.3 to 8.3	1.7'				~35% clay ~35% sand ~30% gravel	CL/SP	7, 8		Gravelly Sandy Clay / Gravelly Clayey Sand, dark yellowish orange (10 YR 6/6), clay exhibits low plasticity, sand is v.f. to c.g. and angular to well rounded, gravel is subangular to subrounded max size ~5 cm, interval is slightly calcareous.
	8.3 to 8.6	.3				>50% clay	CL			Clay, moderate yellowish brown (10 YR 5/4), moderate plasticity, slightly calcareous
	8.6 to 10.3	0						9		No Sample

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 43-89 BR

PAGE 2 OF

GEOLOGIST(S): DCB

DATE: 10/23/89

PROJECT NO: 667-M.11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
	10.3	0								No Sample
1st Box ↑ 11.3	10.3 to 11.3	1.3'				~60% clay ~40% v.f. sand		11		Sandy claystone, mottled dark yellowish orange (10YR 6/6) and light gray (N7), bedding not apparent, highly weathered, moderately friable, sand is v.f.g., trace of silt.
11.8 – 12.3	11.8 to 12.3	0						12		No Sample
12.3 ↓	12.3 to 14.3	1.5				~60% clay ~40% v.f.g. sand		13 14		Sandy Claystone as above (reference interval 10.3 to 11.0 ft.). locally unit is slightly calcareous, clay fraction increases with depth.
2nd Box ↓	14.3 to 16.3	1.6						15 16		Possible mg oxide staining at ~16.0 ft.
	16.3 to 18.3	1.8				>50% clay		17 18		claystone, light gray (N7), bedding not apparent, well weathered, moderately friable, trace of f.g. sand + silt, iron staining occurs on hairline fractures, sand fraction diminishes with depth and is absent below ~17.5 ft., isolated bedding of calcareous mineralization occur occasionally
	18.3 to 20.3	1.6						19		

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 43-89 DR

PAGE 3 OF

GEOLOGIST(S): DCB
DATE: 10/23/89

PROJECT NO: 667-14.11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
	18.7 to 20.3	1.6				>50% clay				Claystone as above
2nd Box	20.3 to 22.3	1.6						21, 22		
22.3	22.3 to 24.3	1.8						23, 24		
3rd Box	24.3 to 26.3	1.6						25, 26		
Bot	26.3 to 28.3	1.6				>50% clay		27, 28		Silty Claystone, dark yellowish orange (10 YR 6/6), bedding not apparent, well weathered, iron stained, mod. friability
	28.3 to 30.3	1.7				>50% clay		29		Claystone, medium light gray (N6), bedding not apparent, weathered, local iron staining, slightly friable, trace of silt

NOTES. General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 43-89BR

GEOLOGIST(S): DCB
DATE: 10/23/89

PROJECT NO: 667-1411

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
	28.3 to 30.3	1.7				>50% clay				claystone as above
Box 30.3 to 32.3	30.3 to 32.3	1.9						31, 32		
32.3 Box 32.3 to 34.3	32.3 to 34.3	1.7						33, 34		
Box 34.3 to 36.3	34.3 to 36.3	1.6						35		
36.0 Box 36.0 to 40.0	36.0 to 40.0	3.0						36, 37, 38, 39		claystone as above w/ a small body (~1cm diam.) of both calcareous and carbonaceous mudstone at ~36.0 ft.

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 43-89 BR PAGE 5 OF

GEOLOGIST(S): DCB
DATE: 10/23/89

PROJECT NO: 667-14.1

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 1 of 7	40.0 to 43.0	2.7				>50% clay		41		Silty Claystone, very light gray (N8), poorly bedded, slightly friable, trace of vfg sand
						~45% clay ~35% vfg sand ~20% silt		42		Interval grades to sandy claystone and interbedded claystone and sandstone, very light gray (N8), poorly bedded, slightly friable, sand is vfg, some silt to silty.
	43.0 to 46.6	3.4				~60% clay ~30% vfg sand ~10% silt		43, 44, 45		Silty Claystone with irregular beds of vfg sandstone interbedded, med. light gray (N6) to v. light gray (N8), slightly friable, bedding ~2 mm and less, soft sediment deformation apparent
46.6	46.6					>50% clay		46		Claystone, med. light gray (N6), bedding not apparent, slightly friable, some silt, trace of iron staining associated w/ carbonaceous mineralization
46.6	46.6 to 47.0	.3						47		
Box 2 of 7	47.0 to 51.5	2.5						48, 49		

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 43-89BR

PAGE 6 OF

GEOLOGIST(S): DCB
DATE: 10/23/89

PROJECT NO: 667-14-K

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
	47.0 to 51.5	2.5						51		
	51.5 to 55.0	4.0						52, 53, 54, 55		Slickensides at ~53.0 ft. altitude ~70°. Interval grades to dark gray (N3), with trace of carb. material from ~53.7 to ~55.0 ft.
Bot 2 of 7	55.0 to 59.5	1.9						56, 57, 58, 59		
59.5	59.5									
59.5 to 63.0	59.5 to 63.0	3.7								

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 43-89 BR PAGE 7 OF

GEOLOGIST(S): CB
DATE: 10/23/89

PROJECT NO: 667-14-11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
	59.5 to 63.0	3.7				>50% dry		61, 62		claystone, med. dark gray (N4), poorly bedded, slightly to moderately friable trace of silt and carb material.
	63.0 to 67.0	3.8						63, 64, 65, 66		claystone as above color grades to light gray (N7) with increased silt fraction to some silt.
	67.0 to 68.7	1.6						67, 68		silty claystone, light gray (N7), poorly bedded, slightly friable trace to some very sandy silt fraction decreases with depth.
68.7 ↓ Bot 4x7	68.7 to 71.0	1.4						69		claystone, med. light gray (N6), poorly bedded, slightly friable, some silt.

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 43-89 BR

PAGE 8 OF

GEOLOGIST(S): DCB
DATE: 10/23/89

PROJECT NO: 667-14-11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
	68.7 to 71.0	1.4				75% clay				claystone as above
	71.0 to 75.0	2.6				~65% silt ~15% vfg sand ~20% clay		71, 72, 73, 74, 75		~~[illegible]~~ Siltstone, very light gray (N8), massive, slightly friable, some clay, trace of vfg sand.
	75.0 to 79.0	3.7						76, 77, 78, 79		
79.0	79.0 to 83.0	3.8								

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 43-89 BR PAGE 7 OF

GEOLOGIST(S): DCB
DATE: 10/23/89

PROJECT NO: 667-1411

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
	79.0 to 83.0	3.8				~65% s. lt ~15% v fg sand ~20% clay		81, 82, 83		s. lt stone as above
	83.0 to 87.0	3.1				~50% clay		84, 85, 86		Below 83 ft interval grades to claystone. claystone med. light gray (N6), poorly bedded, slightly friable, some s. lt.
	87.0 to 91.0	1.8						87, 88, 89		

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 43-89 BR PAGE 10 OF

GEOLOGIST(S): DCB
DATE: 10/23/89

PROJECT NO: 667-14.11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 5 of 7 ↑ 91.0	87.0 to 91.0	1.8				>50% clay				Claystone as above
91.0 ↓	91.0 to 93.0	3.7						91, 92, 93		
Box 6 of 7	93.0 to 97.0	3.8						93, 94, 95, 96, 97		Some carb material occurs below ~93.5 ft.
↑ 98.4	97.0 to 98.4	1.3						97, 98		color grades to grayish black below ~97.0 ft. Interval is carbonaceous from ~98.0 ft. to ~98.6 ft. and silty
98.4 ↓ Box 7 of 11 ↑ 100.0	98.4 to 100.0							99		Silty Claystone, light gray (N7), poorly bedded, slightly friable, trace of carb. material.

Bottom of Box 7/7 at ~100 ft.

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 50-89

PAGE 1 OF 1

GEOLOGIST(S): DCB
DATE: 1/26/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
0.0	0.0 to 1.8	.25				>50% clay		1		Silty Clay, dusky yellow with brown (10 YR 2/2), mod. plasticity, some silt trace of sand and gravel, plant detritus throughout sample.
	1.8 to 4.8	0						2, 3, 4		DCB ~~Sandy Gravel, dominantly light gray~~ No Sample
	4.8 to 5.8	(1) 1.0				~45% gravel ~30% sand ~25% clay		5		Sandy Gravel, dominantly light gray (N7), matrix is mod. yellowish brown (10 YR 5/4) subangular to subrounded, poorly graded, max size ~5 cm., sandy clay to clayey
	5.8 to 7.8	(1) 2.2				75% clay		6, 7		clay stone, mottled greenish orange (10 YR 7/4) to light gray (N7), bedding not apparent, highly weathered, slightly friable, iron stained with some Mn oxide stains.
	7.8 to 9.0	1.1						8		
	9.0 to 9.8	.8						9		Bottom of Box hole at 9.8 ft.

Ensure 1/4/89 DCB corrected intervals

NOTES. General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 51-89BR

GEOLOGIST(S): SWL
DATE: 10/26/89

PROJECT NO: 667-1411

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
0'	0' / .7'	.9'				70% Gravel	GW	0'		SANDY GRAVEL, Moderate yellowish brown (10YR 5/4) max size 6 cm. sub round, well graded.
	→ / 2.1'							1' / 2'		NO SAMPLE
	2.1' / 2.6'	.68'								SANDY GRAVEL, Light brown (5YR 5/6) To Moderate brown (5YR 4/4). max size to 6 5 cm, sub round, well graded.
	2.6 / 4.2'	1.18'				> 50% Gravel	GW	3' / 4'		
	4.2' / 4.6	.41'								SANDY GRAVEL, Grayish orange (10YR 7/4) as above
	4.6' / 6.1'	1.26				> 50% Gravel	GW	5' / 6'		SANDY Gravel, Grayish Orange (10YR 7/4) To very pale orange (10 YR 8/2), max size 6 8 cm. angular to sub angular, well graded.
	6.1' / 6.5'									
	6.5' / 7.7'	.86'				> 50% Gravel		7'		SANDY GRAVEL, Very pale Orange (10 YR 8/6) to Dark yellowish Orange (10YR 6/6) as above.
	7.7 / 8.2'							8'		NO SAMPLE
	8.2' / 9.2'	.87'				> 50% Gravel 30% SAND	GW	9'		SILTY SANDY GRAVEL, Grayish orange (10 YR 7/4) To Dark yellowish orange (10 YR 6/6), max size 3 cm, angular - sub angular, well graded.
13'	9.2' / 10.2'							10'		NO SAMPLE

Box 1 of 7

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 51-89 BR

GEOLOGIST(S): JWL
DATE: 10/26/89

PROJECT NO: 667-M.11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
0'	9.2'-10.2'							10'		NO SAMPLE
Box 1 of 7	10.2' 11.2'	.93'				50% Gravel 30% SAND	GW	11'		SILTY SANDY GRAVEL, as above one large gravel at base 6 5cm
	11.2' 12.2'					10% SILT		12'		NO SAMPLE
13'	12.2' 13'	.67'				50% Gravel 30% SAND	GW			SILTY SANDY GRAVEL, as above
	13' 14.2'					10% SILT		13' 14'		NO SAMPLE
14.2' Box 2 of 7	14.2' 16.2'	1.89'				50% Gravel 30% SAND 10% SILT	GW	15' 16'		SILTY SANDY Gravel, Dark yellowish orange (10YR 6/6) to Light brown (5YR 5/6), sub angular, well graded, max size 6 cm.
	16.2' 17.4'	1.33'						17'		
	17.4' 18.4'							18'		NO SAMPLE
	18.4 19.2'	.49' 1.2'				50% Gravel 30% SAND 10% SILT	GW	19'		SILTY SANDY GRAVEL, AS ABOVE.
24.5'	20.2'							20'		NO SAMPLE

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 51-89BR

GEOLOGIST(S): JWL
DATE: 10/27/89

PROJECT NO: 667-14.11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
14.2'	20.2'							20'		NO SAMPLE
Box 2 of 7	20.4'	.54'								SILTY SANDY GRAVEL, AS ABOVE, COLOR CHANGE TO: Very pale orange (10YR 8/2) 20.6'-20.7' with increase in sand fine grained, poorly graded, sub round. all quartz
	21.3'	1.02'				40% Gravel 30% SAND 30% SILT	GW	21'		
	22.2'							22'		NO SAMPLE
	22.6'	.62'			GRAVEL SAND SILT CLAY	30% 40% 30%	GW			CLAYEY SANDY GRAVEL, GRAYISH ORANGE (10YR 7/4) max size 2 cm. sub angular, well graded, contains more silts and clays
	23.7'	.94'			GRAVEL SAND SILT CLAY	40% 30% 30%	GW	23'		SILTY SANDY GRAVEL, AS IN INTERVAL 20.2'-21.3'
	24.2'							24'		NO SAMPLE
24.5'	24.5'	.54'					GW			SILTY SANDY GRAVEL, AS ABOVE
24.5'	24.5'									SILTY SANDY GRAVEL, GRAYISH ORANGE (10YR 7/4) TO DARK YELLOWISH ORANGE (10YR 6/6), max size 8 cm. Cobble at 26'. LIGHT RED GRAVEL of feldspar at 24.7'
	26.2'	1.54'				60% GRAVEL 20% SAND 20% SILT + CLAY	GW	25 / 26		
Box 3 of 7	26.2'									SILTY SANDY GRAVEL, DARK YELLOWISH ORANGE, (10YR 6/6) max size 1.5 cm. sub angular, well graded,
	28.2'	1.72'				GRAVEL 40% SAND 20% SILT 20% CLAY 20%	GW	27' / 28		
	28.2'							28.3'		SANDY GRAVEL, Very pale orange (10YR 8/2) to Grayish orange (10YR 7/4) max size 7 cm. at base, sub angular, well graded,
34.2'	30.2'	1.72'				60% GRAVEL 20% SAND 20% SILT + CLAY	GW	29' / 30'		

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 51-89OR

GEOLOGIST(S): JWL
DATE: 10/27/89

PROJECT NO: 667-14.11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
24.5'	30.2						CL	30'		CLAY, very pale orange (10YR 8/2) to Dark yellowish orange (10YR 6/6) mottled, med. plasticity
Box 3 of 7	30.2' 32.2'	1.8'				>75% CLAY		31'		CLAY, light brownish gray (5YR 6/1) to dark yellowish orange (10YR 6/6), mottled, med. plasticity,
	32.2' 34.2'	1.7'				>75% CLAY		32' 33' 34'		CLAYSTONE, light brownish gray (5YR 6/1) to dark yellowish orange (10YR 6/6) mottled, highly weathered. CLAYSTONE, Light olive gray (5Y 6/1) to Dark yellowish orange (10YR 6/6) mottled, highly weathered, no bedding.
34.2'	34.2' 35.2'	1.42'			SAND SILT CLAY	50% 30% 20%		35'		CLAYSTONE, olive gray (5Y 4/1) to dark yellowish orange (10YR 6/6) mottled, very highly weathered. CLAYEY SANDSTONE, white (N9), v.fg, mod. sorting, sub round, very friable, very weathered
Box 4 of 7	35.2' 36.2'	1.78'						36'		SILTY CLAYSTONE, dark yellowish brown, (10YR 4/2) to dark yellowish orange (10YR 6/6) mottled with iron oxide stain, with occasional layer sandstone as above at 35' no bedding, mod. plasticity. very weathered
	36.2' 37.2'	1.67'				CLAY >75% SILT 20%		37'		
	37.2' 38.2'	1.7'						38'		SILTY CLAYSTONE, very pale orange (10YR 8/2) to dark yellowish brown (10YR 4/2) mottled with some iron oxide stain, very weathered.
39.2'	38.2' 39.2'	1.6'						39'		
39.2' Box 6 of 7 44.2'	39.2' 40.2'	1.7'				CLAY 80% SILT 20%		40'		SILTY CLAYSTONE, dark yellowish brown (10YR 4/2) to dark yellowish orange (10YR 6/6) mottled, Trace iron stain, very weathered

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 51-89 BR

GEOLOGIST(S): JWL
DATE: 10/27/89

PROJECT NO: 667-14.11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
39.2'	40.2'							40'		
Box 5 of 7	40.2 – 41.2'	1.52'				70% CLAY 20% SILT		41'		SILTY CLAYSTONE, as above, with light brownish gray (5YR 6/1) claystone increasing IRON OXIDE stain, iron nodule at 41.1'
	41.2' – 42.2'	1.63'						42'		SILTY CLAYSTONE + IRONSTONE, dark yellowish orange (10 YR 6/6) to light brown (5YR 5/6) mottled, very weathered, with ironstone fragments throughout, 1 mm. to 1.5 cm. with some caliche at 43.1'
	42.2' – 43.1'	.92'				70% CLAY 20% SILT		43'		
	43.1' – 43.5'	.47'								
44.2'	43.5' – 44.2'	1.4'						44'		SILTY CLAYSTONE + IRONSTONE, as above, with less iron stain, becoming pinkish gray (5YR 8/1), very weathered.
44.2'	44.2' – 45.2'	1.63'				70% CLAY 20% SILT		45'		SILTY CLAYSTONE, dark yellowish orange (10 YR 6/6) to moderate yellowish brown (10 YR 5/4), mottled, very highly weathered, with iron oxide stain, with some sand mg - cg, well rounded scattered throughout.
Box 6 of 7	45.2' – 46.2'	1.8'						46'		SANDY CLAYSTONE, dark yellowish orange (10YR 6/6) to grayish orange (10YR 7/4), with iron stain, gradually becoming more sandy.
	46.2' – 47.2	1.55'				60% CLAY 20% SILT 20% SAND		47'		
	47.2' – 48.2'	1.45'						48'		
		.33'								SANDY CLAYSTONE, as above, with scattered intervals of sandstone, very light gray (N8) v f g, sub round, mod sorting.
49.2'	48.4' – 49.2'	1.55'				50% SAND 40% SILT 10% CLAY		49'		CLAYEY SANDSTONE, dark yellowish orange (10YR 6/6) to very light gray (N8) v f g, sub ang - sub round, mod sorting, very friable, very weathered
49.2 Box 7 of 7 53.6'	49.2' – 50.2'	1.83'						50'		

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 51-89BR

GEOLOGIST(S): JWL
DATE: 10/27/89

PROJECT NO: 667-14.11

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
49.2'		1.83'						50'		SANDY CLAYSTONE, dark yellowish orange (10 YR 6/6) to very light gray (N8), sand is N5g, sub angular to sub round, well sorted.
	50.2'	1.7'								
	51.2'			SAND + SILT		100%		51'		SANDY CLAYSTONE, as above, color changes to dark yellowish orange (10YR 6/6) to light brownish gray. (5YR 6/1)
BOX 7 of 7	51.2	1.63'				30% SAND 40% SILT + CLAY				CLAYEY SANDSTONE, dark yellowish orange, (10 YR 6/6) to pinkish gray (5YR 8/1) vfg, sub angular, mod sorting, very friable, very weathered, Good Clean sand at 51'-51.2', white (N9) vfg, sub angular, well sorted, very friable.
	52.2'							52		
	52.2'	1.45'								
	53.2'							53'		
53.6'	53.6'	.7'								
								54'		

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(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 51-89 BR

GEOLOGIST(S): DCB
DATE: 9/18/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
										Core begins at 54.9 ft.
								51		
								52		
								53		Erasure - 9/18/89 DCB corrected lith. symbols.
								54		
54.9	54.9 to 55.4	.5'				>50% Clay		55		silty Clay, moderate yellowish brown 10 YR 5/4 and med. light gray (N6), moderate high plasticity, thin bedded (< 3 mm), some fg sand (v. light gray N8). Possibly highly [illegible] local iron staining
Box 1 of 18	55.4 to 59.5	0						56		No Sample
								57		
								58		
								59		
	59.5 to 61.5	1.0'				>50% Clay				As above (reference interval 54.9 to 55.4) bedding not apparent.

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(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 51-89 BR

GEOLOGIST(S): DCB
DATE: 9/18/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
	59.5 to 61.5	1.0'				>50% Clay		61		As above, with interval is more completely indurated below ~61 ft.
	61.5 to 63.5	2.0'						62, 63		~~As above with some carb. mineralization and local increases in vf grained sand fraction.~~ Sandy, silty Claystone, moderate yellowish brown (10 YR 5/4) and mottled medium light gray (N6), bedding not apparent, highly weathered, moderately friable, vf g sand occurs both locally abundant and disseminated within silty claystone, locally iron stained and occasional carb. mineralization. Abundant sand ~65.3 to 66 ft
	63.5 to 65.3	1.8'						64, 65		
	65.3 to 66.7	1.4'		50°				66		Iron stained fracture ~66.5'
	66.7 to 67.6	.8'						67		Claystone, dark gray (N3), bedding not apparent, highly weathered, moderately friable, some silt, locally abundant silt, some carb. material.
	67.6 to 70.5	.9'						68, 69		

rasures - DCB 9/18/89 corrected misplaced footage marker.

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(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 51-89 BR

GEOLOGIST(S): DCB
DATE: 9/18/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 1 of 18 ↑ 18 70.5	67.6 to 70.5	.9'				75% clay				As above
	70.5 to 71.5	1.35'						71		
	71.5 to 72.0	.4						72		
	72.0 to 73.5	1.65'						73		
	73.5 to 73.6	.1'								
	73.6 to 75.1	1.6'						74		
Box 2 of 18	75.1 to 75.7	.2'						75		
	75.7 to 77.3	1.9'						76		As above with increase in silt fraction and moderate amount of v.f.g. sand from ~76.7' to ~77.3'
	77.3 to 78.5	1.15'						77		
↑ 79.0	78.5 to 79.0	.65'						78		color grades to med. light gray (N6), below ~77!
79.0 ↓ Box 2 of 18	79.0 to 91.0	2.0						79		

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(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 51-89BR

GEOLOGIST(S): DCB
DATE: 9/12/89

PROJECT NO: 667-115

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
	79.0 to 81.0	1.8				>50% clay		81		Silty Claystone, light gray (N7), to medium gray (N5), bedding not apparent, weathered, moderate to slightly friable, slickensides at ~79.7' altitude ~50°
	81.0 to 81.3	.35								
	81.3 to 82.5	0						82		No Sample
	82.5 to 84.6	1.4						83, 84		
	84.6 to 86.9	3.8'						85, 86		Silty Sandy Claystone, light gray (N7) to very light gray (N8), laminar bedding apparent ~86.6', slightly friable, sand fraction occurs as discrete lenses, v.fg sand well sorted
	86.9 to 87.5	.7						87		
	87.5 to 88.5	1.0				~50% sand ~50% clay		88		
	88.5 to 90.8	1.9'			~20°			89		Interbedded Silty Claystone and sandstone. Sandstone is very light gray (N8), thin bedded (2 mm), v.fg; silty claystone is light gray (N7), thin bedded, slightly friable, some soft sediment deformation apparent

Errors corrected, interval marker error 9/14/89 DCB

NOTES General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

Note interval markers between 84.6 and 86.9 appear out of sequence and are not recorded on this log.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 51-87BR

GEOLOGIST(S): DCB
DATE: 9/18/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
	88.5 to 90.9	1.9'			~25°	75% clay, ~50% silt, ~5% sand				As above
	90.9 to 91.5	.6'				>50% clay		91		Clay stone, light gray (N7) to dark gray (N3), bedding not apparent to thin bedded (<2mm) where visible, slightly friable, some carbonaceous material, occasional partings of silt.
	91.5' to 92.9	1.5'		30°				92		
	92.9 to 94.8	1.9'						93		
Box 4 of 18								94		
	94.8 to 95.5	.7'						95		
	95.5 to 96.6	1.0						96		
	96.6 to 98.5	1.8				25% silt, clay, ~50% sand		97		Interbedded sandstone and silty claystone, light gray (N7) to dark gray (N3) respectively, thin bedded (<2mm), slightly friable, sand is fine and moderately well sorted (silt), some carb. material
								98		
98.5 Box 5 of 18	98.5 to 99.5	1.0			<5°	~20% clay, ~30% silt, ~50% fine sand		99		Interbedded siltstone and silty clay, medium light gray (N6), thin bedded (<2mm) where apparent, slightly friable, slightly sandy fractions, some carb. material.
	99.5 to 100.5	.8								

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ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 51-89BR PAGE 6 OF 17

GEOLOGIST(S): DCB
DATE: 8/19/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
	99.5 to 100.5	.8'			<5°	~70% clay ~25% silt ~5% vfg sand				As above
	100.5 to 102.5	1.75'						101, 102		
	102.5 to 103.5	.65'						103		
5 of 18	103.5 to 104.6	1.1'						104		
Box	104.6 to 106.6	1.9'						105, 106		Interbedded silty clay and siltstone. As above, slabbed core exhibits soft sediment deformation.
↑ 107.5	106.6 to 107.5	1.7						107		
107.5 ↓	107.5 to 109.5	1.85		30°	60°	35% vfg sand; ~70% clay ~25% silt ~5% sand		108, 109		At ~108' a .2' interval of vfg sand occurs thin bedded (<2mm), high bedding angle ~60°.
Box 6 of 13	109.5 to 111.0	1.85								

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ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 51-89 OR

GEOLOGIST(S): DCB
DATE: 9/18/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 6 of 18	109.5 to 111.0	1.85				~80% silty ~25% ~5% vfg sand		111		Interbedded silty clay, and siltstone, very light gray (N7), ~~and~~ thin bedded (<2mm) where apparent, slightly friable, some carb. material, slight vfg sand fraction, bedding exhibits soft sediment deformation
	111.0 to 111.5'	.85								
	111.5 to 112.2	.85						112		
	112.2 to 114.0	1.85'						113		
	114.0 to 115.5	1.5'						114		
								115		
Box 7 of 18	115.5 to 119.5	1.2'				~50% clay		116		Claystone light gray (N7), bedding not apparent, slightly friable, moderate w/ fraction. A .2 ft. vfg sand interval occurs at ~115.5 to ~115.7 - well sorted
								117		
								118		
								119		
	119.5 to 119.7	.2'								Claystone as above, color grades to med. light gray (N6)
	119.7 to 121.2	1.6'								

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(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 51-87 BR

GEOLOGIST(S): DCB
DATE: 9/18/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 7 of 18	119.7 to 121.2	1.6'				>50% clay		121		claystone as above
	121.2 to 122.5	1.3'						122		
	122.5 to 122.7	2'								
	122.7 to 124.4	1.8'		40°				123, 124		
	124.4 to 126.2	1.85'						125		
126.2	126.2 to 126.5	.25		40°				126		claystone light gray (N7), bedding not apparent, slightly friable, abundant silt, trace of vfg sand.
	126.5 to 127.9	1.4'						127		
Box 8 of 18	127.9 to 129.8	1.65'						128, 129		~3 mm thick coal bed occurs at 128.2'. color grades to medium gray (N5) at 128.5 ft. and silt fraction decreases, vfg sand is absent. slickensides occur at ~ 129.3
	129.8 to 129.9	.8'								

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Material amounts are estimated by % volume instead of % weight.
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(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 51-89 DR

GEOLOGIST(S): DLB
DATE: 9/18/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 8 of 18	129.8 to 130.5	.8				>50% clay				DLB Claystone ~~[illegible]~~ medium light (N6), bedding not not apparent, slightly/to moderately friable, ~~[illegible]~~ silt fraction
	130.5 to 131.3	.9						131		
	131.3 to 132.8	1.8'						132		slickensides at ~ 131.6' with ~vertical attitude
	132.8 to 134.5	1.75						133		
								134		
Box 9 of 18	134.5 to 136.5	1.8						135		claystone as above with increase in silt fraction and color change to very light gray (N8), from 135 ft to 136.5 ft.
								136		
	136.5 to 138.4	1.85						137		
								138		slickensides at ~ 138 ft. and 138.8' ~vertical attitude
	138.9 to 140.2	1.6						139		

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Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 51-89BR

GEOLOGIST(S): DCB
DATE: 9/18/89

PROJECT NO: 662-11-5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 9 of 18	139.3 to 140.2	1.7'				>50% clay				claystone as above
	140.2 to 140.9	.6								
	140.9 to 142.5	0						141, 142		No Sample
	142.5 to 143.8	1.1'								
	143.8 to 144.7	1.8'						143, 144		
Box 10 of 18	144.7 to 145.5	.8						145		silty claystone, light gray (N7), bedding not apparent, slightly friable.
	145.5 to 146.5	.9						146		
	146.5 to 148.3	1.8'				>50% silt		147, 148		silt stone, light gray (N7) bedding not apparent, slightly friable.
	148.3 to 149.5	1.3'						149		
	149.5 to 150.1	.5'								

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(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 51-89 BR

GEOLOGIST(S): DCB
DATE: 9/18/89

PROJECT NO: 667-115

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 10 of 18	[illegible]	.5								
	150.1 to 151.9	1.8'				>50% silt		151		Siltstone as above Siltstone as above with some carb. mineralization and slight ~~sand~~ to moderate sand component.
	151.9 to 153.5	1.4'						152 153		~~Siltstone as above with slight to moderate vfg sand component~~
153.7	[illegible]	0								
153.7	153.7 to 155.2	1.75'			<5°	~50% silt ~50% sand		154 155		Sandy Siltstone, very light gray (N8) to medium dark gray (N4), thin bedded (<2mm) where apparent, with some interfingering claystone strata, slightly friable, sand is vfg, abundant carb. mineralization.
Box 11 of 18	155.2 to 157.2	1.8'		20°		>50% clay		156 157		Silty Claystone, medium dark gray (N4), bedding not apparent, slightly friable, contact w/ sandy siltstone above and below is gradational.
	157.2 to 157.5	.25								
	157.5 to 159.0	1.55'				~50% silt ~50% sand		158 159		Sandy Siltstone, very light gray (N8) to medium gray (N4), thin bedded (<3mm), dewatering features and soft sediment deformation exhibited in slabbed section, slightly friable, sand is vfg and fg abundant carb. material
	159.0 to 161.2	1.8'				>50% silt				Clayey Siltstone, medium light gray (N6) (bedding not apparent (massive?),

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ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 51-87 BR

GEOLOGIST(S): D C B
DATE: 9/19/87

PROJECT NO: 667-115

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 11 of 18	159.0 to 161.2	1.8'				>50% silt		161		(cont'd. from previous page), slightly friable. Slickenside at 159.3', altitude 40°
	161.2 to 161.5	.2'								
	161.5 to 163.0	1.5'				>50% clay		162		Silty Claystone, light gray (N7) to medium gray (N5), poorly bedded, bedding appears to be horizontal based on core breakage, slightly friable.
163.0 ↓	163.0 to 164.8	1.8'						163, 164		
Box 12 of 18	164.8 to 165.5	.9						165		vf. sand occurs @ ~165', poorly sorted (contains abundant silt).
	165.5 to 166.3	.85				~50% clay, ~50% silt		166		Interbedded Siltstone and Claystone, light gray (N7) and medium dark gray (N4) respectively, thin bedded (<1/4mm), slightly friable.
	166.3 to 168.0	1.9			-15°			167		
	168.0 to 169.5	1.25'				>50% clay		168, 169		Claystone, medium dark gray (N4), poorly bedded. (not apparent), slightly friable.
	169.5 to 170.0	.5								slickensides occur @ ~169.0' altitude ~70°.

NOTES General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 51-89BR

GEOLOGIST(S): DC B
DATE: 9/19/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 12 of 18 ↑ 171.5	170.0 to 171.5	1.8'				>50% Clay		171		Claystone as above
171.5 ↓	171.5 to 173.0	1.8						172		slickensides occur from ~172.0' to to ~172.9' attitudes range from <5° to ~25°
	173.0 to 173.5	.4						173		
	173.5 to 175.0	1.35						174		slickensides occur at ~174.0 ft. ~60° attitude.
Box 13 of 18	175.0 to 176.7	1.8						175		Interval grades to silty Claystone, silty Claystone medium gray (N5), bedding not apparent, moderate amount of carb material.
	176.7 to 177.5	1.1						176		
	177.5 to 178.0	~0.7						177		silty Claystone as above with decrease in silt fraction below 177.5 ft
	178.0 to 180.0	1.8						178		
↑ 180.0					-0°			179		Interbedded siltstone and claystone, light gray (N7), thin bedded (<2mm) to poorly bedded, slightly friable slight vfg sand component

NOTES. General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 51-89BR

GEOLOGIST(S): DCB
DATE: 9/19/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
180.0 ↓	180.0 to 181.5	1.4'				>50% clay		181		Interbedded siltstone and claystone as above, sand fraction is absent.
	181.5 to 181.7	.3(1)								
	181.7 to 183.5	1.85'						182		
	183.5 to 185.4	1.85'						183		Claystone, medium gray (N5), poorly bedded (not apparent except at core breaks), slightly friable, moderate silt component.
	185.4 to 187.0	1.7'						184		
								185		
								186		
Box 14 of 18	187.0 to 188.8	1.85				~60% clay ~40% silt.		187		Siltstone and claystone interbedded, light gray (N7) and med. light gray (N6), siltstone occurs in beds from 2mm to 6mm thick with laminae <1mm thick, claystone is poorly bedded, slightly friable
								188		
188.8 ↓ Box 15 of 18	188.8 to 189.5	.85				>50% silt		189		Siltstone, very light gray (N8), bedding is distorted - soft sediment deformation, slightly friable, slight to moderate clay fraction. DCB
	189.5 to 190.3	.85								

NOTES. General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
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(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 51-89 BR PAGE 15 OF 17

GEOLOGIST(S): DCB
DATE: 9/19/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 15 of 18	189.5 to 190.3	.85				>50% silt				Siltstone as above
	190.3 to 192.0	1.85			10°	>50% clay		191		Claystone, medium gray (N5), poorly bedded, slightly friable, slight to moderate silt fracture as discrete beds or strata, siltstone at ~191 ft. exhibits convolute bedding. Silt ~~[illegible]~~ beds occur and absent below ~191.5 ft., slight silt component in clay matrix. Slickensides occur at ~193.0 ft, attitude ~70°. Color grades to light gray (N7) at ~193.8'.
	192.0 to 193.5	1.45						192, 193		
	193.5 to 193.9	.50								
	193.9 to 194.9	1.0						194		
	194.9 to 196.0	.8						195		
	196.0 to 197.7	1.8						196, 197		
197.7	197.7 to 199.3	1.8						198, 199		
	199.3 to 199.5	.2								
	199.5 to 201.0	1.6								

NOTES General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 51-89 BR PAGE 16 OF 17

GEOLOGIST(S): DCB
DATE: 9/19/89

PROJECT NO: 667-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 16 of 18	199.5 to 201.0	1.6				750 cly				Claystone as above
	201.0 to 203.0	1.9						201, 202		Claystone and Siltstone interbedded, med. light gray (N6) and very light gray (N8) respectively, claystone is poorly bedded ≈2mm to 2cm thick, siltstone is thin (<2mm) bedded and discontinuous, slightly friable, slabbed section exhibits soft sediment deformation including load cast.
	203.0 to 203.5	.5						203		
	203.5 to 204.8	1.3						204		Claystone, dark gray (N3), bedding not apparent, weathered, slightly friable
	204.8 to 207.5	1.75						205, 206, 207		Slickenside occurs at 204.6 with ~ vertical attitude
207.5	207.5									
207.5 Box 17 of 18	207.5 to 209.0	(2) 1.8						208		Claystone as above weathering diminishes.
	209.0 to 211.0	(2) 1.6						209		Interbedded silt/clay occurs at ~ 210.0 to 210. with trace of coal DCB

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Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 51-89 BR

GEOLOGIST(S): DCB
DATE: 9/19/89

PROJECT NO: 662-11.5

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 17 of 18	209.0 to 211.0	(2) 1.6								see previous page for lith description
	211.0 to 211.5	.5						211		claystone, light brownish gray (5YR 6/1), bedding not apparent, nonfriable, slight silt fraction
	211.5 to 212.5	1.15			-5°			212		claystone, med. dark gray (N4), poorly bedded, slightly friable, slight silt fraction, occasional carb. material.
	212.5 to 214.5	1.85						213		Slickensides occur at ~213.0', attitude ~60°
								214		
	214.5 to 215.5	1.2						215		slickensides occur at ~214.8', attitude ~65°
	215.5 to 216.0	.5								
Box 18 of 18	216.0 ↓ 220.0							216		slickensides occur from ~216.8 to ~219.0 attitudes range from ~60° to vertical.
								217		
								218		
								219		some carb. material at 219.4 and interval contains more silt below 219.4

Bottom of Box 18 of 18 @ 220.0'

NOTES. General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 52-89 BR PAGE 1 OF

GEOLOGIST(S): JAY
DATE: 9/27/89

PROJECT NO: 667-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
0.0	0.0 / 0.6	0.5				55% GRAVEL 35% SAND 1% CLAY				SANDY GRAVEL, matrix is dark reddish brown (10 R 3/4), subangular-subrounded, mod-well graded, max size 7cm, some clay
Box 1 of 5	~~0~~ 3.5	Ø						1, 2, 3		NO SAMPLE
	4.2	0.35						4		CALICHE, mod orange pink (5YR 8/6), some gravel, trace of sand
	5.5	Ø						5		NO SAMPLE
	6.4	0.6						6		Same as above. Some clay (possibly claystone) at base of interval
	7.5	Ø						7		NO SAMPLE
	9.5	2.0						8, 9		TOP OF ROCK: CLAYSTONE, light olive gray (5Y 6/1), apparent massive bedding, mod-highly weathered, mod-poorly friable, some iron staining as mottles, some calc. bodies (1-2 cm), trace of Mg staining, some possible micro-fractures
		0.75								Same as above: increased iron staining along fractures & as mottles, trace of white non-calc mineralization

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 52-89 BR

PAGE 1 OF

GEOLOGIST(S): [illegible]
DATE: 9/27/89

PROJECT NO: 667-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
										See previous page
	11.5							11		
Box 1 of 5	13.5	2.0						12, 13		CLAYSTONE, med light gray (N6), massive bedding, mod-highly weathered, mod friable, some iron staining as mottles, some Mg staining, top of interval has some calc bodies a 1-2 cm wide & 5-7 cm long (deep).
↑ 14.9	14.9	1.35						14		Same as above: some silt
14.9 ↓	14.9 15.5	0.7						15		SILTY CLAYSTONE, grayish orange (10 YR 7/4), massive bedding, mod weathered, mod-poorly friable, some iron staining throughout matrix, some Mg staining, some micro-fractures w/ trace of assoc. calc. filling and possible iron leaching. Trace of sand (VFG)
Box 2 of 5	17.5	2.1						16, 17		Same as above some VFG sand, 90° & 0° fractures some calc. filled. Base of interval 15.5-17.5 ~~[illegible]~~
	19.5	2.1				70% SAND 30% SILT		18, 19		SILTY SANDSTONE, very light gray (N8), massive bedding, mod weathered, mod friable, VFG, mod-well sorted, trace of clay, ~~some~~ abundant iron staining as mottles, some Mg
	(21.5)									Same as above: sand is FG, trace of iron nodules

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Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 52-89 BR

PAGE 3 OF

GEOLOGIST(S): [illegible]
DATE: 9/27/89

PROJECT NO: 667-11 50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 2 of 5		2.2						21		See previous page
	21.5									SILTY SANDSTONE, dark yellowish ~~gray~~ orange (10 YR 6/6) & very light gray (N8), massive bedding, mod weathered, mod friable, subangular-subrounded, mod-well sorted, VFG, abundant iron staining as mottles
		2.35						22		
↑ 23.5	21.5							23		Same as above
		2.2						24		
	25.5							25		
		2.55				5% CLAY 25% SILT 20% SAND		26		SILTY CLAYSTONE, generally light olive gray (5 Y 6/1), massive bedding, mod weathered, mod friable, some VFG sand lenses at base of interval ≈ 1cm - 2cm thick, abundant iron staining as mottles & concretions, ~~[illegible]~~ some ~~[illegible]~~ staining, trace of carb material
	27.5							27		
		2.4				50 ~~[illegible]~~% SAND 35% CLAY 15% SILT		28		TOP 1 FT of interval: same as above, increase in sand fraction
	29.5							29		CLAYEY SANDSTONE, light olive gray (5 Y 6/1), massive bedding, mod weathered, mod friable, VFG, mod sorted, abundant iron staining, some SILT
	(31.5)	2.0								TOP of interval (TO ≈ 30.0): same as above, increase in silt fraction

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Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 52-89 BR PAGE 4 OF

GEOLOGIST(S): [illegible]
DATE: 9/27/89

PROJECT NO: 667-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Box 3 of 5						25% SILT 75% SAND				Base of interval (+30.0-31.5) SILTY SANDSTONE, grayish orange (10 YR 7/4), non-apparent bedding, ~~mod~~ mod-highly weathered, mod friable, flowing texture in middle of interval, ~~Some iron stain~~ VFG-FG, mod-well sorted, Some iron staining as mottles & possibly assoc. w/ micro-fractures, trace of carb at base of interval, trace of clay lenses at top of interval
	31.5							31		
31.9	31.9	0.45		40°				32		
	33.5							33		CLAYEY SILTSTONE, slight olive gray (5 Y 6/1), massively bedded, mod weathered, mod-poorly friable, Some iron staining as mottles, possible fracture at 40°
								34		TOP 1 FT OF INTERVAL: Same as above. Base: SANDSTONE, very light gray (N8), massively bedded, mod weathered, mod-highly friable, MG, well sorted, Some iron staining as mottles, trace of clay as a ~ 5 [illegible]
	35.5							35		Same as above: base is very pale orange (10 YR 8/2) and FG
								36		Same as above: Clay lenses w/ below sandstone showing soft-sed deformation
	37.5							37		
								38		Same as above: increased clay fraction to some w/ clay in matrix
	39.5							39		Same as above. increased clay fraction to CLAYEY VFG SANDSTONE
	41.9									

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 52-89 B2

GEOLOGIST(S): [illegible]
DATE: 9/28/89

PROJECT NO: 1067-11.50

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
41.5	41.5							41		See previous page
	43.5	1.9		50°		55% SILT 30% SAND 15% CLAY		42, 43		SANDY SILTSTONE, light olive gray (5 Y 6/1), apparently massive bedding w/ VFG sand lenses (1 mm - 1 cm), mod weathered, mod-poorly friable, sand is as above lenses & in matrix, some clay, abundant iron staining, some mottles & along fracture planes (≈ 50°), some Mg staining
	45.5	1.8				45% SILT 35% SAND 20% CLAY		44, 45		Same as above increased clay fraction, sand fraction increases at base of interval
	47.5	1.9						46, 47		Same as above: middle to base of interval shows 2 ~~sequences~~ fining upward sequences (from VFG SS to silty claystone)
	49.5	1.95		70° -50°				48, 49		SILTY CLAYSTONE, olive gray (5 Y 4/1), massive bedding, mod weathered, mod friable, ~~[illegible]~~ some VFG sand interbeds ≈ ½-2 cm thick, abundant iron staining as mottles and along some fracture planes (≈ 70°-50°), trace of coal ~~[illegible]~~
	(51.7)	1.65								Base (≈ 49.0 FT): SILTY VFG SANDSTONE, non apparent bedding ~~mod weathered~~, mod friable, mod sorted, iron staining as mottles.

Box 5 of 5

see next page

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.

LOG OF BORING NO. 52-89 BR

PAGE 6 OF

GEOLOGIST(S): [illegible]
DATE: 9/28/89

PROJECT NO: 1167-1156

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL IN BOX	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	LITHOLOGIC LOG	LITHOLOGIC DESCRIPTION
Cx 5 x 5 ↑ 51.2				~90°				51		CLAYSTONE, med dark gray (N4), massively bedded, mod weathered, mod. poorly friable, some silt, abundant iron staining along abundant fracture ~90°, trace of lignite coal.
								52		
								53		
								54		
								55		
								56		
								57		
								58		
								59		

NOTES: General: USCS is modified for this log as follows:
Material amounts are estimated by % volume instead of % weight.
(1) Badly broken core, accurate footage measurements not possible.
(2) Core breaks cannot be matched, accurate footage measurements not possible.

ROCKY FLATS PLANT

FIGURE NO.