

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

GEOPHYSICAL LOGS OF COAL TEST DRILL HOLES IN THE
GRAND MESA COAL FIELD, DELTA COUNTY, COLORADO

By
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This report has not been edited for conformity
with Geological Survey editorial standards or
stratigraphic nomenclature.

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INTRODUCTION

In the summer of 1978, the U.S. Geological Survey relogged two holes drilled in 1977 and obtained geophysical logs for three holes drilled in trespass on Federal coal.

The coal occurs above the basal Rollins Sandstone Member of the Upper Cretaceous Mesaverde Formation. The strata dip gently to the north or north-northeast into the Piceance Creek Basin.

USGS holes CE-77-2 and CE-77-3, in the Cedaredge $7\frac{1}{2}$ -minute quadrangle, were drilled, logged, and cased, as ground-water observation wells, in November 1977. The original geophysical logs, reported by Eager (1978), had anomalously high natural-gamma radiation above the fluid level, caused by backscatter from the density-gamma source. The holes were relogged, through the PVC casing, for natural-gamma radiation in August 1978 by Strata Surveys of Steamboat Springs, Colorado.

Trespass holes WS-1 and WS-2, in the Dry Creek $7\frac{1}{2}$ -minute quadrangle, were drilled and logged in December 1977 for the Sundance Oil Company, Inc. of Denver, Colorado. The casing in these holes was HQ wireline drill rods.

Trespass hole Fairlamb 75-2, in the Hells Kitchen $7\frac{1}{2}$ -minute quadrangle, was drilled and logged in May 1975 for Utah International, Inc. of Salt Lake City, Utah.

The holes were drilled with truck-mounted rotary and diamond-core drilling rigs using air, air with biodegradable foam injection (foam), water, or mud as the drilling medium. All holes were logged for natural-gamma radiation (GAM) alone or in a suite with gamma-gamma density (DEN), single-point resistivity (RES), and caliper (CAL). In this report, the logged depth is considered the total depth (T.D.).

Beds of coal and impure coal have been interpreted to the nearest $\frac{1}{2}$ foot. To convert from feet to meters, multiply by .3048.

REFERENCE

Eager, G. P., 1978, Geophysical logs of coal test drill holes in the Grand Mesa coal field, Delta and Mesa Counties, Colorado: U.S. Geol. Survey Open-File Report 78-540, 97 p.

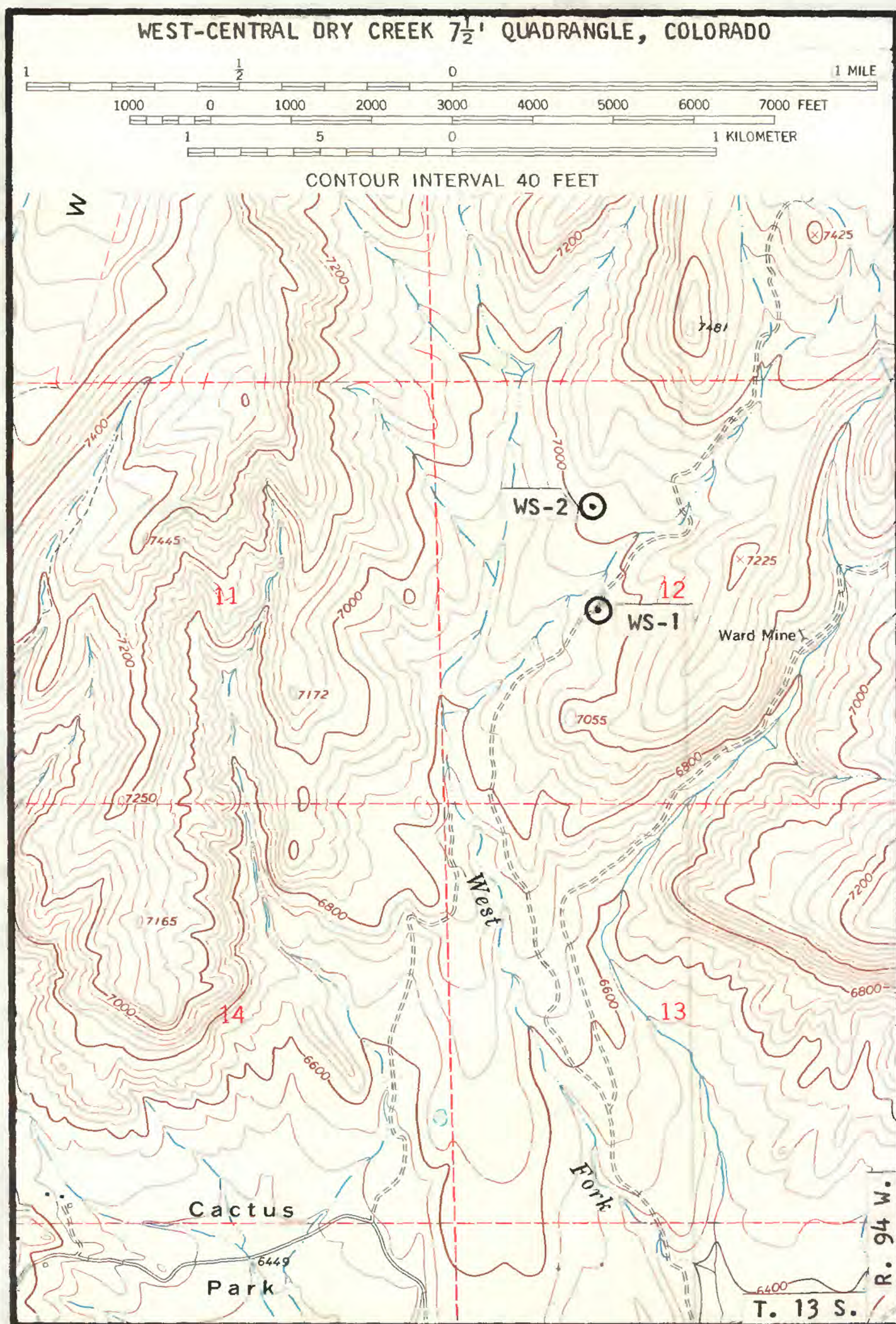


Figure 1.--Map showing drill-hole locations in the Dry Creek 7½' quadrangle, Colorado.

U.S. GEOLOGICAL SURVEY DRILL-HOLE LOG
 DRY CREEK 7 $\frac{1}{2}$ ' QUADRANGLE, GRAND MESA COAL FIELD

Drill-hole no. WS-1 State Colorado County Delta
 T. 13 S., R. 94 W., sec. 12, NW $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ Approx. elev. (ft) 6960
 Drilled depth 179' Cored interval 92-179'
 Logged depth 179' Logging company Strata Surveys Date logged 12-15-77

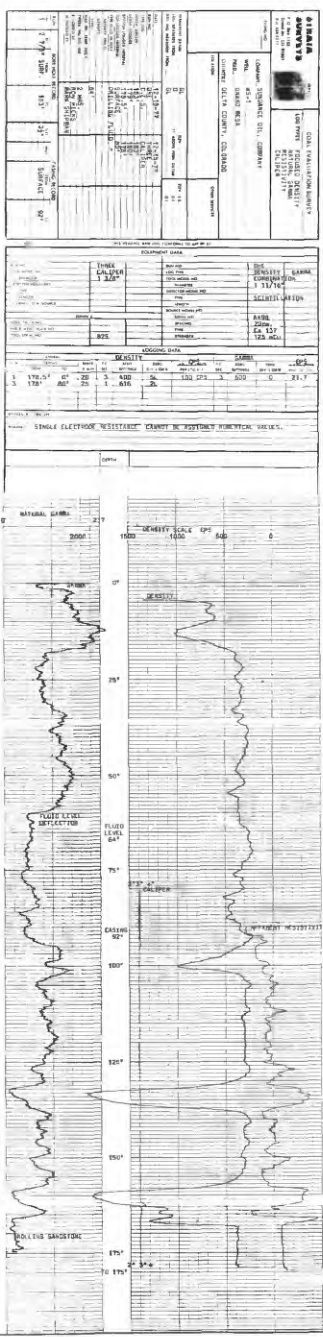
Drilling media record		Bore-hole record		Casing record	
Mud	0- 92'	4.75"	0- 92'	3.06" ID	0- 92'
Water	92- 179'	2.98"	92- 179'		

LOGGING DATA
 Gamma source Cs 137

Run no.	Tool diam.	Log run	T.C. (sec)	Scale	Interval	Speed (fpm)
1	1.69"	Gamma Density Resistivity	3 3	434 cps/in. 2000 cps/in.	175- 0' 179- 5' 180- 90'	20
2	1.38"	Caliper (3-arm)	1	20 ins./in.	178- 80'	25

Remarks:

U.S. GEOLOGICAL SURVEY
Drill-hole no. WS-1 continued

DESCRIPTION	GEOPHYSICAL LOGS				DEPTH	
	GAM	CAL	DEN	RES	FT	M
0-17' Surficial deposit					0	0
17-95' Baked rock					50	
131½-132' Impure coal					100	
132-134' Coal						
134-136½' Impure coal						
158-158½' Impure coal					150	
158½-160½' Coal						
160½-162½' Impure coal						
165½-167' Impure coal					50	
167-T.D. Sandstone (Rollins)					180	
					T.D.	

U.S. GEOLOGICAL SURVEY DRILL-HOLE LOG
 DRY CREEK 7 $\frac{1}{2}$ ' QUADRANGLE, GRAND MESA COAL FIELD

Drill-hole no. WS-2 State Colorado County Delta

T. 13 S., R. 94 W., sec. 12, NW $\frac{1}{4}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$ Approx. elev. (ft) 7020

Drilled depth 311' Cored interval 121'-311'

Logged depth 310' Logging company Strata Surveys Date logged 12-19-77

Drilling media record		Bore-hole record		Casing record	
Mud	0- 121'	4.75"	0- 121'	3.06" ID	0- 121'
Water	121- 311'	2.98"	121- 311'		

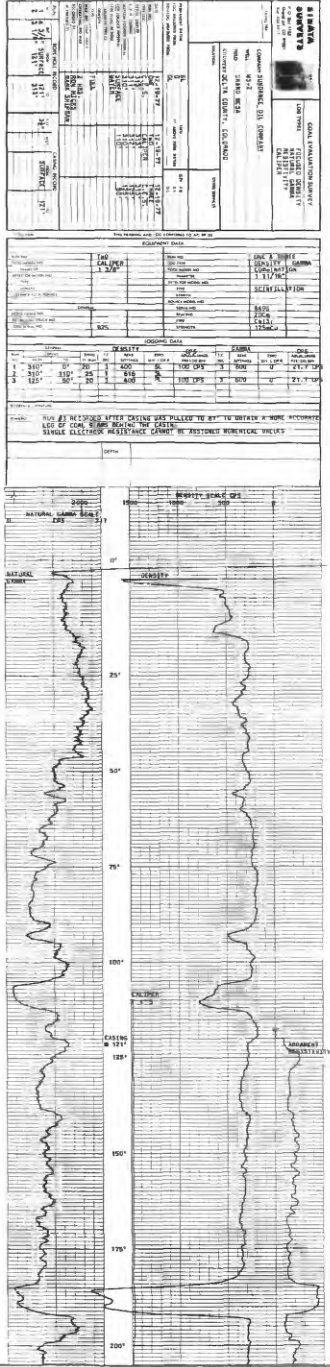
LOGGING DATA

Gamma source Cs 137

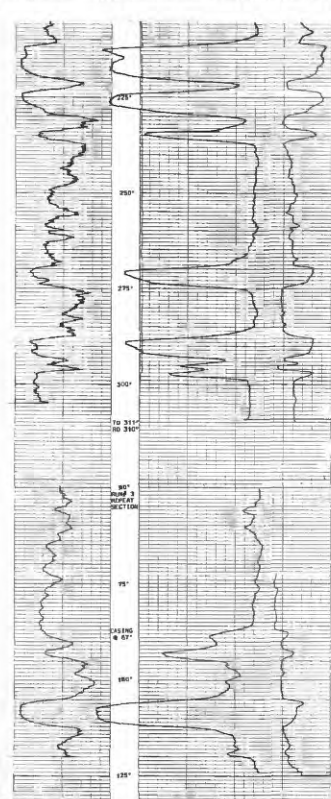
Run no.	Tool diam.	Log run	T.C. (sec)	Scale	Interval	Speed (fpm)
1	1.69"	Gamma Density Resistivity	3 3	434 cps/in. 2000 cps/in.	305- 0' 309- 0' 310- 120'	20
2	1.38"	Caliper (3-arm)	1	20 ins./in.	310- 111'	25
3	1.69"	Gamma Density Resistivity	3 3	434 cps/in. 2000 cps/in.	120- 50' 124- 50' 125- 73'	20

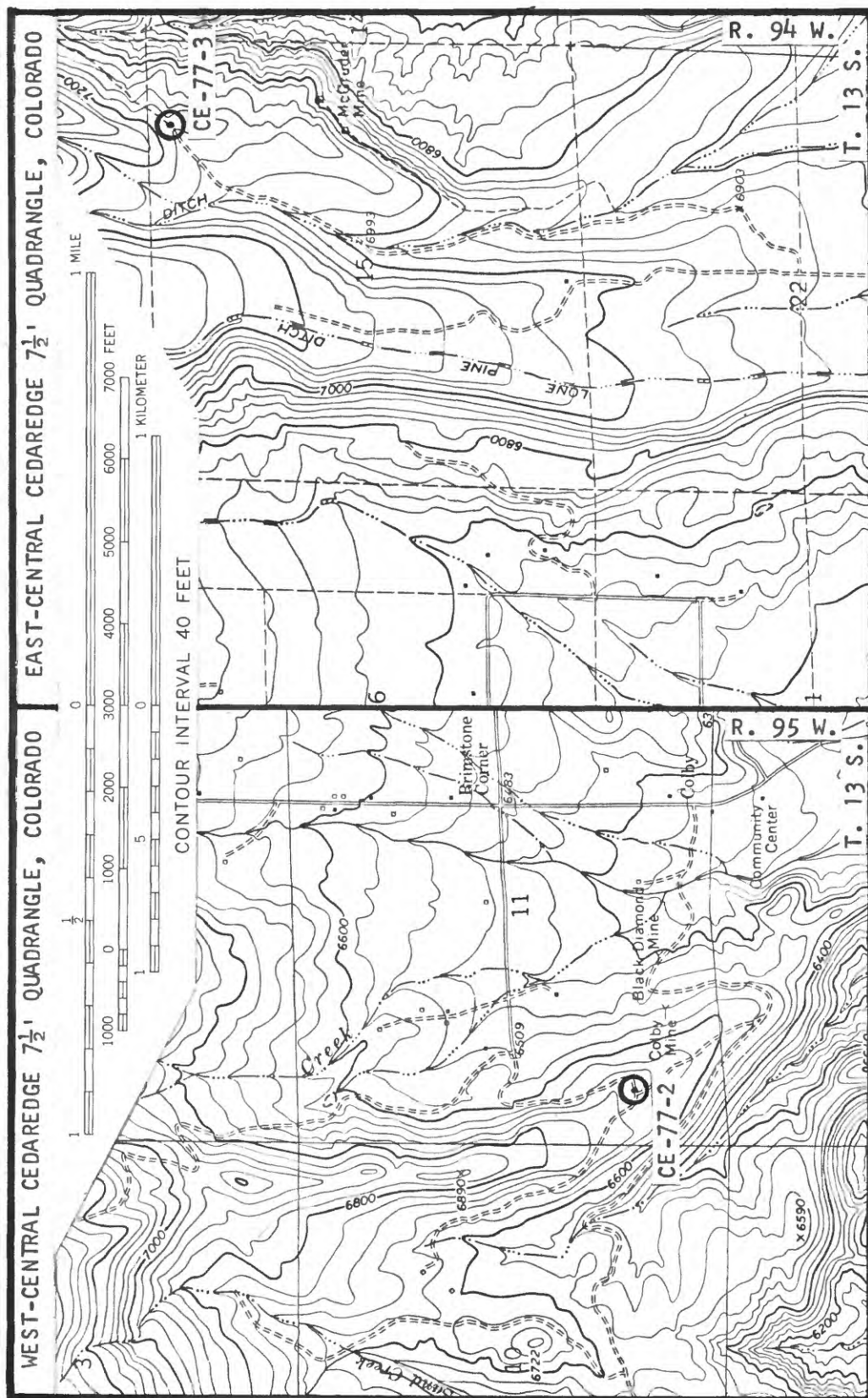
Remarks: Runs no. 1 and 3: Gamma and resistivity are 1 $\frac{1}{2}$ ' too shallow; density is 1' too shallow.

U.S. GEOLOGICAL SURVEY
Drill-hole no. WS-2 continued

DESCRIPTION	GEOPHYSICAL LOGS				DEPTH	
	GAM	CAL	DEN	RES	FT	M
0-46' Surficial deposit					0	0
92-93½' Impure coal					50	
105-105½' Impure coal					100	
105½-111' Coal					150	
111-111½' Impure coal					50	
184½-190½' Coal					200	
190½-191½' Impure coal						

U.S. GEOLOGICAL SURVEY
Drill-hole no. WS-2 continued

DESCRIPTION	GEOPHYSICAL LOGS				DEPTH	
	GAM	CAL	DEN	RES	FT	M
211½-219½' Coal						
219½-220' Impure coal						
223-223½' Impure coal					70	
223½-227½' Coal						
227½-229' Impure coal					250	
233½-235½' Impure coal						
269½-270' Impure coal						
270-272½' Coal					300	
272½-274' Impure coal					310	
288-288½' Impure coal					T.D.	
288½-289½' Coal					50	
289½-291' Impure coal						
291-292' Coal					20	
292-293' Impure coal						
294-295½' Impure coal						
296-298' Impure coal						
298-T.D. Sandstone (Rollins)					100	
92-93½' Impure coal					125	
105-105½' Impure coal						
105½-111' Coal						
111-111½' Impure coal						



U.S. GEOLOGICAL SURVEY DRILL-HOLE LOG
CEDAREGE 7½' QUADRANGLE, GRAND MESA COAL FIELD

Drill-hole no. CE-77-2 State Colorado County Delta

T. 13 S., R. 95 W., sec. 11, CN $\frac{1}{2}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ Approx. elev. (ft) 6700

Drilled depth 460' Cored interval NONE

Logged depth	449'	Logging company	Strata Surveys	Date logged	8-31-78
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Drilling media record		Bore-hole record		Casing record
Air/Foam	0- 460'	6.75"	0- 40'	3.0" ID PVC 0- 454'
		4.75"	40- 460'	

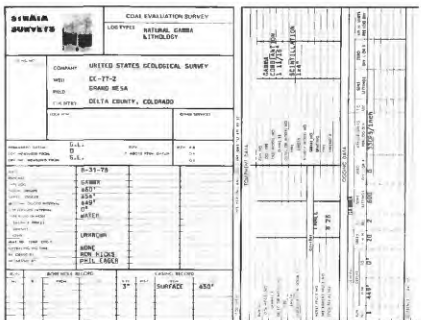
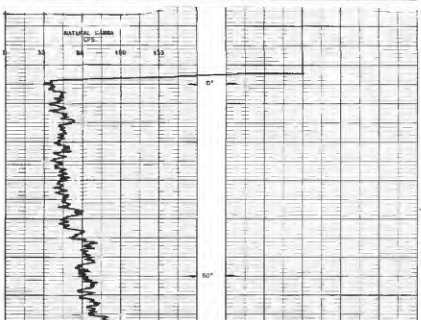
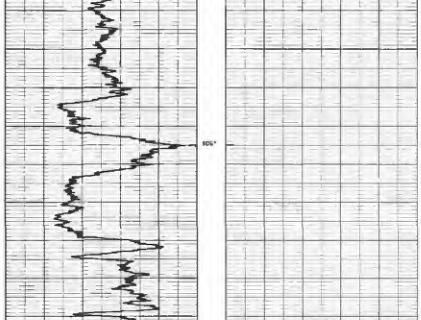
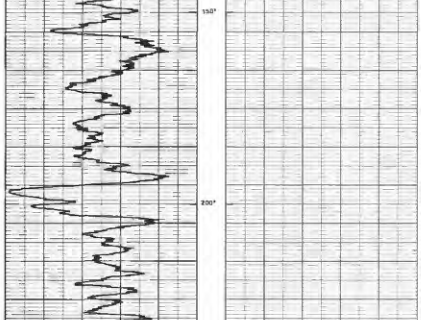
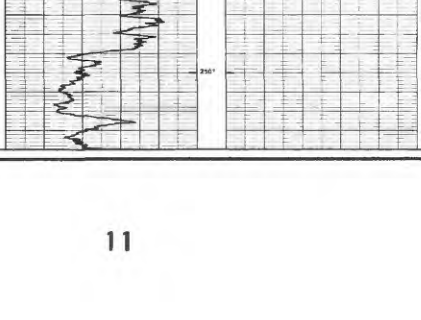

LOGGING DATA

Gamma source NONE

Run no.	Tool diam.	Log run	T.C. (sec)	Scale	Interval	Speed (fpm)
1	1.69"	Gamma	2	167 cps/in.	449- 0'	20

Remarks: Run no. 1 is 1' too shallow.

U.S. GEOLOGICAL SURVEY
Drill-hole no. CE-77-2 continued

DESCRIPTION	GEOPHYSICAL LOGS				DEPTH	
	GAM				FT	M
0-87' Surficial deposit					0	0
154-155½' Impure coal					50	50
195-199' Coal					150	150
200-201½' Coal					200	200
201½-203' Impure coal					250	250
220½-221½' Impure coal					300	300

U.S. GEOLOGICAL SURVEY
Drill-hole no. CE-77-2 continued

DESCRIPTION	GEOPHYSICAL LOGS				DEPTH	
	GAM				FT	M
277-277½' Impure coal						
281-282' Impure coal						
290½-291' Impure coal					300	
314½-315' Impure coal						100
335½-345½' Coal						
345½-346' Impure coal					350	
356½-360½' Coal						
360½-361' Impure coal						
367½-369½' Impure coal					400	
377½-378' Impure coal						
378-379' Coal						
379-379½' Impure coal						
388-390½' Impure coal						
391½-393½' Coal					449	
393½-394' Impure coal					T.D.	
419½-421½' Coal						
421½-422½' Impure coal						
422½-434' Coal						
434-435' Impure coal						
435-436½' Coal						

U.S. GEOLOGICAL SURVEY DRILL-HOLE LOG
CEDAREDGE 7 $\frac{1}{2}$ ' QUADRANGLE, GRAND MESA COAL FIELD

Drill-hole no. CE-77-3 State Colorado County Delta

T. 13 S., R. 94 W., sec. 15, NW $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ Approx. elev. (ft) 7170

Drilled depth 360' Cored interval NONE

Logged depth 343' Logging company Strata Surveys Date logged 8-31-78

Drilling media record		Bore-hole record		Casing record
Air	0- 360'	5.13"	0- 360'	3.0" ID PVC 0- 348'

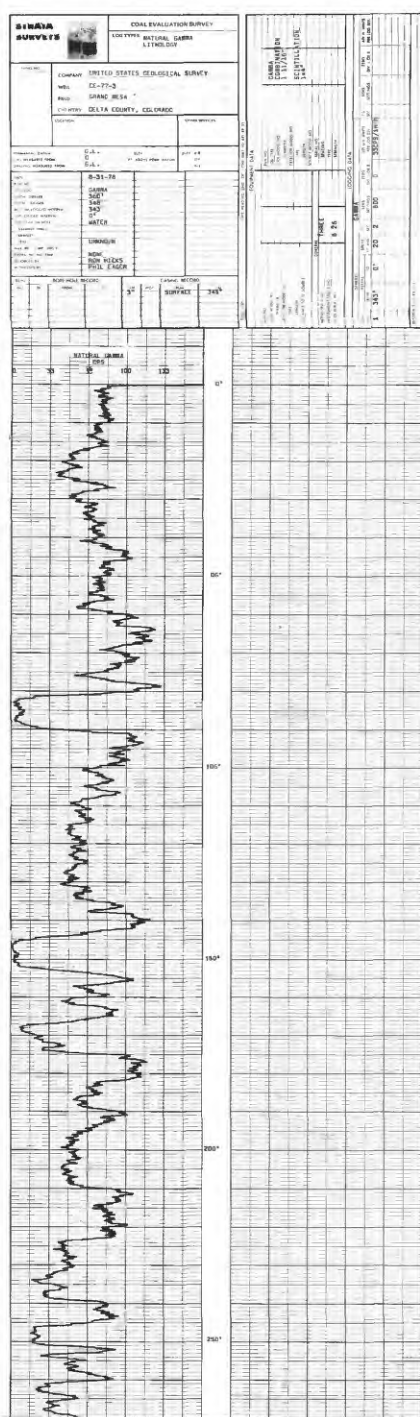
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Gamma source NONE

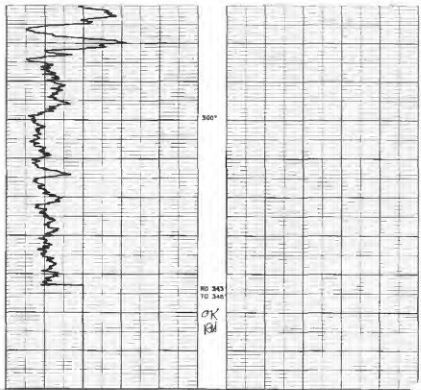
Run no.	Tool diam.	Log run	T.C. (sec)	Scale	Interval	Speed (fpm)
1	1.69"	Gamma	2	167 cps/in.	343- 0'	20

Remarks:

U.S. GEOLOGICAL SURVEY
Drill-hole no. CE-77-3 continued

DESCRIPTION	GEOPHYSICAL LOGS				DEPTH	
	GAM				FT	M
						
0-16' Surficial deposit					0	0
75½-76' Impure coal					50	
81-90' Coal						
90-90½' Impure coal						
144-152½' Coal					100	
152½-153' Impure coal						
157-157½' Impure coal						
160-162' Impure coal					150	
167-172' Coal						50
172-173' Impure coal						
173-174' Coal						
174-175' Impure coal						
231½-233½' Impure coal					200	
233½-235' Coal						
235-236½' Impure coal						
236½-238½' Coal						
238½-239' Impure coal						
246-251' Coal					250	
253-254' Coal						

U.S. GEOLOGICAL SURVEY
Drill-hole no. CE-77-3 continued

DESCRIPTION	GEOPHYSICAL LOGS				DEPTH	
	GAM				FT	M
275-275½' Impure coal					300	
275½-277½' Coal						
277½-278½' Impure coal						
281½-283' Impure coal						
283½-285' Coal						
298-T.D. Sandstone (Rollins)					343 T.D.	100

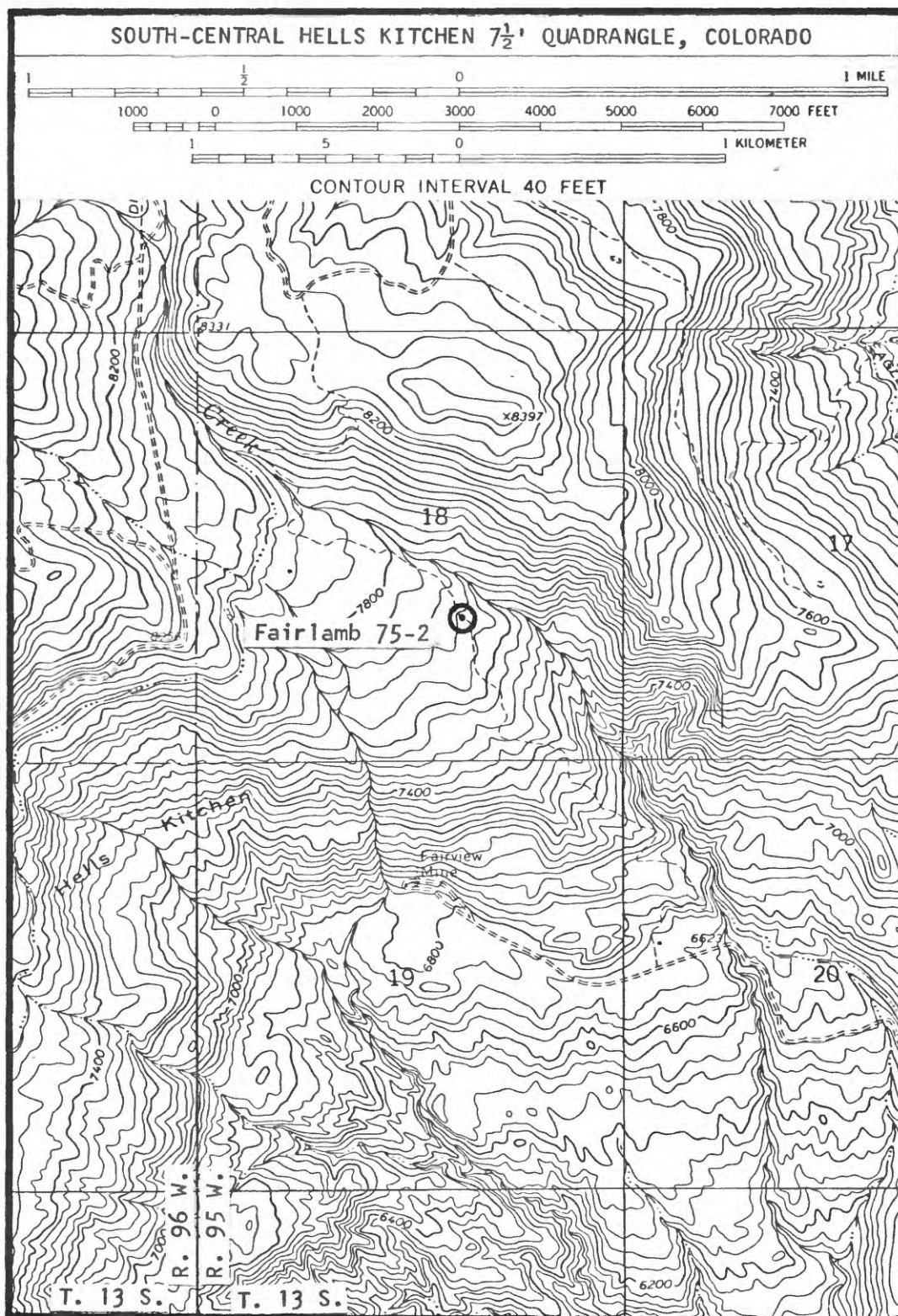


Figure 3.--Map showing drill-hole location in the Hells Kitchen 7½' quadrangle, Colorado.

U.S. GEOLOGICAL SURVEY DRILL-HOLE LOG
HELLS KITCHEN 7 $\frac{1}{2}$ ' QUADRANGLE, GRAND MESA COAL FIELD

Hole no. Fairlamb 75-2 State Colorado County Delta

T. 13 S., R. 95 W., sec. 18, CS $\frac{1}{2}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ Approx. elev. (ft) 7670

Drilled depth 1103' Cored interval NONE

Logged depth 1103' Logging company Utah Int'l., Inc. Date logged 5-20-75

Drilling media record		Bore-hole record	Casing record
Mud	0-1103'	5.13 & 5.0" 0- 470' 4.75" 470-1103'	NONE

LOGGING DATA

Gamma source Cs 137

Run no.	Tool diam.	Log run	T.C. (sec)	Scale	Interval	Speed (fpm)
1	1.69"	Gamma Resistivity Density	2 2	50 cps/in. 25 Ohms/in. 500 cps/in.	1102- 0' 1103- 7' 1102- 571'	20

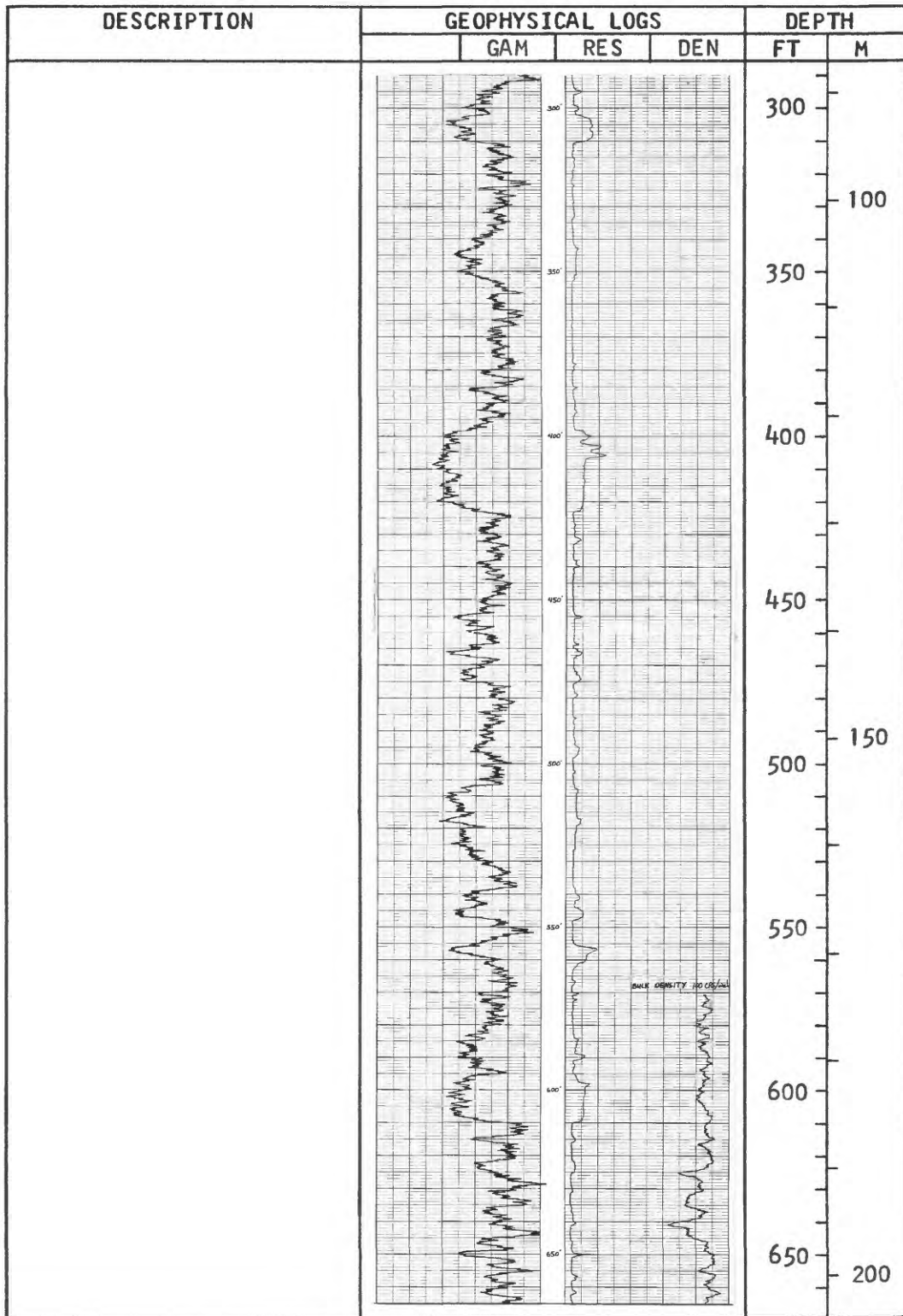
Remarks:

U.S. GEOLOGICAL SURVEY

Drill-hole no. Fair1amb 75-2 continued

0-165' Surficial deposit

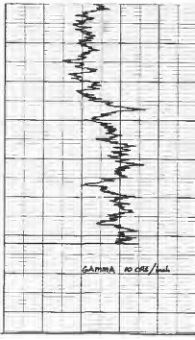
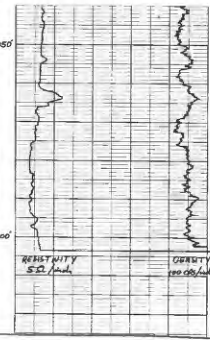
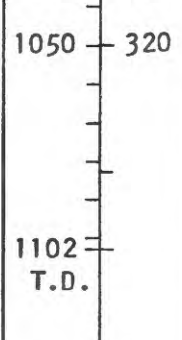
U.S. GEOLOGICAL SURVEY
Drill-hole no. Fairlamb 75-2 continued



U.S. GEOLOGICAL SURVEY
Drill-hole no. Fairlamb 75-2 continued

DESCRIPTION	GEOPHYSICAL LOGS			DEPTH	
	GAM	RES	DEN	FT	M
716 $\frac{1}{2}$ -717' Impure coal				700	
717-718' Coal					
718-718 $\frac{1}{2}$ ' Impure coal					
782 $\frac{1}{2}$ -783 $\frac{1}{2}$ ' Impure coal				750	
793 $\frac{1}{2}$ -794 $\frac{1}{2}$ ' Impure coal					
850 $\frac{1}{2}$ -851' Impure coal					
851-853' Coal				800	
853-853 $\frac{1}{2}$ ' Impure coal					
853 $\frac{1}{2}$ -857' Coal					250
857-858' Impure coal					
893-896 $\frac{1}{2}$ ' Coal				850	
896 $\frac{1}{2}$ -898 $\frac{1}{2}$ ' Impure coal					
902-903' Impure coal					
930 $\frac{1}{2}$ -931' Impure coal					
940 $\frac{1}{2}$ -943' Impure coal				900	
944-946' Coal					
950 $\frac{1}{2}$ -951 $\frac{1}{2}$ ' Coal					
951 $\frac{1}{2}$ -952' Impure coal					
956 $\frac{1}{2}$ -957 $\frac{1}{2}$ ' Impure coal				950	
957 $\frac{1}{2}$ -967 $\frac{1}{2}$ ' Coal					
967 $\frac{1}{2}$ -970 $\frac{1}{2}$ ' Impure coal					
993 $\frac{1}{2}$ -994 $\frac{1}{2}$ ' Impure coal					300
994 $\frac{1}{2}$ -995' Coal					
995-995 $\frac{1}{2}$ ' Impure coal				1000	
995 $\frac{1}{2}$ -1040' Sandstone (Rollins)					

U.S. GEOLOGICAL SURVEY
Drill-hole no. Fairlamb 75-2 continued

DESCRIPTION	GEOPHYSICAL LOGS			DEPTH	
	GAM	RES	DEN	FT	M
1040-1066' Sandstone (Rollins)				1050	320
				1102 T.D.	