UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

GEOPHYSICAL LOGS OF 22 HOLES DRILLED IN 1976 IN THE YAMPA COAL FIELD, MOFFAT COUNTY, NORTHWESTERN COLORADO

By

Richard F. Meyer

Open-file report 77-118

1977

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Introduction

Under Contract No. 14-08-0001-15726, awarded by the U. S. Geological Survey, the Hayden Farmer Drilling Company drilled 22 holes in the Yampa coal field in Moffat County, Colorado (figures 1, 2, and 3). Geo-Dynamics Logging Company geophysically logged the 22 drill holes for the U.S. Geological Survey. The purpose of the project was to obtain information about the thicknesses, quality, and depths of coal beds in the Yampa coal field. The drill-hole locations were selected by the U.S. Geological Survey and appropriate permission for access was obtained. Post-drilling reclamation was inspected and approved by the landowner and met U.S. Bureau of Land Management specifications.

Drill-hole locations, elevations, and depths are summarized in table 1.

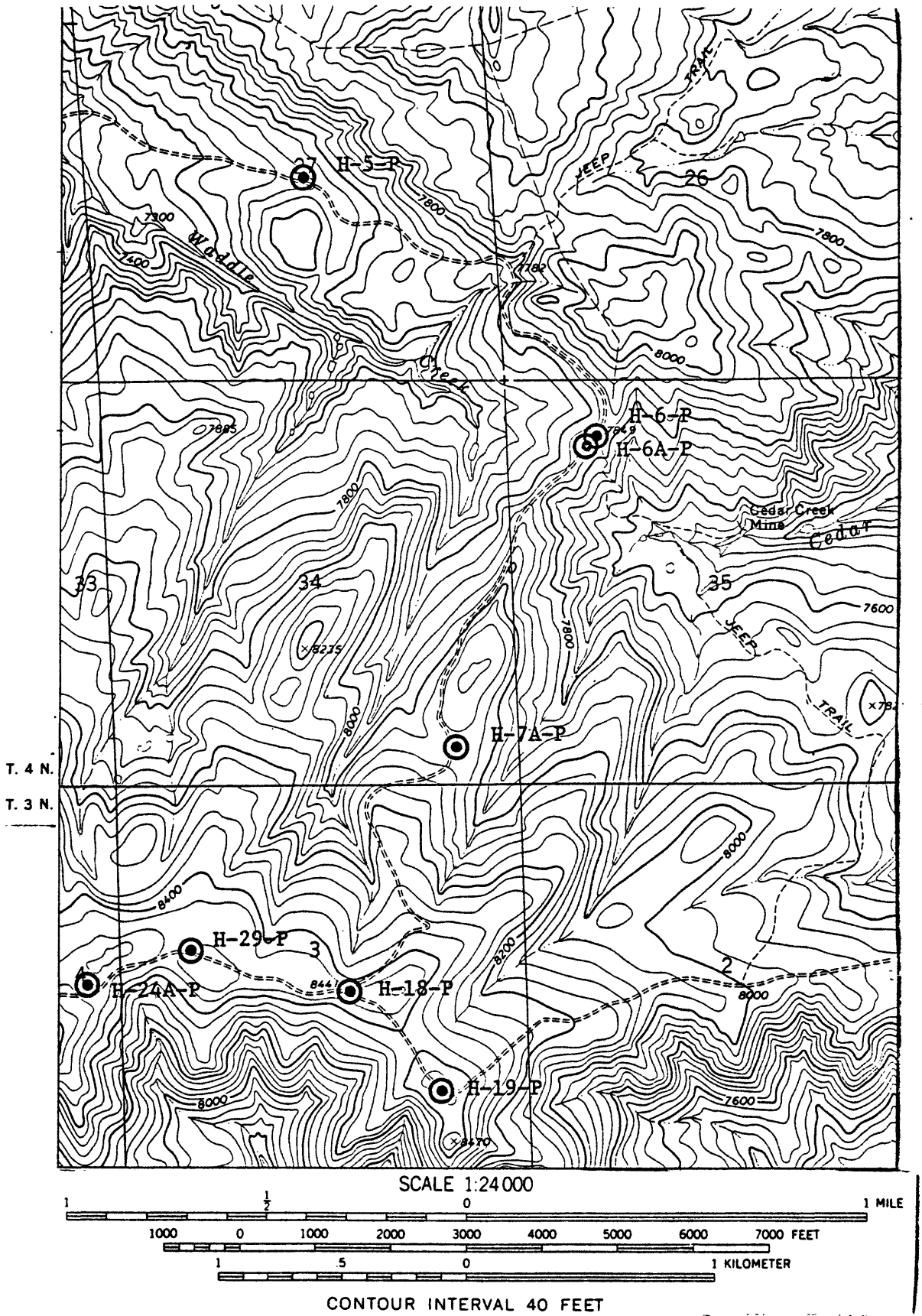

Figure 1. -- Location of drill holes, Pagoda quadrangle, Moffat County, Colorado.

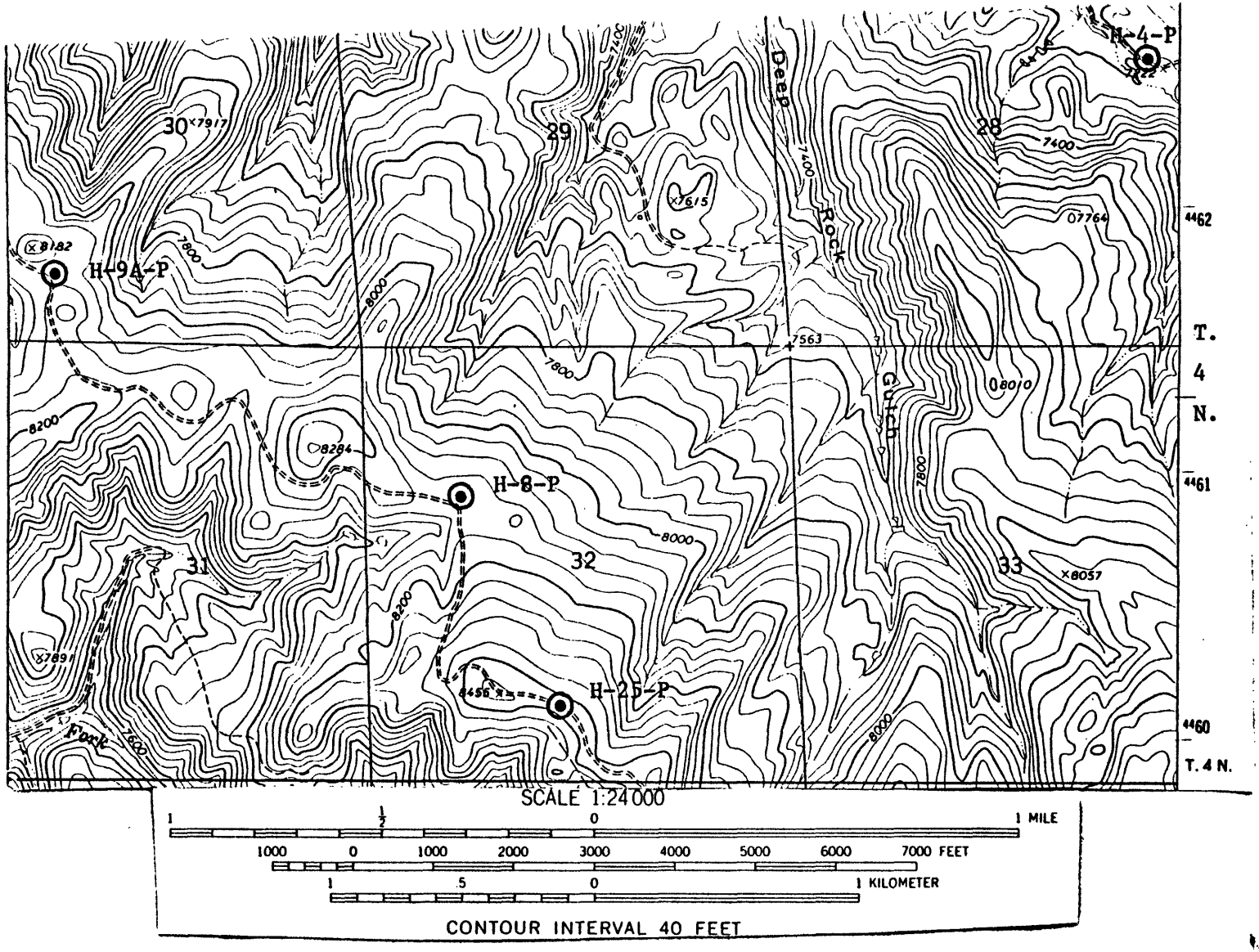

Figure 2. -- Location of drill holes, southeastern Hamilton quadrangle, Moffat County, Colorado

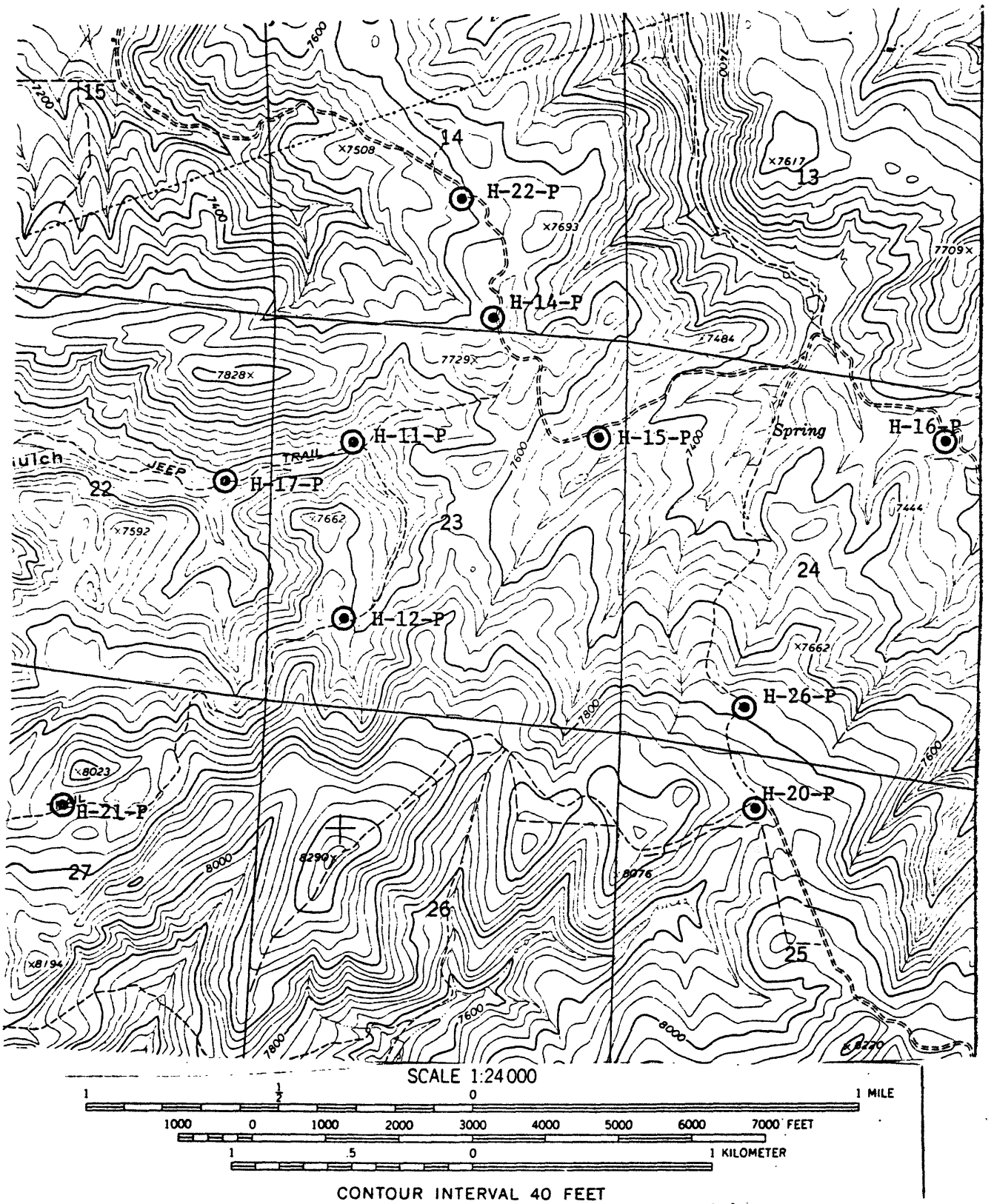

Figure 3. -- Location of drill holes, west-central Hamilton quadrangle, Moffat County, Colorado.

Table 1. Drill-hole locations, elevations, and drilling and logging depths

(All depths stated herein are in feet; to convert feet to meters, multiply by 0.3048.)

Hole No.	Location	Surface elevation	Depth drilled	Depth logged
H-4-P	NE¼SE¼NE¼ Sec. 28, T.4N., R.90W.	7,215	500	495
H-5-P	NW¼NW¼SE¼ Sec. 27, T.4N., R.90W.	7,513	545	544
H-6-P	SE¼NW¼NW¼ Sec. 35 T.4N., R.90W.	7,849	280	260½
H-6A-P	SE¼NW¼NW¼ Sec. 35 T.4N., R.90W.	7,853	500	489
H-7A-P	SW¼SE¼SE¼ Sec. 34 T.4N., R.90W.	8,065	300	298½
H-8-P	NE¼SW¼NW¼ Sec. 32 T.4N., R.90W.	8,135	265	258
H-9A-P	NW¼SE¼SW¼ Sec. 30 T.4N., R.90W.	8,108	510	509
H-11-P	Lot #5, Sec. 23 T.4N., R.91W.	7,415	380	373
H-12-P	Lot #13, Sec. 23 T.4N., R.91W.	7,615	380	379
H-14-P	Lot #15, Sec. 14 T.4N., R.91W.	7,695	280	273½
H-15-P	Lot #1, Sec. 23 T.4N., R.91W.	7,468	360	359
H-16-P	NE¼NE¼NE¼ Sec. 24 T.4N., R.91W.	7,295	400	397
H-17-P	Lot #8, Sec. 22 T.4N., R.91W.	7,350	450	438
H-18-P	NW¼NW¼SE¼, Sec. 3 T.3N., R.90W.	8,441	322	316
H-19-P	NW¼SE¼SE¼, Sec. 3 T.3N., R.90W.	8,465	460	300½
H-20-P	Lot #3, Sec. 25 T.4N., R.91W.	7,870	480	462
H-21-P	Lot #6, Sec. 27 T.4N., R.91W.	7,895	400	397½
H-22-P	Lot #10, Sec. 14 T.4N., R.91W.	7,592	500	498½
H-24A-P	SE¼SE¼NE¼, Sec. 4 T.3N., R.90W.	8,545	355	353
H-25-P	NE¼SE¼SW¼, Sec. 32 T.4N., R.90W.	8,420	300	299

Hole No.	Location	Surface elevation	Depth drilled	Depth logged
H-26-P	Lot #10, Sec. 24 T.4N., R.91W.	7,785	460	438
H-29-P	SE¼SW¼NW¼, Sec. 3 T.3N., R.90W.	8,480	285	282

Figure 10.--Drill-hole No. 8-56-7

Geo Dynamics

GEOPHYSICAL SERVICES CASPER, WYOMING 82601

COMPANY [illegible]

HOLE NO. OR NAME [illegible] ELEVATION 8,160

FIELD Tomes Coal Field

COUNTY Routt County STATE Colorado

LOCATION NW,SE,NW,	SECTION 30	TOWNSHIP 4 N.	RANGE 90 W.

LOG TYPE	Gamma-Density	RUN	2
RUN NO.	1	TOOL NO. & MODEL	3-54
DATE	10-28-76	DIAMETER, INCHES	3-5/8"
DEPTH DRILLED	500'	GR DETECTOR	DENSITY DETECTOR
DEPTH LOGGED	500'	BOX CRYSTAL, INCHES	3x3
BOTTOM LOGGED INTERVAL	500'	GR SENSITIVITY	1x
TOP LOGGED INTERVAL	Surface	DEADTIME, SECONDS	.5 usec
FLUID LEVEL	Dry	TIME CONSTANT (GR)	DENSITY
TYPE FLUID IN HOLE	Air	SCALE, CPS (GR)	DENSITY
BIT GUAGE	3-5/8"	ZERO PLACEMENT (GR)	DENSITY
CASING	None	WATER FACTOR	
TRUCK NO.	4		
LOGGING SPEED, FT/MIN	30 ft. in 1 min.	RESISTIVITY TYPE	
RECORDED DEPTH SCALE, FT/IN.	50	SPACING, INCHES	
		SCALE, OHMS/INCH	
		ZERO	
		SP SCALE, MV/INCH	

REMARKS:

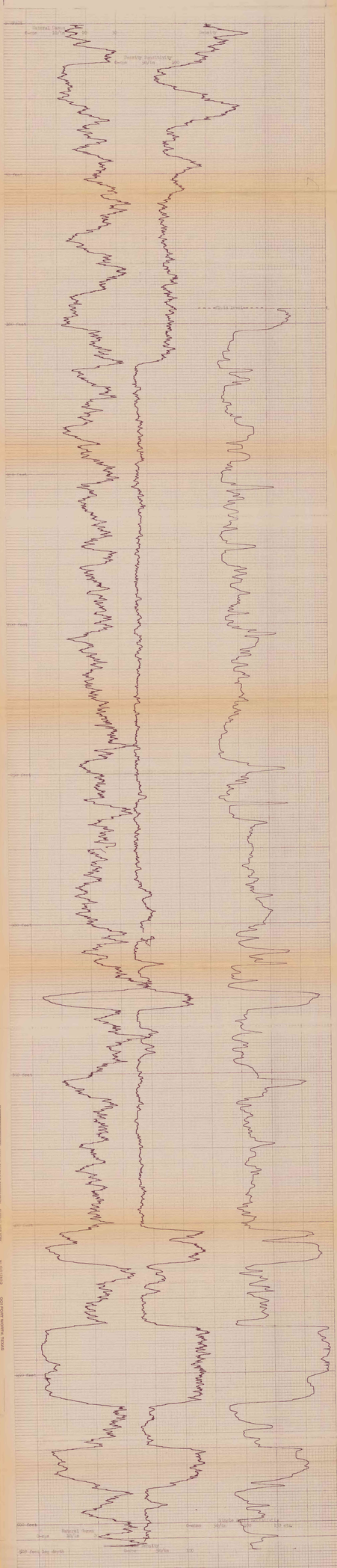

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Figure 11.—Drill-hole H-11-P

Geo Dynamics

GEOPHYSICAL SERVICES — CASPER, WYOMING 82601

COMPANY [illegible]

HOLE NO. OR NAME H-11-P — ELEVATION 7,415

FIELD YAMPA COAL FIELD

COUNTY ROUTT — STATE COLORADO

LOCATION Lot #5 — SECTION 23 — TOWNSHIP 6 N. — RANGE 91 W.

LOG TYPE	GR-DENSITY	RUN	1
RUN NO.	1	TOOL NO. & MODEL	5-10
DATE	8 October 1976	DIAMETER, INCHES	3-11/16
DEPTH DRILLED	771'	GR DETECTOR	5-10
DEPTH LOGGED	771'	SIZE CRYSTAL, INCHES	3" x 3"
BOTTOM LOGGED INTERVAL	none	K FACTOR	[illegible]
TOP LOGGED INTERVAL	none	DEADTIME, SECONDS	[illegible]
FLUID LEVEL	71'	TIME CONSTANT (GR)	[illegible]
TYPE HOLE FLUID	natural mud	SCALE, CPS (GR)	100/in
BIT GUAGE	4-3/4	ZERO PLACEMENT (GR)	left margin
CASING	none	WATER FACTOR	.31
TRUCK NO.	2		
LOGGING SPEED, FT/MIN	30 on 10-5 2000'	RESISTIVITY TYPE	[illegible]
RECORDER DEPTH SCALE, FT/IN.	50	SPACING, INCHES	16"
		SCALE, OHMS/INCH	10
		ZERO	2-inches right
		S.P. SCALE, MV/INCH	[illegible]

DENSITY 1
DENSITY 50/in
DENSITY 2-inches right

REMARKS:

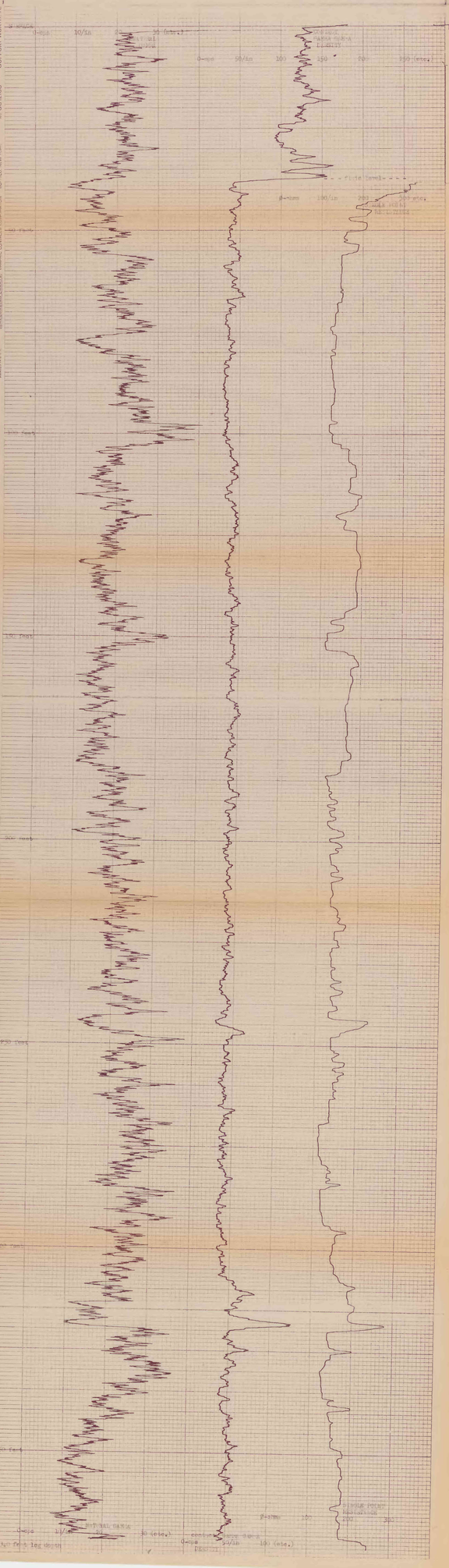

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Figure 12.--Drill-hole H-12-P

Geo Dynamics

GEOPHYSICAL SERVICES CASPER, WYOMING 82601

COMPANY Shell Oil Co.
HOLE NO. OR NAME H-12-P ELEVATION 7,615
FIELD Lompa Coal Field
COUNTY Moffat STATE Colorado

LOCATION Lot #13 SECTION 23 TOWNSHIP 4 N. RANGE 91 W.

LOG TYPE	RESISTIVITY	RUN	1	2
RUN NO.	1 & 2	TOOL NO. & MODEL	5-16	5-1
DATE	1 October 1976	DIAMETER, INCHES	5-1/16	5-1/16
DEPTH DRILLED	550.0'	GR DETECTOR	scint.	DENSITY DETECTOR Cs.
DEPTH LOGGED	375.0'	SIZE CRYSTAL, INCHES	3/ 3 x 3"	3/ 3 x 3"
BOTTOM LOGGED INTERVAL	none	K FACTOR	1.0 @ 1,000	
TOP LOGGED INTERVAL	surf.	DEADTIME, SECONDS	3.4 @ 5,000	
FLUID LEVEL	12.0	TIME CONSTANT (GR)		DENSITY 3
TYPE HOLE FLUID	water & mud	SCALE, CPS (GR)	20/in	DENSITY 50/in
BIT GUAGE	5-7/8"	ZERO PLACEMENT (GR)	left margin	DENSITY 1-inches right
CASING	none	WATER FACTOR	1.0 @ 1,000	
TRUCK NO.	1			
LOGGING SPEED, FT/MIN.	20 thru 10-13 when.	RESISTIVITY TYPE	Single Point	
RECORDER DEPTH SCALE, FT/IN.	50	SPACING, INCHES	Mag.	
		SCALE, OHMS/INCH	10/inch	
		ZERO	5-inches right	
		S.P. SCALE, MV/INCH	none	

REMARKS:

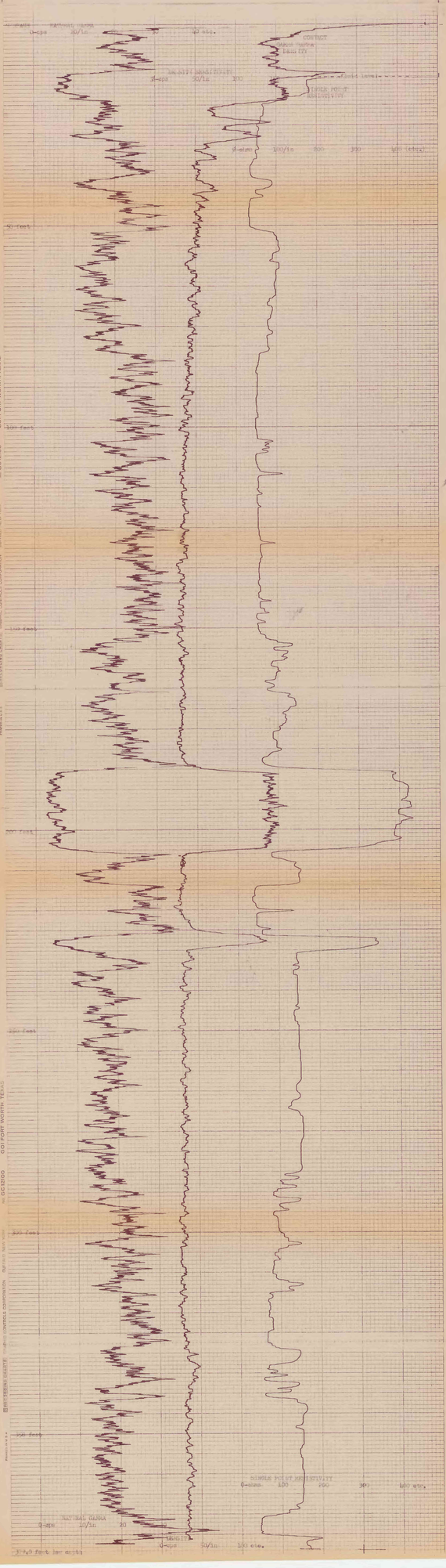

Figure 13.--Drill-hole H-14-P

Geo Dynamics

GEOPHYSICAL SERVICES CASPER, WYOMING 82601

COMPANY

HOLE NO. OR NAME H-14-P ELEVATION 7,695

FIELD Yampa Coal Field

COUNTY Moffat STATE Colorado

LOCATION Lot #15 SECTION 14 TOWNSHIP 4 N. RANGE 91 W.

LOG TYPE	Dens-GR-NITT	RUN	1	2
RUN NO.	1 & 2	TOOL NO. & MODEL	97-10	-1
DATE	3 October 1978	DIAMETER, INCHES	5-7/8	5-7/8
DEPTH DRILLED	2001	GR DETECTOR	2-1/2	DENSITY DETECTOR 1...
DEPTH LOGGED	2000	SIZE CRYSTAL, INCHES	3" x 3"	1 x 6"
BOTTOM LOGGED INTERVAL	none	K FACTOR	1.0	4.10-5
TOP LOGGED INTERVAL	none	DEADTIME, SECONDS	1.0	none
FLUID LEVEL	911'	TIME CONSTANT (GR)	1	DENSITY 1
TYPE HOLE FLUID	natural mud	SCALE, CPS (GR)	0/16	DENSITY 1.0/in
BIT GUAGE	6-7/8	ZERO PLACEMENT (GR)	left screen	DENSITY 1-inches right
CASING	none	WATER FACTOR	0.00	
TRUCK NO.	1			
LOGGING SPEED, FT/MIN	30 at 1 foot	RESISTIVITY TYPE	16"/64"	18"
RECORDER DEPTH SCALE, FT/IN.	10	SPACING, INCHES	16"	
		SCALE, OHMS/INCH	20/in	
		ZERO	0-inches right	
		S.P. SCALE, MV/INCH	40/5	

REMARKS:

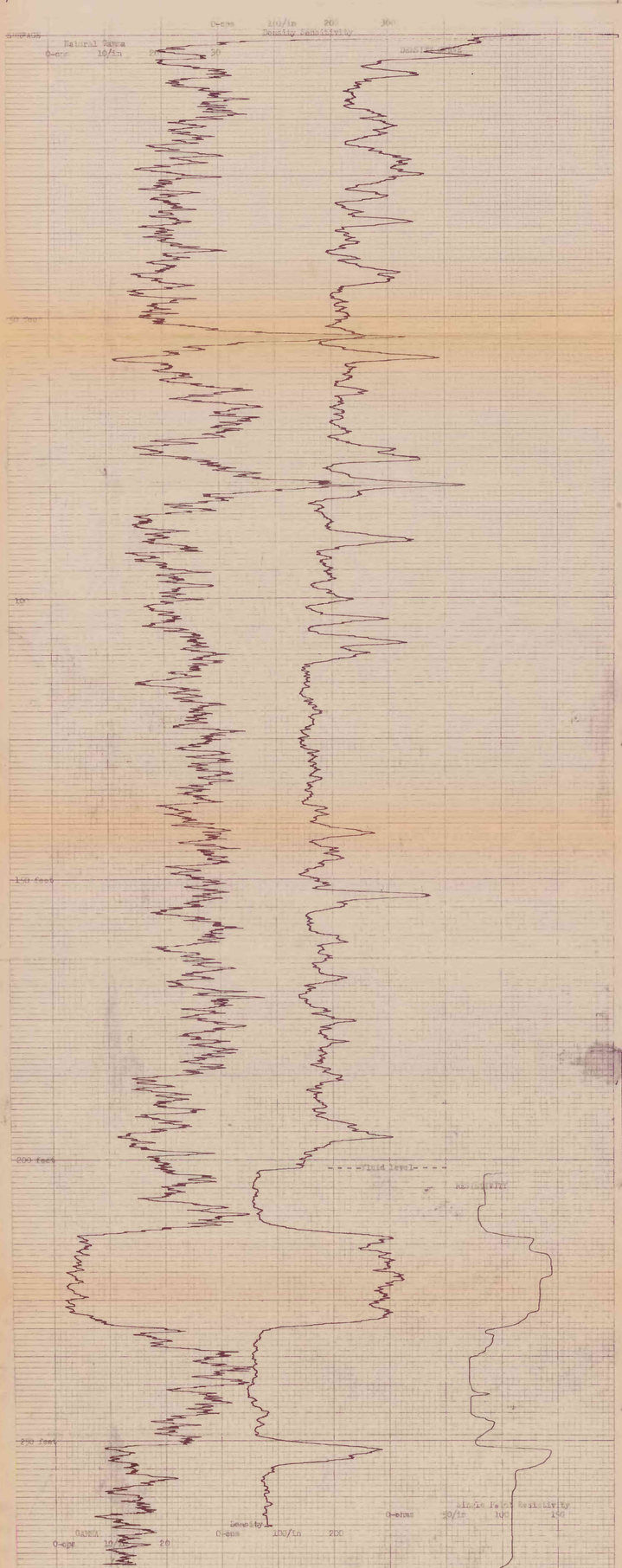

Figure 14.--Drill-hole H-15-P

Geo Dynamics

GEOPHYSICAL SERVICES CASPER, WYOMING 82601

COMPANY [illegible]

HOLE NO. OR NAME H-15-P

FIELD Tampa Coal Field ELEVATION 7,468

COUNTY Moffat STATE Colorado

LOCATION Lot #1 SECTION 23 TOWNSHIP 4 N. RANGE 91 W.

LOG TYPE	GR-N-DENSITY	RUN	3
RUN NO.	1 of 2	TOOL NO. & MODEL	2
DATE	October 1976	DIAMETER, INCHES	3-1/2
DEPTH DRILLED	1000'	GR DETECTOR	3-11/16
DEPTH LOGGED	1004'	SIZE CRYSTAL, INCHES	DENSITY DETECTOR
BOTTOM LOGGED INTERVAL	1000'	K FACTOR	
TOP LOGGED INTERVAL	400'	DEADTIME, SECONDS	
FLUID LEVEL	25 Feet	TIME CONSTANT (GR)	
TYPE IDLE FLUID	Mud/Wtr	SCALE, CPS (GR)	DENSITY
BIT GUAGE	6-3/4"	ZERO PLACEMENT (GR)	DENSITY
CASING	8-5/8"	WATER FACTOR	DENSITY
TRUCK NO.	2008		
LOGGING SPEED, FT/MIN.	30 Feet Per Minute	RESISTIVITY TYPE	
RECORDER DEPTH SCALE, FT/IN.	10	SPACING, INCHES	
		SCALE, OHMS/INCH	
		ZERO	
		S.P. SCALE, MV/INCH	

REMARKS:

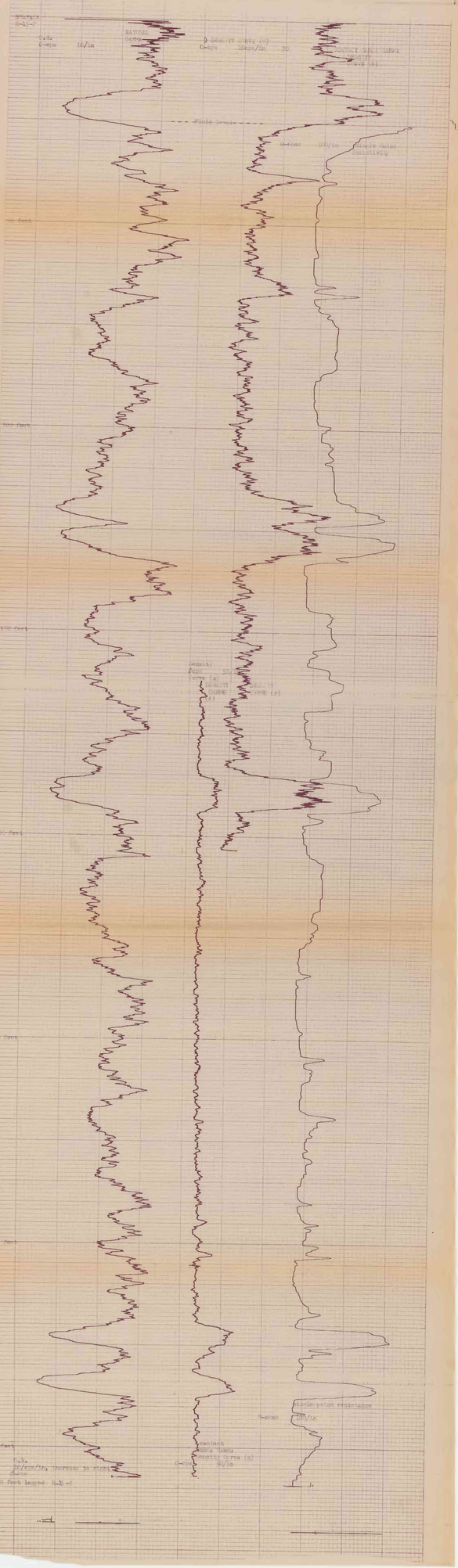

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Figure 15.—Drill-hole H-16-P

Geo Dynamics

GEOPHYSICAL SERVICES — CASPER, WYOMING 82601

COMPANY [illegible]

HOLE NO. OR NAME H-16-P — ELEVATION 7,295

FIELD Tampa Coal Field

COUNTY Moffat — STATE Colorado

LOCATION NE¼ NE¼	SECTION 26	TOWNSHIP 4 N.	RANGE 91 W.
LOG TYPE	Gamma-Density	RUN	2
RUN NO.	2	TOOL NO. & MODEL	5-1
DATE	11 October 1976	DIAMETER, INCHES	3 5/16"
DEPTH DRILLED	1000	GR DETECTOR	Scint. DENSITY DETECTOR [illegible]
DEPTH LOGGED	1000	SIZE CRYSTAL, INCHES	1 1/2 x 1"
BOTTOM LOGGED INTERVAL	1000	K FACTOR	.45 x 10⁻⁴
TOP LOGGED INTERVAL	1000	DEADTIME, SECONDS	25x10⁻⁶ Case
FLUID LEVEL	Dry	TIME CONSTANT (GR)	1 DENSITY 1
TYPE HOLE FLUID	Drilling Mud	SCALE, CPS (GR)	1000 DENSITY 10/in
BIT GUAGE	5 7/8"	ZERO PLACEMENT (GR)	10% DENSITY 2.2 Below Bit
CASING	6 5/8"	WATER FACTOR	1.41
TRUCK NO.	5		
LOGGING SPEED, FT/MIN	30 ft. 30 ft. Below	RESISTIVITY TYPE	Single Point
RECORDER DEPTHSCALE, FT/IN.	100	SPACING, INCHES	16"
		SCALE, OHMS/INCH	10/in
		ZERO	0-Ohms Right
		S.P. SCALE, MV/INCH	100 mv

REMARKS:

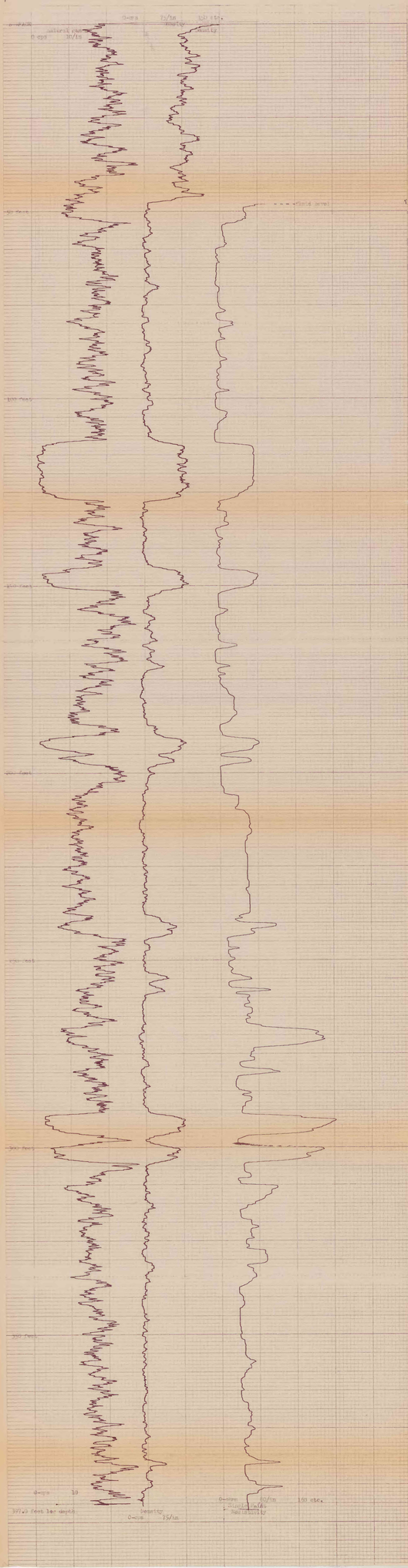


Figure 16.--Drill-hole H-17-P

Geo Dynamics

GEOPHYSICAL SERVICES CASPER, WYOMING 82601

COMPANY U.S.G.S.

HOLE NO. OR NAME H-17-P ELEVATION 7,350

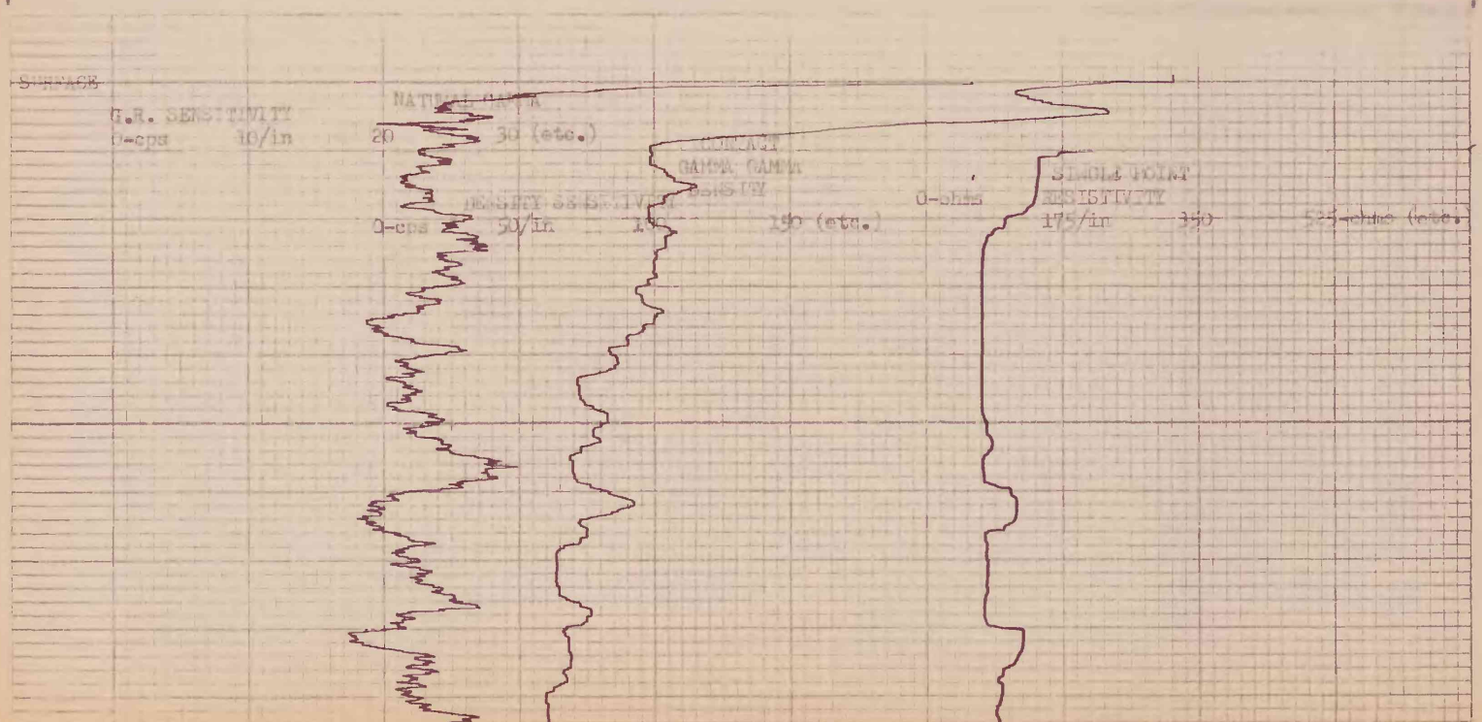
FIELD Yampa Coal Field

COUNTY MOFFAT STATE COLORADO

LOCATION Lot #8 SECTION 22 TOWNSHIP 4 N. RANGE 91 W.

LOG TYPE	SSTR-DENSITY	RUN	1	2
RUN NO.	1 & 2	TOOL NO. & MODEL	[illegible]	D-2
DATE	3 October 1976	DIAMETER, INCHES	1-11/16	1-11/16
DEPTH DRILLED	450	GR DETECTOR	point	DENSITY DETECTOR D.N.
DEPTH LOGGED	438.0	SIZE CRYSTAL, INCHES	3/4 x 1.5	1 x 6.5
BOTTOM LOGGED INTERVAL	none	K FACTOR	1.24 x 10^-2	
TOP LOGGED INTERVAL	none	DEADTIME, SECONDS	33.75 μ-sec	
FLUID LEVEL	surface	TIME CONSTANT (GR)	1	DENSITY 1
TYPE HOLE FLUID	natural mud	SCALE, CPS (GR)	10/in	DENSITY 50/in
BIT GUAGE	4-3/4	ZERO PLACEMENT (GR)	left margin	DENSITY 2-inches right
CASING	none	WATER FACTOR	1.00	
TRUCK NO.	1			
LOGGING SPEED, FT/MIN	20 (at 12-13 ohms)	RESISTIVITY TYPE	SINGLE POINT	
RECORDER DEPTH SCALE, FT/IN.	10	SPACING, INCHES	N/A	
		SCALE, OHMS/INCH	175/in	
		ZERO	6-inches right	
		S P SCALE, MV/INCH	NONE	

REMARKS:



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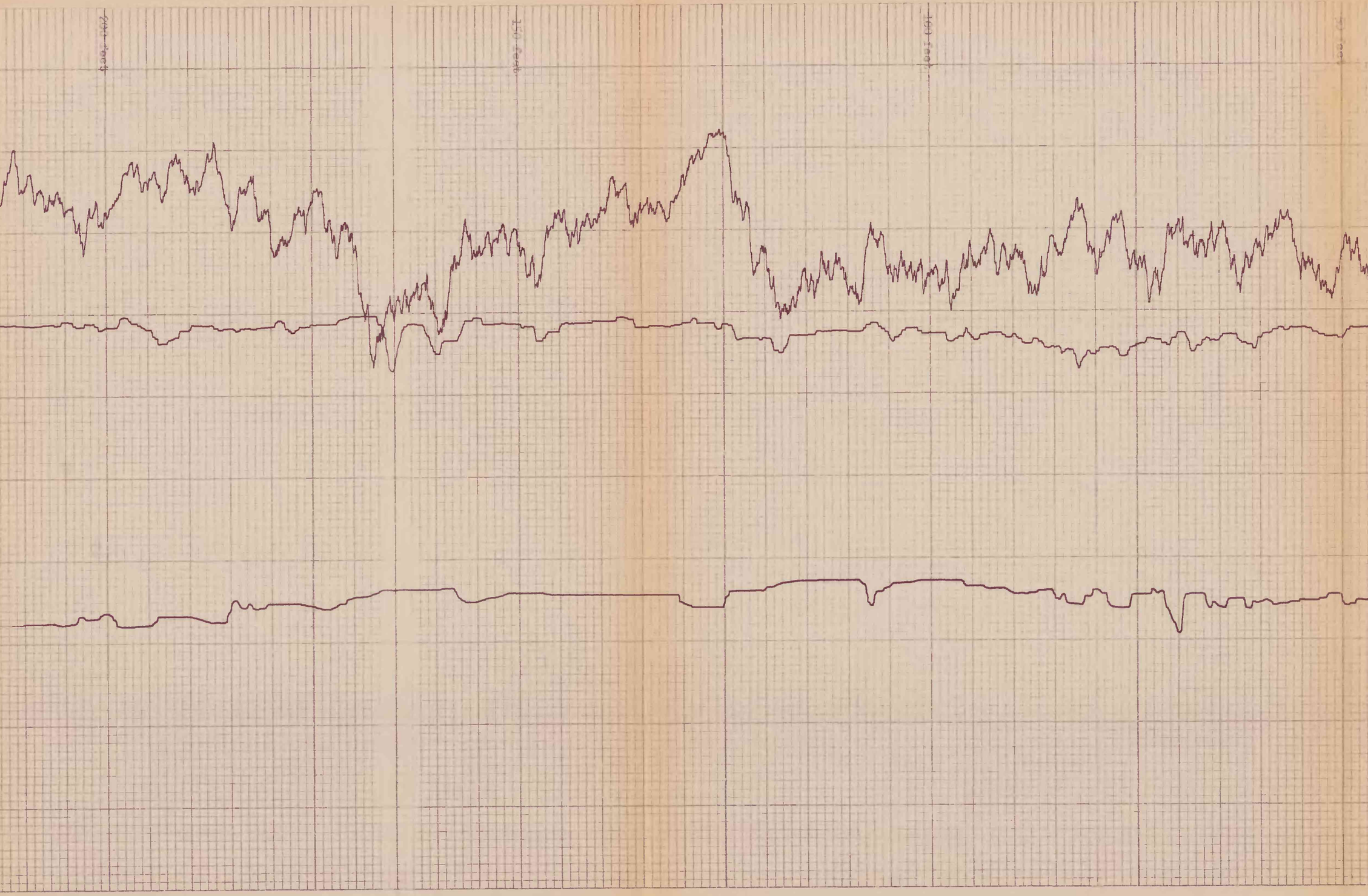

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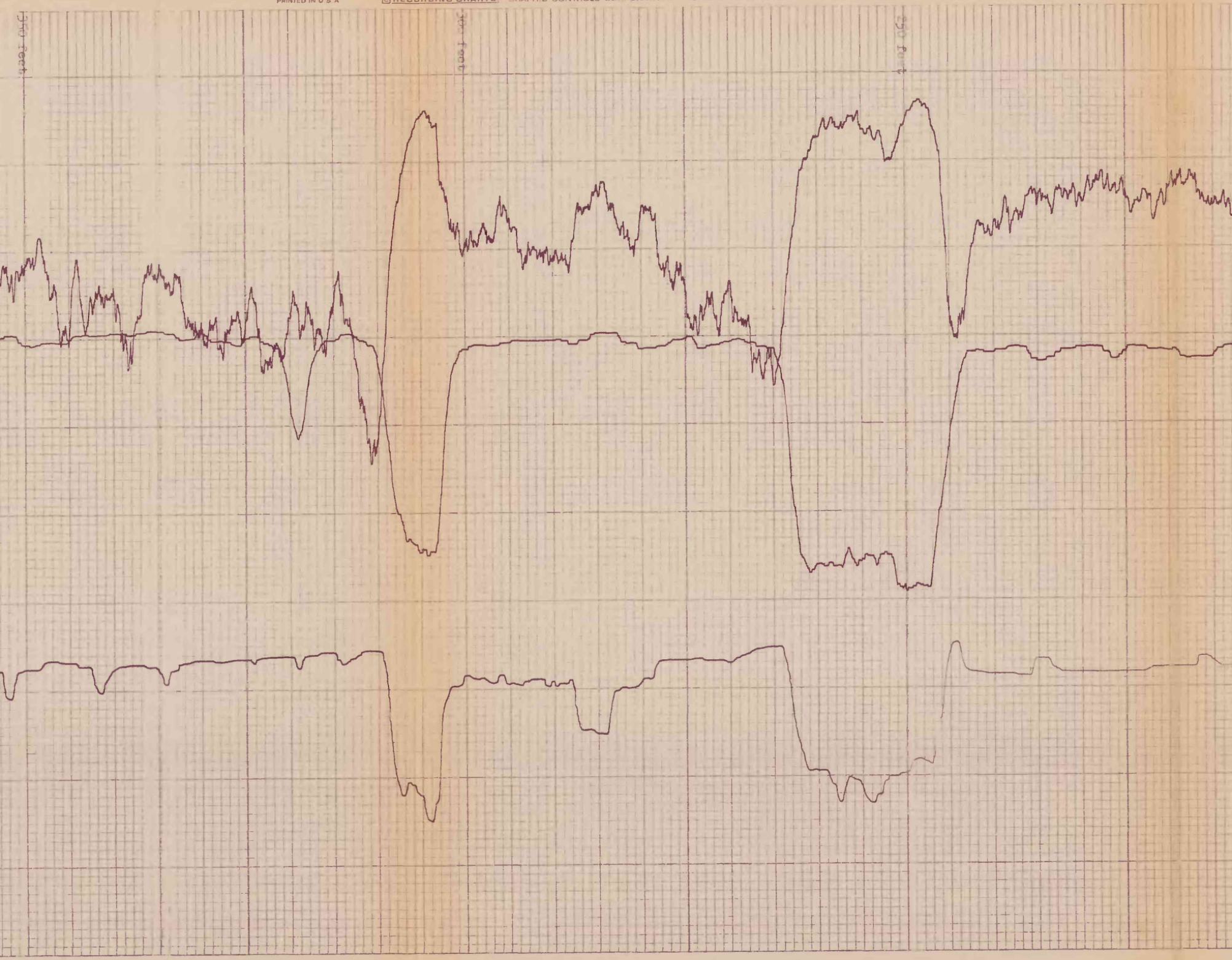

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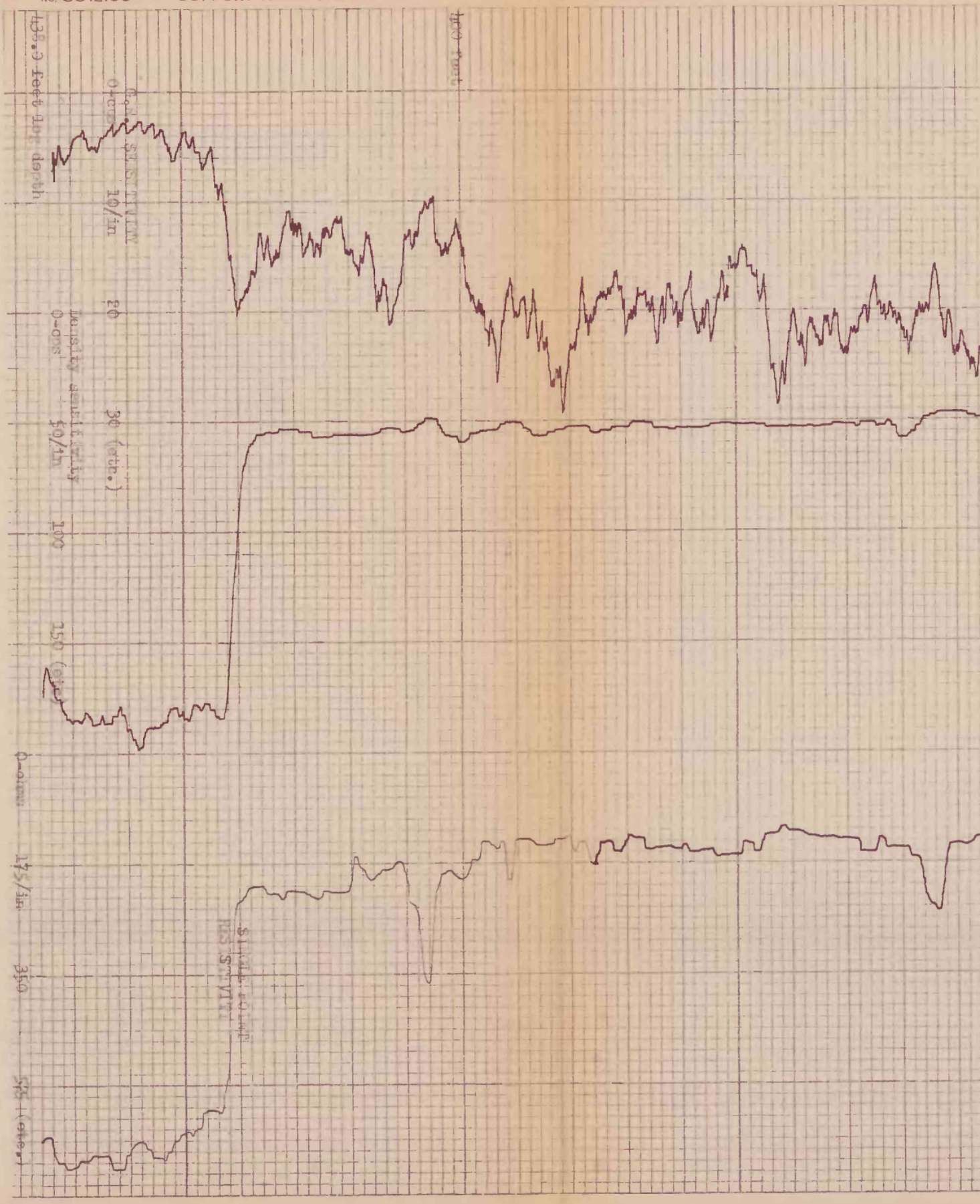

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Figure 17.--Drill-hole H-18-P

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COMPANY U.S.G.S.

HOLE # OR NAME H-18-P — ELEVATION 8,441

FIELD Kaycee Coal Field

COUNTY CONVERSE — STATE COLORADO

LOCATION NW¼ NW¼ SE¼ — SECTION 3 — TOWNSHIP 3 N. — RANGE 90 W.

LOG TYPE	BOREHOLE GEOPHYSICAL	RUN	1	2
RUN #	1 & 2	TOOL # & MODEL	SC-1C	1=1
DATE	28 September 1976	DIAMETER, INCHES	1-11/16	1-11/16
DEPTH DRILLED	322	GR DETECTOR	2-INT	DENSITY DETECTOR Gulf
DEPTH LOGGED	316.40	SIZE CRYSTAL, INCHES	3/4 X 3.5	1 X 6.2
BOTTOM LOGGED INTERVAL	none	K FACTOR	1.2h X 10-5	
TOP LOGGED INTERVAL	none	DEADTIME, SECONDS	33.78 M-sec	
FLUID LEVEL	306.5	TIME CONSTANT (GR)	1.	DENSITY 1
TYPE HOLE FLUID	natural groundwater	SCALE, CPS (GR)	10/inch	DENSITY 125/inch
BIT GUAGE	4-3/4	ZERO PLACEMENT (GR)	left margin	DENSITY left margin
CASING	none	WATER FACTOR	1.111	
TRUCK #	1	RESISTIVITY TYPE	SINGLE POINT	
LOGGING SPEED, FT/MIN	20 OR: 12-33 DESR.	SPACING, INCHES	16"N	
RECORDER DEPTH SCALE, FT/IN.	10	SCALE, OHMS/INCH	100/inch	
		ZERO	1.5 inches right	
		S P SCALE, MV/INCH	MINS	

REMARKS:

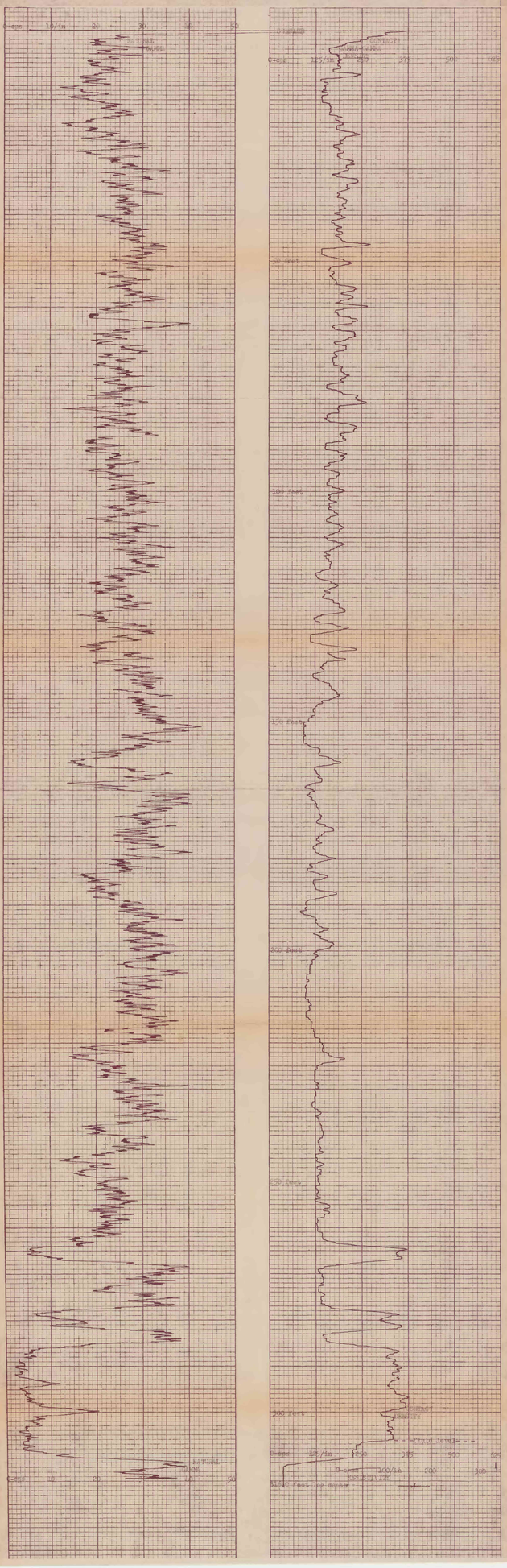

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Figure 18.--Drill-hole H-19-P

Geo Dynamics

GEOPHYSICAL SERVICES CASPER, WYOMING 82601

COMPANY -do-do-

HOLE NO. OR NAME H-19-P ELEVATION 8,465

FIELD Yampa Coal Field

COUNTY Moffat STATE Colorado

LOCATION NW¼SE¼SE¼ SECTION 3 TOWNSHIP 3 N. RANGE 90 W.

LOG TYPE	DC-GR/FD	RUN	3 / 2
RUN NO.	3 & 2	TOOL NO. & MODEL	SD-16 / D-1
DATE	4 October 1976	DIAMETER, INCHES	1-11/16 / 1-11/16
DEPTH DRILLED	460	GR DETECTOR	5-in. DENSITY DETECTOR 3-in.
DEPTH LOGGED	900+	SIZE CRYSTAL, INCHES	1½ X 1½ / 1 X 1½
BOTTOM LOGGED INTERVAL	none	K FACTOR	4.20 / 4.1965
TOP LOGGED INTERVAL	none	DEADTIME, SECONDS	45µ / 1-sec
FLUID LEVEL	none (dry hole)	TIME CONSTANT (GR)	1 DENSITY 1
TYPE HOLE FLUID	none	SCALE, CPS (GR)	20/in DENSITY 10/in
BIT GUAGE	6-7/8	ZERO PLACEMENT (GR)	1/4 margin DENSITY 1/4-in. on plot
CASING	none	WATER FACTOR	not available
TRUCK NO.	2		
LOGGING SPEED, FT/MIN	25 fpm IS HOLE.	RESISTIVITY TYPE	none
RECORDER DEPTH SCALE, FT/IN.	10	SPACING, INCHES	none
		SCALE, OHMS/INCH	none
		ZERO	none
		S.P. SCALE, MV/INCH	none

REMARKS:

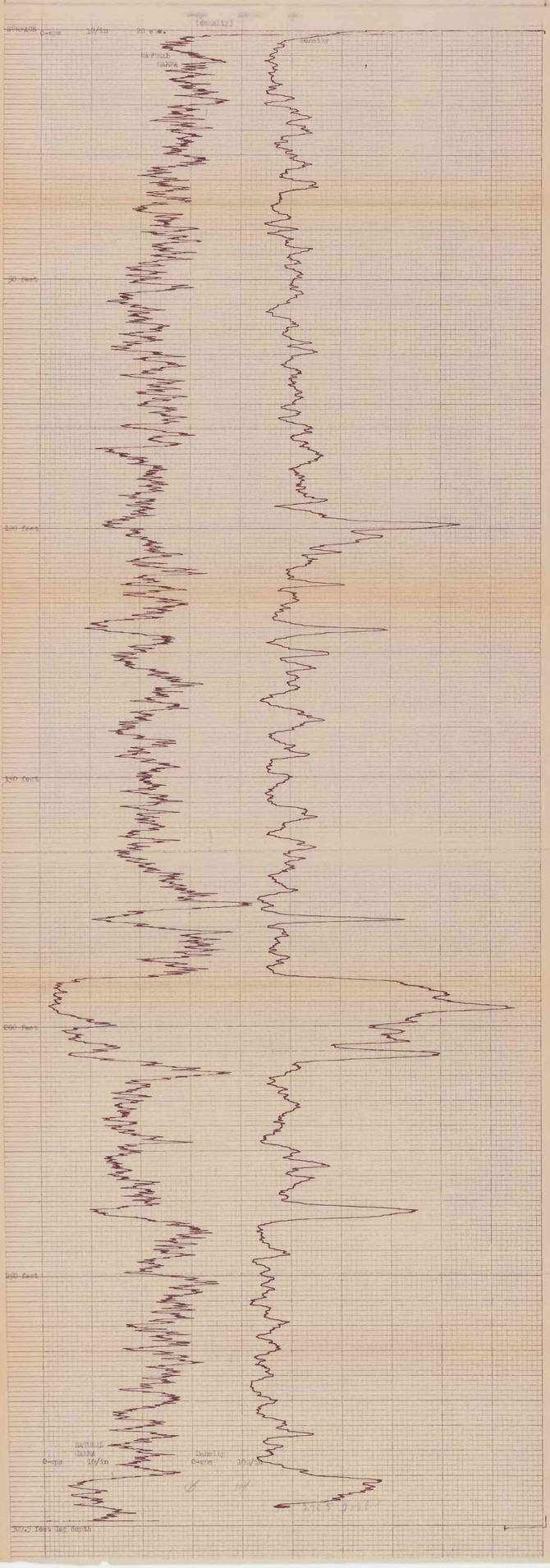

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Figure 19.--Drill-hole H-20-P

Geo Dynamics

GEOPHYSICAL SERVICES CASPER, WYOMING 82601

COMPANY U.S.G.S.

HOLE NO. OR NAME H-20-P ELEVATION 7,870

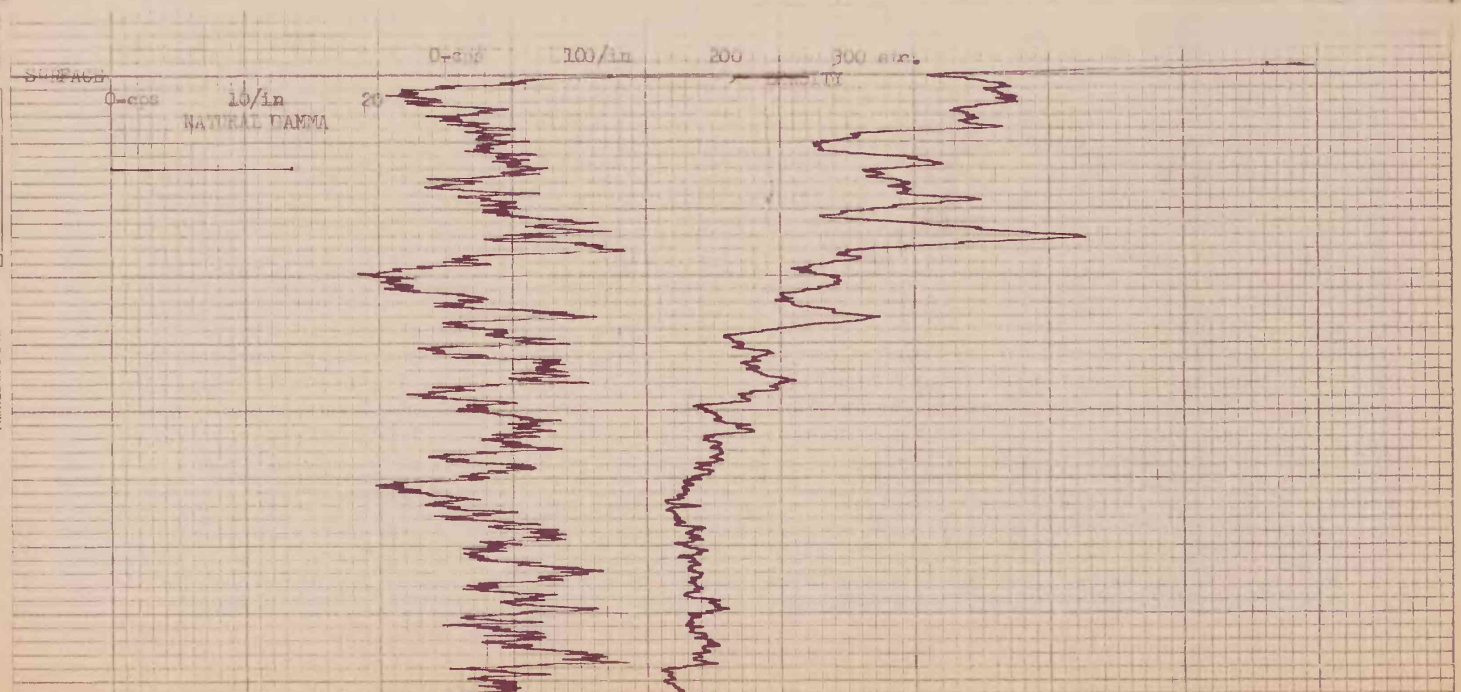
FIELD Yampa Coal Field

COUNTY Moffat STATE Colorado

LOCATION Lot #3 SECTION 25 TOWNSHIP 4 N. RANGE 91 W.

LOG TYPE	GAMMA DENSITY	RUN	1	2
RUN NO.	1 & 2	TOOL NO. & MODEL	26-10	D-1
DATE	4 October 1976	DIAMETER, INCHES	1-11/16	1-11/16
DEPTH DRILLED	460.0	GR DETECTOR	Saint	DENSITY DETECTOR G.M.
DEPTH LOGGED	462.0	SIZE CRYSTAL, INCHES	1/4 X 3.5	1 X 6.5
BOTTOM LOGGED INTERVAL	none	K FACTOR	1.24×10^{-5}	
TOP LOGGED INTERVAL	none	DEADTIME, SECONDS	33.74×10^{-6} sec	
FLUID LEVEL	63.5	TIME CONSTANT (GR)	1	DENSITY 1
TYPE HOLE FLUID	natural mud	SCALE, CPS (GR)	10/in	DENSITY 100/in
BIT GUAGE	4-3/4	ZERO PLACEMENT (GR)	left margin	DENSITY 2.5 inches right
CASING	none	WATER FACTOR	1.101	
TRUCK NO.	1			
LOGGING SPEED, FT/MIN	25 OR: 15 Dens.	RESISTIVITY TYPE	SINGLE POINT	
RECORDER DEPTH SCALE, FT/IN	10	SPACING, INCHES	16.3	
		SCALE, OHMS/INCH	60/in	
		ZERO	2-inches right	
		S P SCALE, MV/INCH	10/in	

REMARKS:



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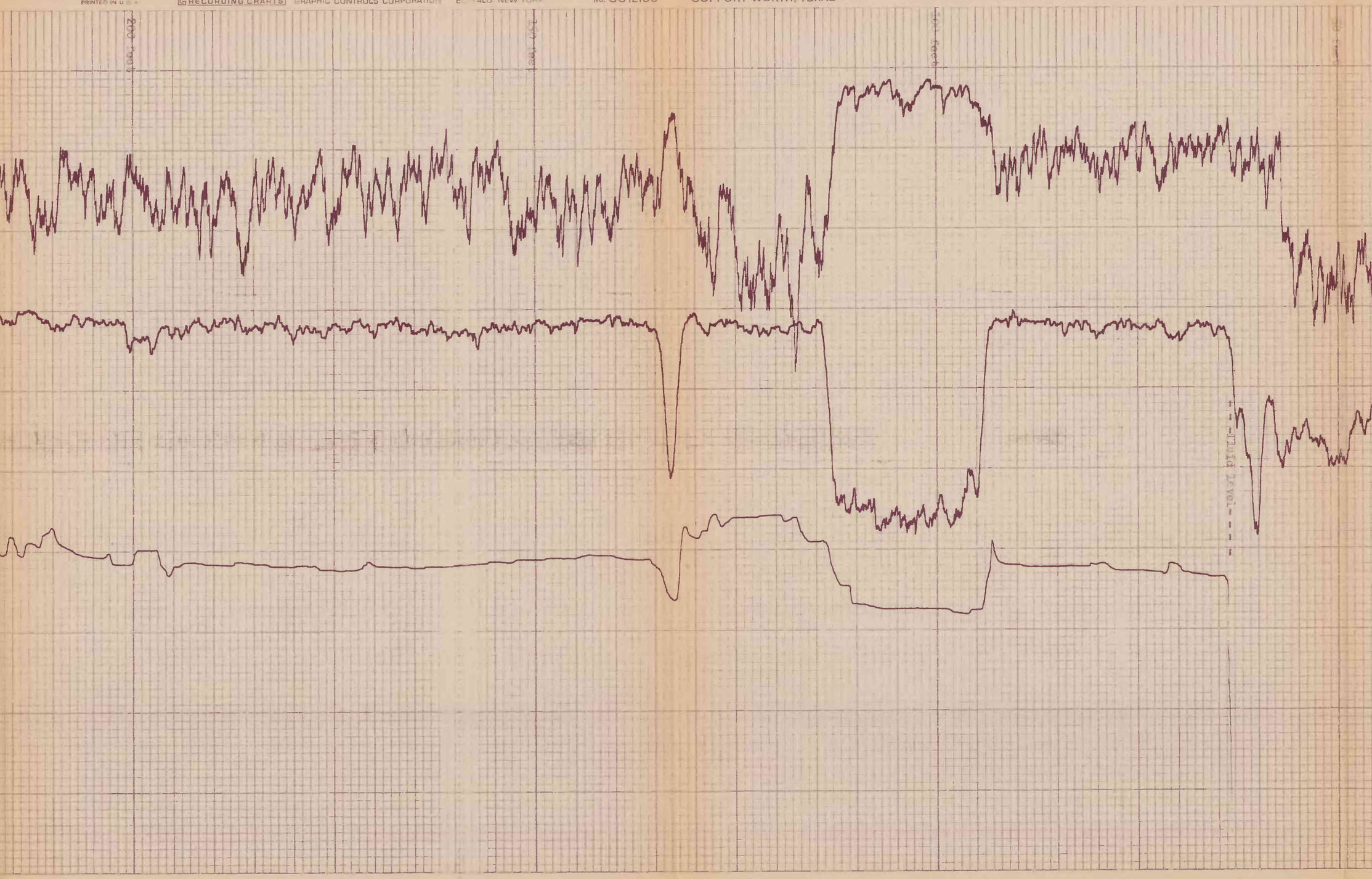

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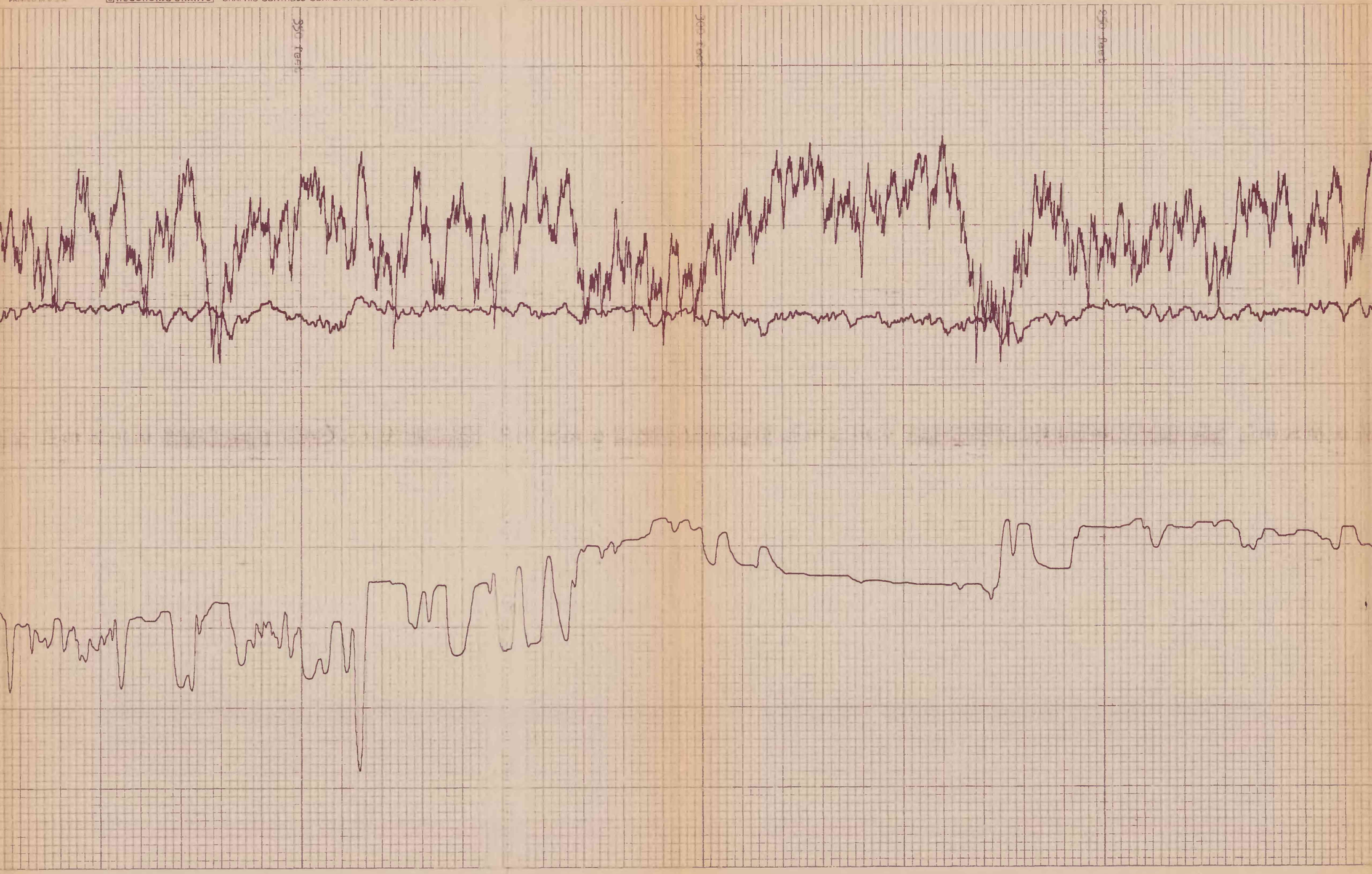

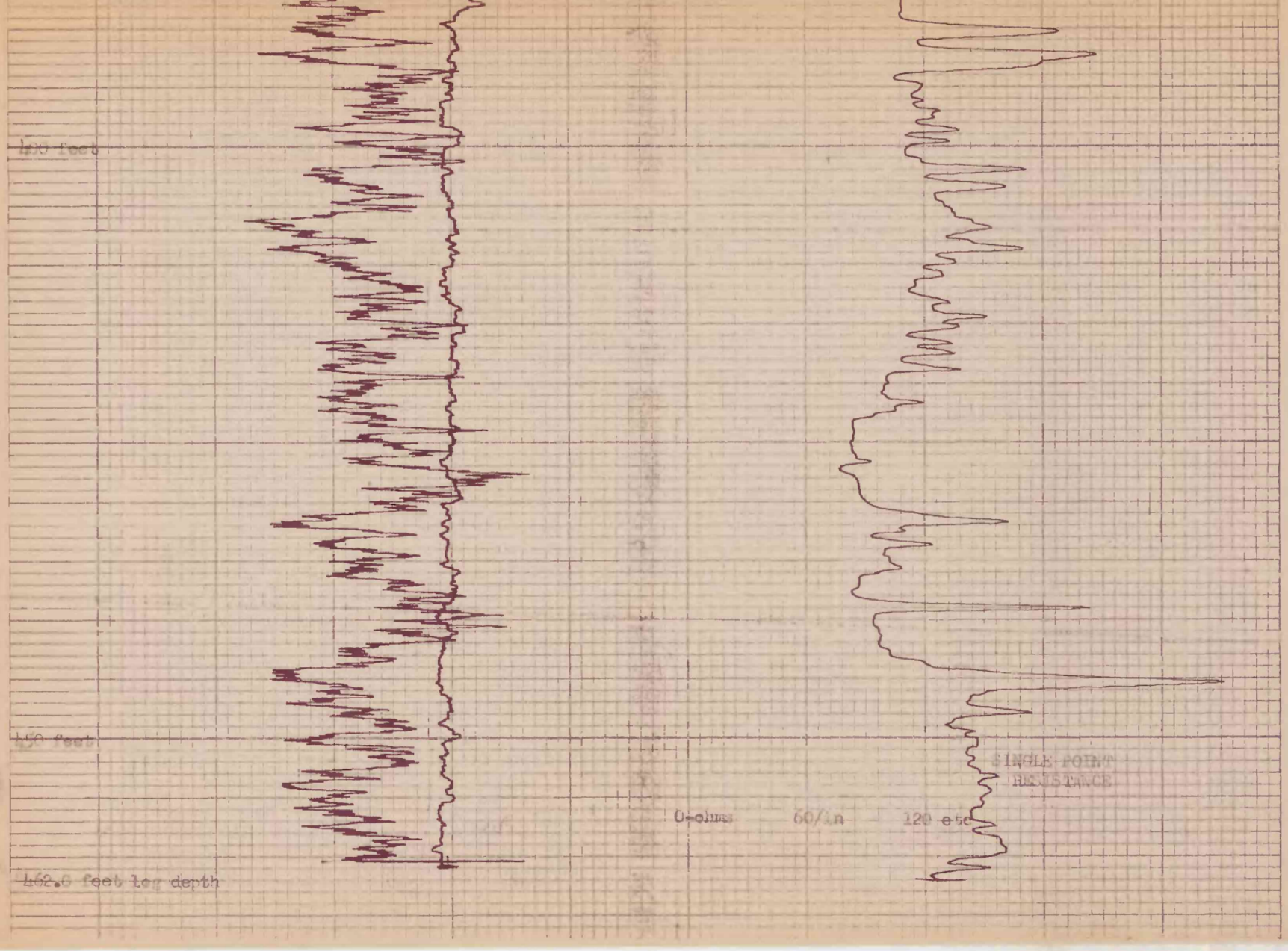
400 feet
450 feet
462.6 feet log depth
SINGLE POINT
RESISTANCE
0-ohms
60/in
120 ohms

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Figure 20.--Drill-hole M-21-P

Geo Dynamics
casper wyoming 82601

COMPANY Welded

HOLE # OR NAME M-21-P — ELEVATION 7,895
FIELD Yampa Coal Field
COUNTY Moffat — STATE Colorado

LOCATION	Lot 46	SECTION 27	TOWNSHIP 4 N.	RANGE	91 W.

LOG TYPE	RADIOACTIVITY	RUN	1		2
RUN #	1 & 2	TOOL # & MODEL	701-15		5-1
DATE	30 September 1976	DIAMETER, INCHES	1-11/16		1-11/16
DEPTH DRILLED	400'0	GM DETECTOR	SC102	DENSITY DETECTOR	SC45
DEPTH LOGGED	397.5	SIZE, CRYSTAL, INCHES	3/4 x 1.5		1 X 6.5
BOTTOM LOGGED INTERVAL	none	K FACTOR	1.5A x 10-5		
TOP LOGGED INTERVAL	none	DRAFTING, SECONDS	33.76 " sec		
FLUID LEVEL	214.0 feet	TIME CONSTANT (GM)	1	DENSITY	1
TYPE HOLE FLUID	natural groundwater	SCALE, CPS (GR)	30/in	DENSITY	10/in
BIT GUAGE	N-7/8	ZERO PLACEMENT (GR)	left margin	DENSITY	4-inches right
CASING	none	WATER FACTOR	1.11h		
TRUCK #	2				
LOGGING SPEED, FT/MIN	20 UH: 12-1 DENS.	RESISTIVITY TYPE	single P.ELT		
RECORDER DEPTH SCALE, FT/IN.	10	SPACING, INCHES	none		
		SCALE, OHMS/INCH	10a1		
		ZERO	Celimeters start		
		S P SCALE, MV/INCH	none		

REMARKS:

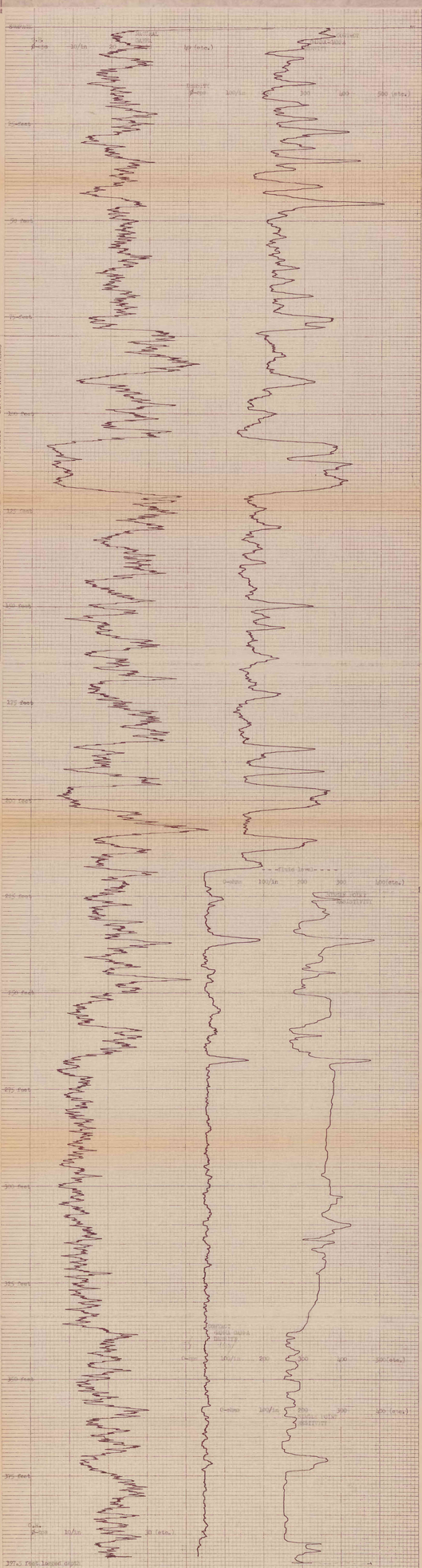

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Figure 21.--Drill-hole H-22-P

Geo Dynamics

GEOPHYSICAL SERVICES CASPER, WYOMING 82601

COMPANY U.S.G.S.

HOLE NO. OR NAME H-22-P ELEVATION 7,592

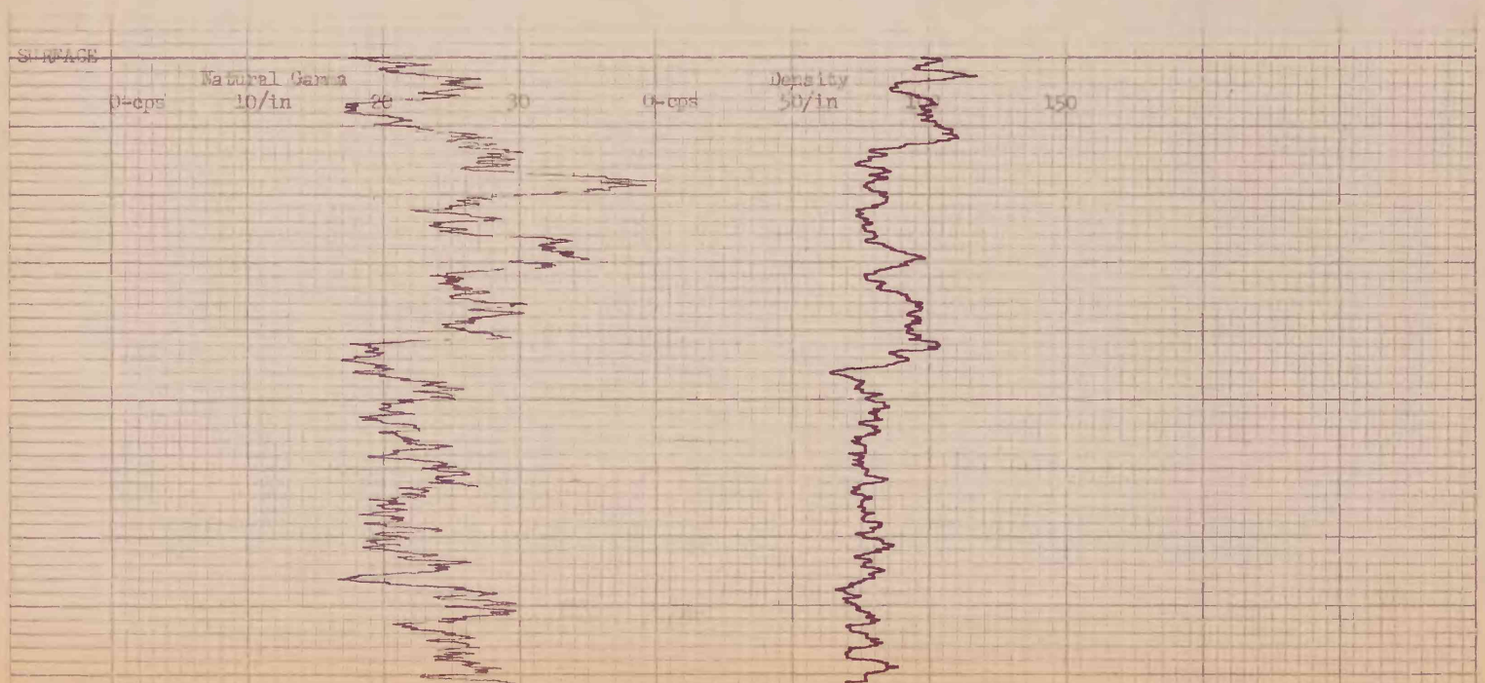
FIELD Yampa Coal Field

COUNTY Moffat STATE Colorado

LOCATION Lot #10 SECTION 14 TOWNSHIP 4 N. RANGE 91 W.

LOG TYPE	ESGR-DENSITY	RUN	1	2
RUN NO.	1 & 2	TOOL NO. & MODEL	EG-10	D-1
DATE	5 October 1976	DIAMETER, INCHES	1-11/16	1-11/16
DEPTH DRILLED	500	GR DETECTOR	Scint	DENSITY DETECTOR G.M.
DEPTH LOGGED	498.5	SIZE CRYSTAL, INCHES	3/4 X 1.5	1 X 6.2
BOTTOM LOGGED INTERVAL	none	K FACTOR	1.24×10^{-3}	
TOP LOGGED INTERVAL	none	DEADTIME, SECONDS	33.78 μ-sec	
FLUID LEVEL	57	TIME CONSTANT (GR)	1	DENSITY 1
TYPE HOLE FLUID	natural mud	SCALE, CPS (GR)	10/in	DENSITY 50/in
BIT GUAGE	4-1/4	ZERO PLACEMENT (GR)	left margin	DENSITY 4-inches right
CASING	none	WATER FACTOR	1.101	
TRUCK NO.	1			
LOGGING SPEED, FT/MIN	25 GR; 15 dens.	RESISTIVITY TYPE	SINGLE POINT	
RECORDER DEPTH SCALE, FT/IN.	10	SPACING, INCHES	none	
		SCALE, OHMS/INCH	100/in	
		ZERO	6-inches right	
		SP SCALE, MV/INCH	none	

REMARKS:



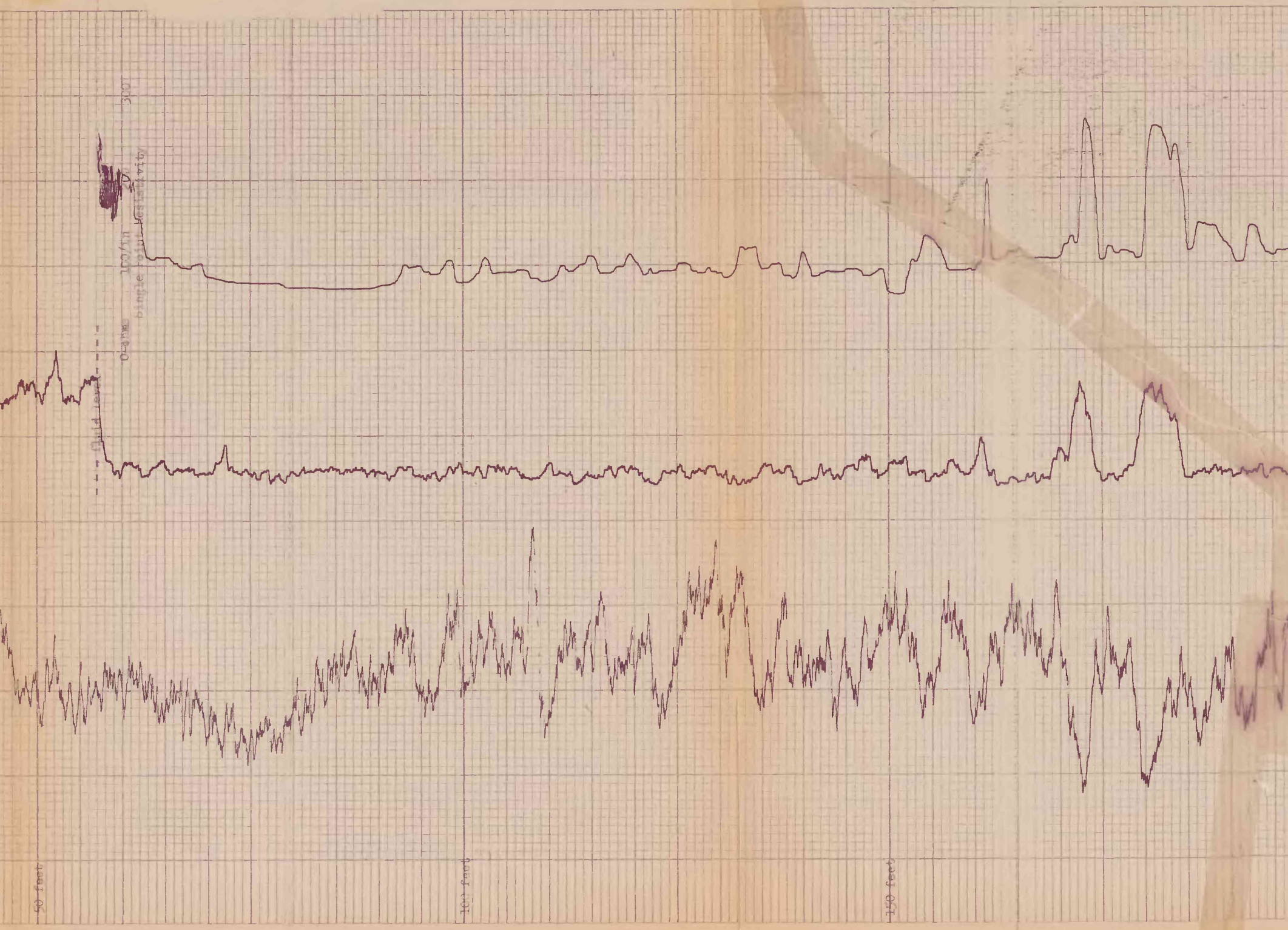


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Figure 22.--Drill-hole H-24A-P

Geo Dynamics
casper wyoming 82601

COMPANY U.S.G.S.

HOLE # OR NAME H-24A-P ELEVATION 8,545
FIELD Yampa Coal Field
COUNTY Moffat STATE Colorado

LOCATION SE¼SE¼NE¼ SECTION 4 TOWNSHIP 3 N. RANGE 90 W.

LOG TYPE	ES-GR-DENSITY
RUN #	1 & 2
DATE	29 September 1976
DEPTH DRILLED	355
DEPTH LOGGED	353.0
BOTTOM LOGGED INTERVAL	none
TOP LOGGED INTERVAL	none
FLUID LEVEL	*see remarks, fluid dropping in level
TYPE HOLE FLUID	Injected water & mud *see remarks
BIT GUAGE	4-3/4
CASING	none
TRUCK #	1
LOGGING SPEED, FT/MIN	20 GR: 12-13 DENS.
RECORDER DEPTH SCALE, FT/IN.	10

RUN	1		2
TOOL # & MODEL	EG-10		D-1
DIAMETER, INCHES	1-11/16		1-11/16
GR DETECTOR	SCINT	DENSITY DETECTOR	G.M.
SIZE CRYSTAL, INCHES	3/4 X 3.5		1 X 6.5
K FACTOR	1.24 X 10^{-5}		
DEADTIME, SECONDS	33.78 u-sec		
TIME CONSTANT (GR)	1	DENSITY	1
SCALE, CPS (GR)	10/in	DENSITY	100/inch
ZERO PLACEMENT (GR)	left margin	DENSITY	4-inches right
WATER FACTOR	1.141		
RESISTIVITY TYPE	SINGLE POINT		
SPACING, INCHES	NONE		
SCALE, OHMS/INCH	50/inch		
ZERO	5-inches right		
S P SCALE, MV/INCH	NONE		

REMARKS: LOST CIRCULATION WHILE DRILLING. QUICK-TROL, GEL, COTTONSEED HULLS, ETC. ADDED WHILE DRILLING. FLUID LEVEL FELL LOWER BETWEEN 1ST & 2ND RUN. SEE LOG FOR FLUID LEVEL MARKINGS

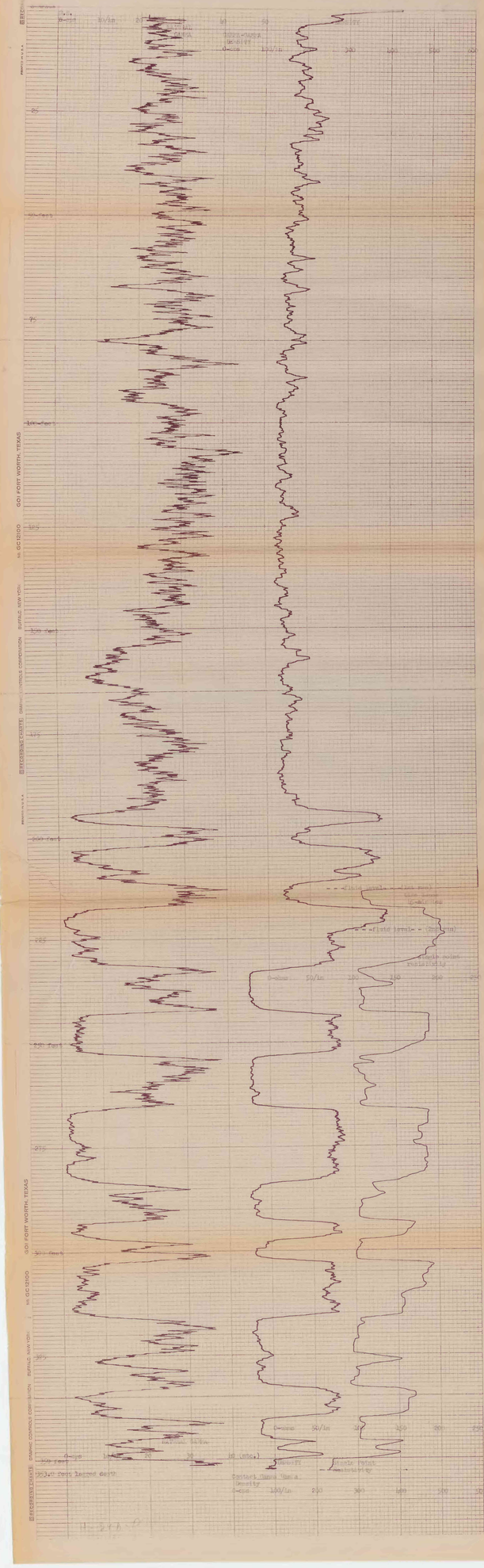


Figure 23.--Drill-hole H-25-P

Geo Dynamics
casper wyoming 82601

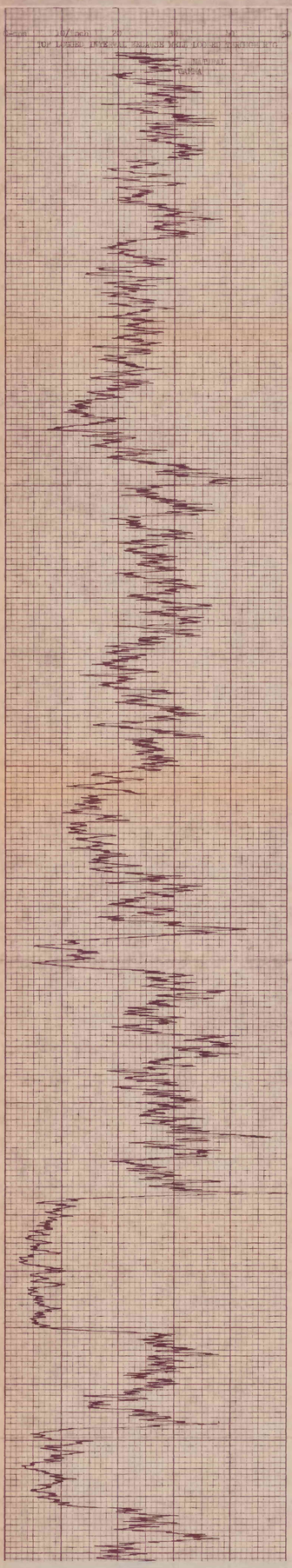
COMPANY U.S.G.S.

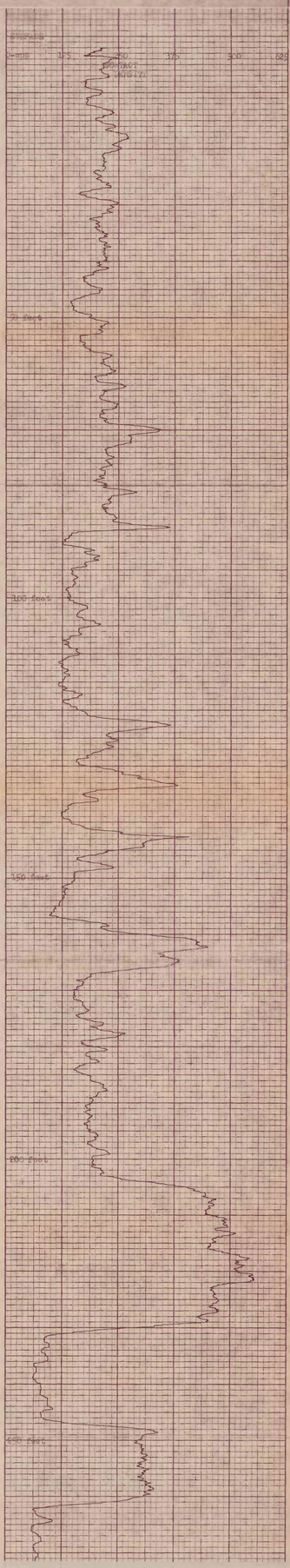
HOLE # OR NAME H-25-P ELEVATION 8,420
FIELD Yampa Coal Field
COUNTY Moffat STATE Colorado

LOCATION NE¼SE¼SW¼ SECTION 32 TOWNSHIP 4 N. RANGE 90 W.

LOG TYPE	GR-DENSITY	RUN	1	2
RUN #	1 & 2	TOOL # & MODEL	DD-16	D-1
DATE	27 September 1976	DIAMETER, INCHES	1-11/16	1-11/16
DEPTH DRILLED	300.0	GR DETECTOR	scint.	DENSITY DETECTOR GeM.
DEPTH LOGGED	299.0	SIZE CRYSTAL, INCHES	3/4 x 3.5	1 x 0.5
BOTTOM LOGGED INTERVAL	1.5 (Note dry hole)	K FACTOR	1.0 X 10-5	
TOP LOGGED INTERVAL	240 feet	DEADTIME, SECONDS	13.70 u-sec.	
FLUID LEVEL	none	TIME CONSTANT (GR)	1	DENSITY 1
TYPE HOLE FLUID	none	SCALE, CPS (GR)	10/inch	DENSITY 125/inch
BIT GUAGE	4-3/4	ZERO PLACEMENT (GR)	left margin	DENSITY left margin
CASING	none	WATER FACTOR	1.111	
TRUCK #	1			
LOGGING SPEED, FT/MIN	20 GR: 12-13 DENS.	RESISTIVITY TYPE	NONE	
RECORDER DEPTH SCALE, FT/IN.	10	SPACING, INCHES	NONE	
		SCALE, OHMS/INCH	NONE	
		ZERO	NONE	
		S P SCALE, MV/INCH	NONE	

REMARKS:





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No. GC-12185
GEO-DYNAMICS GEOPHYSICAL SERVICES, CASPER, WYO. 82601
No. GC-12185

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Figure 24.--Drill-hole H-26-P

Geo Dynamics

GEOPHYSICAL SERVICES CASPER, WYOMING 82601

COMPANY U.S.G.S.

HOLE NO. OR NAME H-26-P ELEVATION 7,785

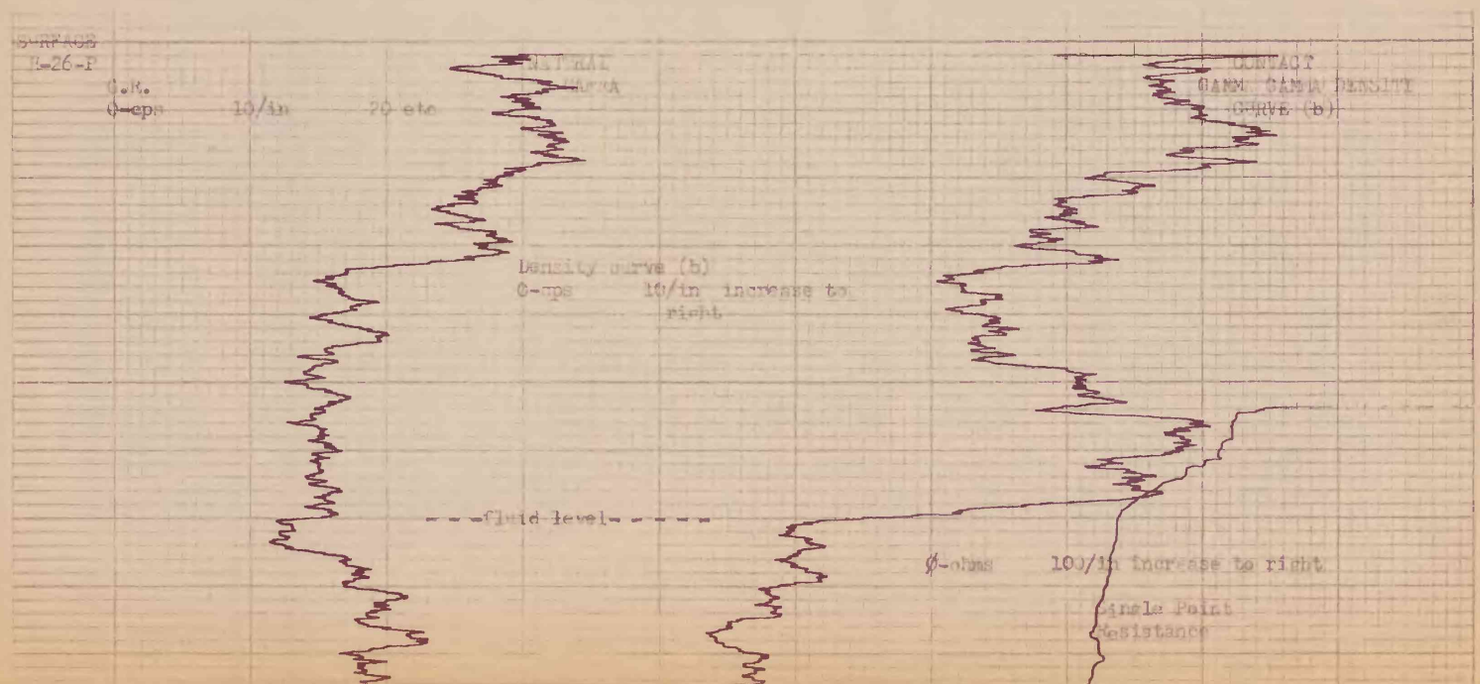
FIELD Yampa Coal Field

COUNTY Moffat STATE Colorado

LOCATION Lot #10 SECTION 24 TOWNSHIP 4 N. RANGE 91 W.

LOG TYPE	ESOR-DENSITY	RUN	1 2
RUN NO.	1 & 2	TOOL NO. & MODEL	EO-10 D-1
DATE	3 October 1977	DIAMETER, INCHES	1-11/16 1-11/16
DEPTH DRILLED	450	GR DETECTOR	Geiger DENSITY DETECTOR [illegible]
DEPTH LOGGED	432.0	SIZE CRYSTAL, INCHES	1/4 X [illegible] 1 X 6 [illegible]
BOTTOM LOGGED INTERVAL	none	K FACTOR	1.20 x 10-5
TOP LOGGED INTERVAL	none	DEADTIME, SECONDS	34.78 μ-sec
FLUID LEVEL	75.0	TIME CONSTANT (GR)	1 DENSITY 1
TYPE HOLE FLUID	natural mud	SCALE, CPS (GR)	10 DENSITY 20/inch 10/in 6
BIT GUAGE	4-3/4	ZERO PLACEMENT (GR)	left margin DENSITY 6-inches right
CASING	none	WATER FACTOR	1.00
TRUCK NO.	4		
LOGGING SPEED, FT/MIN	25 ft. in 15 secs.	RESISTIVITY TYPE	Single Point
RECORDER DEPTH SCALE, FT/IN.	10	SPACING, INCHES	None
		SCALE, OHMS/INCH	100/in
		ZERO	6-inches right
		S P SCALE, MV/INCH	NONE

REMARKS:



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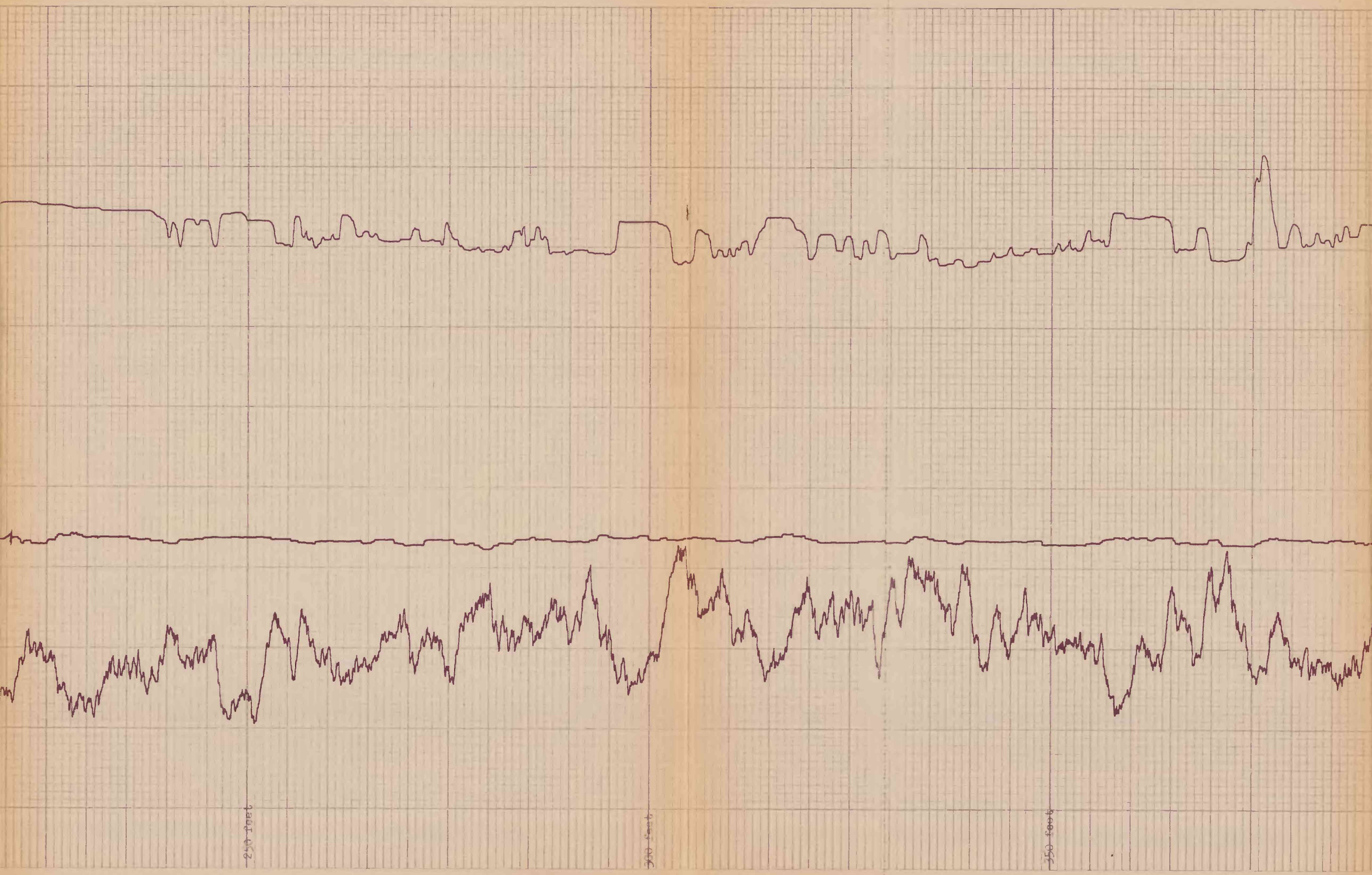

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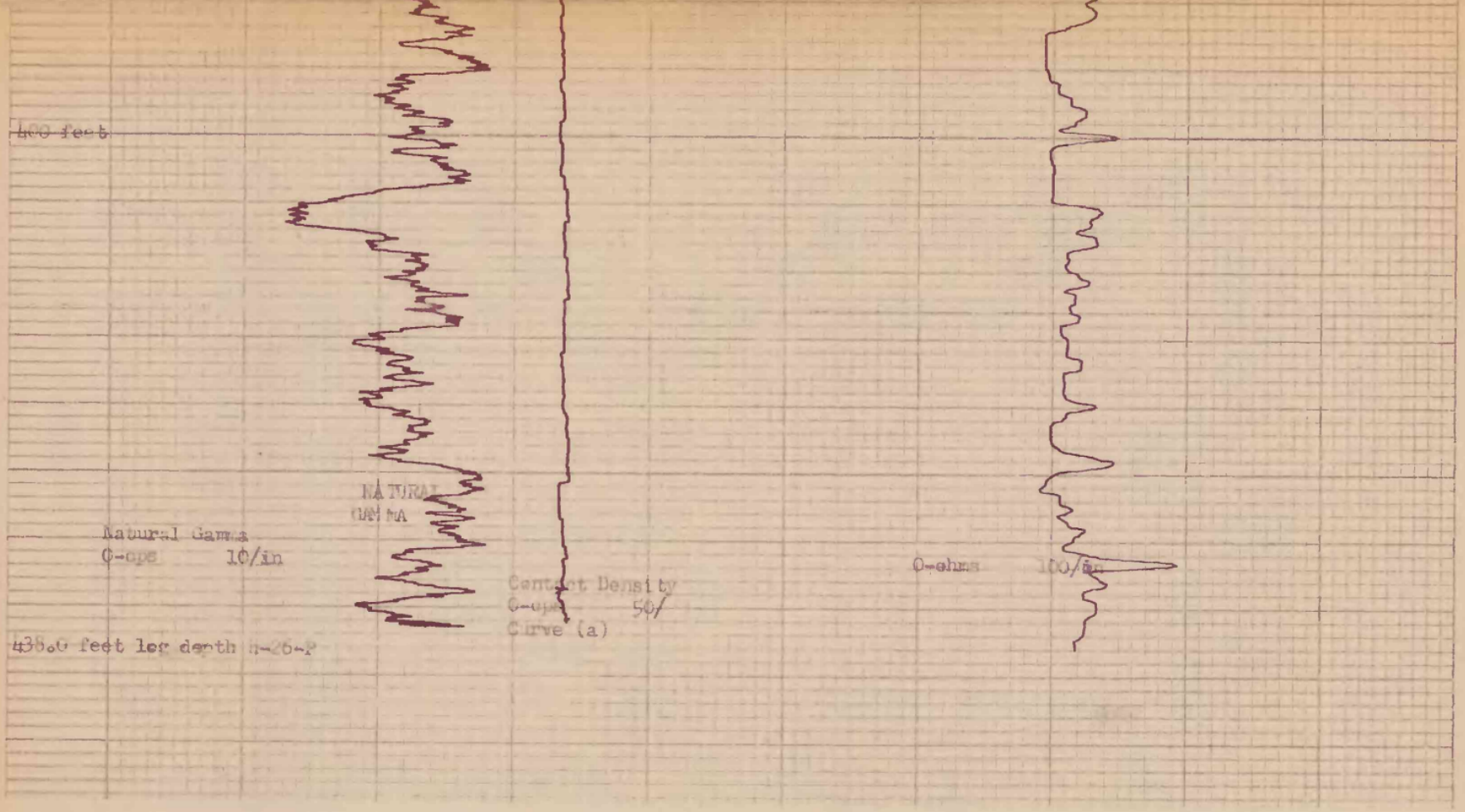

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Figure 25.--Drill-hole H-29-P

Geo Dynamics

GEOPHYSICAL SERVICES CASPER, WYOMING 82601

COMPANY U.S.G.S.

HOLE NO. OR NAME H-29-P ELEVATION 8,480

FIELD Yampa Coal Field

COUNTY Moffat STATE Colorado

LOCATION SE¼SW¼NW¼ SECTION 3 TOWNSHIP 3 N. RANGE 90 W.

LOG TYPE	RSWR-DENSITY	RUN	1 2
RUN NO.	1 & 2	TOOL NO. & MODEL	55-10 D-1
DATE	9 October 1976	DIAMETER, INCHES	1-11/16 1-11/16
DEPTH DRILLED	285	GR DETECTOR	SCINT DENSITY DETECTOR G.M.
DEPTH LOGGED	280.	SIZE CRYSTAL, INCHES	3/4 X 3 1 X 0.5
BOTTOM LOGGED INTERVAL	none	K FACTOR	1.00 X 10-5
TOP LOGGED INTERVAL	none	DEADTIME, SECONDS	33.33 0-secs
FLUID LEVEL	137.40	TIME CONSTANT (GR)	1 DENSITY 1
TYPE HOLE FLUID	natural mud	SCALE, CPS (GR)	1cy/in DENSITY 1cy/in
BIT GUAGE	4.97	ZERO PLACEMENT (GR)	left margin DENSITY 3-inches right
CASING	none	WATER FACTOR	1.00
TRUCK NO.	1		
LOGGING SPEED, FT/MIN	25 TH: 20 DENS.	RESISTIVITY TYPE	SINGLE POINT
RECORDER DEPTH SCALE, FT/IN.	10	SPACING, INCHES	NONE
		SCALE, OHMS/INCH	50
		ZERO	5-inches right
		S.P SCALE, MV/INCH	NONE

REMARKS:

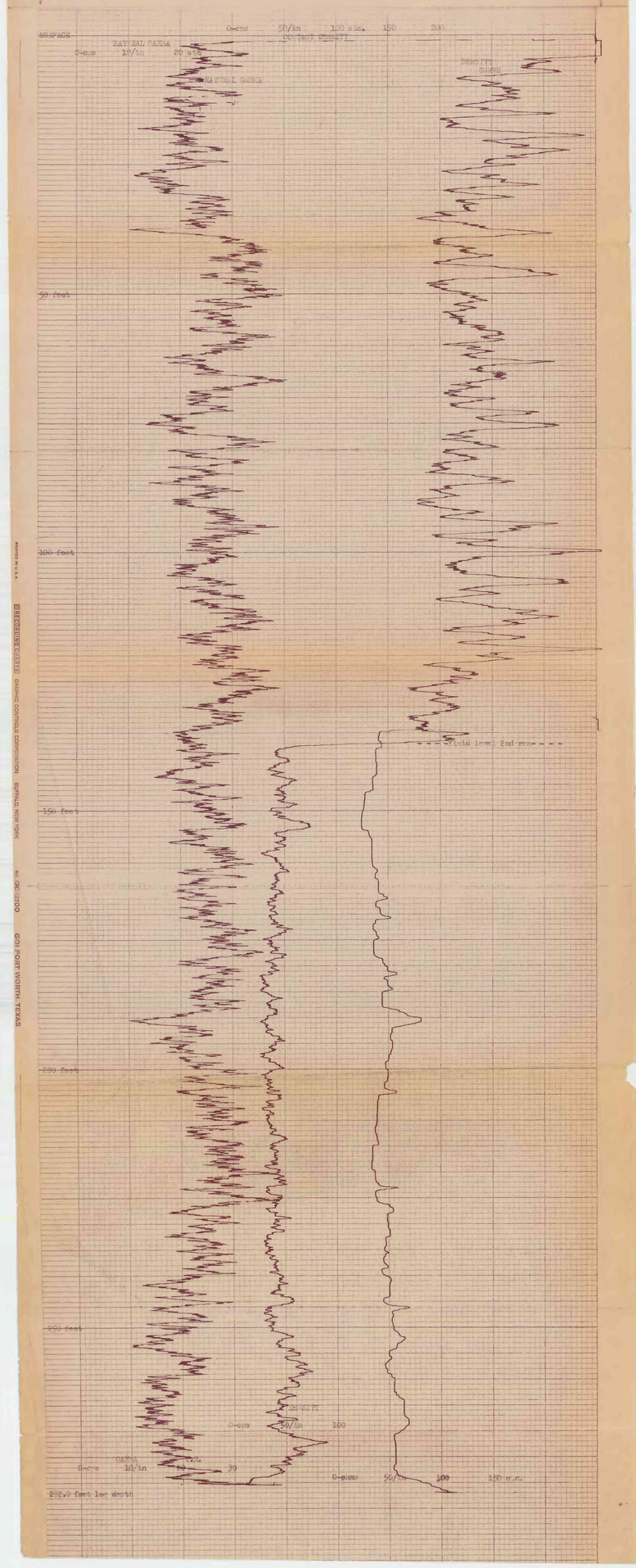


Figure 4.--Drill-hole No. H-4-P

Geo Dynamics

GEOPHYSICAL SERVICES CASPER, WYOMING 82601

COMPANY U.S.G.S.

HOLE NO. OR NAME H-4-P ELEVATION 7,215

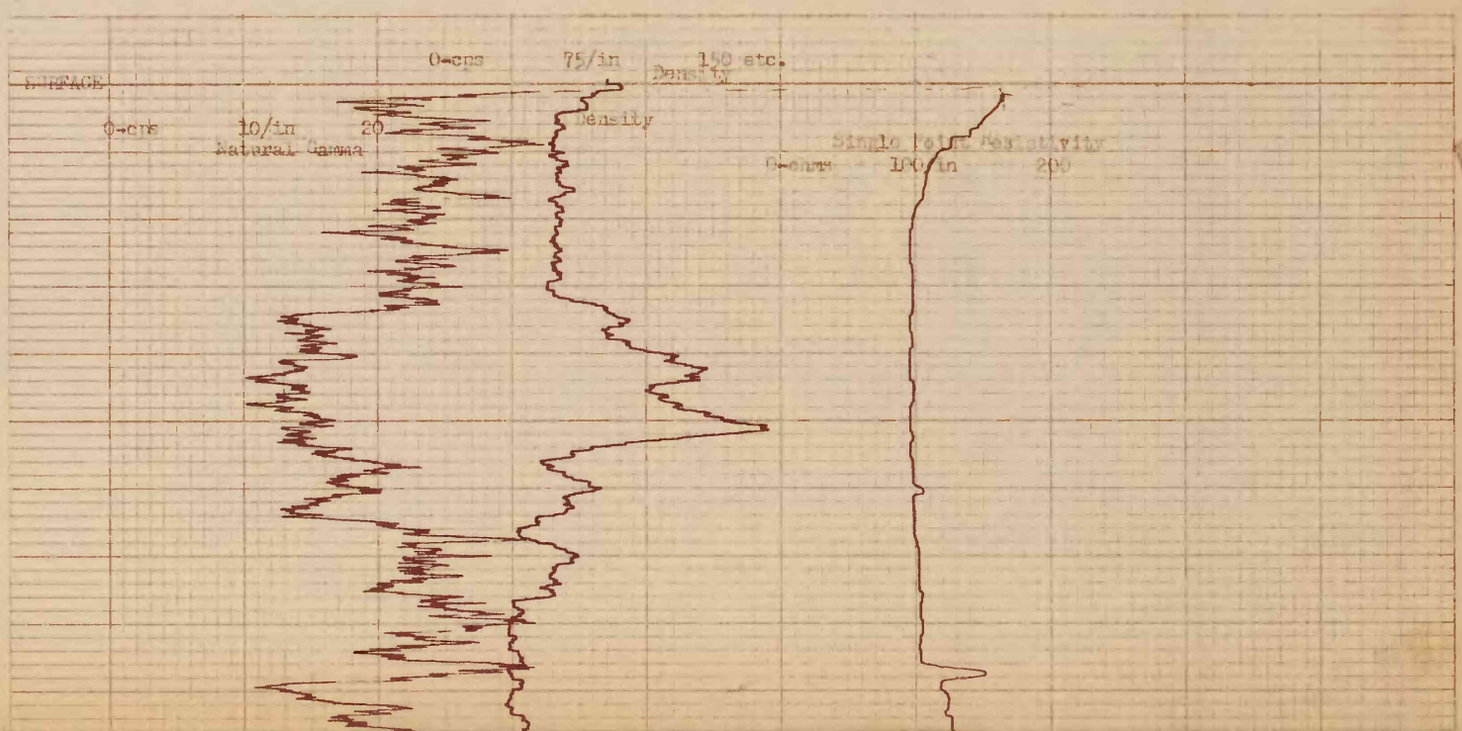
FIELD Yampa Coal Field

COUNTY Moffat STATE Colorado

LOCATION NE¼SE¼NE¼ SECTION 28 TOWNSHIP 4 N., RANGE 90 W.

LOG TYPE	ESGR-DENSITY	RUN	1	2
RUN NO.	1 & 2	TOOL NO. & MODEL	DG-10	D-1
DATE	7 October 1976	DIAMETER, INCHES	1-11/16	1-11/16
DEPTH DRILLED	500	GR DETECTOR	Scint	DENSITY DETECTOR
DEPTH LOGGED	485.5	SIZE CRYSTAL, INCHES	3/4 X 1.5	1 X 1.5
BOTTOM LOGGED INTERVAL	none	K FACTOR	1.24 X 10⁻⁴	
TOP LOGGED INTERVAL	none	DEADTIME, SECONDS	33.78 μ-sec	
FLUID LEVEL	surface	TIME CONSTANT (GR)	1	DENSITY 1
TYPE HOLE FLUID	natural mud	SCALE, CPS (GR)	10/in	DENSITY 75/in
BIT GUAGE	5-3/8	ZERO PLACEMENT (GR)	left margin	DENSITY 2.5 inches right
CASING	none	WATER FACTOR	1.141	
TRUCK NO.	1			
LOGGING SPEED, FT/MIN	25 GR; 15 Dens.	RESISTIVITY TYPE	Single Point	
RECORDER DEPTH SCALE, FT/IN	10	SPACING, INCHES	16	
		SCALE, OHMS/INCH	100/in	
		ZERO	5-inches right	
		SP SCALE, MV/INCH	NONE	

REMARKS:



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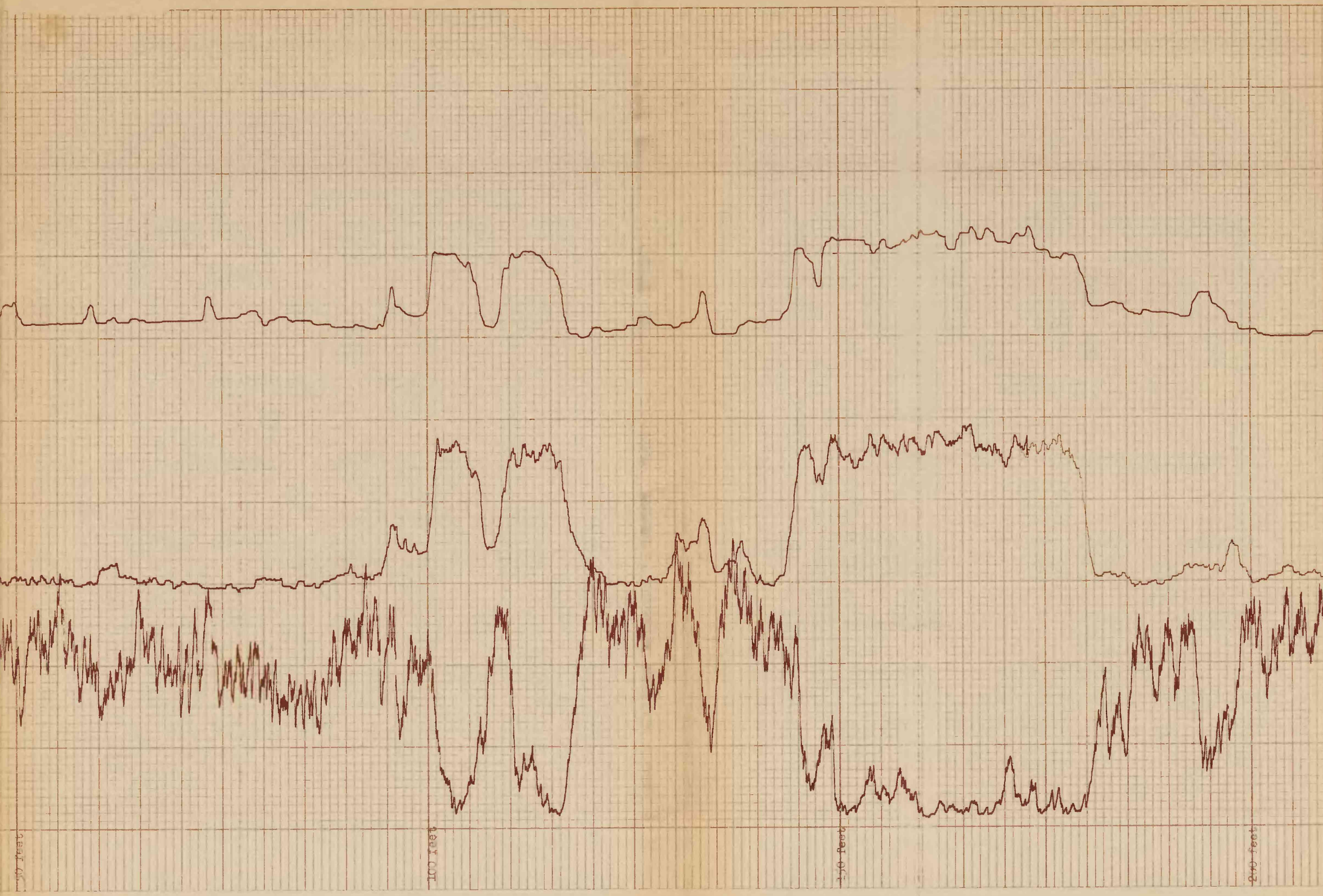

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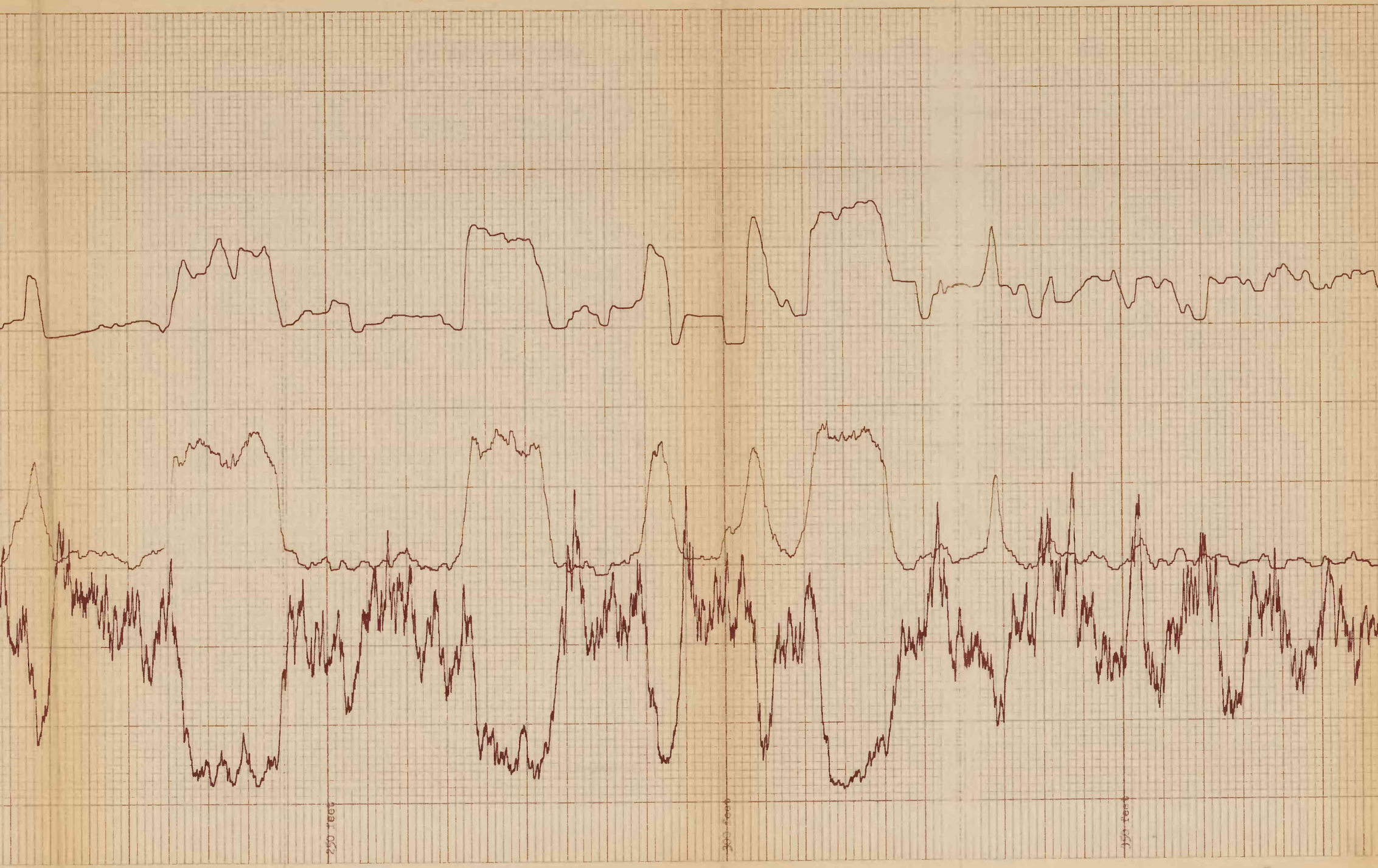

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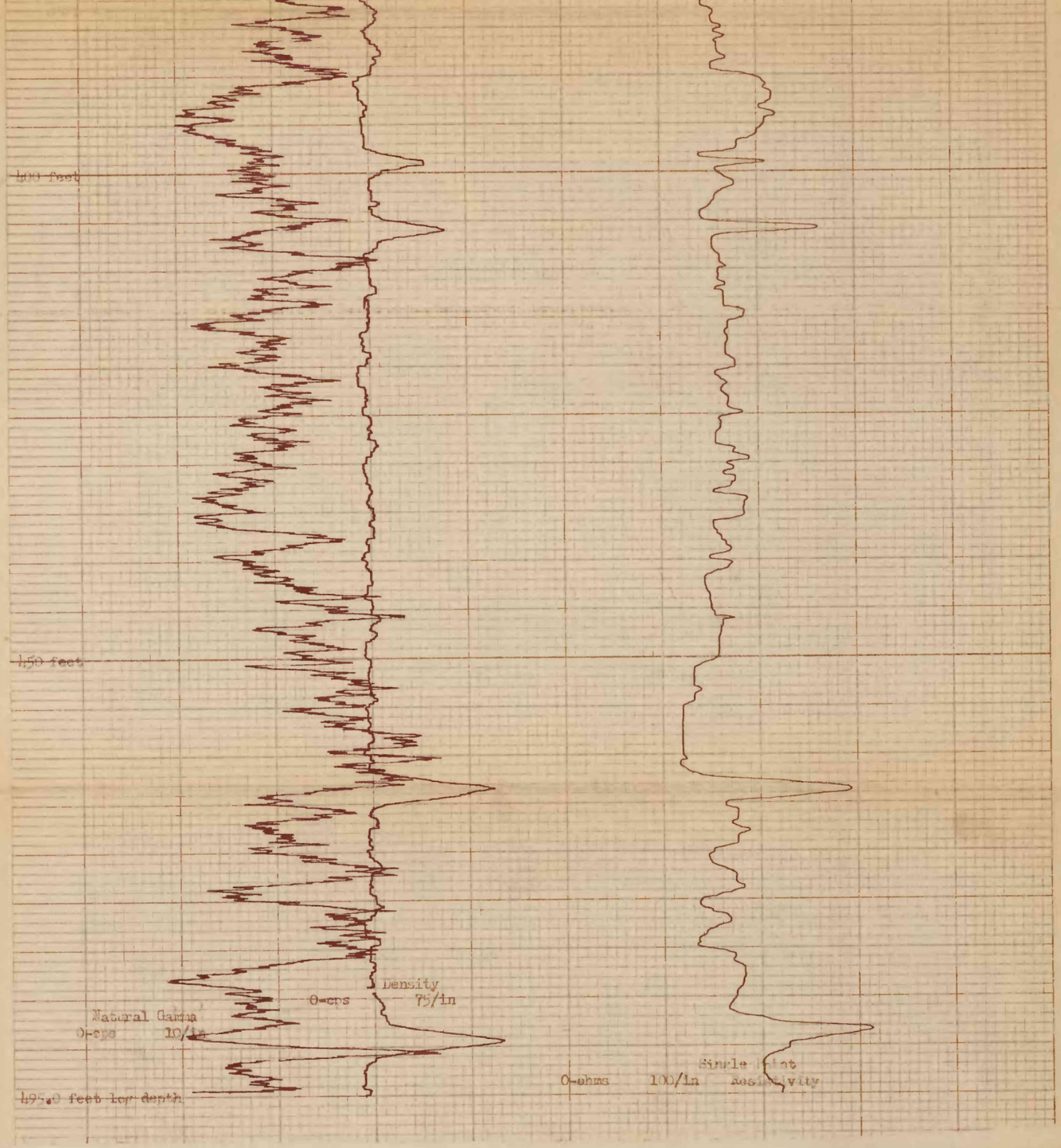

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Figure 5.--Drill-hole No. H-5-P

Geo Dynamics

GEOPHYSICAL SERVICES CASPER, WYOMING 82601

COMPANY U.S.G.S.

HOLE NO. OR NAME H-5-P ELEVATION 7,513

FIELD Yampa Coal Field

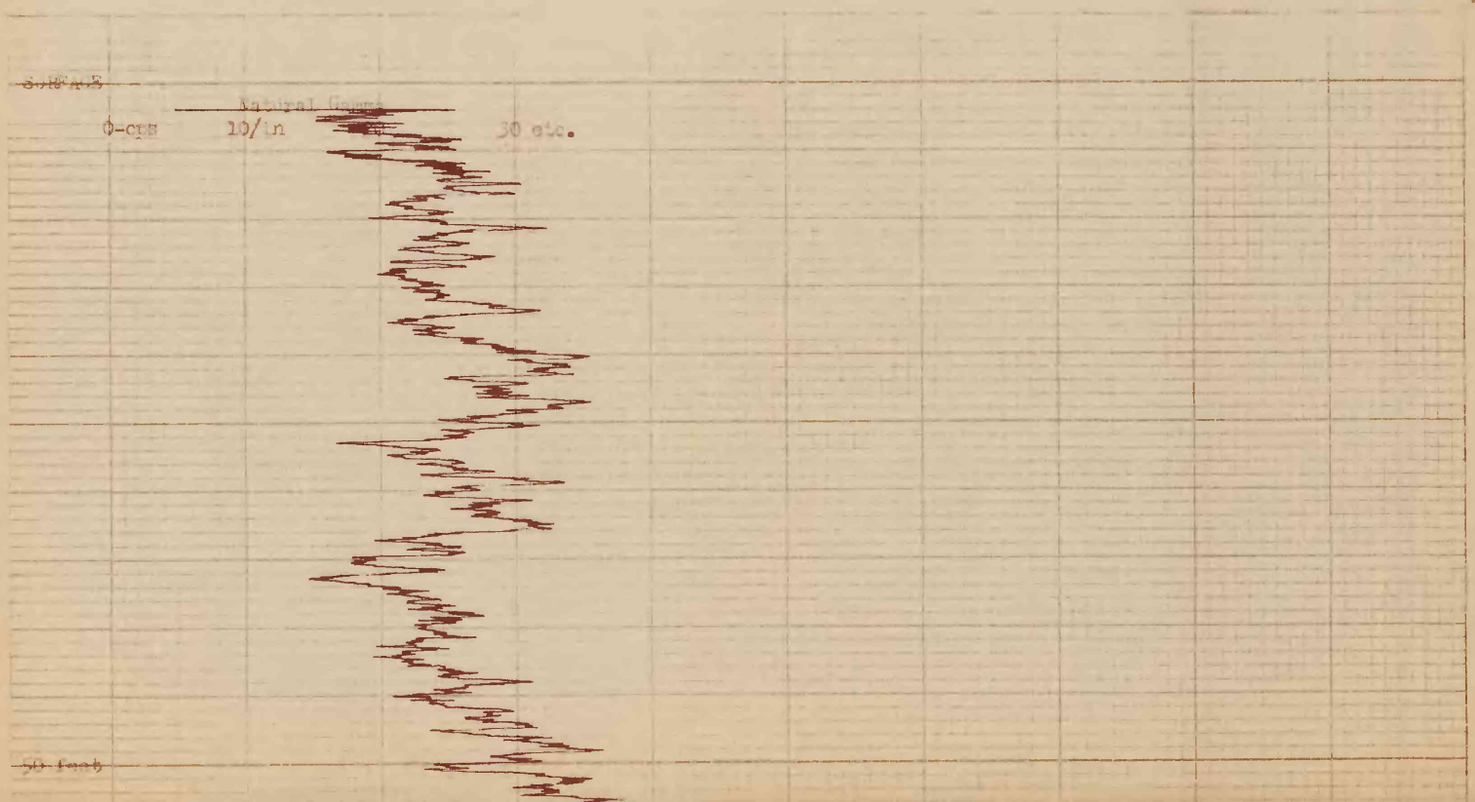
COUNTY Moffat STATE Colorado

LOCATION NW¼,NW¼,SE¼ SECTION 27 TOWNSHIP 4 N. RANGE 90 W.

LOG TYPE	ESGR	RUN	1	2
RUN NO.	1	TOOL NO. & MODEL	[illegible]	2nd run shorter
DATE	9 October 1976	DIAMETER, INCHES	[illegible]	
DEPTH DRILLED	518	GR DETECTOR	[illegible]	DENSITY DETECTOR
DEPTH LOGGED	518	SIZE CRYSTAL, INCHES	[illegible]	
BOTTOM LOGGED INTERVAL	none	K FACTOR	[illegible]	
TOP LOGGED INTERVAL	none	DEADTIME, SECONDS	[illegible]	
FLUID LEVEL	[illegible]	TIME CONSTANT (GR)	[illegible]	DENSITY
TYPE HOLE FLUID	natural mud	SCALE, CPS (GR)	10/in	DENSITY
BIT GUAGE	3-1/4	ZERO PLACEMENT (GR)	left corner	DENSITY
CASING	none	WATER FACTOR	[illegible]	
TRUCK NO.	[illegible]			
LOGGING SPEED, FT/MIN	25	RESISTIVITY TYPE	[illegible]	
RECORDER DEPTH SCALE, FT/IN.	10	SPACING, INCHES	[illegible]	
		SCALE, OHMS/INCH	[illegible]	
		ZERO	[illegible]	
		S P SCALE, MV/INCH	[illegible]	

REMARKS:

[illegible]



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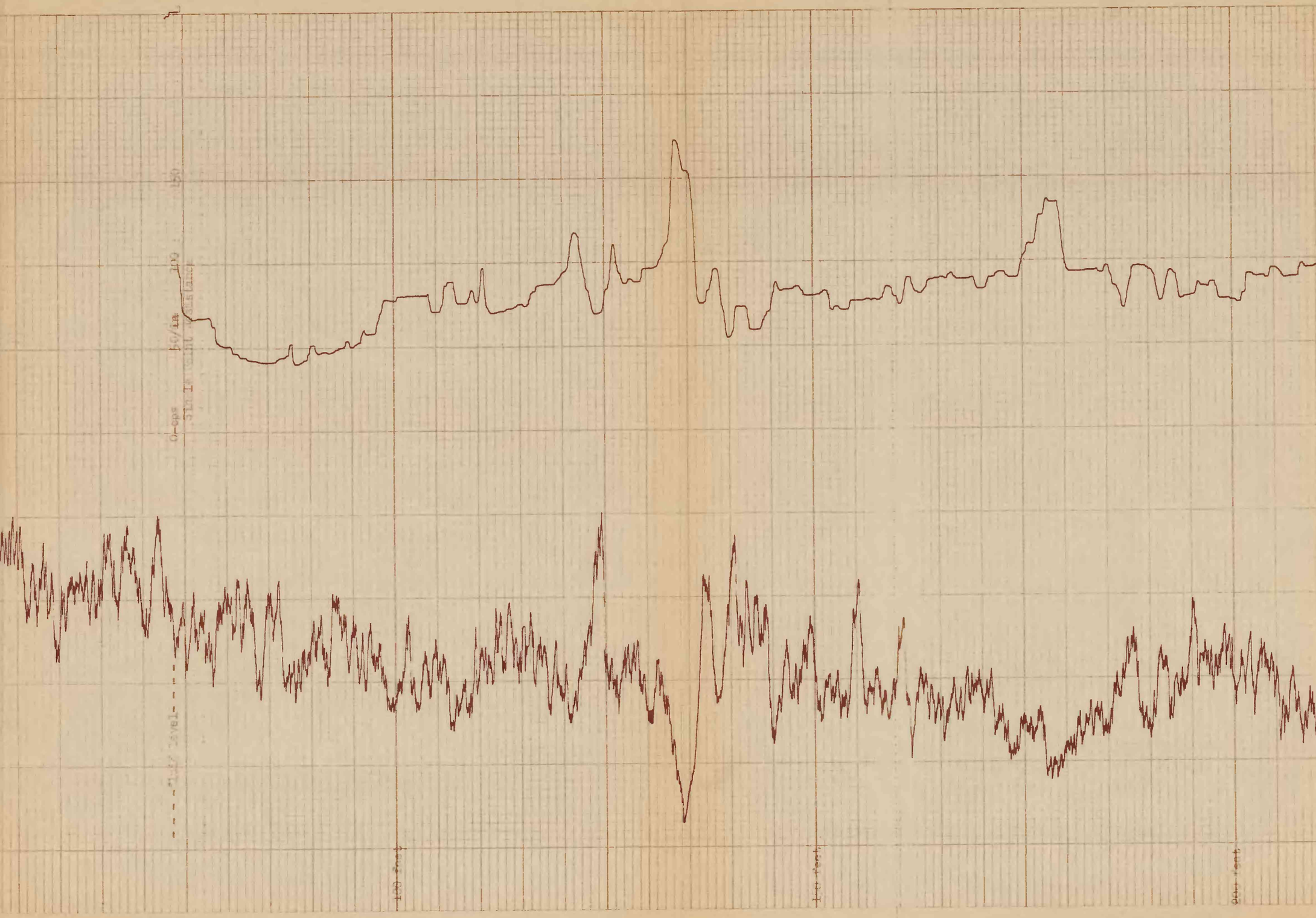

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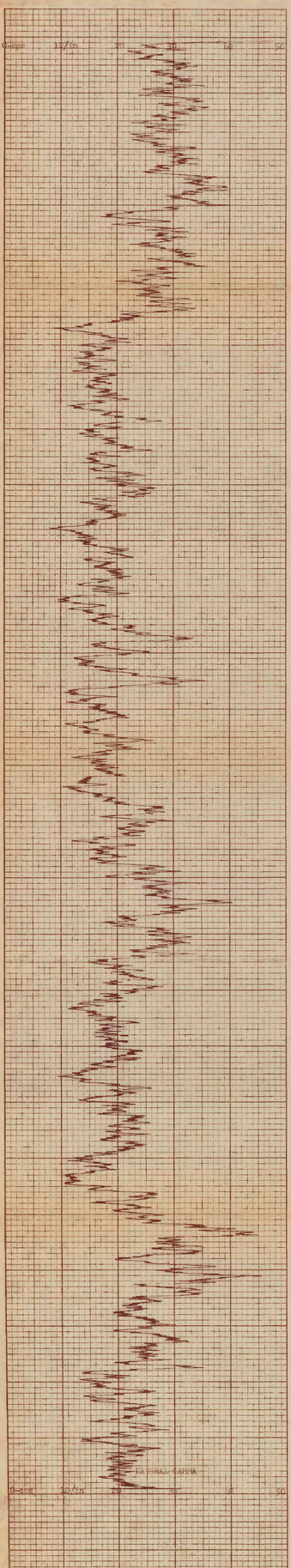
Figure 6.--Drill-hole No. H-6-P

Geo Dynamics
casper wyoming 82601

COMPANY U.S.G.S.
HOLE # OR NAME H-6-P ELEVATION 7,849
FIELD Yampa Coal Field
COUNTY MOFFAT STATE COLORADO

LOCATION	SE¼NW¼	SECTION 35	TOWNSHIP 4 N.	RANGE 90 W.	
LOG TYPE	RSGR-DENSITY		RUN	1	2
RUN #	1 & 2		TOOL # & MODEL	60-10	D-1
DATE	28 September 1976		DIAMETER, INCHES	1-11/16	1-11/16
DEPTH DRILLED	2300		GR DETECTOR	Scint	DENSITY DETECTOR G.M.
DEPTH LOGGED	2065		SIZE CRYSTAL, INCHES	3/4 X 3.5	1 x 6.5
BOTTOM LOGGED INTERVAL	none		K FACTOR	1.24 x 10-5	
TOP LOGGED INTERVAL	none		DEADTIME, SECONDS	33.72 u-sec	
FLUID LEVEL	2315		TIME CONSTANT (GR)	1	DENSITY 1
TYPE HOLE FLUID	natural groundwater		SCALE, GIS (GR)	10/inch	DENSITY 125/inch
BIT GUAGE	4-5/8		ZERO PLACEMENT (GR)	left margin	DENSITY left margin
CASING	none		WATER FACTOR	1.111	
TRUCK #	1				
LOGGING SPEED, FT/MIN	20 GR: 12-13 DENS.		RESISTIVITY TYPE	SINGLE POINT	
RECORDER DEPTH SCALE, FT/IN.	10		SPACING, INCHES	NONE	
			SCALE, OHMS/INCH	100	
			ZERO	1.5 inches right	
			S P SCALE, MV/INCH	NONE	

REMARKS:



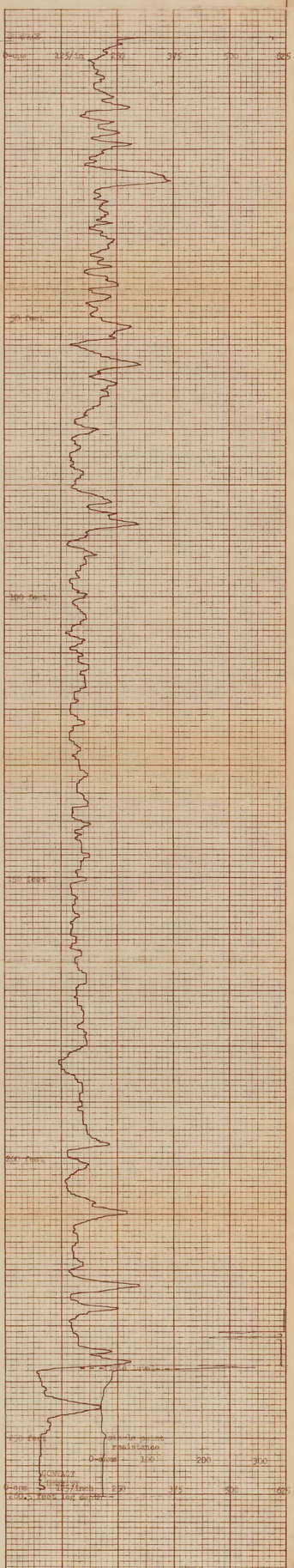


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Figure 7.--Drill-hole No. H-6A-P

Geo Dynamics

GEOPHYSICAL SERVICES CASPER, WYOMING 82601

COMPANY U.S.G.S.

HOLE NO. OR NAME H-6A-P

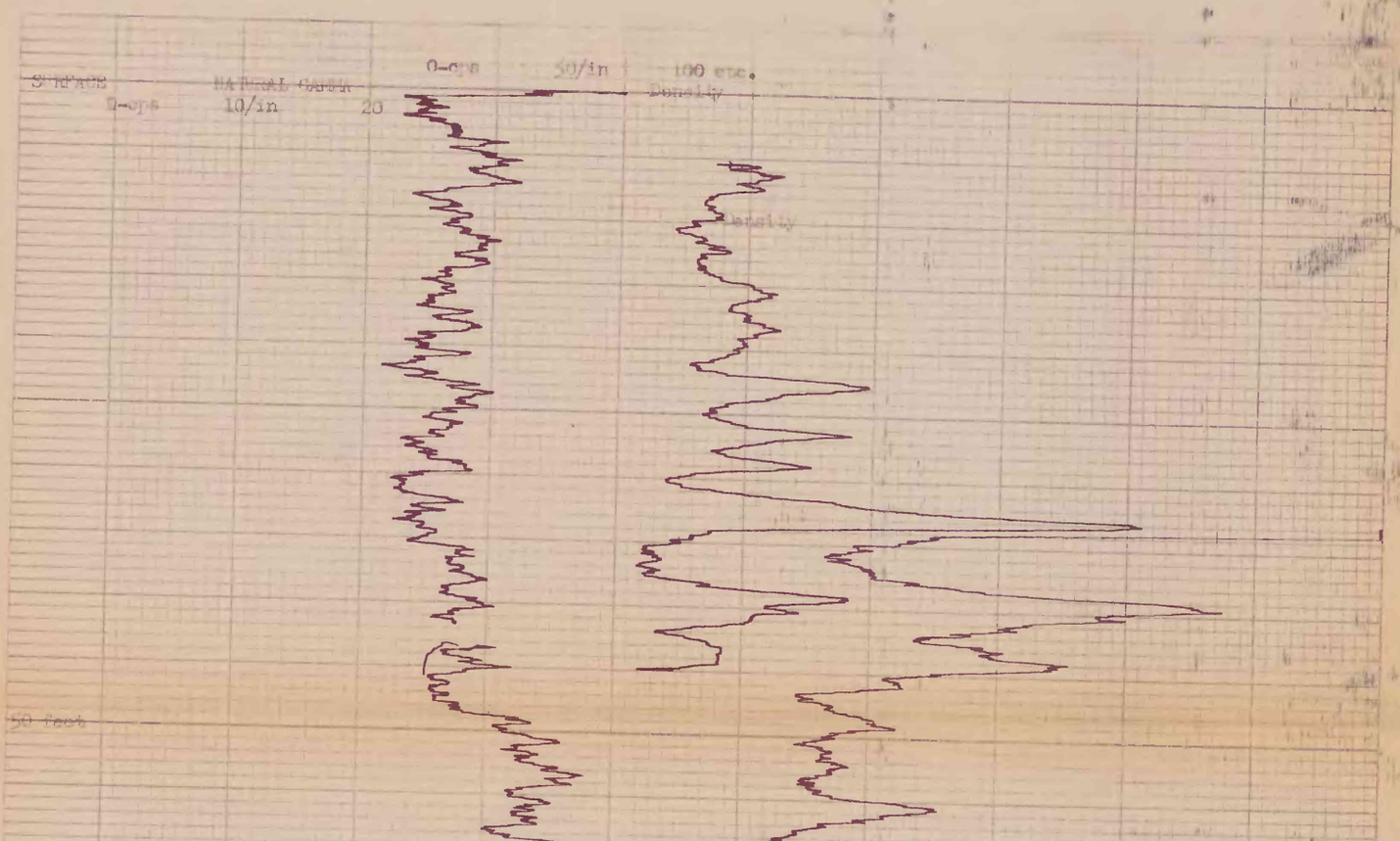
FIELD Yampa Coal Field ELEVATION 7,853

COUNTY Moffat STATE Colorado

LOCATION SE¼NW¼NW¼ SECTION 35 TOWNSHIP 4 N. RANGE 90 W.

LOG TYPE	BSGM-DENSITY	RUN	1 / 2
RUN NO.	1 & 2	TOOL NO. & MODEL	SG-10 / D-1
DATE	7 October 1976	DIAMETER, INCHES	1-11/16 / 1-11/16
DEPTH DRILLED	500	GR DETECTOR	Scint / DENSITY DETECTOR G.M.
DEPTH LOGGED	489.0	SIZE CRYSTAL, INCHES	1/4 X 3.5 / 1 X 6.5
BOTTOM LOGGED INTERVAL	none	K FACTOR	1.24 X 10-5
TOP LOGGED INTERVAL	none	DEADTIME, SECONDS	33.78 μ-sec
FLUID LEVEL	278.0	TIME CONSTANT (GR)	1 / DENSITY 1
TYPE HOLE FLUID	natural mud, with additives	SCALE, CPS (GR)	50/in / DENSITY 50/in
BIT GUAGE	4-3/4	ZERO PLACEMENT (GR)	left margin / DENSITY 2½ inches right
CASING	none	WATER FACTOR	1.141
TRUCK NO.	1		
LOGGING SPEED, FT/MIN	25 (GR: 15 Dens.	RESISTIVITY TYPE	SINGLE POINT
RECORDER DEPTH SCALE, FT/IN.	10	SPACING, INCHES	60.5
		SCALE, OHMS/INCH	200/in
		ZERO	5-inches right
		S P SCALE, MV/INCH	4.043

REMARKS: Apparent Resistivity above fluid level is due to cable (Res. reference ground) making contact with mud-cake on bore hole wall. The apparent resistivity curve from fluid level upwards is not a reliable indicator of formation parameters.



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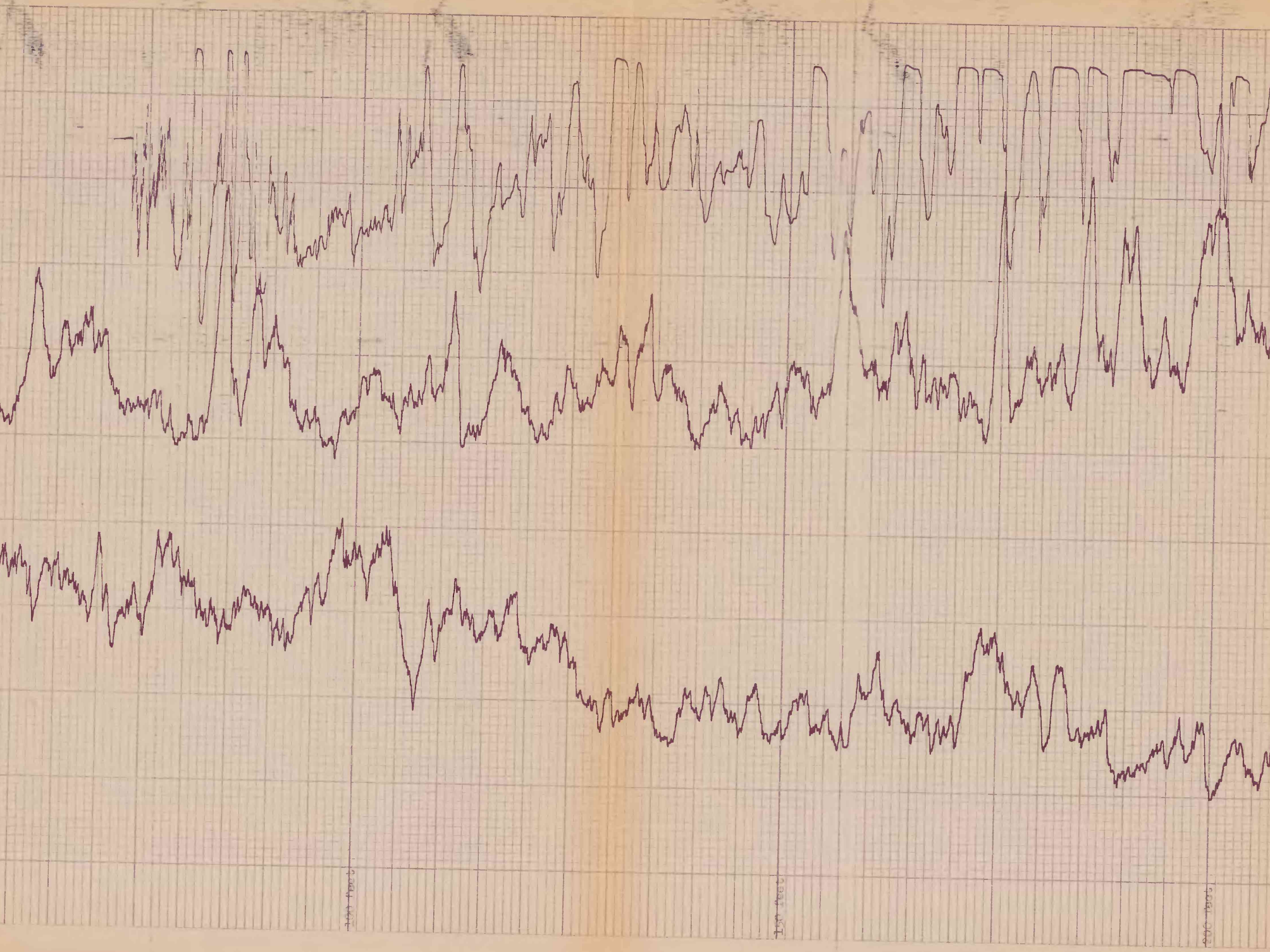

No. GC12100 GOI FORT WORTH, TEXAS

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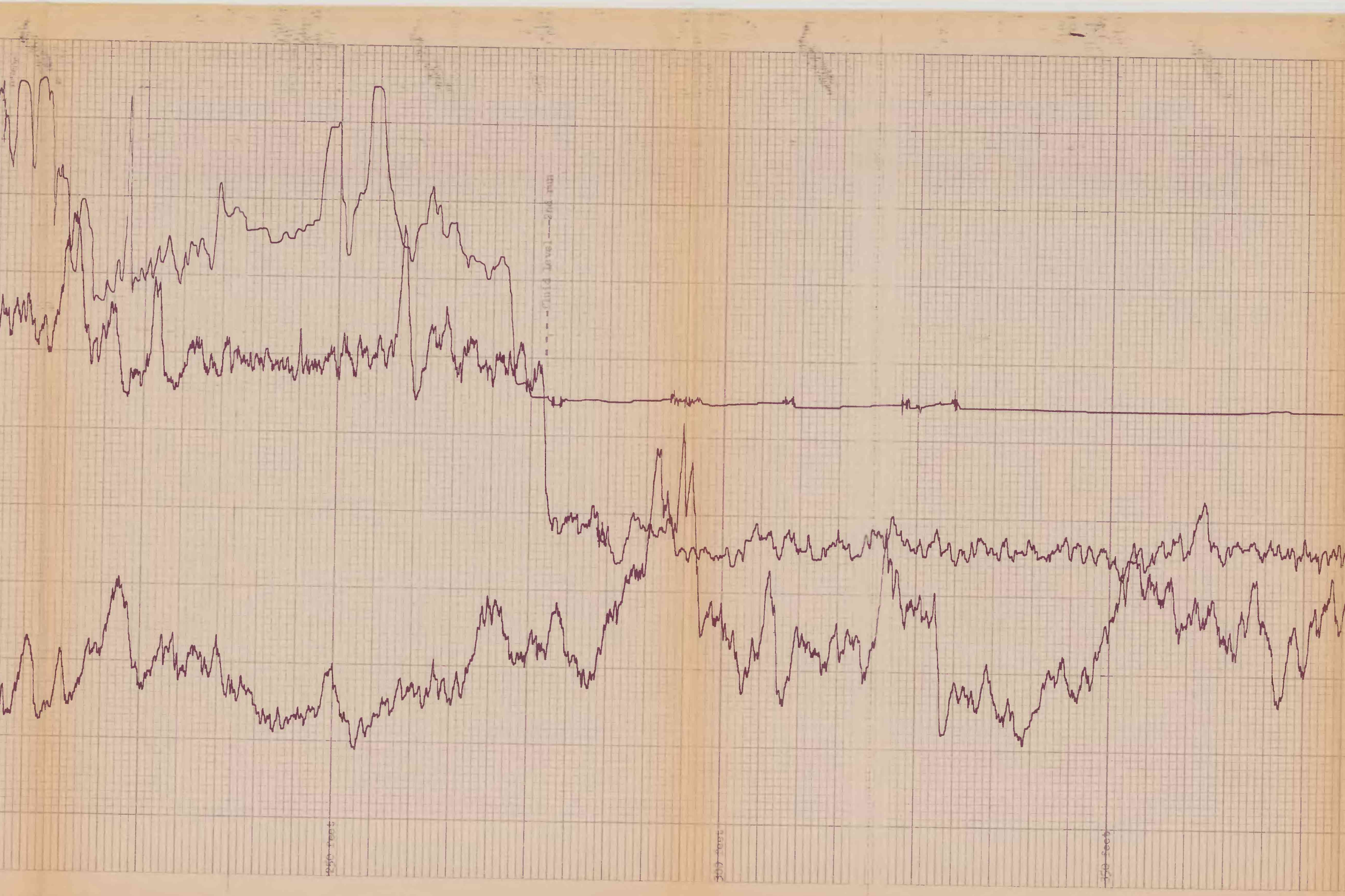

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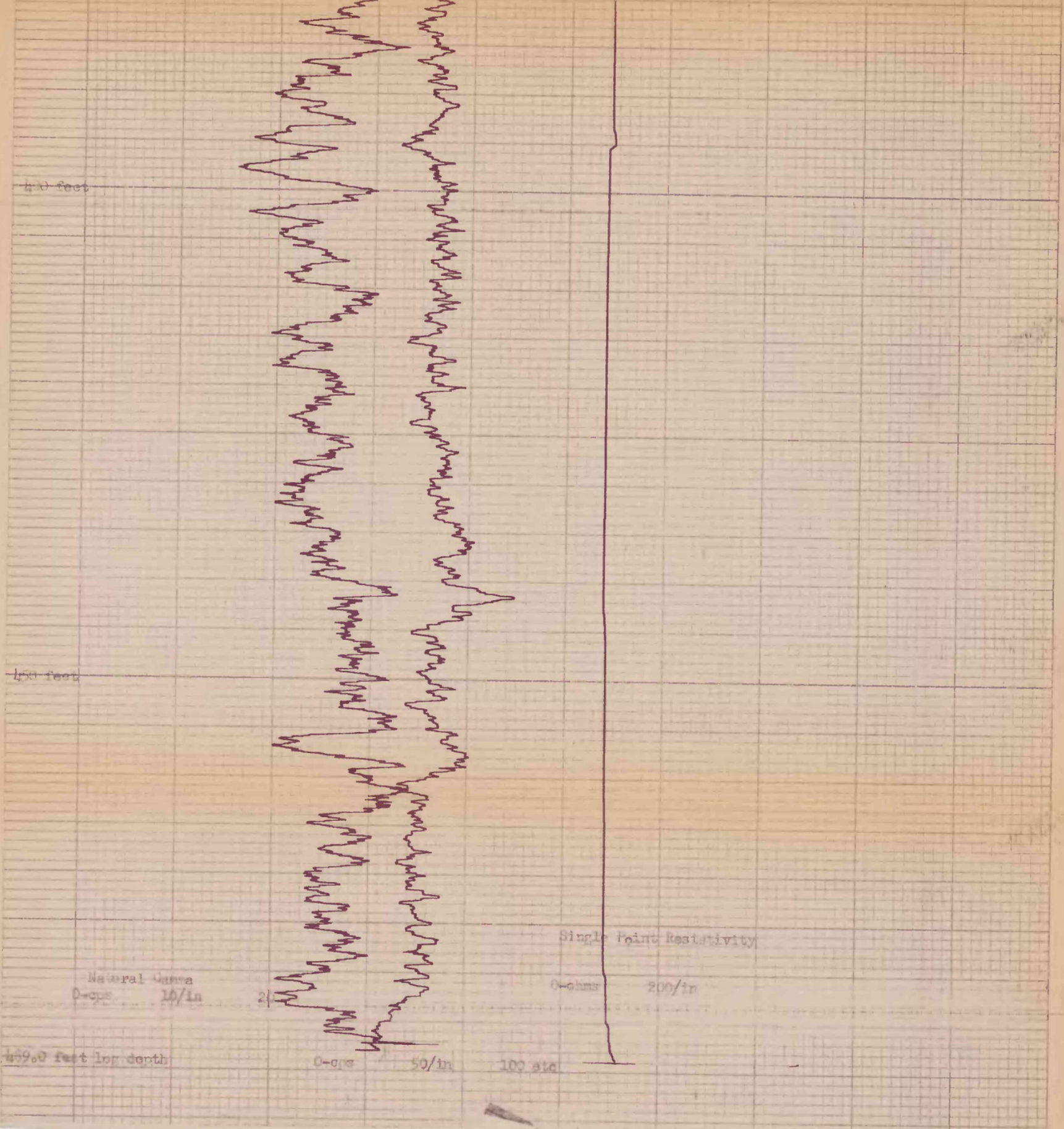
400 feet
450 feet
Natural Gamma
0-cps 10/in
Single Point Resistivity
0-ohms 200/in
4990 feet log depth
0-cps 50/in
100 sec

U.S. Geological Survey
Open-file Report 1977

Figure 8.--Drill-hole No. H-7A-P

Geo Dynamics

GEOPHYSICAL SERVICES CASPER, WYOMING 82601

COMPANY U.S.G.S.

HOLE NO. OR NAME H-7A-P ELEVATION 8,065

FIELD Yampa Coal Field

COUNTY Moffat STATE Colorado

LOCATION SW¼SE¼SE¼ SECTION 34 TOWNSHIP 4 N. RANGE 90 W.

LOG TYPE	BOREHOLE GEOLOGY	RUN	1
RUN NO.	1 & 2	TOOL NO. & MODEL	30-10
DATE	7 October 1976	DIAMETER, INCHES	4-1/2
DEPTH DRILLED	300	GR DETECTOR	2-in1
DEPTH LOGGED	298.5	SIZE CRYSTAL, INCHES	3/4 x 5
BOTTOM LOGGED INTERVAL	none	K FACTOR	1.0 x 10-5
TOP LOGGED INTERVAL	none	DEADTIME, SECONDS	11
FLUID LEVEL	20'	TIME CONSTANT (GR)	1
TYPE HOLE FLUID	Injected water	SCALE, CPS (GR)	10/in
BIT GUAGE	4-3/4	ZERO PLACEMENT (GR)	left margin
CASING	none	WATER FACTOR	1.00
TRUCK NO.	1		
LOGGING SPEED, FT/MIN	20 OR: 21 MOS	RESISTIVITY TYPE	SINGLE POINT
RECORDER DEPTHSCALE, FT/IN.	10	SPACING, INCHES	N/A
		SCALE, OHMS/INCH	20/inch
		ZERO	0-inches right
		SP SCALE, MV/INCH	N/A

REMARKS:

2 - DENSITY

BYPASS
H-7-P(re)

0-cps 10/in
Natural Gamma

NATURAL GAMMA

CONTACT DENSITY GAMMA

Contact Density
0-cps 10/in 20

50 feet

100 feet

150 feet

200 feet

tool malfunction

tool malfunction

SINGLE POINT RESISTANCE

250 feet

Contact density
0-cps 10/in - enlarged 2nd run -

SINGLE POINT RESISTANCE

0-ohms 50/in

0-cps 10/in NATURAL GAMMA

298.5 feet log depth H-7-P(re)

GEO DYNAMICS FORT WORTH, TEXAS

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Figure 9.--Drill-hole No. H-8-P

Geo Dynamics
casper wyoming 82601

COMPANY U.S.G.S.

HOLE # OR NAME H-8-P — ELEVATION 8,135

FIELD Yampa Coal Field

COUNTY Rio Blanco — STATE COLORADO

LOCATION NE¼ SW¼ NW¼ — SECTION 32 — TOWNSHIP 4 N. — RANGE 90 W.

LOG TYPE	BSGR-DENSITY	RUN	1 2
RUN #	1 & 2	TOOL # & MODEL	3-3 3-3
DATE	29 September 1976	DIAMETER, INCHES	1-11/16 1-11/16
DEPTH DRILLED	265	GR DETECTOR	SHORT DENSITY DETECTOR S.M.
DEPTH LOGGED	258.	SIZE (RYSTAL, INCHES	3/4 X 3.5 1 X 6.5
BOTTOM LOGGED INTERVAL	none	K FACTOR	1.2A X 10⁻²
TOP LOGGED INTERVAL	none	DEADTIME, SECONDS	33.79 ⁻⁶sec
FLUID LEVEL	surface	TIME CONSTANT (GR)	1 DENSITY 1
TYPE HOLE FLUID	natural mud, with sol	SCALE, CPS (GR)	10/in DENSITY 125/in
BIT GUAGE	4-3/8	ZERO PLACEMENT (GR)	left margin DENSITY left margin
CASING	none	WATER FACTOR	1.0m
TRUCK #	3		
LOGGING SPEED, FT/MIN	20 OR: 12-13 DOWN.	RESISTIVITY TYPE	SINGLE POINT
RECORDER DEPTH SCALE, FT/IN.	10	SPACING, INCHES	NONE
		SCALE, OHMS/INCH	50/in
		ZERO	1.5 inches right
		S P SCALE, MV/INCH	NONE

REMARKS: