Appendix C

Hydrogeologic Data

A voluminous amount of hydrogeologic data was collected and analyzed during the course of the Mashudda Strip Mine Investigation. The following appendix presents the subsurface information in summarized form, in two sections as follows:

- Well and Soil Logs

- Piezometer Data Summary

The well and soil logs contain geological as well as geophysical logs, piezometer data, and permeability test data. The Piezometer Data Summary includes all pertinent water level data, as well as elevations of measuring points.

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WELL AND SOIL LOG EXPLANATION

Piezometer Construction

- 6" diameter steel casing
- 2" diameter piezometer tube and screen
- Static water level in indicated piezometer/zone (1/84 for well logs, 4/84 for soil logs)
- Morie grade "O" sand
- Bentonite seal

Geologic Log

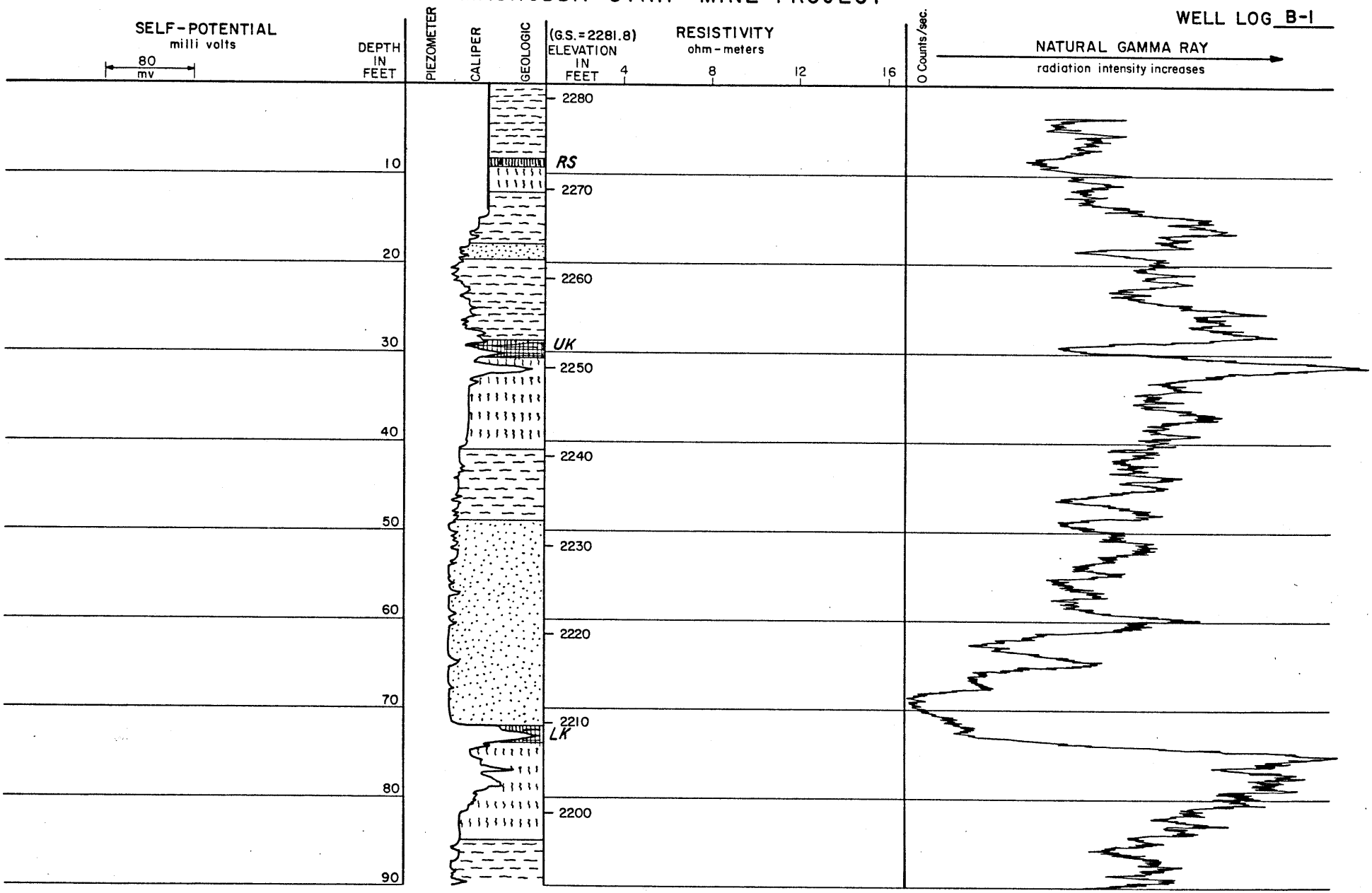
Overburden	Generally a heterogeneous mixture of brown and gray silt, clay, and rock fragments; noncompetent; generally saturated near base. Hydraulic conductivity[1] in Overburden range from 293 gpd/ft^2[2], to 1810 gpd/ft^2, and average approximately 380 gpd/ft^2.
Sandstone (H)	In coal measures, generally hard, gray, siliceous, silty, very fine- to fine-grained sandstone. "H" indicates Homewood sandstone, a very hard, gray, siliceous medium- to very coarse-grained sandstone. Hatchures indicate weathered zones. Hydraulic conductivities in Homewoo range from 0.06 gpd/ft^2 to 86.8 gpd/ft^2, and average approximately 11 gpd/ft^2.
Siltstone	Medium to dark olive-gray, siliceous, clayey to very fine sandy siltstone; competency varies from moderately to very hard. Low hydraulic conductivity[3].
Mudstone	Medium to dark olive-gray mudstone; moderately hard. Low hydraulic conductivity.
Claystone/ clay	Light gray, occasionally silty claystone; generally soft and crushable, occurs occasionally as soft clay (non-indurated) and as "under-clay" of coal seams. Low hydraulic conductivity.
Shale	Dark olive-gray to black, frequently carbonaceous shale; generally soft with moderate fissility. Low hydraulic conductivity.
Coal (UK, LK, BV/C, RS)	Black, occasionally carbonaceous shaley, coal; very soft. "UK" indicates Upper Kittanning coal seam. "MK" indicates Middle Kittanning coal seam. "LK" indicates Lower Kittanning coal seam. "BV/C" indicates Brookville/Clarion coal seam. "RS" indicates "rider" coal seam. Thickness to nearest 0.5 foot. Hydraulic conductivities in Brookville/Clarion coal range from 0.17 gpd/ft^2 to 1490 gpd/ft^2, and and average approximately 37 gpd/ft^2.
WBZ — Water-Bearing Zones	Yields from individual zones vary from less than 1/10 gpm in sandstone and coal to greater than 70 gpm in overburden.

[1] Results of pulse-testing conducted March, 1984

[2] Gallons per day per square foot

[3] Results of drilling, logging, and water level measurements; limited pulse testing data.

MASHUDDA STRIP MINE PROJECT



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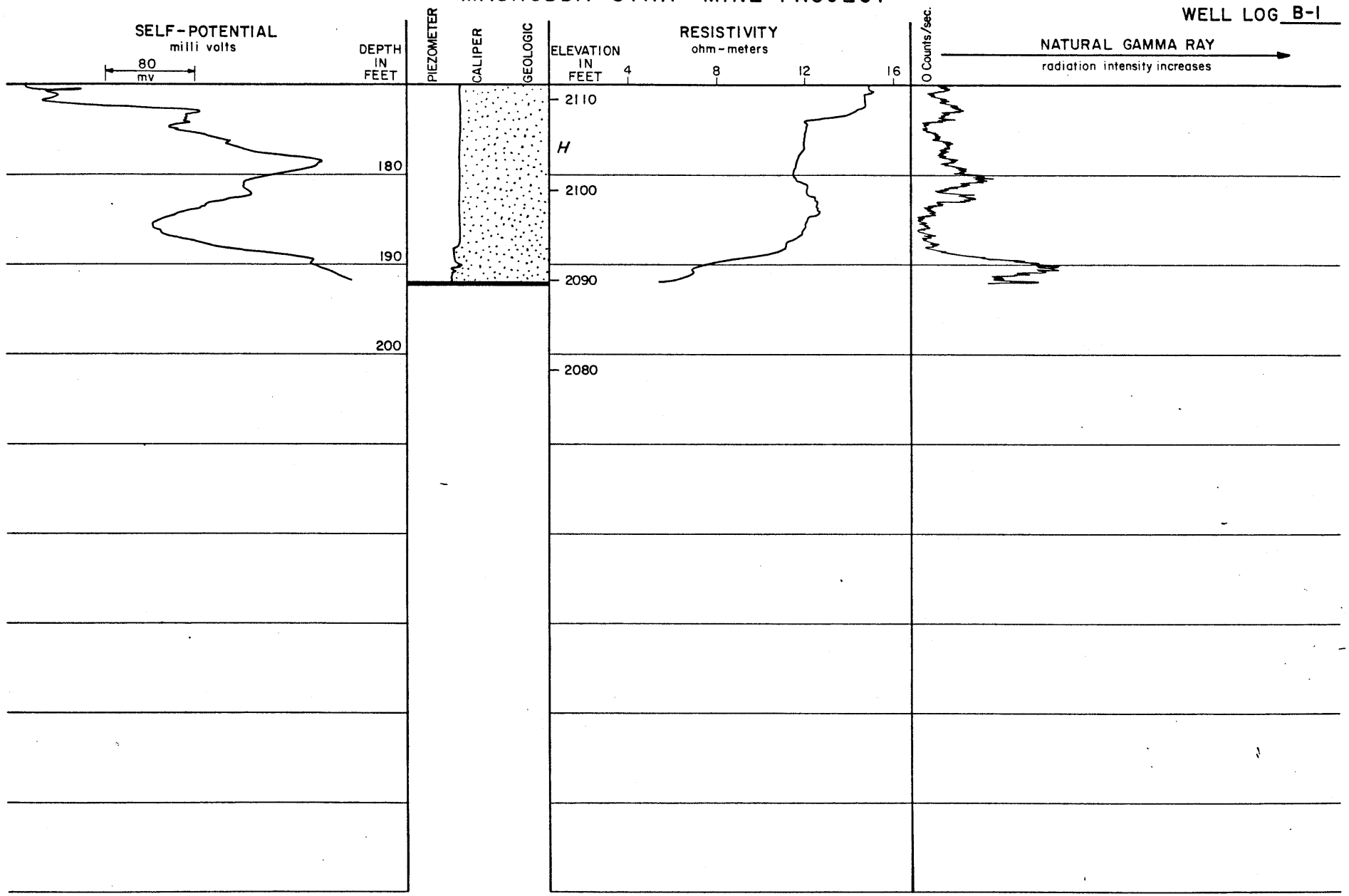
MASHUDDA STRIP MINE PROJECT

WELL LOG B-1



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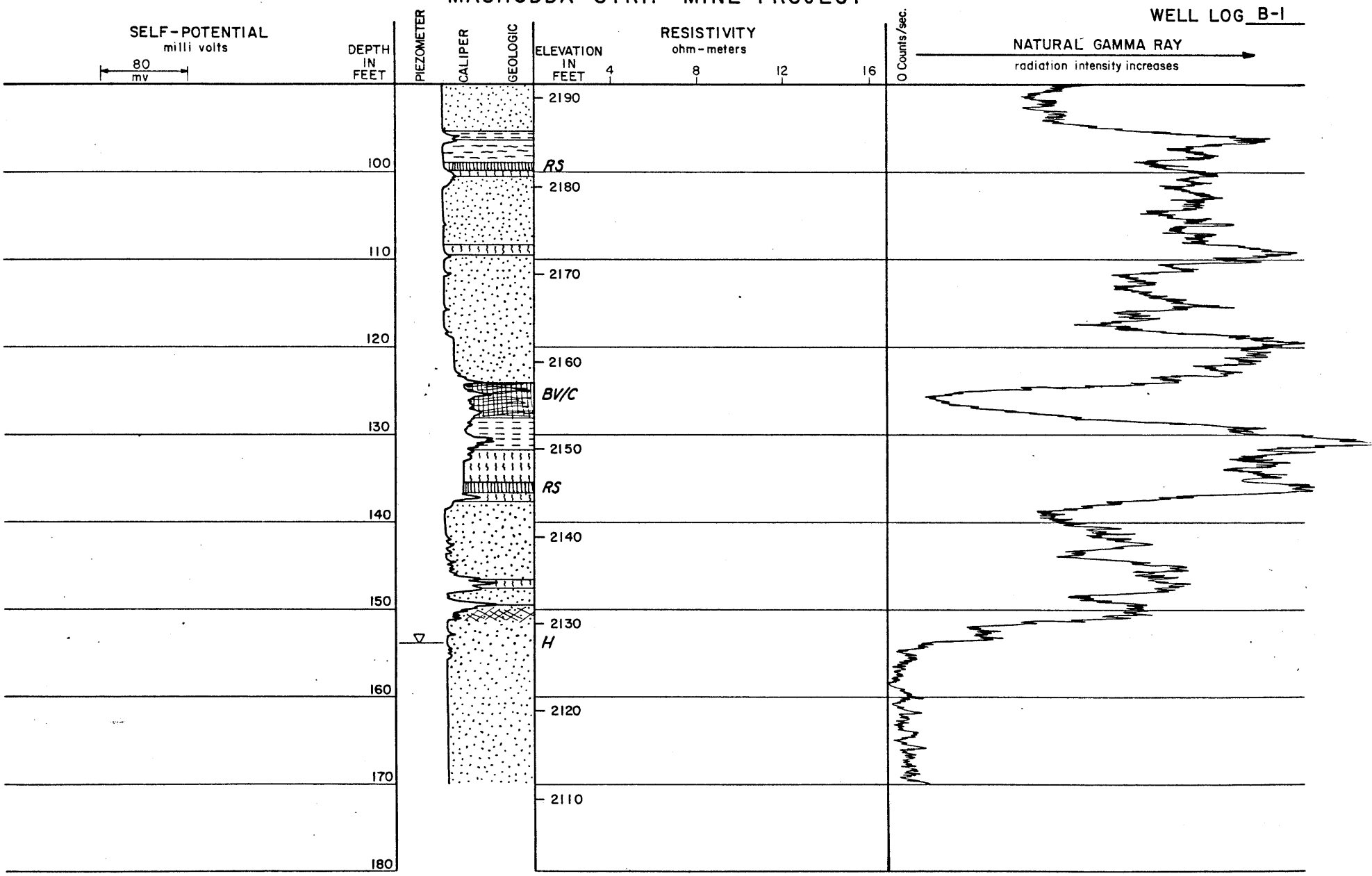

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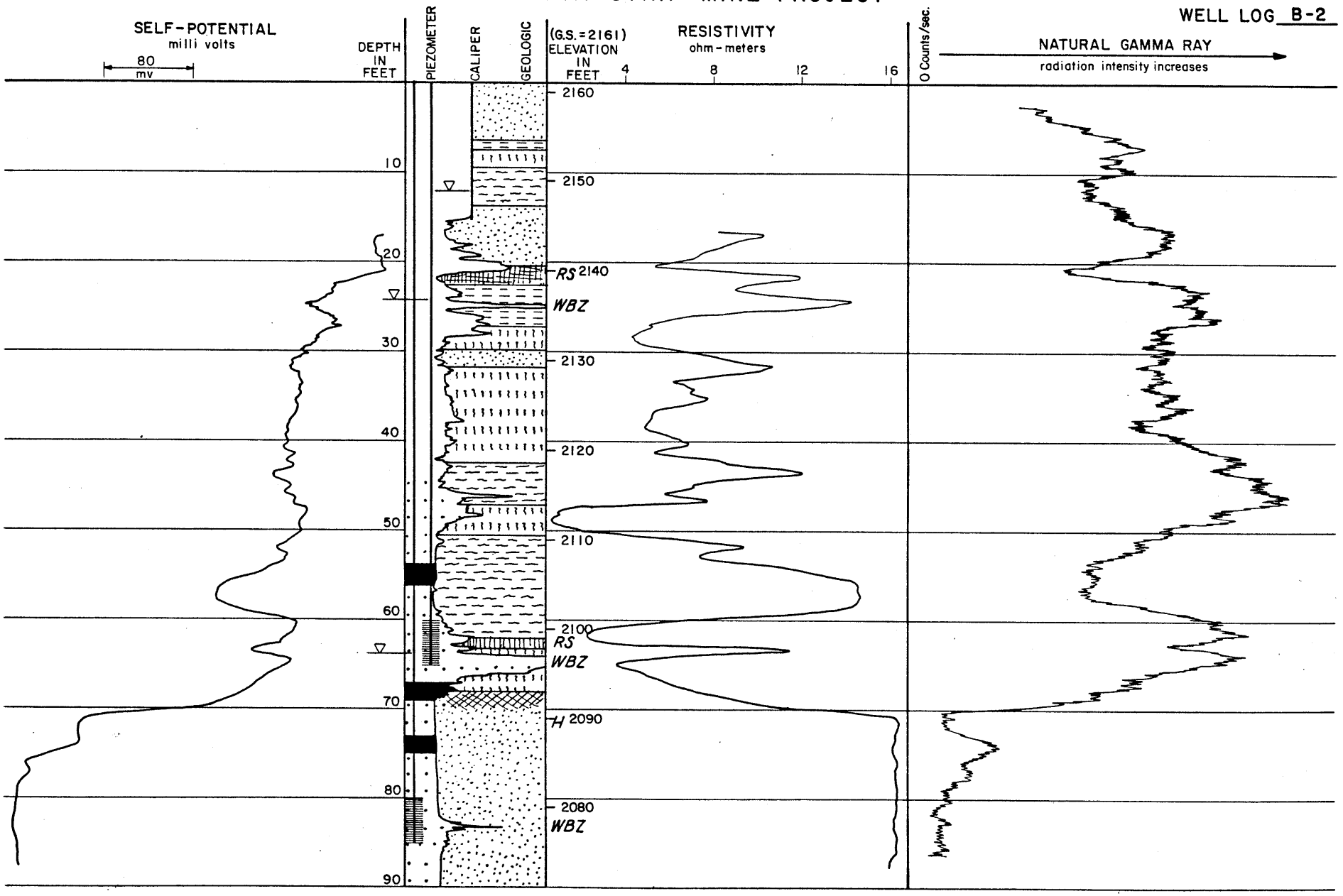
WELL LOG B-2



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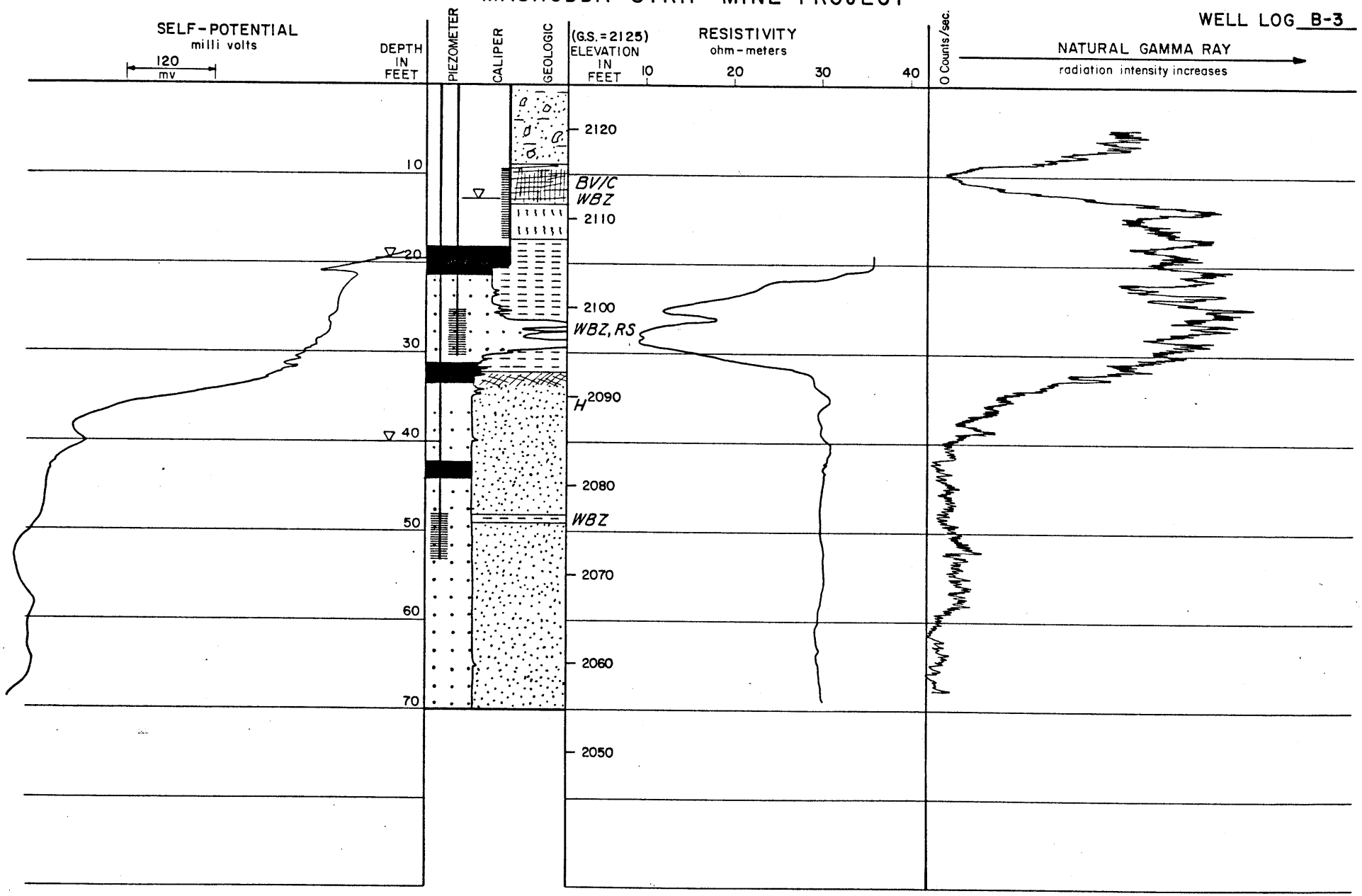

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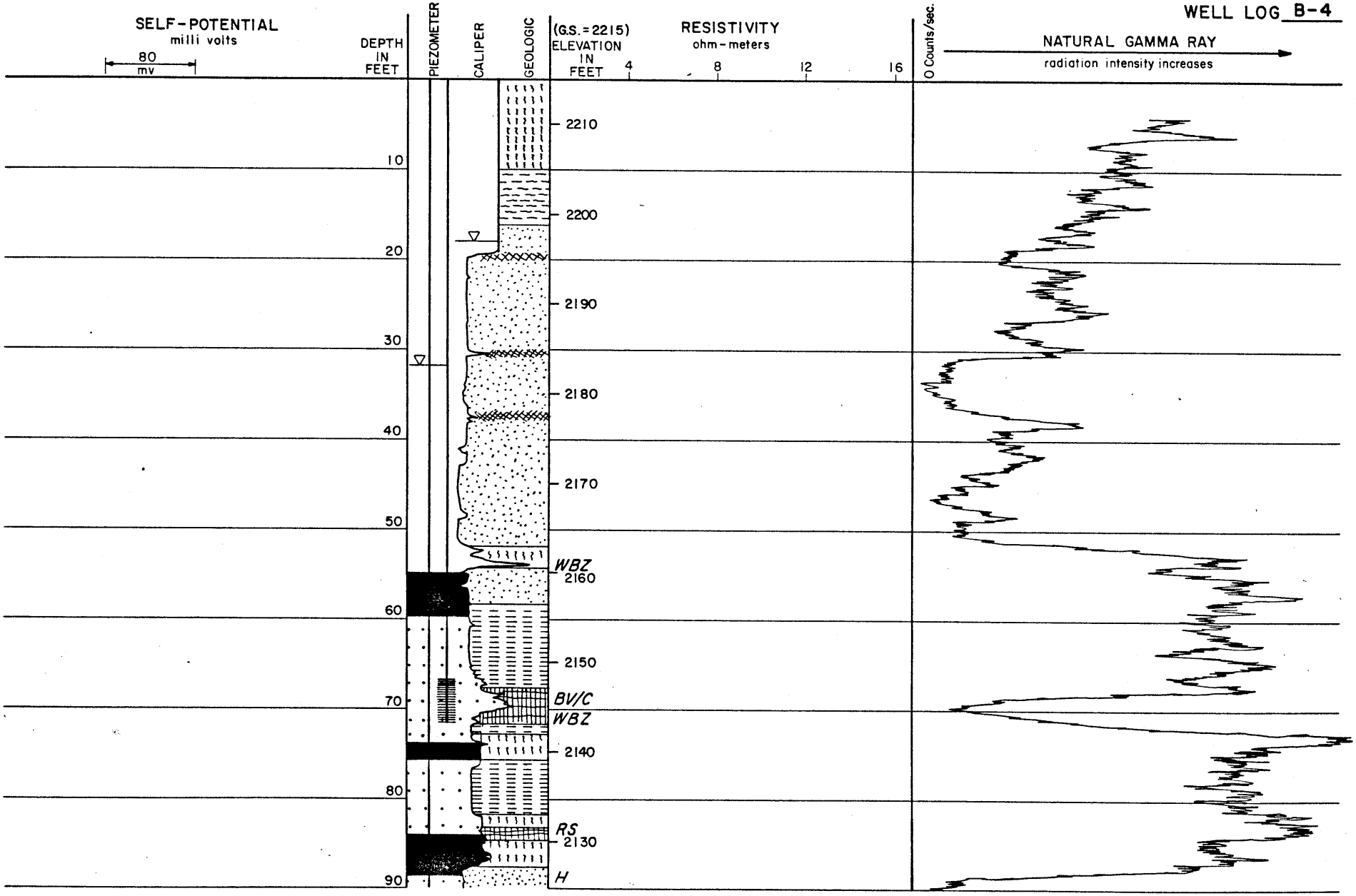

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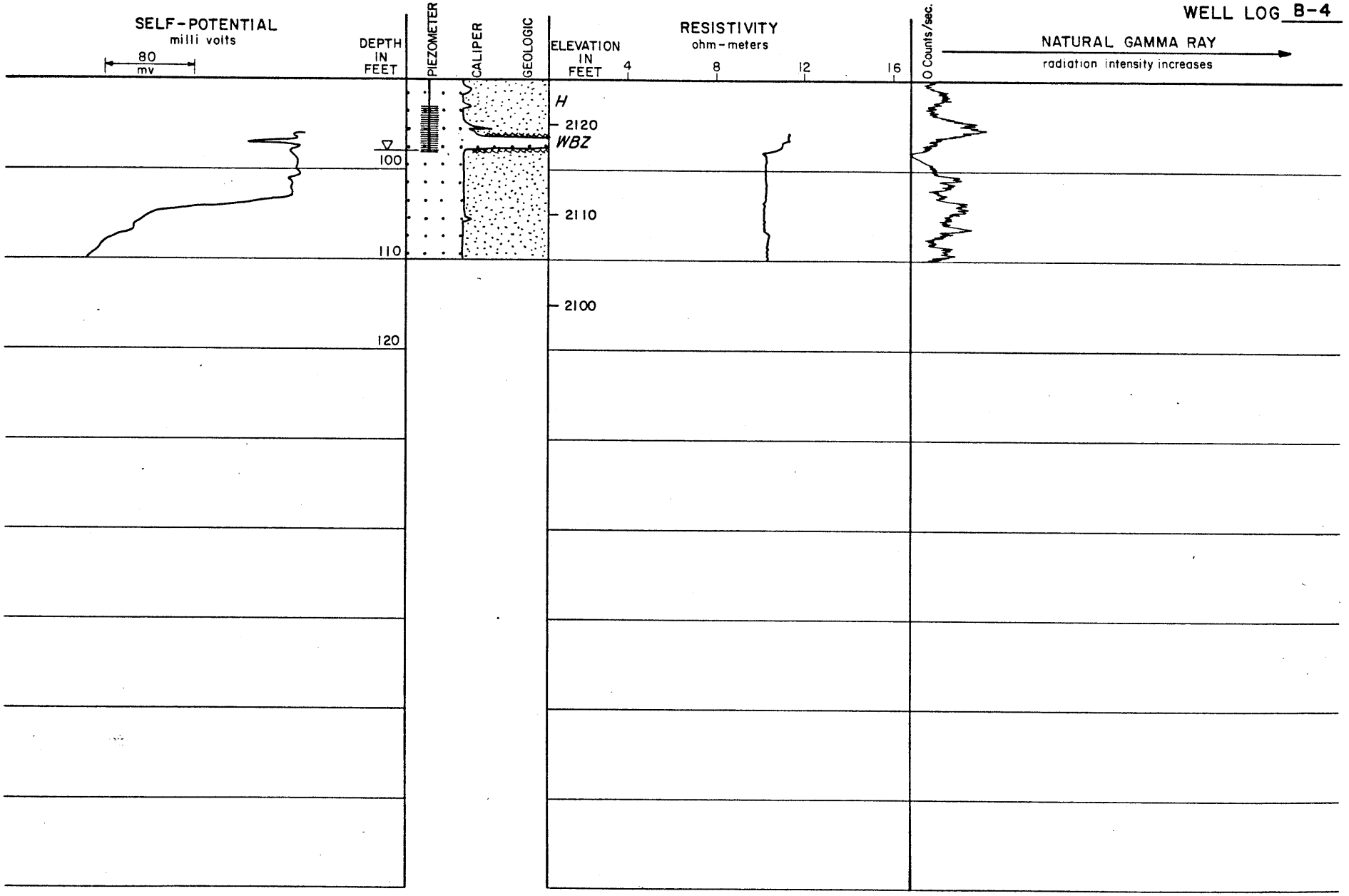
MASHUDDA STRIP MINE PROJECT

WELL LOG B-4



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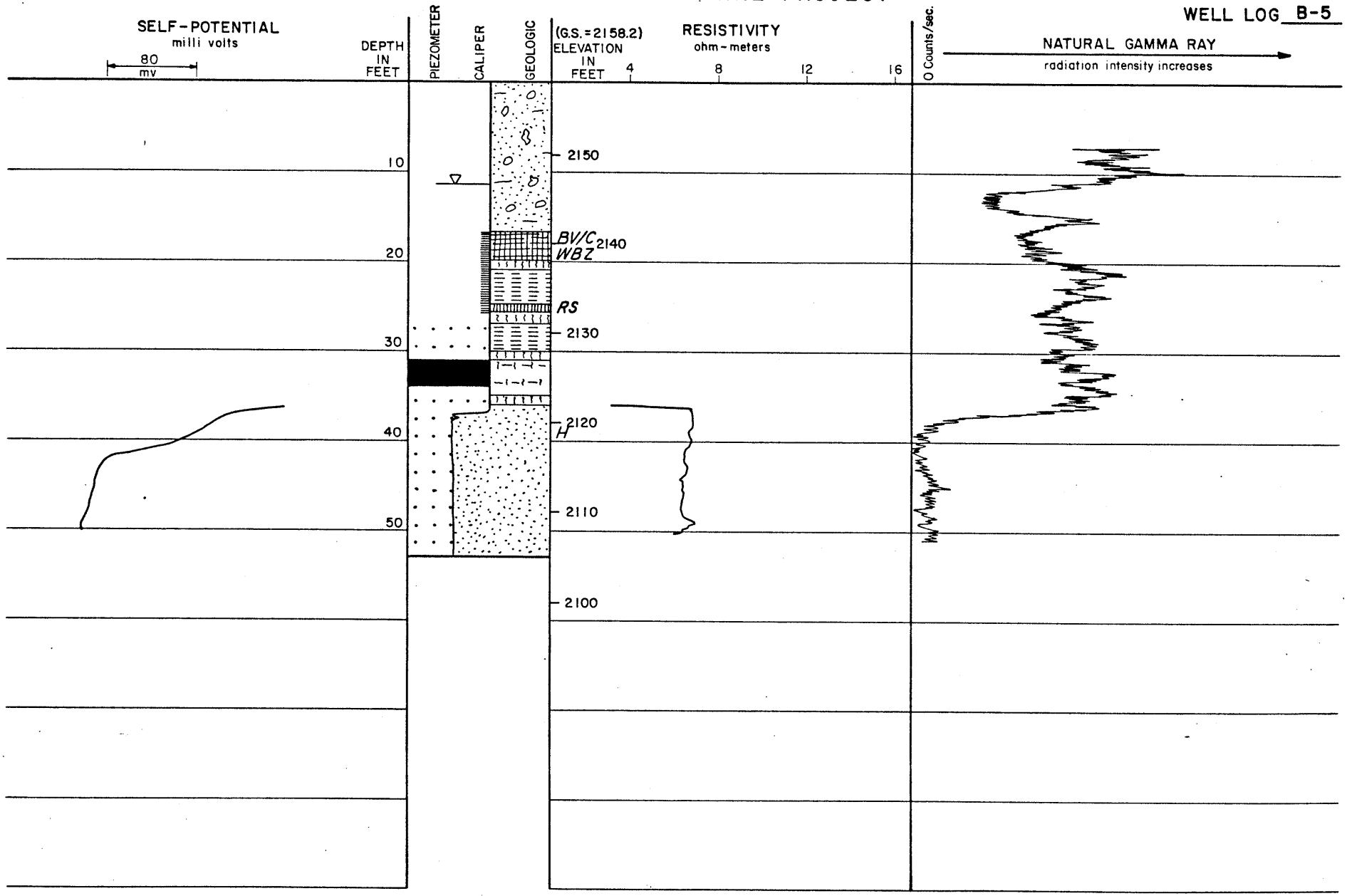

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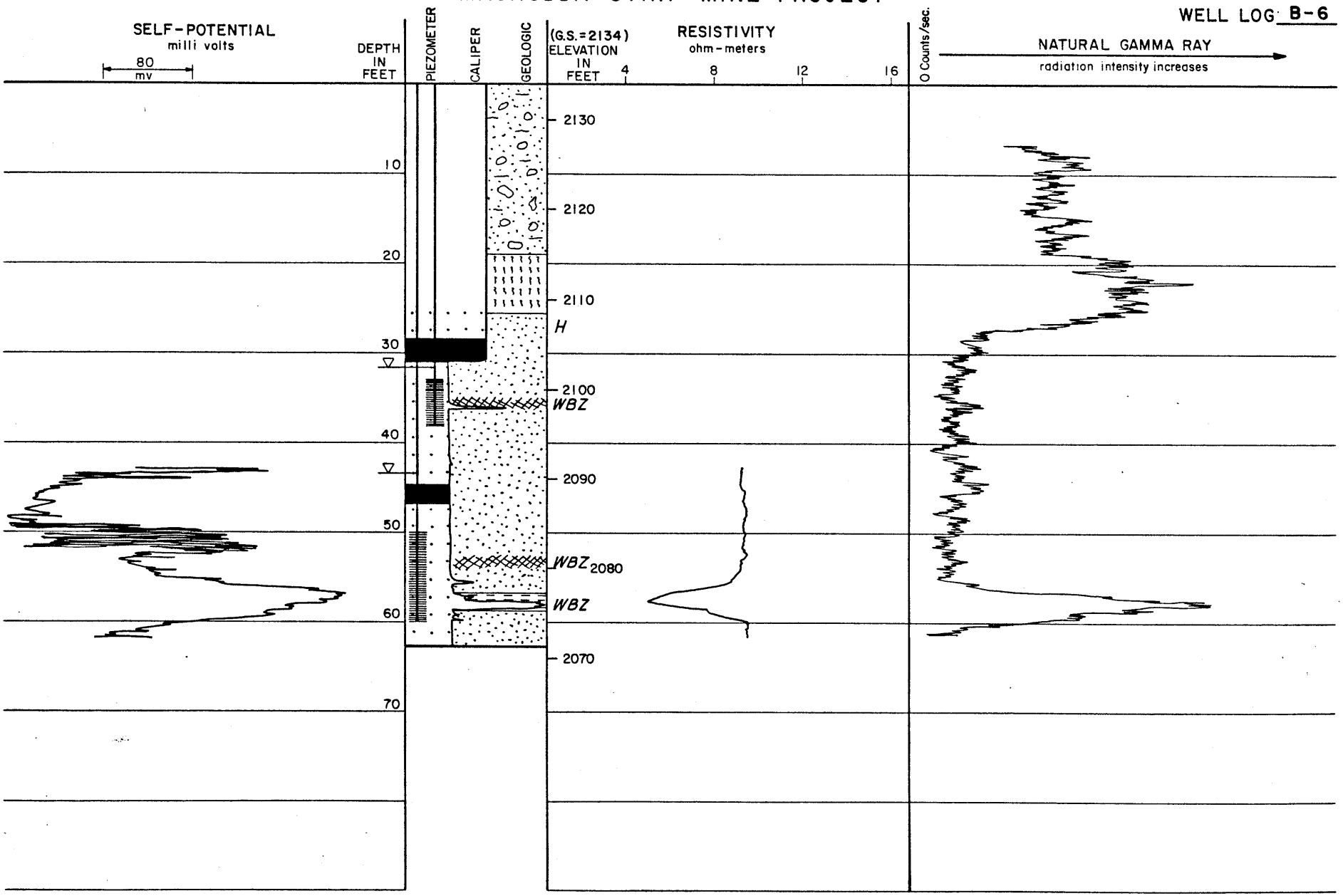
MASHUDDA STRIP MINE PROJECT

WELL LOG B-6



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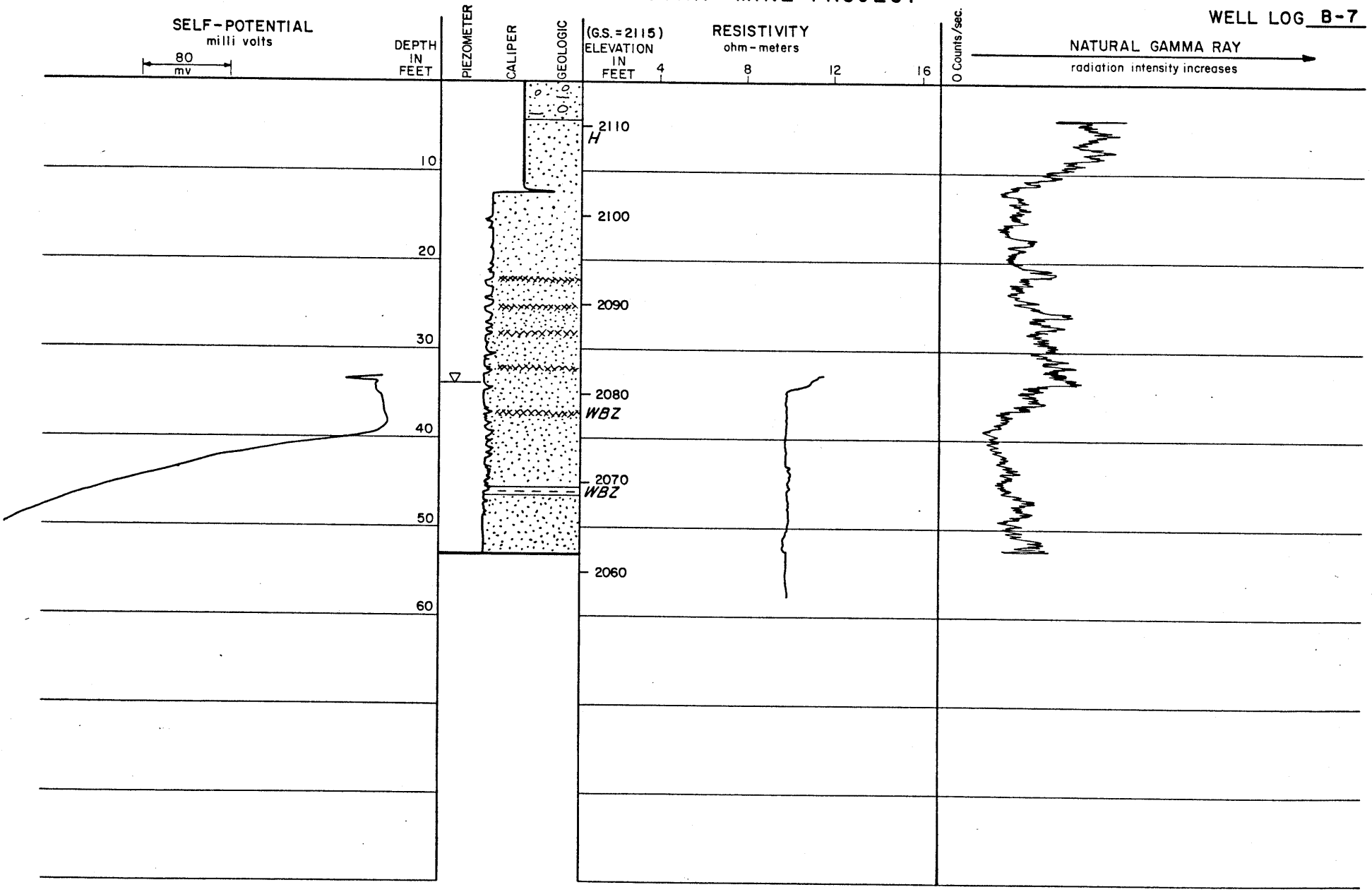

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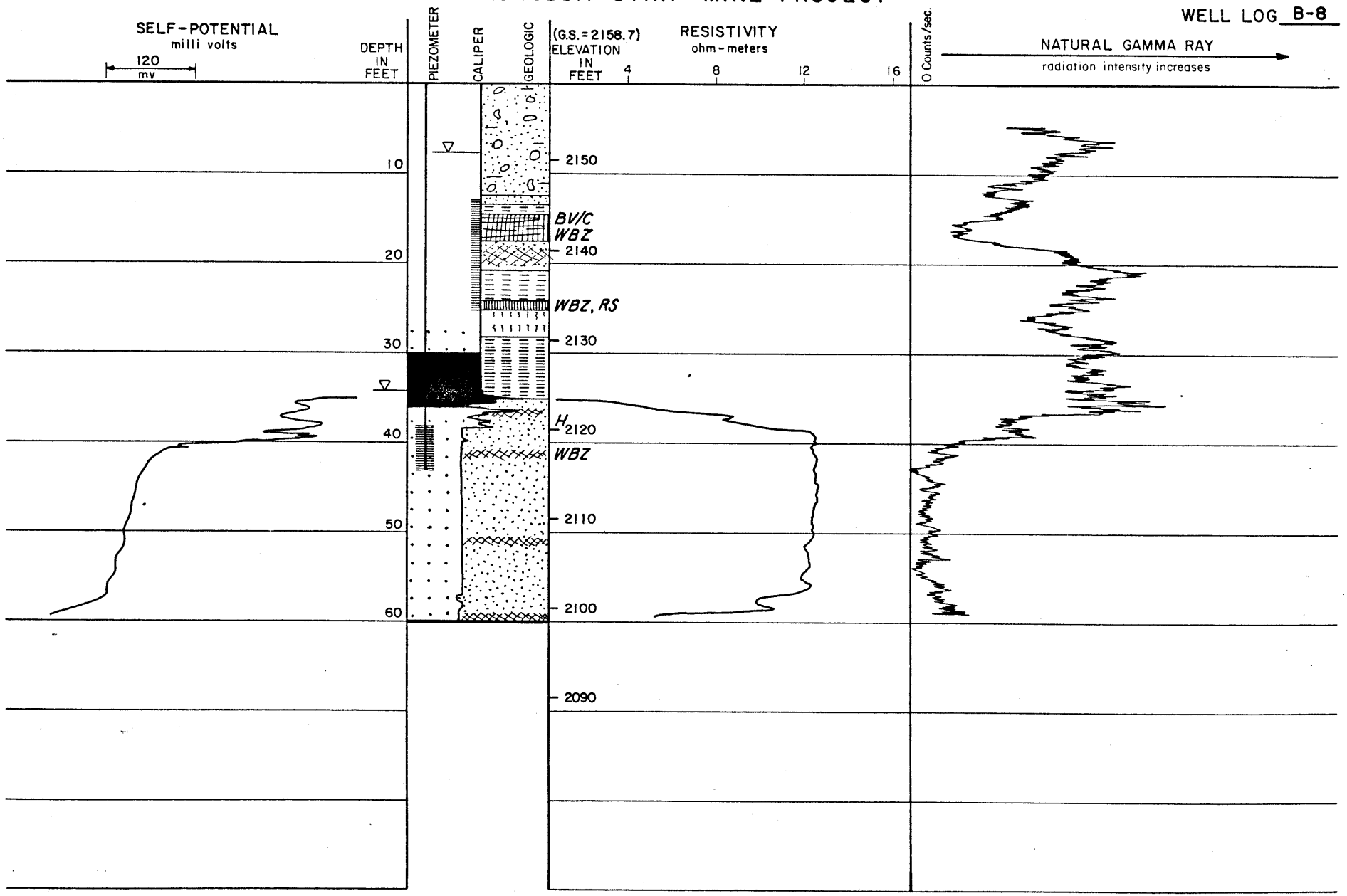
MASHUDDA STRIP MINE PROJECT

WELL LOG B-8



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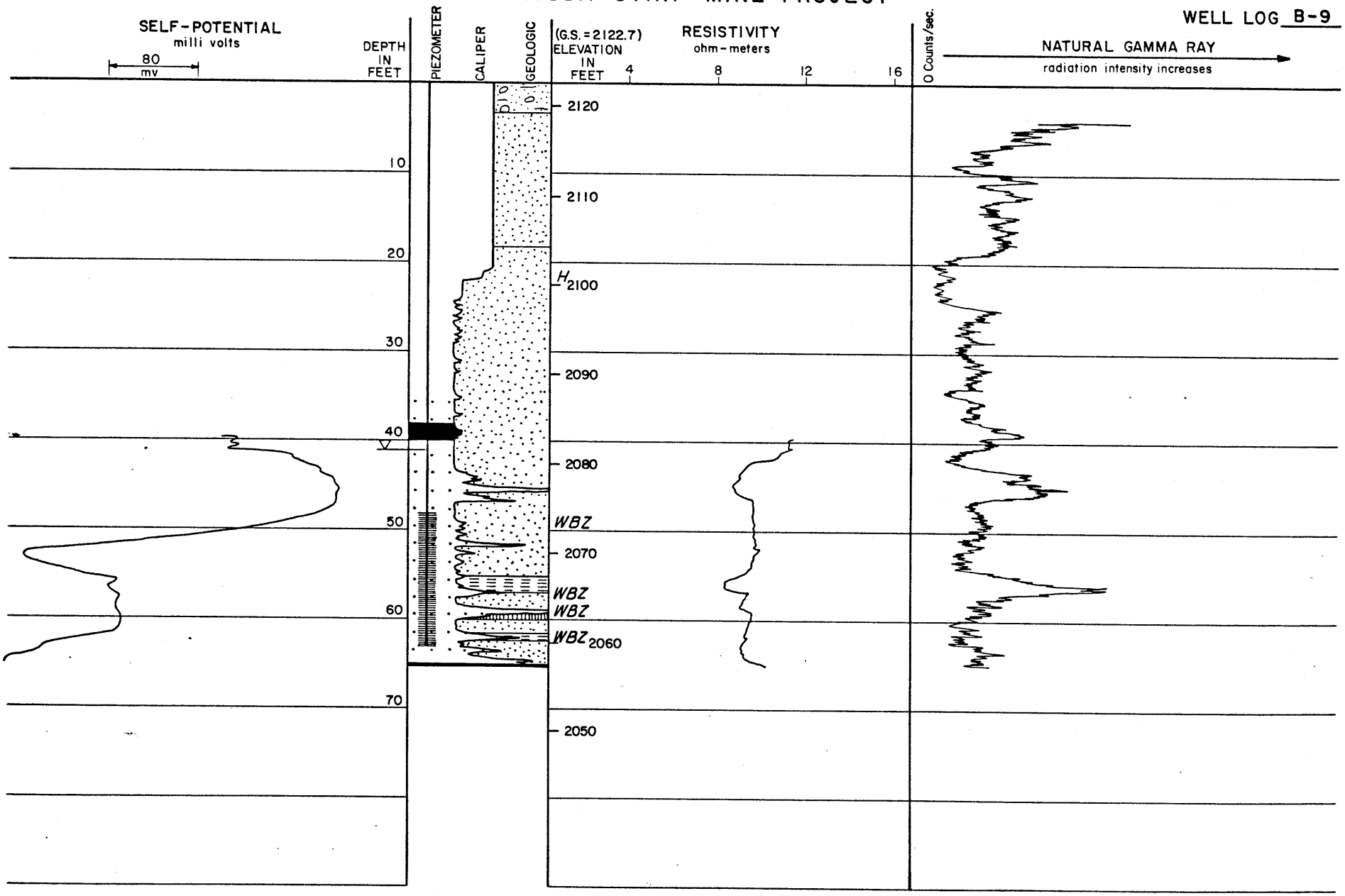

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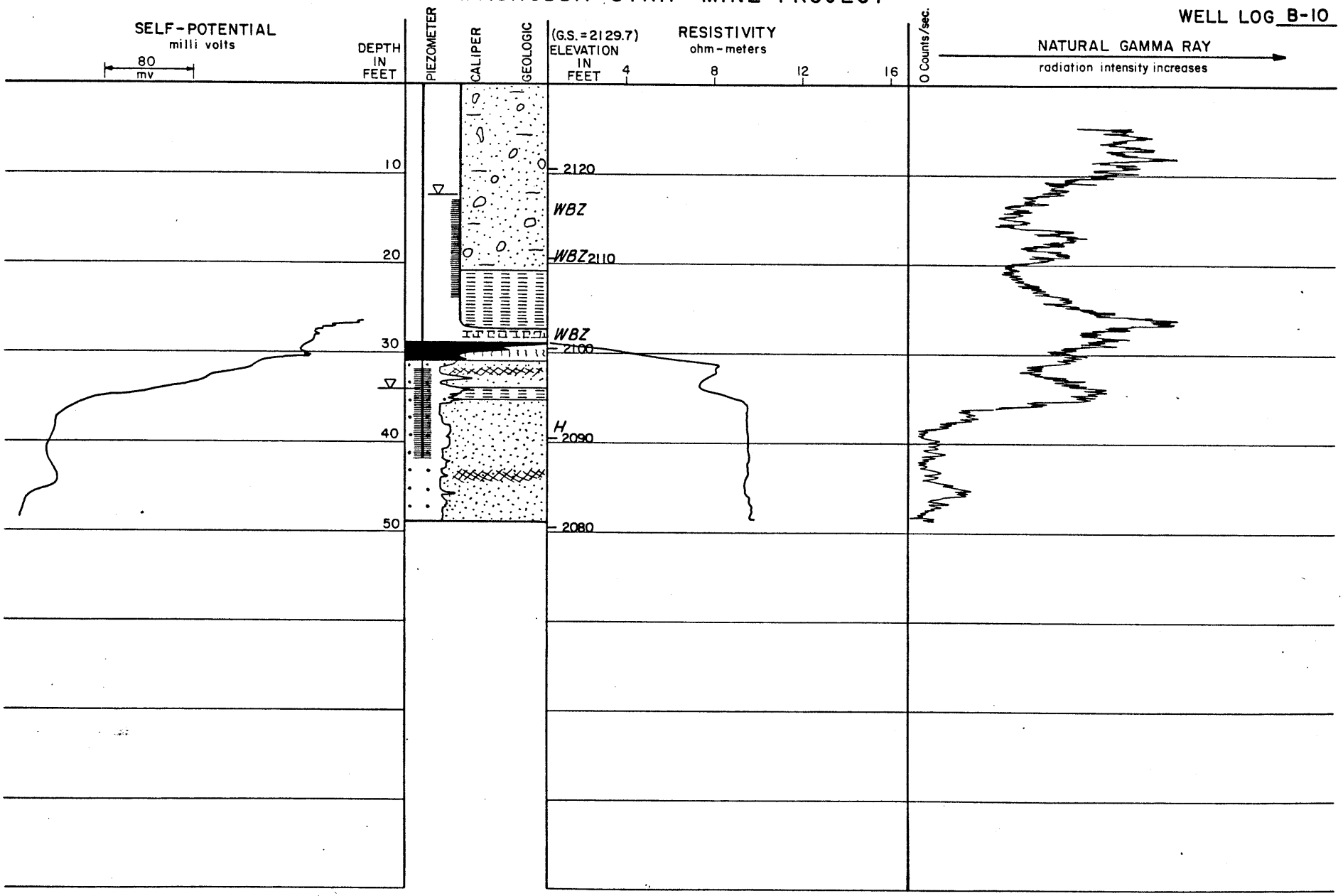

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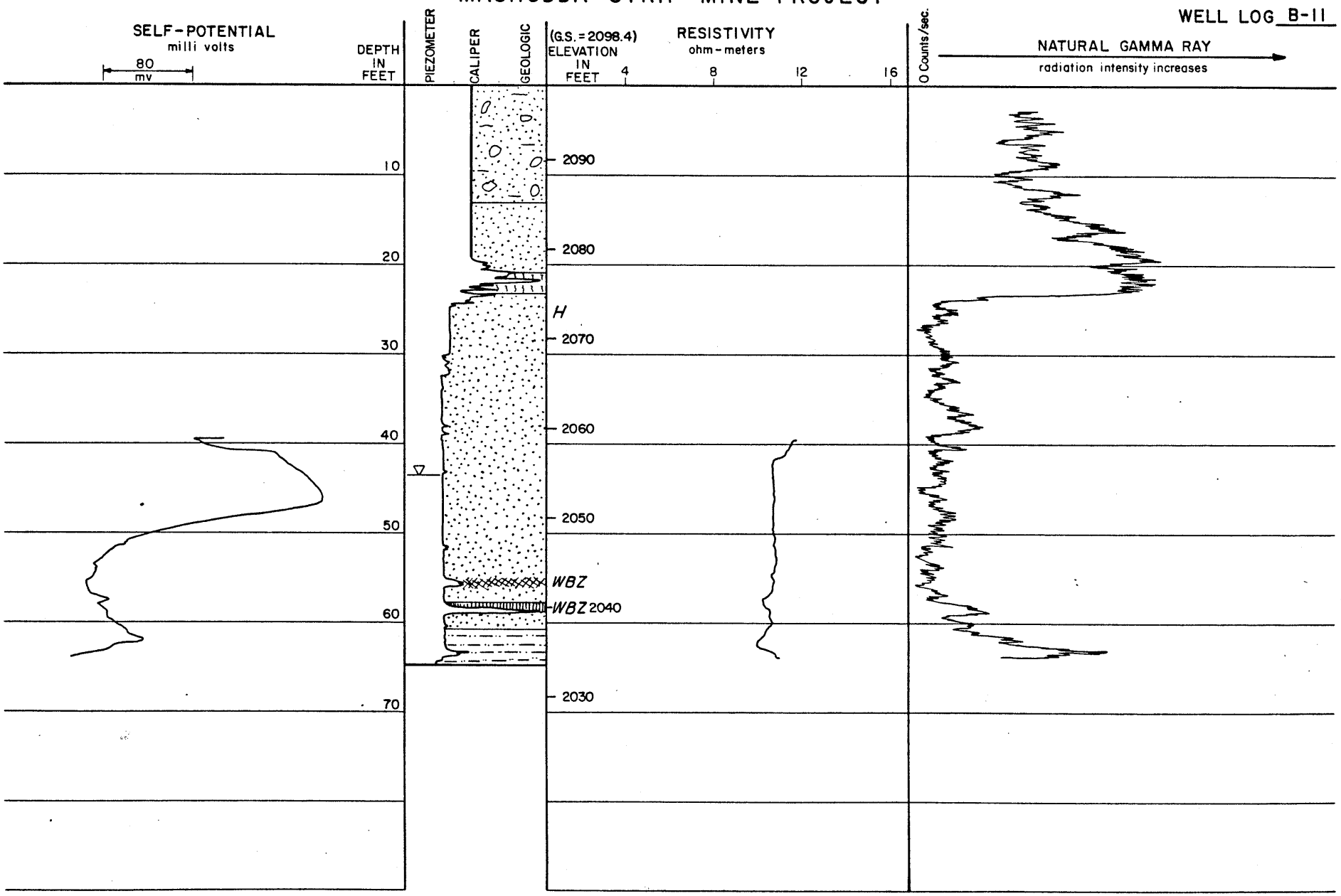
MASHUDDA STRIP MINE PROJECT

WELL LOG B-11



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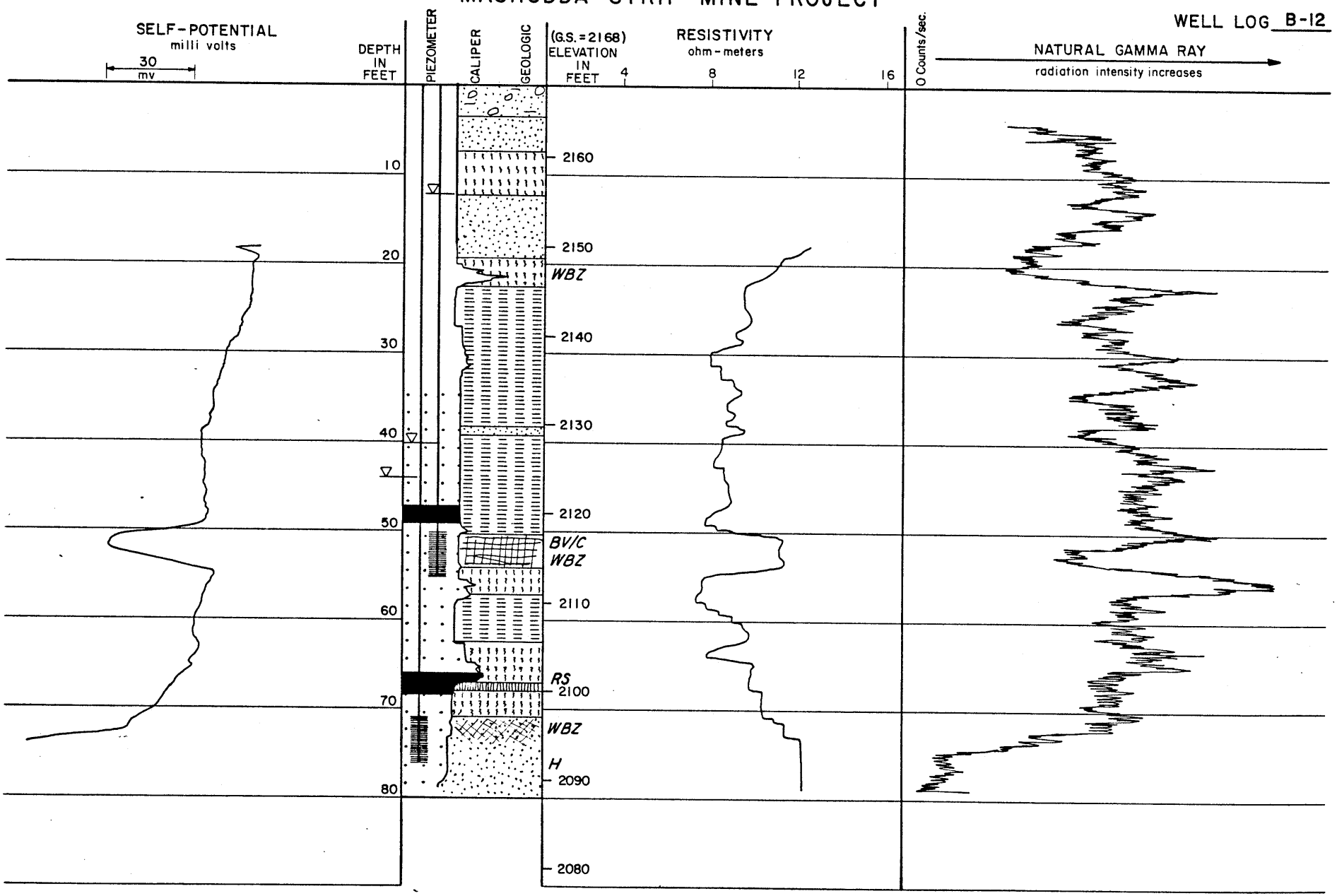

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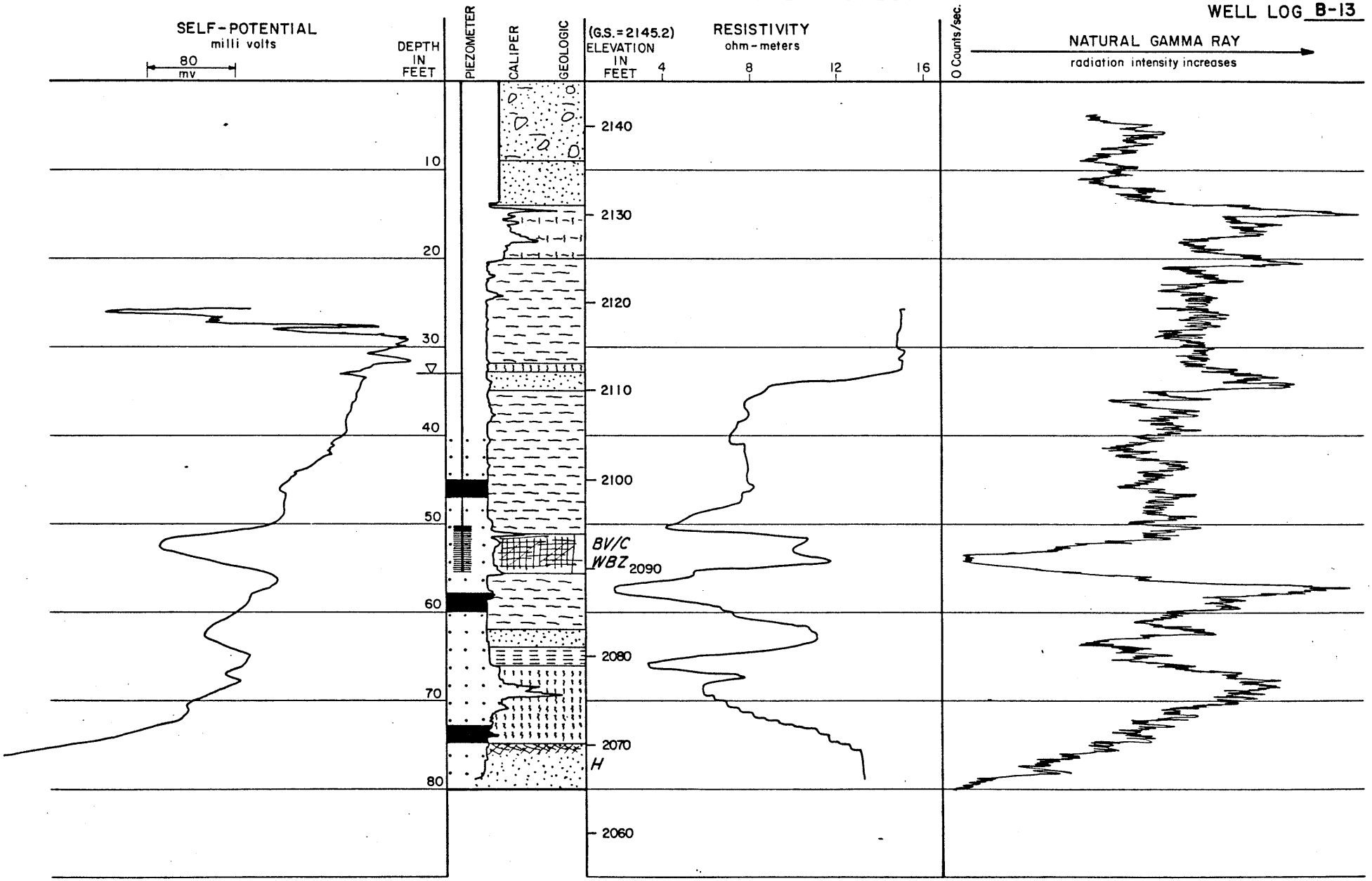
MASHUDDA STRIP MINE PROJECT

WELL LOG B-13



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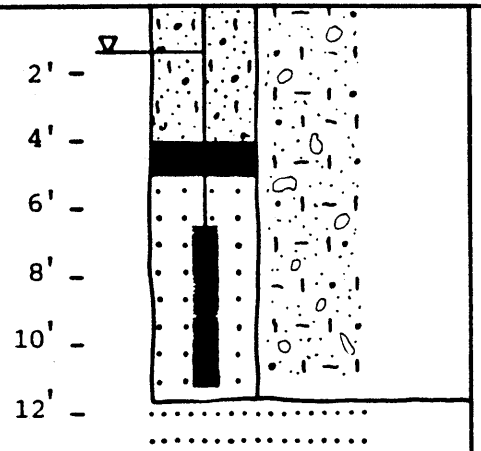
MASHUDDA STRIP MINE PROJECT

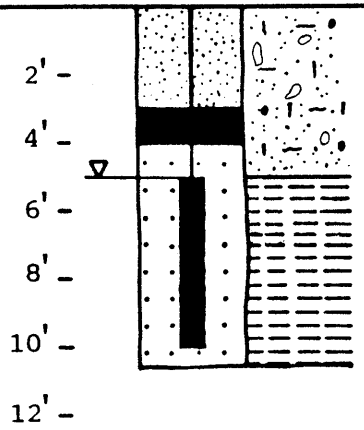
Soil Logs P-1 to P-6

P-1



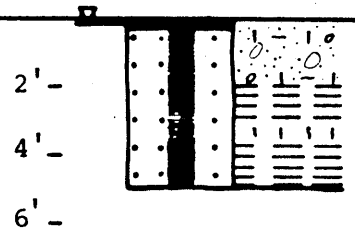
Ground Surface Elevation = 2129'

P-2



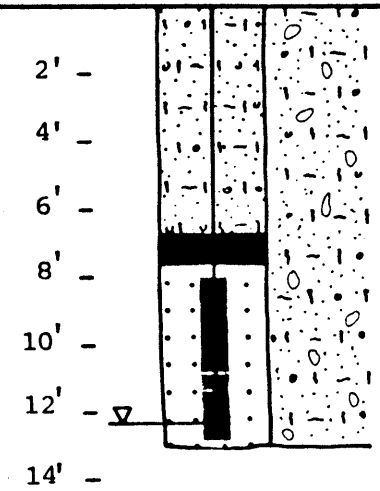
Ground Surface Elevation = 2123'

P-3



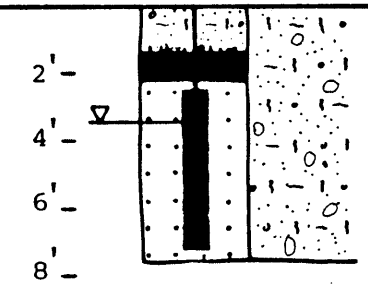
Ground Surface Elevation = 2117'

P-4



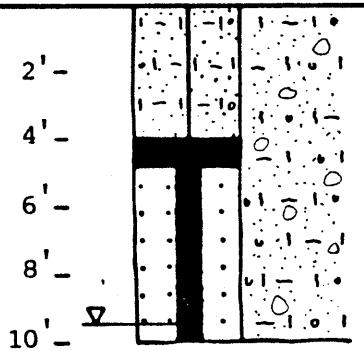
Ground Surface Elevation = 2162'

P-5



Ground Surface Elevation = 2152'

P-6



Ground Surface Elevation = 2143'

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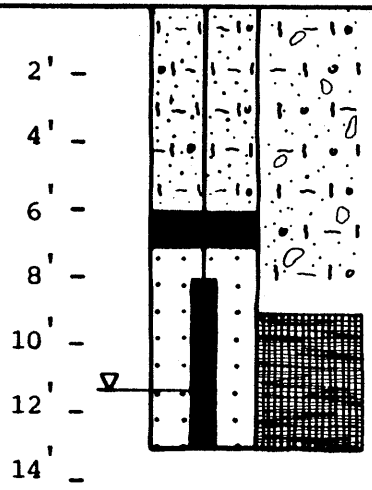
MASHUDDA STRIP MINE PROJECT

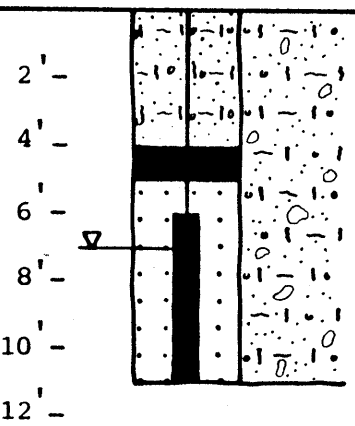
Soil Logs P-7 to P-9

P-7



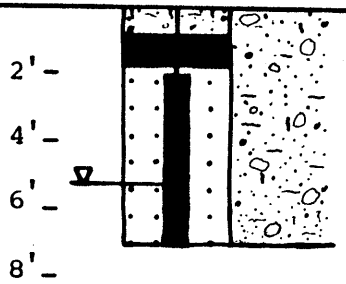
Ground Surface Elevation = 2135'

P-8



Ground Surface Elevation = 2113'

P-9



Ground Surface Elevation = 2058'

166T07

TABLE

PIEZOMETER DATA SUMMARY
(all measurements in feet)

Site	Elevation Ground Surface	Elevation TOC (1)	Piezometer Depth Interval (TOC)	Water Level (TOC) (1/17-19/84)	Water Level (TOC) (3/22/84)	Water Level (TOC) (4/30/84)
B-1	2282	2283.41	0 - 193	155	145.4	144.1
B-2	2161	2162.39	0 - 45	12	10.6	10.1
			61 - 65	24	25.6	25.2
			81 - 85	62	77.6	77.0
B-3	2125	2125.83	0 - 18	12	10.7	10.2
			26 - 31	19	17.5	17.5
			49 - 54	40	39.5	39.6
B-4	2215	2216.18	0 - 56	17	20.4	18.8
			68 - 73	31	35.5	28.6
			95 - 100	95	--	--
B-5	2158	2158.84	0 - 27	11	12.1	11.5
B-6	2134	2134.73	0 - 26	--	--	28.1
			34 - 39	32	32.9	31.7
			51 - 61	44	40.2	40.7
B-7	2115	2116.14	0 - 54	34	33.0	32.8
B-8	2158	2159.24	0 - 28	7.8	7.2	6.8
			39 - 44	34	33.1	33.3
B-9	2122	2123.50	0 - 36	--	--	29
			49 - 64	41	40.6	40.2
B-10	2129	2130.23	0 - 29	13	10.2	9.9
			33 - 43	34	34.2	34.1
B-11	2098	2099.22	0 - 66	44	40.8	40.0
B-12	2168	2168.81	0 - 36	12	10.2	9.7
			51 - 56	40	35.2	34.1
			72 - 77	44	39.2	35.2
B-13	2145	2145.71	0 - 41	--	--	10.6
			51 - 56	32	30.8	30.7

TABLE

PIEZOMETER DATA SUMMARY (cont'd)

Site	Elevation Ground Surface	Elevation TOC (1)	Piezometer Depth Interval (TOC)	Water Level (TOC) (1/17-19/84)	Water Level (TOC) (3/22/84)	Water Level (TOC) (4/30/84)
P-1	2129	(2)	6.5 - 11.5	--	1.2 (3)	1.3 (3)
P-2	2123		5 - 10	--	1.7	5.1
P-3	2117		0 - 5	--	0	0.1
P-4	2162		8 - 13	--	--	12.3
P-5	2152		2.5 - 7.5	--	0.5	3.5
P-6	2143		5 - 10	--	9.2	9.5
P-7	2135		8 - 13	--	9.9	11.4
P-8	2113		6 - 11	--	3.2	7.0
P-9	2058		2 - 7	--	--	5.3

(1) TOC = Top of steel casing.

(2) Steel protector pipes not yet installed (5/84).

(3) Ground surface water levels.