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Progress report on the hydrology of Mortandad Canyon, disposal system for treated low-level liquid radioactive wastes; July 1961 to June 1963

By

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Prepared in cooperation with and for administrative release only to the Atomic Energy Commission and the University of California, Los Alamos Scientific Laboratory, Los Alamos, New Mexico

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Abstract

The U.S. Geological Survey in cooperation with the U.S. Atomic Energy Commission and the Los Alamos Scientific Laboratory collected hydrologic data in Mortandad Canyon prior to the discharge of low-level radioactive effluents into the canyon from an industrial waste-treatment plant at technical area TA-50. The plant began operation on June 28, 1963. Prior to and following June 1963 waste water also was discharged into Effluent Canyon, a tributary to Mortandad Canyon, from technical area TA-48 and from the New Sigma Building of the head of Mortandad Canyon.

Nine observation wells finished in the alluvium and nine access tubes to study the moisture distribution in the alluvium and tuff were constructed in the canyon during the period from July 1961 to June 1963. Two gaging stations were built, and equipped with semicontinuous recorders to monitor surface flow in the canyon.

Waste water from the plants in TA-48 and New Sigma Building and storm runoff constitute the surface flow on the canyon floor. The alluvium in the canyon is highly permeable and accepts recharge readily; the underlying Tshirege and Otowi Members of the Bandelier Tuff are much less permeable and accept recharge very slowly, the Tshirege more slowly than the Otowi. The chemical quality of water in the alluvium changes slightly as the water moves eastward downgradient. The change may be related to differences in the bedrock beneath the alluvium; the Tshirege underlies the alluviun on the west, the Otowi on the east.

Chemical and radiochemical analyses of water provide background radioactivity data. Analyses of samples of alluvium and tuff provide background-radioactivity data of materials on the canyon floor. Gamma-radiation logs of observation wells, access tubes, and a test well provide additional background monitoring information and aid in computing storage for the effluents in the alluvium.

Introduction

The U.S. Geological Survey in cooperation with the U.S. Atomic Energy Commission and the Los Alamos Scientific Laboratory collected hydrologic data in Mortandad Canyon prior to the discharge of low-level radioactive effluents into the canyon from the industrial-waste-treatment plant at technical area TA-50. The new plant began operation June 28, 1963. Previous to and following June 1963 waste water also was discharged to the Mortandad drainage system from technical area TA-48 and New Sigma Building. The hydrologic data is to provide background monitoring data on the chemical and radiochemical quality of water and on radioactivity of the alluvium in Mortandad Canyon. The hydrologic data will be used to establish guidelines for monitoring the movement of water through the canyon and for future hydrologic observations.

A preliminary study of the geology and hydrology of Mortandad Canyon was summarized in a report for the period from October 1960 to June 1961 (Baltz and others, 1963). The present report summarizes work done from July 1961 to June 1963. The study is being continued as the low-level radioactive effluents are being discharged from the treatment plant into the canyon.

Well and access-tube designation

Observation wells and moisture access tubes in Mortandad Canyon are numbered consecutively downgradient from west to east (fig. 1).

Figure 1.--Geologic map showing locations of gaging stations, observation wells, access tubes, and test wells in Mortandad Canyon, Los Alamos area, New Mexico.

The observation wells and access tubes are indentified by the following:

Prefix MCO - observation well,

Prefix TW - test well,

Prefix MCM - access tube in Mortandad Canyon,

Prefix TSCM - access tube in 10-Site Canyon,

Prefix TSCO - observation well in 10-Site Canyon,

Prefix MCS - Surface water and alluvium sampling stations

Suffix A and B - Wells drilled in 1961

Decimal suffixes - indicate additional access tubes constructed in 1961

Most of the moisture access tubes are in seven lines. Tubes in a line are lettered consecutively from south to north, and each line of access tubes contains one observation well. Tube numbers that have not suffixes or that have decimal suffixes indicate tube location between lines.

Surface-water and alluvium sampling stations are numbered downgradient from west to east and are designated as gaging stations 1 and 2 and sampling stations MCS-3.2, MCS-3.8, MCS-3.9.

Test drilling and well and access tube construction

Nine access tubes to measure the moisture content of alluvium and underlying tuff were constructed in Mortandad Canyon and its tributary 10-Site Canyon in November and December 1961 (Table 1). Four of the access tubes were constructed in alluvium; the other five tubes were constructed to measure the infiltration of water into the tuff from the stream channel or from the alluvium. Two of the access tubes in the tuff (MCM-2.2 and MCM-2.8) were set in holes drilled at an angle into the tuff beneath the stream channel. The annular space between the wall of the holes and the tubes was filled with crushed tuff and compacted to approximate the density of the undisturbed tuff. The other three tubes in the tuff (MCM-4.5, MCM-6.5, and MCM-7.5) were constructed by setting 5-inch steel casings through the alluvium to seal out the water and then drilling into the underlying tuff. A 2-inch diameter plastic pipe was set into the tuff, and the annular space between the walls of the hole and tube was filled and compacted with crushed tuff.

MCO-6.5A and MCO-6.5B do not penetrate the full thickness of alluvium and are dry except when recharge to the alluvium is sufficient to raise the ground-water levels above the bottom of the wells. MCO-7.5 and MCO-8.2 penetrate the full thickness of alluvium. MCO-8A, MCO-9.5, MCO-11, MCO-12 and TSCO-1 are dry; however, they were cased to provide additional wells for observation.

Two 6-inch modified, Parshall flumes were permanently installed in the stream channel. They are equipped with semicontinuous water-stage recorders to obtain a continuous record of surface flow.

Table 1.--Logs and casing schedules of moisture access tubes and observation wells in Mortandad and 10-Site Canyons, November and December 1961.

Hole designation	Diameter of Casing (inches)	Length of plastic casing below land surface (feet)	Log	
			Alluvium (feet)	Bandelier Tuff (feet)
MCM-2.2	2	82		82
2.8	2	58		58
4.5	1/ 2	48	26	22
4.8	2	33	30	3
6.5	2/ 2	95	46	49
7.5	3/ 2	94	61	33
10	2	67	62	5
12	2	42	42	
TSCM - 1	2	22	22	
MCO - 6.5A	2	45	45	
6.5B	4	4/ 42	42	
7.5	3	60	60	
8A	2	50	50	
8.2	2	70	70	
9.5	2	46	46	
11	2	20	20	
12	2	60	60	
TSCO- 1	2	35	35	

1/ Double cased - 29 feet of 4-inch steel casing

2/ Double cased - 51 feet of 4-inch steel casing

3/ Double cased - 66 feet of 4-inch steel casing

4/ 20 feet of 4-inch plastic casing; 22 feet of 4-inch steel casing

Hydrology

Surface water

Surface water entering the Mortandad Canyon disposal area is measured at gaging station 1, below the confluence of Effluent and Mortandad Canyons (fig. 1). Gaging station 2 is about 1 mile downstream. The loss or gain in surface flow between the two gaging stations is computed from records from the two stations (table 2).

Water entering the canyons during the period from July 1961 to June 1963 consisted of storm runoff and waste water from technical area TA-48 and the New Sigma Building. The water from TA-48, which averages about 10 gpm (gallons per minute), is discharged into Effluent Canyon about $1\frac{1}{4}$ miles west of gaging station 1. A small part of this water reached the confluence of Effluent and Mortandad Canyons during the months of July, August, and part of September when precipitation was high. Waste water used in a cooling process at New Sigma Building contributed most of the surface water flow in Mortandad Canyon. Four periods of waste water discharge were recorded, and the amounts that passed through gaging station 1 are shown below.

Date	Flow duration	Total gallons
August-September 1962	20 days	5,250,000
February-March 1963	29 days	6,500,000 (estimated)
April 1963	14 days	4,500,000
June 1963	9 days	2,000,000

The gage wells at station 1 and 2 were frozen during January, February and the early part of March 1963, and the amounts of water passing through th gaging station for February and first part of March are estimated.

Table 2.--Surface water records at gaging stations 1 and 2 and loss between stations.

Month	Gaging Station Number 1 (gallons)	Gaging Station Number 2 (gallons)	Loss between gaging stations (gallons)	Precipitation S = snow R = rain (inches of water)
March 1962	140,000	0	140,000	.58 S
April	129,000	0	129,000	.54 R and S
May	0	0	0	.05 R
June	0	0	0	.34 R
July	2,832,000	1,007,000	1,825,000	4.81 R
1/ August	3,388,000	661,000	2,727,000	1.10 R
1/ September	4,609,000	3,282,000	1,357,000	2.92 R
October	969,000	0	969,000	.83 R
November	1,196,000	0	1,196,000	1.18 R
December	879,000	0	879,000	1.59 R
2/ January,1963	-	-	-	1.04 S
3/ February	-	-	-	1.78 S
3/ March	6,253,000	5,266,000	987,000	1.21 S
4/ April	5,152,000	4,283,000	869,000	.41 R and S
May	121,000	0	121,000	.23 R
5/ June	2,153,000	267,000	1,886,000	1.25 R

1/ Discharge of cooling water from New Sigma Building, began Aug 22 and ended Sept. 12.

2/ Gage well frozen, no record

3/ Gage well frozen, estimated March 11 to 31. Discharge from New Sigma Building began in late February and ended March 26.

4/ Discharge of cooling water from New Sigma Building began April 2 and ended April 16.

5/ Discharge of cooling water from New Sigma Building began June 11 and ended June 19.

An estimated 1.8 million gallons of water passing gaging station 1 at 250 to 300 gpm is required to saturate the alluvium between gaging stations 1 and 2. The loss between the two stations when the alluvium is saturated varies during early spring and summer due to different rates of evapotranspiration. About 40,000 gpd (gallons per day) was lost to the saturated alluvium in early April when evapotranspiration was at a minimum. The loss in August and September, when evapotranspiration is at a maximum, averaged about 60,000 gpd.

Surface water will flow on fully saturated alluvium and then will infiltrate into the first unsaturated alluvium downstream; therefore, the section of fully saturated alluvium will be extended downgradient only when the amount of surface flow exceeds the amount needed to keep the alluvium saturated. Part of the water in the alluvium moves downgradient, and a part infiltrates into the underlying tuff. Presently, recharge is sufficient to maintain water in the alluvium as far downgradient as MCO-8.2.

Ground water in the alluvium

The alluvium at MCO-5 and to the west is underlain by and is derived from the Tshirege Member; the lower alluvium at MCO-6 and to the east is underlain by and derived from the Otowi Member; the upper part is derived from the Tshirege Member. The lower part of the alluvium is saturated. Some water is moving into the underlying tuff from the alluvium, but the tuff is not saturated.

Water in the alluvium is recharged from storm runoff and from periodic discharge of waste water from New Sigma Building. Recharge from storm runoff in the summer of 1961 and spring of 1962 raised the water levels only slightly in observation wells east of MCO-7 (fig. 2).

Figure 2.--Monthly average water levels in selected observation wells in Mortandad Canyon, Los Alamos area, New Mexico.

Storm runoff and cooling water in the summer of 1962 and spring of 1963 caused a larger water-level rise in these wells. The volume of alluvium becomes greater (the canyon widens and alluvium thickens) eastward from MCO-6 so that available storage for water is larger. The water levels in wells east of MCO-6 rise progressively less due to the increasing area for storage and the greater loss of water from the alluvium into the tuff in this area.

The rate of movement of water in the alluvium increased from August-September 1962 to March-April 1963. The August-September recharge caused a water-level rise in MCO-8 in about 85 days and the March-April recharge caused a similar rise in MCO-8 in about 70 days.

Moisture distribution in the alluvium and tuff

The moisture content was determined by a counter and a neutron-scattering moisture probe that was lowered into access tubes in the alluvium and the tuff. As previously stated, there are seven lines of access tubes across the canyon; numbered from west to east (downgradient). Several access tubes are located between lines. The moisture contents of the alluvium (lines 2, 4, 5, 6, and 8 and MCM-4.8, MCM-10, and TSCM-1) and tuff (lines 1 and 2) did not change significantly from one measurement to another. The moisture content in the upper few feet of alluvium or tuff varied due to prevailing weather conditions at the time the measurements were made. The moisture content in the capillary fringe, above the saturated alluvium, changed in response to water-level fluctuations in the alluvium.

Moisture measurements in access tubes in the alluvium indicate that precipitation on the canyon floor may be a source of recharge to the water in the alluvium west of line 5, where the ground water is relatively close to the land surface. East of line 5, precipitation on the canyon floor infiltrates to a depth of from 4 to 8 feet and is returned to the atmosphere by evapotranspiration.

Five access tubes were constructed in November 1961to use to study the infiltration of water from the stream channel or from the alluvium into the underlying tuff. The natural moisture content of the tuff ranges from less than 2 percent to about 4 percent by volume. Two access tubes MCM-22 and MCM 2.8 were set in holes drilled at an angle of about 30 degrees beneath the stream channel in the upper part of the canyon (fig. 1). The access tubes are in a welded unit of the Tshirege Member. The moisture content of the welded tuff beneath the stream channel ranged from 12 to 28 percent by volume. Access tube MCM-4.5 is vertical and is finished in a moderately welded unit of the Tshirege Member. The moisture content of this tuff ranged from 15 to 18 percent by volume beneath the water in the alluvium. Access tubes MCM-6.5 and MCM-7.5 are vertical and are finished in the nonwelded tuff of the Otowi Member. The moisture content of this tuff beneath the water in the alluvium ranged from 22 to 48 percent by volume.

Because the moisture content of the tuff in the five holes is greater than the natural moisture content of the tuff there must be some water moving from the stream channel and from the alluvium into the underlying tuff. The moisture content of the tuff adjacent to access tubes is less than the porosity of the tuff; therefore, the movement of water through the tuff is unsaturated flow. The high moisture content and the relatively high permeability of the nonwelded tuff of the Otowi Member as compared with the welded tuff of the Tshirege Member indicates that the largest amount of water is being transmitted through the tuff in the section of the canyon where the alluvium overlies the Otowi Member. The Otowi Member underlies the alluvium from near MCO-6 eastward.

Chemical and radiochemical quality of water

Discharge from New Sigma Building, surface flow, water from observation wells, and water from test wells were analyzed to obtain background data prior to the discharge of treated effluent into the canyon from TA-50 (table 3). Additional chemical and radiochemical analyses were made of water from MCO-5 and MCO-7 (table 4).

The chemical quality of water changes slightly as the water moves eastward through the alluvium. The calcium content decreases from MCO-1 to MCO-5 then increases from MCO-6 eastward. This quality change may be related to differences in the bedrock under the alluvium; the Tshirege underlies the alluvium to the west, the Otowi Member on the east. The sodium and bicarbonate contents decrease downgradient (table 3).

The results of radiochemical analyses of water in the alluvium indicate no plutonium and only background amounts of uranium. Beta (gamma) activity of 2,000 dml (disintegrations per minute per liter) was reported from MCO-6.5A. This contamination was probably from effluent discharged into 10-Site Canyon. MCO-6.5A is at the confluence of 10-Site and Mortandad Canyons (fig. 1). Beta (gamma) activity above background was also reported in water from test well TW-8A, from test well TW-8, and in waste water from New Sigma Building. The cause of the reported contamination of water from test well TW-8A may be due to fallout of radioactive particles from gases that are vented from the laboratory at 10-Site. The cause of contamination of water from New Sigma Building and from test well TW-8 is unknown.

Table 4.--Chemical and radiochemical analyses of water from MCO-5 and MCO-7.

(Analyses by U. S. Geological Survey)

MCO-5

Date collected: 9/5/62		Lab. No. 4939	
Chemical components		Physical characteristics	
Parts per million (ppm)		and computed values	
Silica (SiO_2)	26	Dissolved solids (ppm)	
		Res. on evap. at 180° C.	156
Aluminum (Al)	8.5	Calculated	135
Iron (Fe)	.13	Hardness at $CaCO_3$ (ppm)	
		Total	32
Manganese (Mn)	.00	Non-carbonate	0
Calcium (Ca)	8.0	Specific conductance (micromhos at 25°C)	166
Magnesium (Mg)	2.7		
Strontium (Sr)	.32	pH	6.3
Sodium (Na)	27	Color	-
Potassium (K)	2.8	Temperature (F°)	48
Lithium (Li)	.00	Radiochemical data	
Bicarbonate (HCO_3)	78	Alpha activity (pc/l) as of 12-7-62	4.6±4.5
Carbonate (CO_3)	0	Beta activity (pc/l) as of 11-28-62	23±4
Sulfate (SO_4)	14	Radium (Ra) (pc/l)	0.6±0.1
Chloride (Cl)	7.2	Uranium (U) (ug/l)	0.7±0.4
Fluoride (F)	.2	Extractable alpha activity (net) (pc/l)	0.2±0.2
Nitrate (NO_3)	.9		
Phosphate (PO_4)	.04	Strontium 90 (pc/l)	0.5±0.5

Table 4.--Continued

(Analyses by U. S. Geological Survey)

MCO-7

Date collected: 9/5/62		Lab. No. 4940	
Chemical components Parts per million (ppm)		Physical characteristics and computed values	
Silica (SiO_2)	38	Dissolved solids (ppm)	
		Res. on evap. at 180°C	144
Aluminum (Al)	.09	Calculated	126
Iron (Fe)	.07	Hardness as $CaCO_3$ (ppm)	
		Total	46
Manganese (Mn)	.49	Non-carbonate	0
Calcium (Ca)	12	Specific conductance	
		(micromhos at 25°C)	161
Magnesium (Mg)	3.9		
Strontium (Sr)	.18	pH	6.3
Sodium (Na)	14	Color	-
Potassium (K)	3.6	Temperature (F°)	49
Lithium (Li)	.00	Radiochemical data	
Bicarbonate (HCO_3)	66	Alpha activity (pc/l)	
		as of 11-28-62	13±11
Carbonate (CO_3)	0		
Sulfate (SO_4)	14	Beta activity (pc/l)	
		as of 11-28-62	21±3
Chloride (Cl)	7.6	Radium (Ra) (pc/l)	1.4±0.3
Fluoride (F)	.1	Uranium (U) (ug/l)	1.1±0.2
Nitrate (NO_3)	.7	Extractable alpha	0.3±0.3
		activity (net) (pc/l)	
Phosphate (PO_4)	.08		
		Strontium 90 (pc/l)	<0.6

Radioactivity in alluvium and tuff

Samples of alluvium and tuff were collected and analyzed for gross-alpha and gross-beta activity during construction of observation wells and access tubes from October 20 to November 10, 1960 (table 5). Gross-alpha and gross-beta activity was near background; however, some high gross-beta activity was reported in samples from wells or access tubes in lines 1, 2, 5, 6 and 8.

Samples of alluvium were collected from the stream channel in Mortandad Canyon on May 22, 1963, and were analyzed for radioactivity (table 6). Gross-alpha and gross-beta activity was near background; however, samples from most of the stations contained some gross-beta activity.

The gross-beta activity reported in samples collected in 1960 and 1963 may be the result of fallout of radioactive particles from gases that were vented from the laboratories at 10-Site with precipitation moving the particles into the alluvium.

Table 5.--Radiochemical analyses of alluvium and tuff from construction of observation wells and access tubes, October 20 through November 10, 1960. (Analyses by the Los Alamos Scientific Laboratory. Results are reported in counts per minute per gram of dry material.)

Observation well or moisture access tube	Depth below land surface					
	1 foot		2 feet		3 feet	
	Gross alpha	Gross beta	Gross alpha	Gross beta	Gross alpha	Gross beta
MCM - 1A	1.4	6.0	1.6	0.0		
MCO- 1	1.1	0.0	1.5	31.0		
MCM - 1B	1.5 1.3	2.5 3.0	1.1 1.4	7.0 12.8		
MCM - 2A	1.7	.0	1.6	.0		
MCO - 2	1.4 1.4	10.0 5.2	2.1 1.8	.0 <.5		
MCM - 3A	1.6	.0	1.3	.0		
MCM - 3B	1.0 1.3	<.5 .0	.7 1.0	.0 <.5		
MCM - 4A	1.2	4.5	1.7	.0		
MCO - 4	.6	.0	.8	.0		
MCM - 4B	1.4 1.0	2.7 3.0	1.6 1.4	.0 <.5		
MCM - 5A	1.6	8.0	2.1	.0		
MCM - 5B	1.0	.0	1.8	2.5		
MCO - 5	.9	.5	.3	.0		
MCM - 5C	1.6 1.3	2.4 .0	.4 1.2	.0 1.0		
MCM - 6A	.8	1.0	1.3	6.0	0.7	6.0
MCM - 6B	.5	2.0	.8	.0	.3	4.5
MCM - 6C	-	-	.4	.0	.7	.0
MCO - 6	.9	.0	.8	.0	.7	.0
MCM - 6D	.8	.0	1.2	2.5		
MCM - 6E	1.2 .8	2.3 9.5	1.3 1.0	.0 1.8		
MCM - 8A	1.5	16.0	1.1	21.0		
MCM - 8B	.9	26.0	1.4	20.5		
MCO - 8	2.0	29.5	1.9	15.5		
MCM - 8C	1.1	18.5	2.0	19.0		
MCM - 8D	1.4	17.0	.7	21.0		
MCM - 8E	1.3	11.5	2.2	18.5		
MCM - 8F	1.7 1.4	21.5 20.0	3.0 1.8	41.5 22.4		

Table 6.--Radiochemical analyses of alluvium from the stream channel May 22, 1963 (Analyses by the Los Alamos Scientific Laboratory. Results are reported in counts per minute per gram of dry material.)

Type of activity	Depth below land surface	Sampling stations							
		Gaging station No. 1	MCS-3	MCS-3.2	MCS-3.8	MCS-4	MCS-5	MCS-6	MCS-7
Gross alpha	Surface	1	0	5	2	1	2	2	1
	1 foot	1	1	1	2	1	0	1	0
	2 feet	3	1	2	2	0	2	2	1
	3 feet	2	-	1	2	1	1	3	3
Gross beta	Surface	159	2	8	2	27	10	36	28
	1 foot	22	13	0	32	2	0	0	0
	2 feet	11	0	0	0	4	0	9	0
	3 feet	3	-	0	0	31	15	8	21
Radioactive strontium	Surface	5	-	-	-	-	-	-	-
	1 foot	-	-	-	-	-	-	-	-
	2 feet	-	-	-	-	-	-	-	-
	3 feet	-	-	-	-	-	-	-	-

Conclusions

Surface water in Mortandad Canyon from July 1961 to June 1963 consisted of storm runoff and waste water discharged from TA-48 and New Sigma Building. Cooling water from New Sigma Building contributed the largest amount of surface flow. Surface water in the canyon recharges the water in the alluvium. The water then moves eastward in the alluvium along the upper surface of the Bandelier Tuff. An estimated 1.8 million gallons of water discharged through gaging station 1 at a rate of from 250 to 300 gpd is required to saturate the alluvium in the canyon between gaging stations 1 and 2. The loss between the two gaging stations when the alluvium is saturated is about 40,000 gpd in the early spring when evapotranspiration rates are low and about 60,000 gpd during the summer when evapotranspiration rates are high; therefore, the alluvium and tuff underlying the stream channel will transmit about 40,000 gpd between the two gaging stations. Part of the 40,000 gpd moves eastward in the alluvium and part moves downward, as unsaturated flow, into the tuff.

Moisture measurements in the tuff underlying the water in the alluvium indicate that the largest loss of water from the alluvium is into the Otowi Member of the Bandelier Tuff near MCO-6 and eastward; however, moisture measurements indicate that some water is lost from the stream channel and alluvium into the Tshirege Member west of MCO-6.

The chemical quality of water changes slightly as the water moves downgradient through the alluvium. The calcium content decreases from MCO-1 to MCO-5 then increases from MCO-6 eastward. This quality change may be due to the change in bedrock underlying the alluvium between MCO-5 and MCO-6. The sodium and bicarbonate contents decrease downgradient.

Radioactive contamination of water and soil may be due to effluent discharged from the laboratory at 10-Site or to fallout of radioactive particles from gases that were vented into the atmosphere at 10-Site. Contamination was found in water from test well TW-8 and in cooling water from New Sigma Building. The cause of this contamination is unknown.

References

Baltz, E. H., Abrahams, J. H., Jr., and Purtymun, W. D., 1963, Preliminary report on the geology and hydrology of Mortandad Canyon near Los Alamos, N. Mex., with special reference to disposal of liquid low-level radioactive wastes; U.S. Geol. Survey open-file report, 105 p., 13 figs.

Figure 3.--Gamma-radiation log MCO-4.

Field No. MCO-4 Casing diameter (inches) 2 Length of casing below land surface (ft) 23.5 Depth to water below land surface (ft) dry

Logging datum land surface

Altitude of land surface (ft) 6,900.4

Date 11-28-61 Equipment USGS I-65717

Logging Data

Run No. 2 of 2 runs. Probe sensitivity High. Logged out 12 ft/min

Gamma-Ray circuit scale 0.05 Potential circuit scale 5 Time constant 10

Statistical Variation 1/4 in. at 20 ft G-R Scale 0.05 Time constant 10

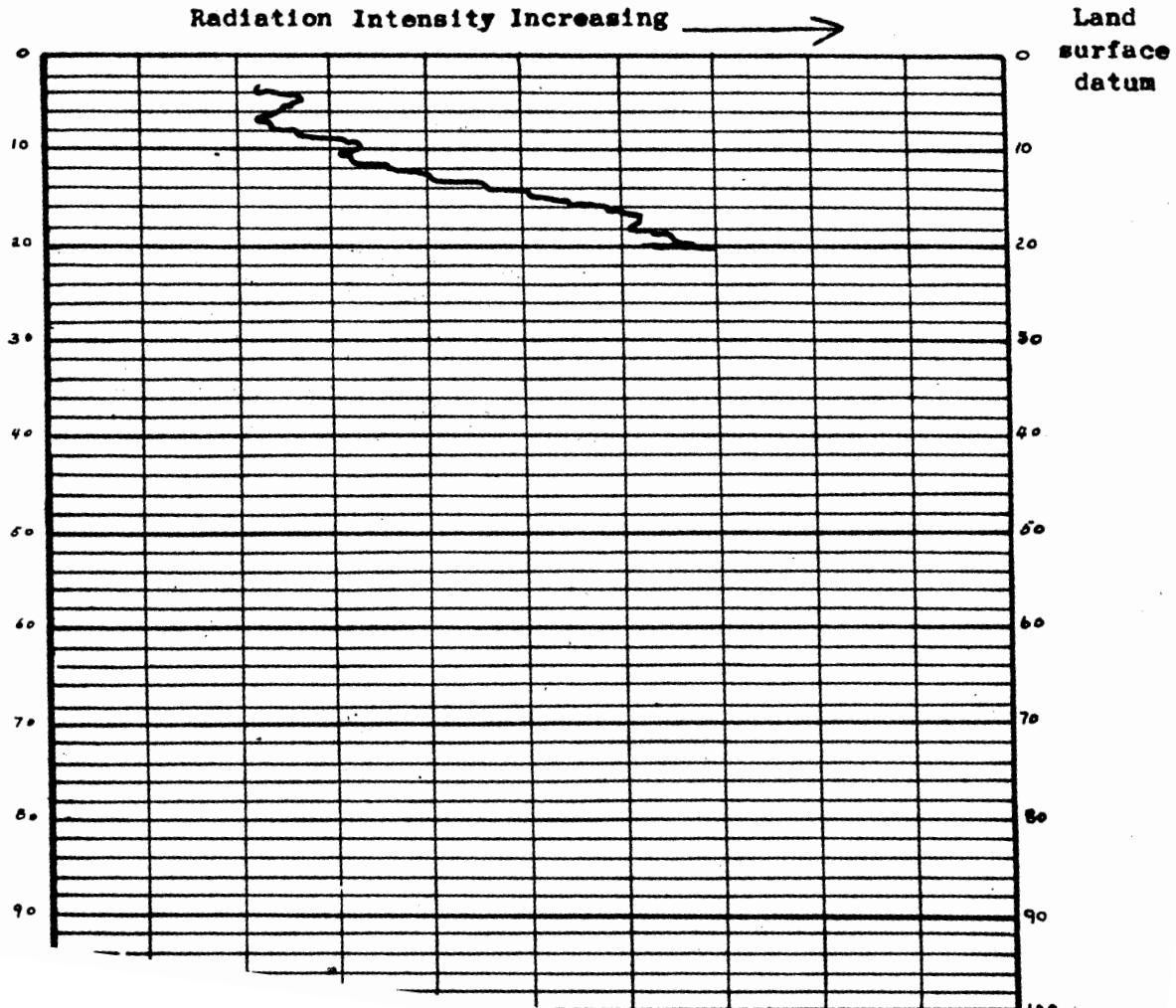
Calibration in hole: (G-R Scale 0.05 Pot. circ. scale 5)

Depth (ft)	Obs. Time (min)	Meter Reading
20	1	0.007 MRH

Remarks Plastic casing

Depth Scale 20 ft /in.

Radiation Intensity Increasing →



ure 4.--Gamma-radiation log MCO-5.

ield No. MCO-5 Casing diameter (inches) 3 Length of casing below land
urface (ft) 38.5 Depth to water below land surface (ft) 21.6
Logging datum land surface
Altitude of land surface (ft) 6,876.7 Equipment USGS I-65717
Date 11-28-61

Logging Data

Run No. 1 of 1 runs. Probe sensitivity High. Logged out 12 ft/min
Gamma-Ray circuit scale 0.01 Potential circuit scale 5 Time constant 10
Statistical Variation 1/8 in. at 32 ft G-R Scale 0.01 Time constant 10
Calibration in hole: (G-R Scale 0.01 Pot. circ. scale 5)

Depth (ft)	Obs. Time (min)	Meter Reading
32	1	0.0062 MRH

Remarks Plastic casing

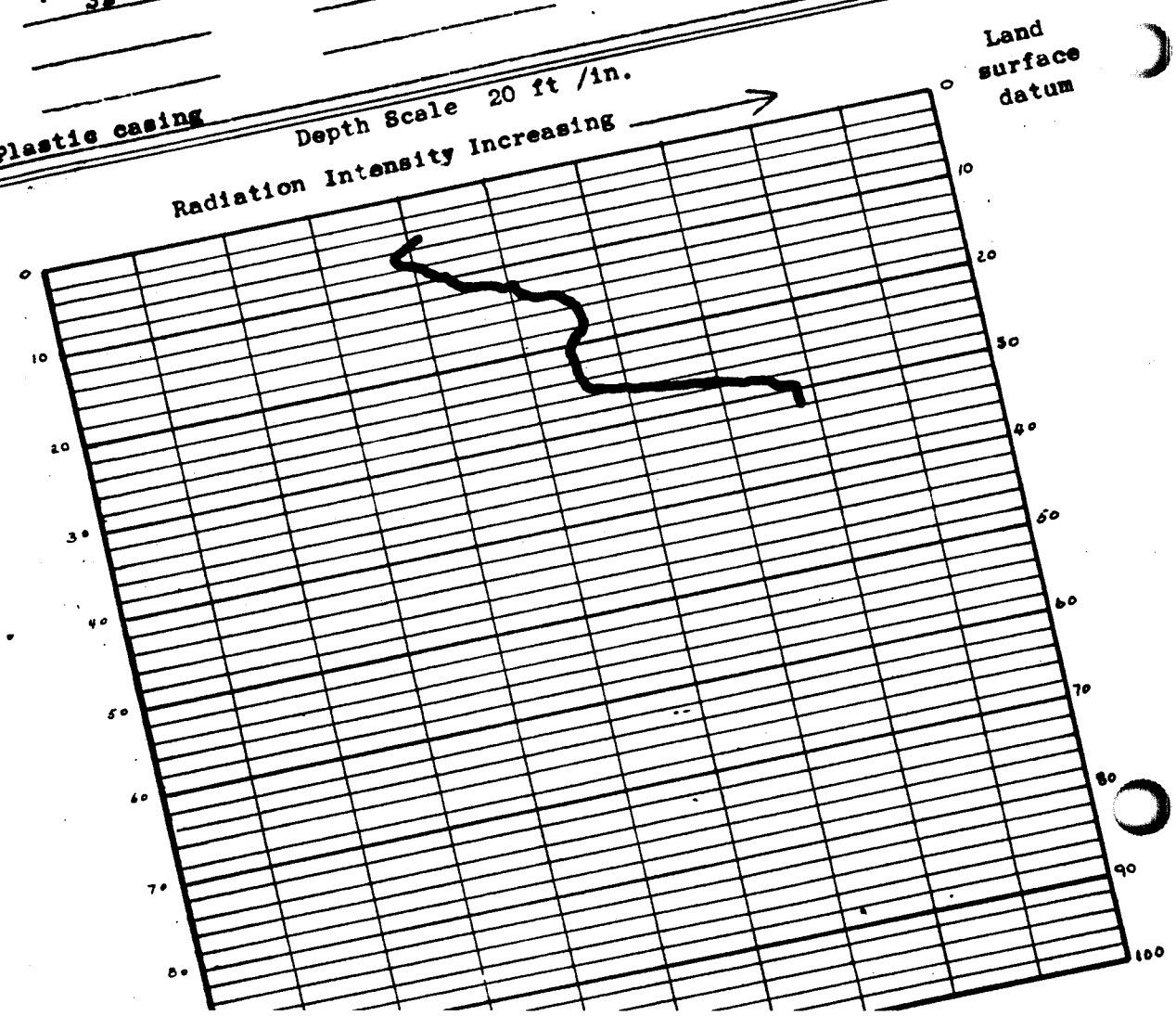


Figure 5.--Gamma-radiation log MCO-6.

Field No. MCO-6 Casing diameter (inches) 3 Length of casing below land surface (ft) 70.7 Depth to water below land surface (ft) 32.5

Logging datum land surface

Altitude of land surface (ft) 6,848.9

Date 11-28-61 Equipment USGS I-65717

Logging Data

Run No. 1 of 1 runs. Probe sensitivity High. Logged out 12 ft/min

Gamma-Ray circuit scale 0.01 Potential circuit scale 5 Time constant 10

Statistical Variation 1/4 in. at 62 ft G-R Scale 0.01 Time constant 10

Calibration in hole: (G-R Scale 0.01 Pot. circ. scale 5)

Depth (ft)	Obs. Time (min)	Meter Reading
62	1	0.0060 MRH

Remarks Plastic casing

Depth Scale 20 ft /in.

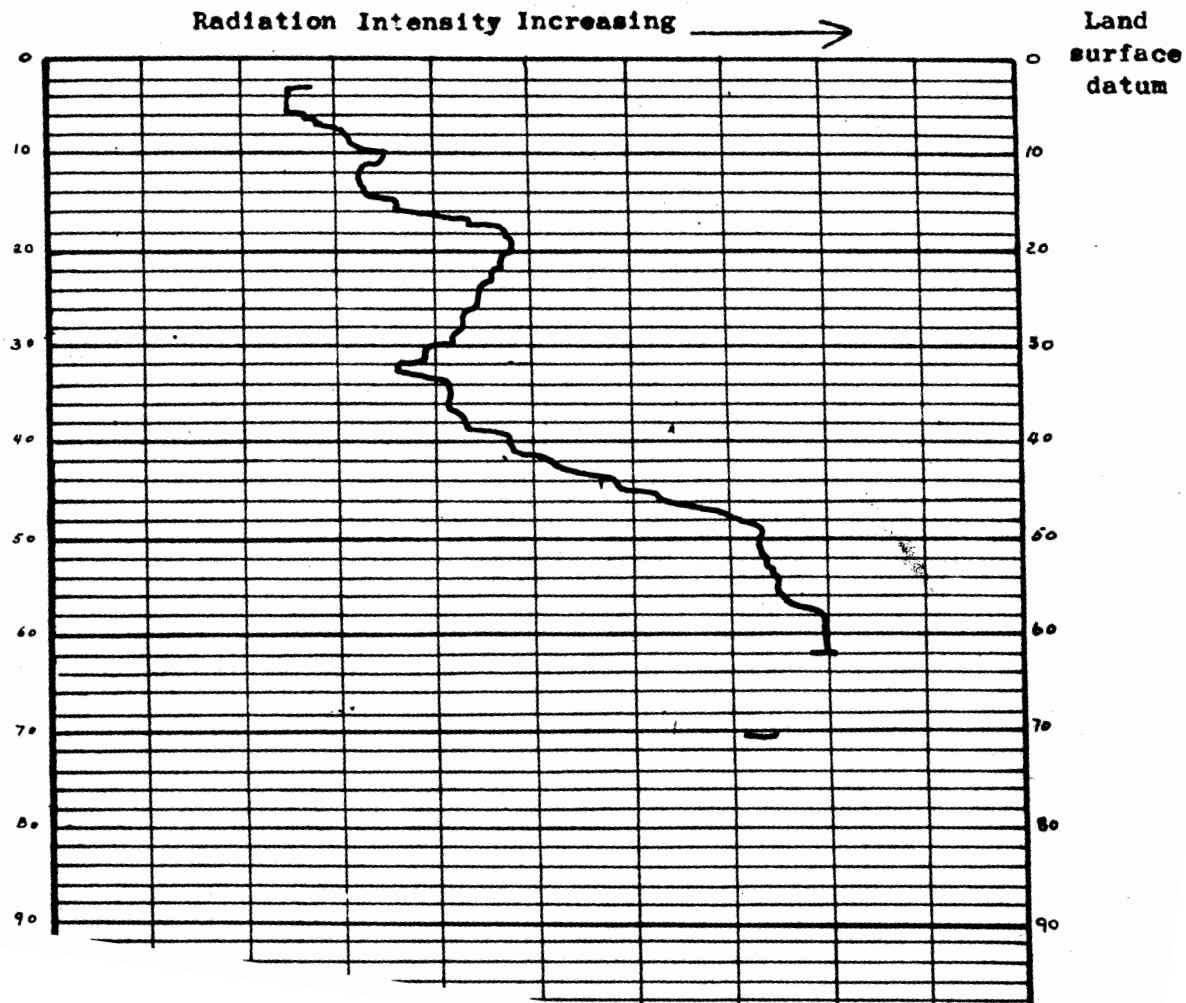


Figure 6.--Gamma-radiation log MCO-6.5B.

Field No. MCO-6.5B Casing diameter (inches) 4 Length of casing below land surface (ft) 42 Depth to water below land surface (ft) 36.8

Logging datum land surface

Altitude of land surface (ft) 6,839.3

Date 12-1-61 Equipment USGS I-65717

Logging Data

Run No. 1 of 1 runs. Probe sensitivity High. Logged out 12 ft/min

Gamma-Ray circuit scale 0.01 Potential circuit scale 5 Time constant 10

Statistical Variation 1/16 in. at 39 ft G-R Scale 0.01 Time constant 10

Calibration in hole: (G-R Scale 0.01 Pot. circ. scale 5)

Depth (ft)	Obs. Time (min)	Meter Reading
39	1	0.005 MRH

Remarks Upper part of hole 22 feet steel casing; lower part of hole 20 feet plastic casing

Depth Scale 20 ft /in.

Radiation Intensity Increasing →

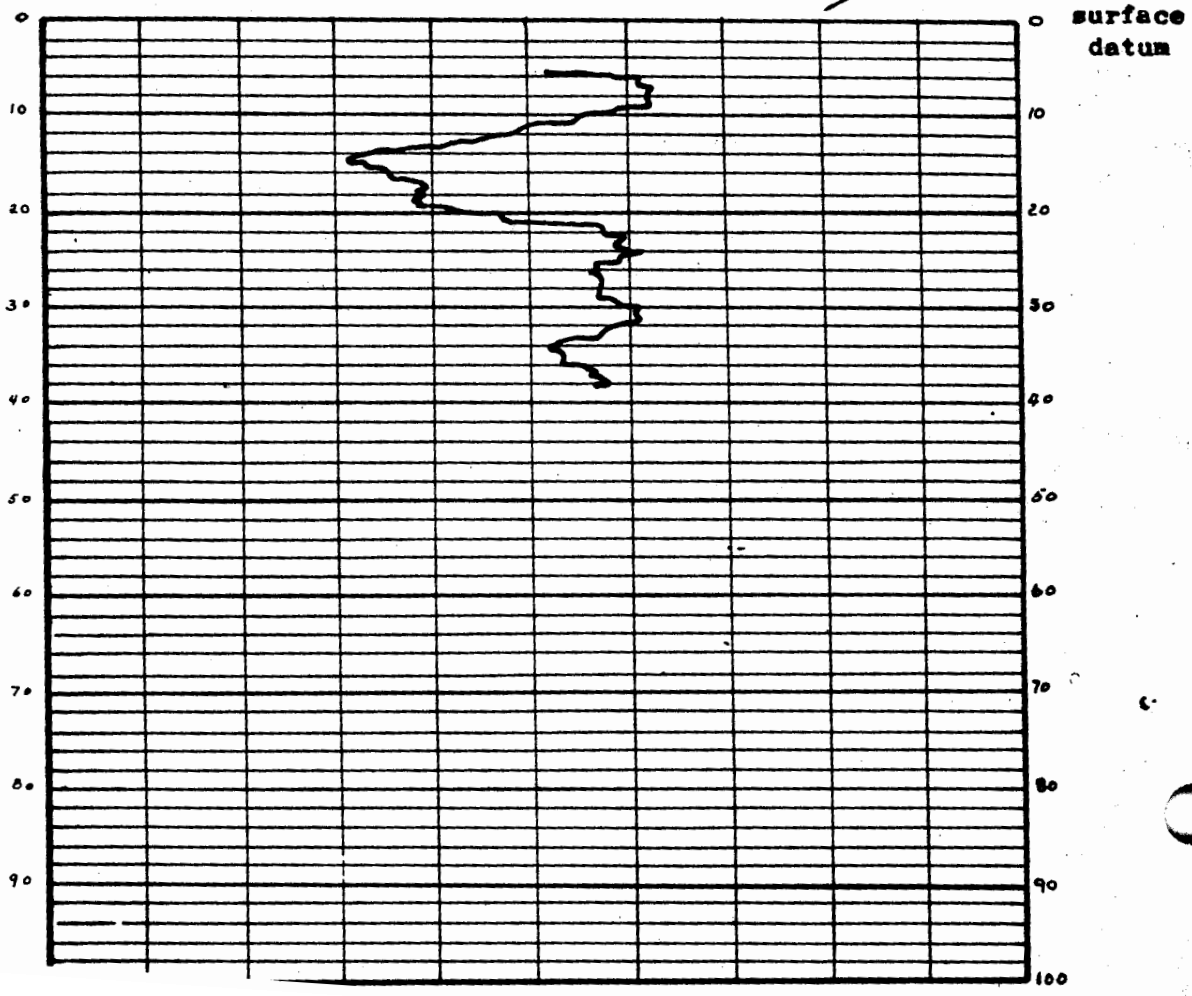


Figure 7.--Gamma-radiation log MCO-7.

Field No. MCO-7 Casing diameter (inches) 3 Length of casing below land surface (ft) 68.5 Depth to water below land surface (ft) 35.85

Logging datum land surface

Altitude of land surface (ft) 6,827.6

Date 11-30-61 Equipment USGS I-65717

Logging Data

Run No. 1 of 1 runs. Probe sensitivity High. Logged out 12 ft/min

Gamma-Ray circuit scale 0.01 Potential circuit scale 5 Time constant 10

Statistical Variation 1/4 in. at 65 ft G-R Scale 0.01 Time constant 10

Calibration in hole: (G-R Scale 0.01 Pot. circ. scale 5)

Depth (ft)	Obs. Time (min)	Meter Reading
65	1	0.0059 MRH

Remarks Plastic casing

Depth Scale 20 ft /in.

Radiation Intensity Increasing →

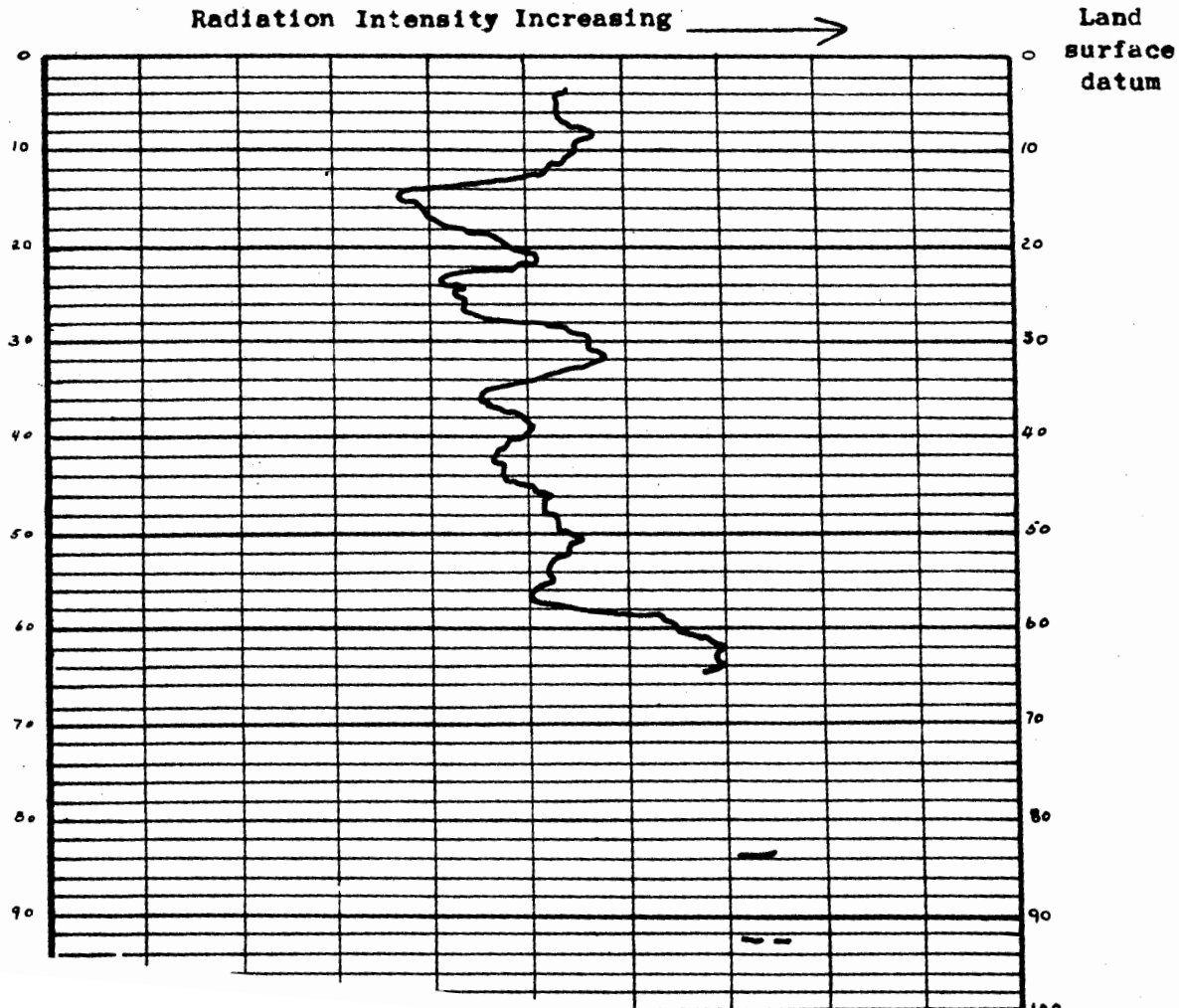


Figure 8.--Gamma-radiation log MCO-7.5.

Field No. MCO-7.5 Casing diameter (inches) 3 Length of casing below land surface (ft) 60 Depth to water below land surface (ft) 41.1

Logging datum land surface

Altitude of land surface (ft) 6,808.6

Date 11-29-61 Equipment USGS I-65717

Logging Data

Run No. 1 of 1 runs. Probe sensitivity High. Logged out 12 ft/min

Gamma-Ray circuit scale 0.01 Potential circuit scale 5 Time constant 10

Statistical Variation 1/8 in. at 51 ft G-R Scale 0.01 Time constant 10

Calibration in hole: (G-R Scale 0.01 Pot. circ. scale 5)

Depth (ft)	Obs. Time (min)	Meter Reading
51	1	0.0058 MRH

Remarks Plastic casing

Depth Scale 20 ft /in.

Radiation Intensity Increasing →

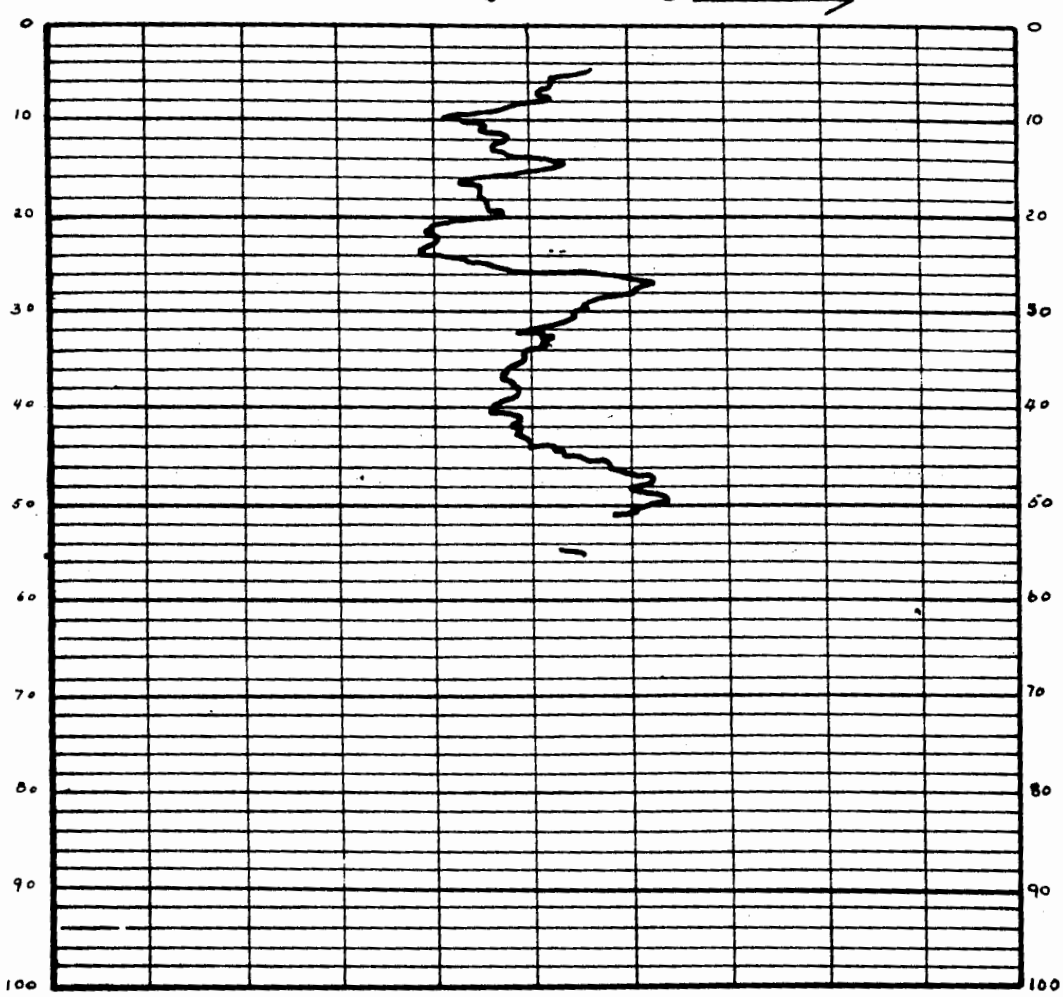


Figure 9.--Gamma-radiation log MCO-8.

Field No. MCO-8 Casing diameter (inches) 3 Length of casing below land surface (ft) 83.4 Depth to water below land surface (ft) 60.2

Logging datum land surface

Altitude of land surface (ft) 6,797.3

Date 11-29-61 Equipment USGS I-65717

Logging Data

Run No. 1 of 1 runs. Probe sensitivity High. Logged out 12 ft/min

Gamma-Ray circuit scale 0.01 Potential circuit scale 5 Time constant 10

Statistical Variation 1/4 in. at 80 ft G-R Scale 0.01 Time constant 10

Calibration in hole: (G-R Scale 0.01 Pot. circ. scale 5)

Depth (ft)	Obs. Time (min)	Meter Reading
80	1	0.0043 MRH

Remarks Plastic casing

Depth Scale 20 ft /in.

Radiation Intensity Increasing →

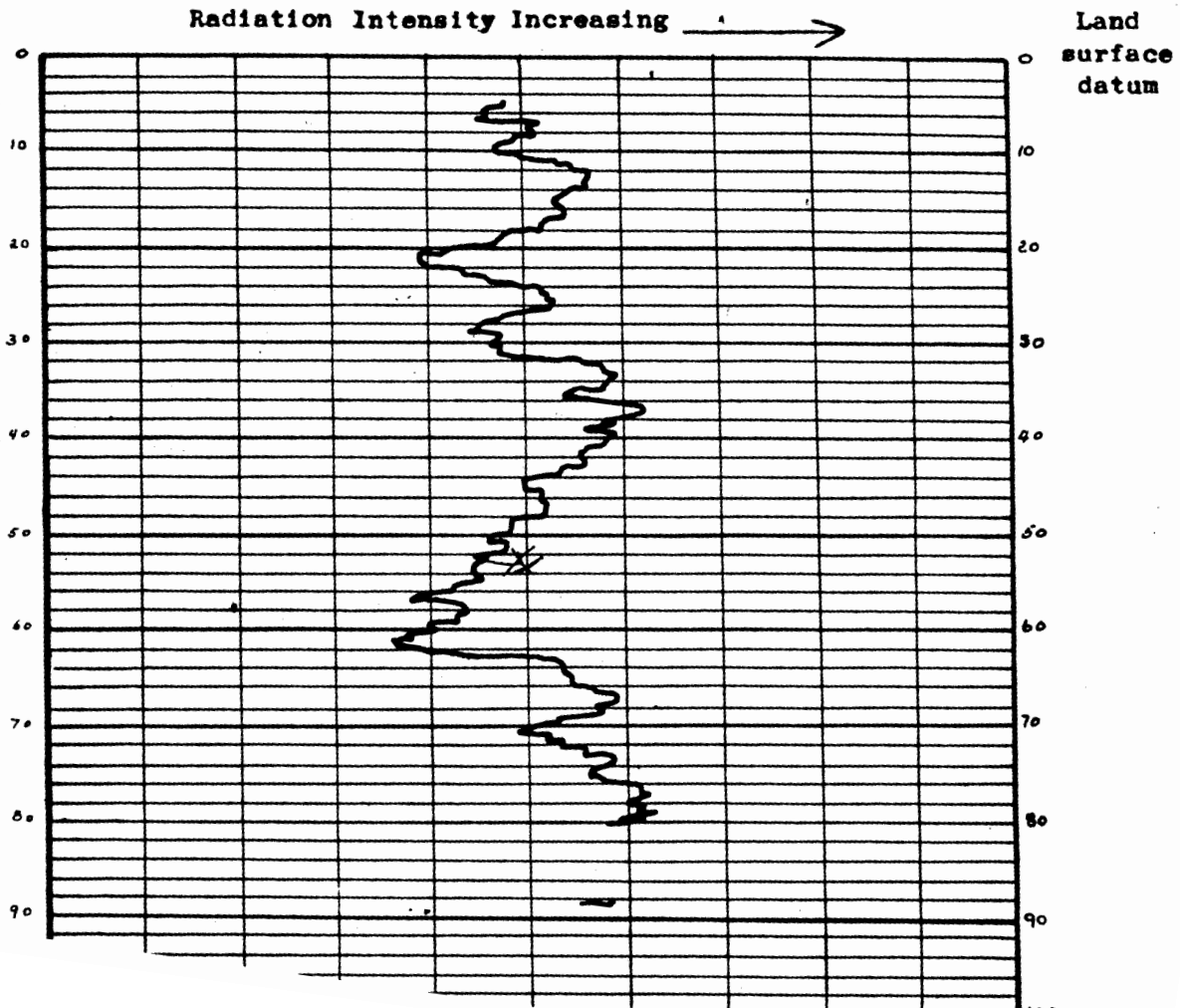


Figure 100--Gamma-radiation log MCO-8.2.

Field No. MCO-8.2 Casing diameter (inches) 2 Length of casing below land surface (ft) 70 Depth to water below land surface (ft) 58

Logging datum land surface

Altitude of land surface (ft) 6,781.8

Date 11-29-61 Equipment USGS I-65717

Logging Data

Run No. 1 of 1 runs. Probe sensitivity High. Logged out 12 ft/min

Gamma-Ray circuit scale 0.01 Potential circuit scale 5 Time constant 10

Statistical Variation 1/4 in. at 66 ft G-R Scale 0.01 Time constant 10

Calibration in hole: (G-R Scale 0.01 Pot. circ. scale 5)

Depth (ft)	Obs. Time (min)	Meter Reading
66	1	0.0053 MRH

Remarks Plastic casing

Depth Scale 20 ft /in.

Radiation Intensity Increasing →

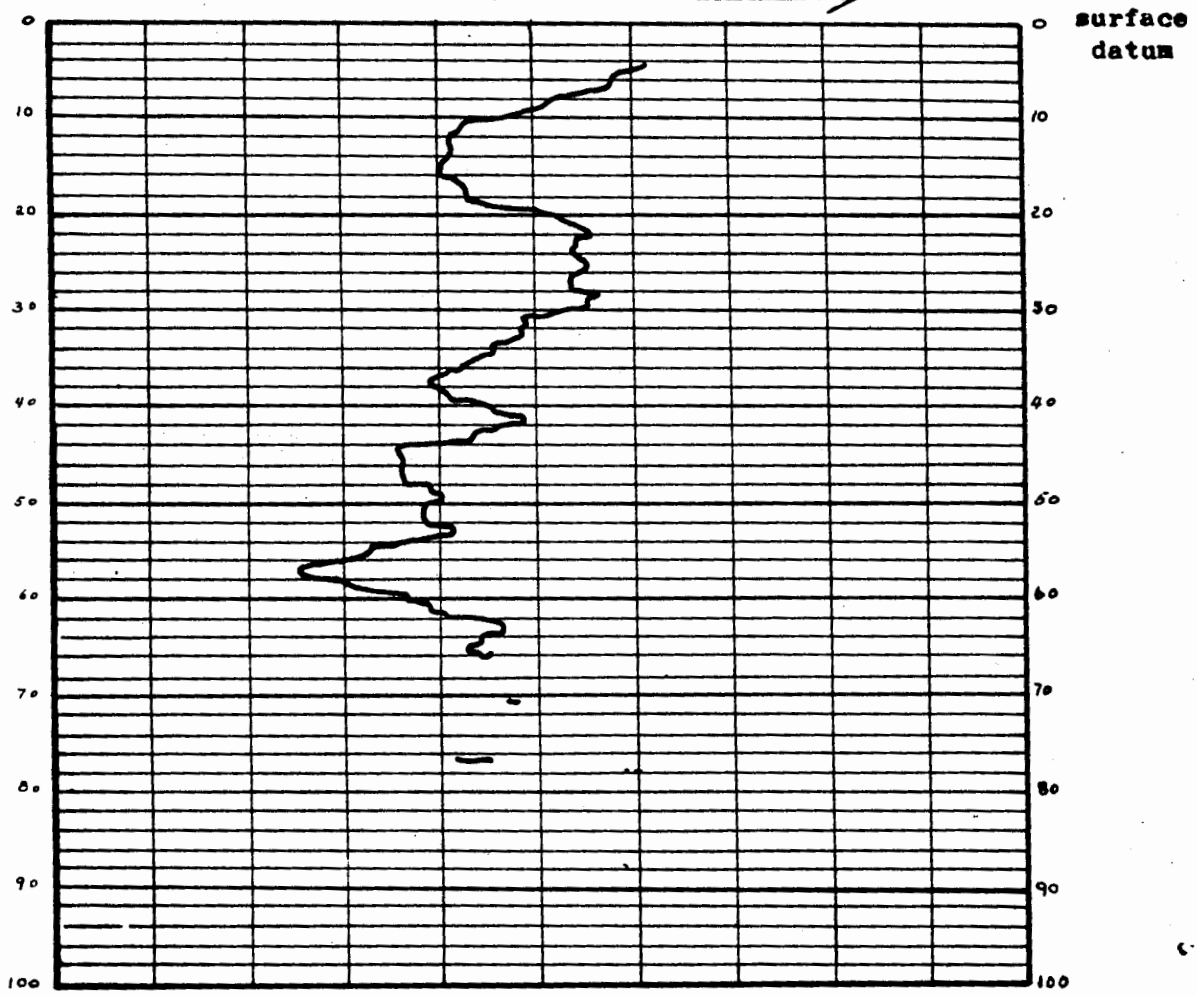


Figure 11.--Gamma-radiation log MCO-9.

Field No. MCO-9 Casing diameter (inches) 3 Length of casing below land surface (ft) 55.5 Depth to water below land surface (ft) dry

Logging datum land surface

Altitude of land surface (ft) 6,749.8

Date 11-29-61 Equipment USGS I-65717

Logging Data

Run No. 1 of 1 runs. Probe sensitivity High. Logged out 12 ft/min

Gamma-Ray circuit scale 0.01 Potential circuit scale 5 Time constant 10

Statistical Variation 1/8 in. at 54 ft G-R Scale 0.01 Time constant 10

Calibration in hole: (G-R Scale 0.01 Pot. circ. scale 5)

Depth (ft)	Obs. Time (min)	Meter Reading
54	1	0.0068 MRH

Remarks Plastic casing

Depth Scale 20 ft /in.

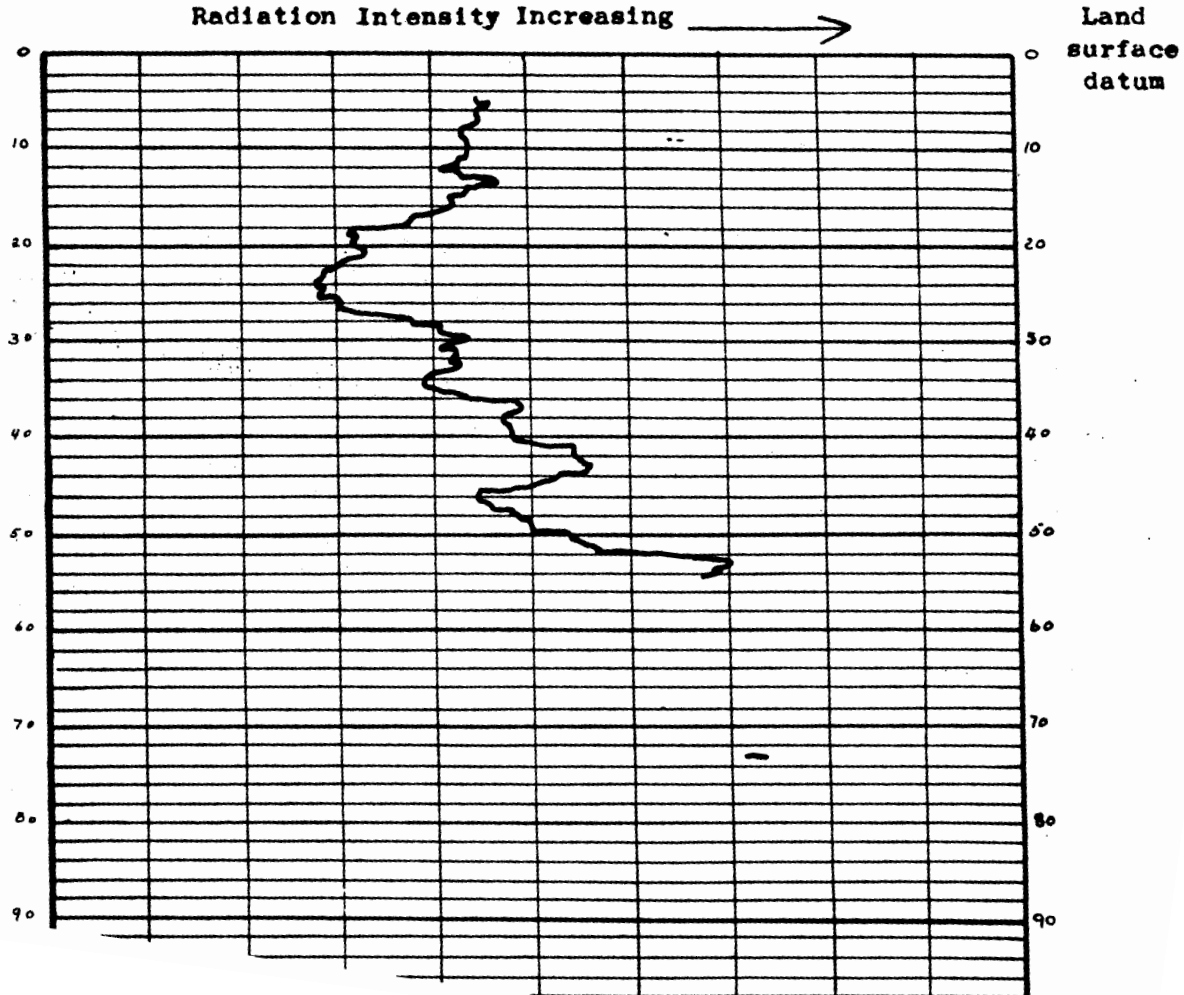


Figure 12.--Gamma-radiation log TSCO-1.

Field No. TSCO-1 Casing diameter (inches) - Length of casing below land surface (ft) - Depth to water below land surface (ft) dry

Logging datum land surface

Altitude of land surface (ft) 6,856.9

Date 11-29-61 Equipment USGS I-65717

Logging Data

Run No. 1 of 1 runs. Probe sensitivity High. Logged out 12 ft/min

Gamma-Ray circuit scale 0.01 Potential circuit scale 5 Time constant 10

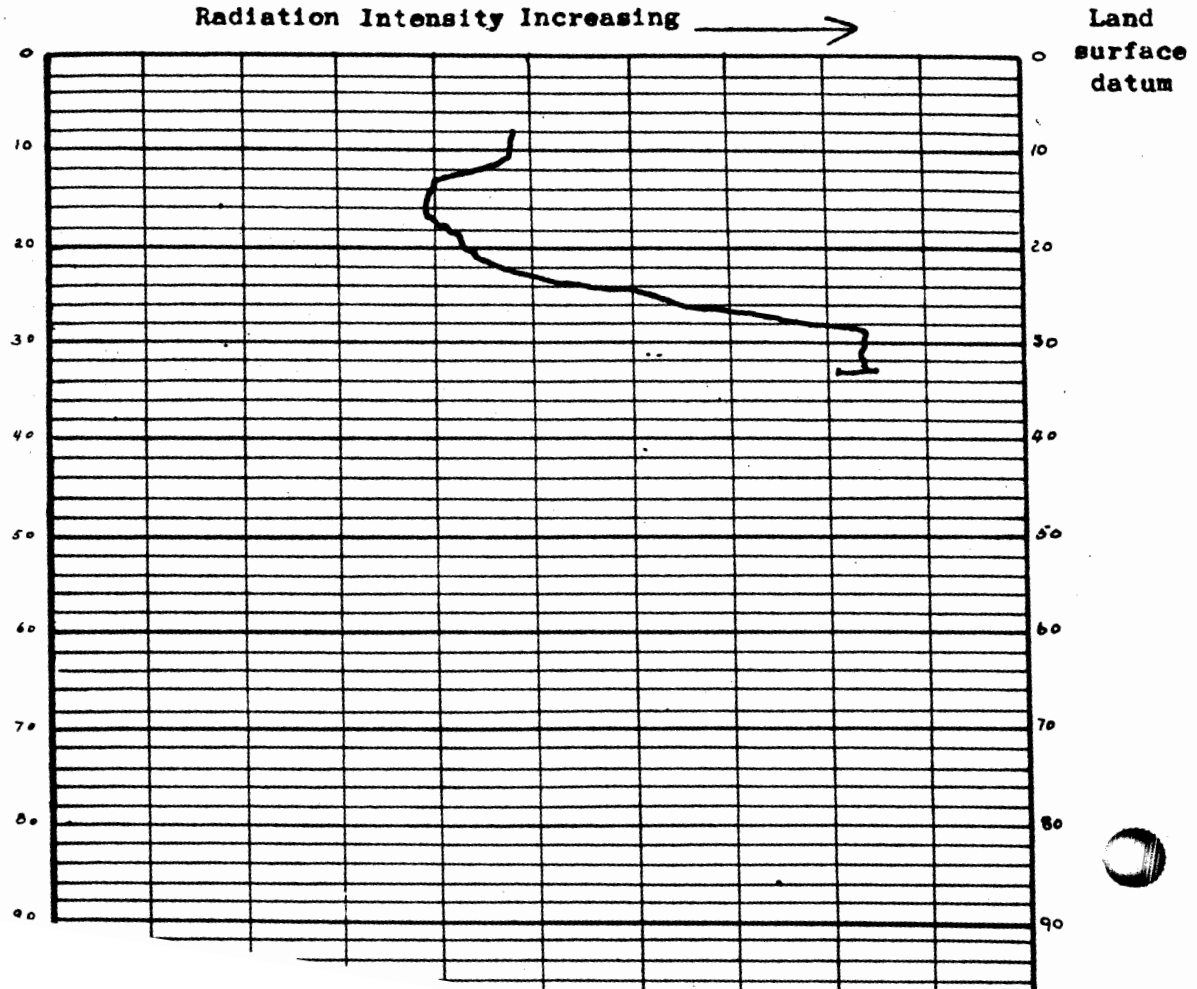
Statistical Variation 1/4 in. at 33 ft G-R Scale 0.01 Time constant 10

Calibration in hole: (G-R Scale 0.01 Pot. circ. scale 5)

Depth (ft)	Obs. Time (min)	Meter Reading
33	1	0.0066 MRH

Remarks Open hole, 3 inches in diameter

Depth Scale 20 ft /in.



gure 13.--Gamma-radiation log MCM-2.2.

Field No. MCM 2.2 Casing diameter (inches) - Length of casing below land surface (ft) - Depth to water below land surface (ft) dry

Logging datum land surface

Altitude of land surface (ft) 7,109

Date 12-1-61 Equipment USGS I-65717

Logging Data

Run No. 1 of 1 runs. Probe sensitivity High. Logged out 12 ft/min

Gamma-Ray circuit scale 0.01 Potential circuit scale 5 Time constant 10

Statistical Variation 1/8 in. at 87 ft G-R Scale 0.01 Time constant 10

Calibration in hole: (G-R Scale 0.01 Pot. circ. scale 5)

Depth (ft)	Obs. Time (min)	Meter Reading
87	1	0.0063 MRH

Remarks Inclined hole 30° from vertical - open hole

Depth Scale 20 ft /in.

Radiation Intensity Increasing →

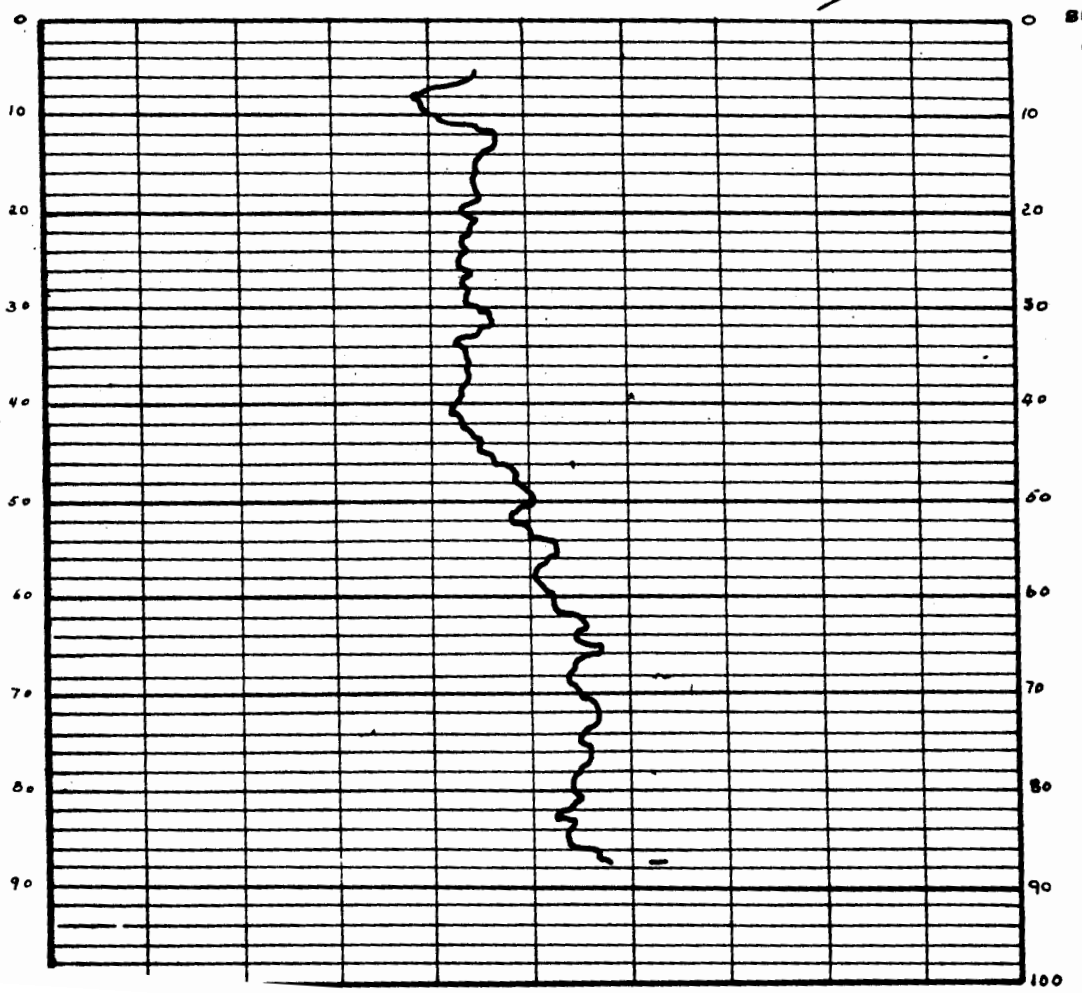


Figure 17.--Gamma-radiation log MCM-5A.

Field No. MCM-5A Casing diameter (inches) 2 Length of casing below land surface (ft) 25 Depth to water below land surface (ft) 26.3

Logging datum land surface

Altitude of land surface (ft) 6,881.4

Date 11-28-61 Equipment USGS I-65717

Logging Data

Run No. 1 of 1 runs. Probe sensitivity High. Logged out 12 ft/min

Gamma-Ray circuit scale 0.01 Potential circuit scale 5 Time constant 10

Statistical Variation 3/16 in. at 24 ft G-R Scale 0.01 Time constant 10

Calibration in hole: (G-R Scale 0.01 Pot. circ. scale 5)

Depth (ft)	Obs. Time (min)	Meter Reading
24	1	0.0068 MRH

Remarks Plastic casing

Depth Scale 20 ft /in.

Radiation Intensity Increasing →

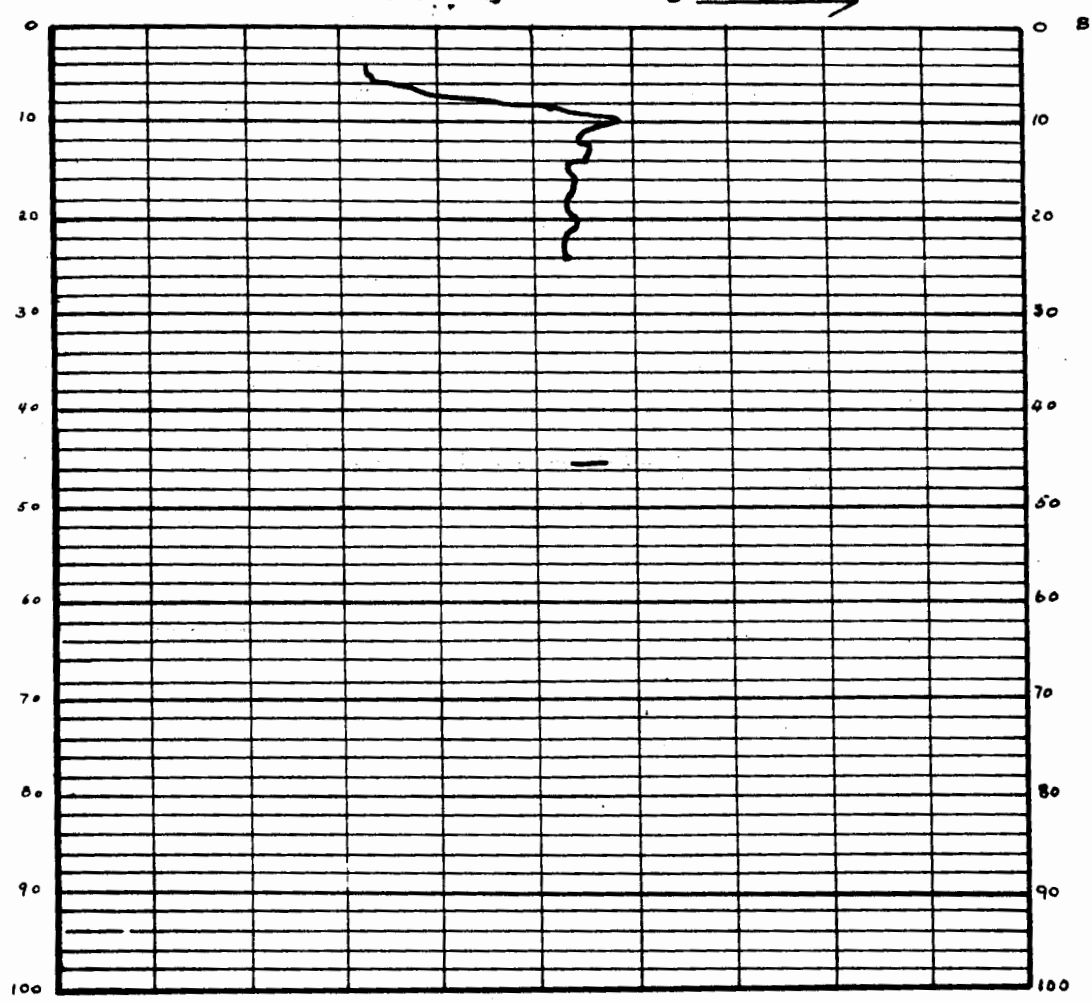


Figure 18.--Gamma-radiation log MCM-5B.

Field No. MCM-5B Casing diameter (inches) 2 Length of casing below land surface (ft) 30 Depth to water below land surface (ft) 23.9

Logging datum land surface

Altitude of land surface (ft) 6,870.0

Date 11-28-61 Equipment USGS I-65717

Logging Data

Run No. 1 of 1 runs. Probe sensitivity High. Logged out 12 ft/min

Gamma-Ray circuit scale 0.01 Potential circuit scale 5 Time constant 10

Statistical Variation 1/4 in. at 30 ft G-R Scale 0.01 Time constant 10

Calibration in hole: (G-R Scale 0.01 Pot. circ. scale 5)

Depth (ft)	Obs. Time (min)	Meter Reading
30	1	0.0067 MRH

Remarks Plastic casing

Depth Scale 20 ft /in.

Radiation Intensity Increasing →

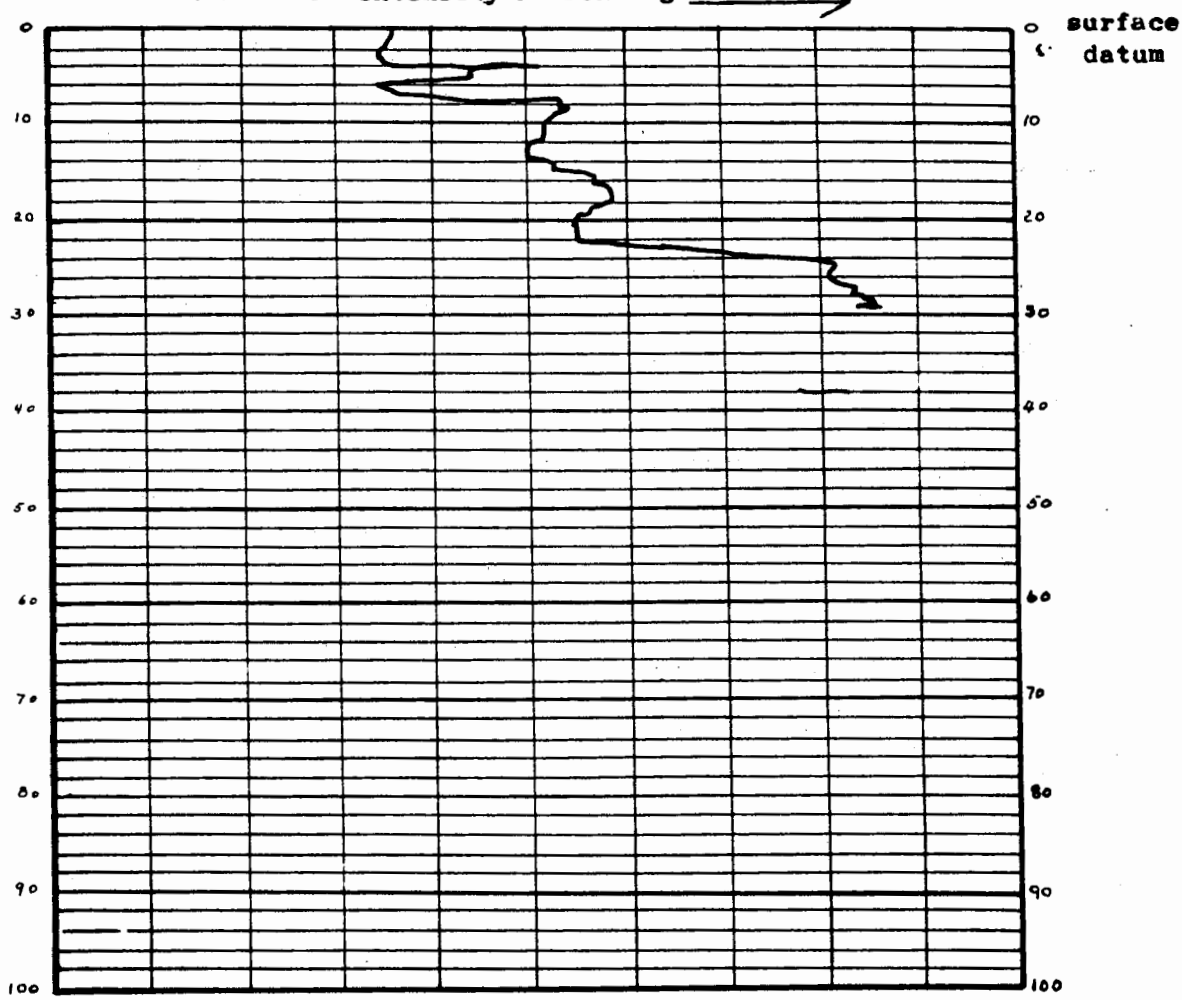


Figure 19.--Gamma-radiation log MCM-5C.

Field No. MCM-5C Casing diameter (inches) 2 Length of casing below land surface (ft) 37 Depth to water below land surface (ft) 22.5

Logging datum land surface

Altitude of land surface (ft) 6,877.6

Date 11-28-61 Equipment USGS I-65717

Logging Data

Run No. 1 of 1 runs. Probe sensitivity High. Logged out 12 ft/min

Gamma-Ray circuit scale 0.01 Potential circuit scale 5 Time constant 10

Statistical Variation 1/4 in. at 37 ft G-R Scale 0.01 Time constant 10

Calibration in hole: (G-R Scale 0.01 Pot. circ. scale 5)

Depth (ft)	Obs. Time (min)	Meter Reading
37	1	0.0063 MRH

Remarks Plastic casing

Depth Scale 20 ft /in.

Radiation Intensity Increasing →

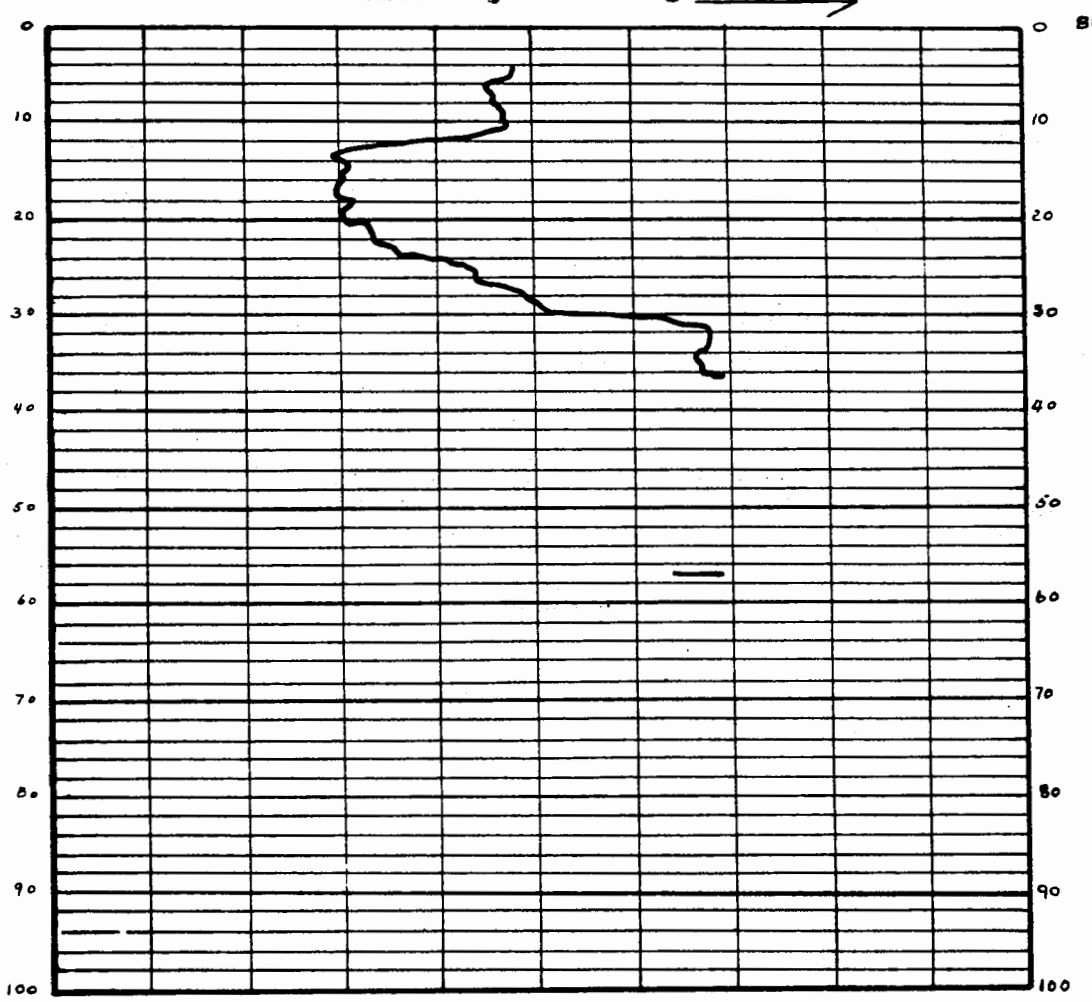


Figure 20.--Gamma-radiation log MCM-6A.

Field No. MCM-6A Casing diameter (inches) 2 Length of casing below land surface (ft) 17.8. Depth to water below land surface (ft) dry

Logging datum land surface

Altitude of land surface (ft) 6,852.6

Date 11-27-61 Equipment USGS I-65717

Logging Data

Run No. 1 of 1 runs. Probe sensitivity High. Logged out 12 ft/min

Gamma-Ray circuit scale 0.01 Potential circuit scale 5 Time constant 10

Statistical Variation 1/8 in. at 18 ft G-R Scale 0.01 Time constant 10

Calibration in hole: (G-R Scale 0.01 Pot. circ. scale 5)

Depth (ft)	Obs. Time (min)	Meter Reading
18	1	0.0071 MRH

Remarks Plastic casing

Depth Scale 20 ft /in.

Radiation Intensity Increasing →

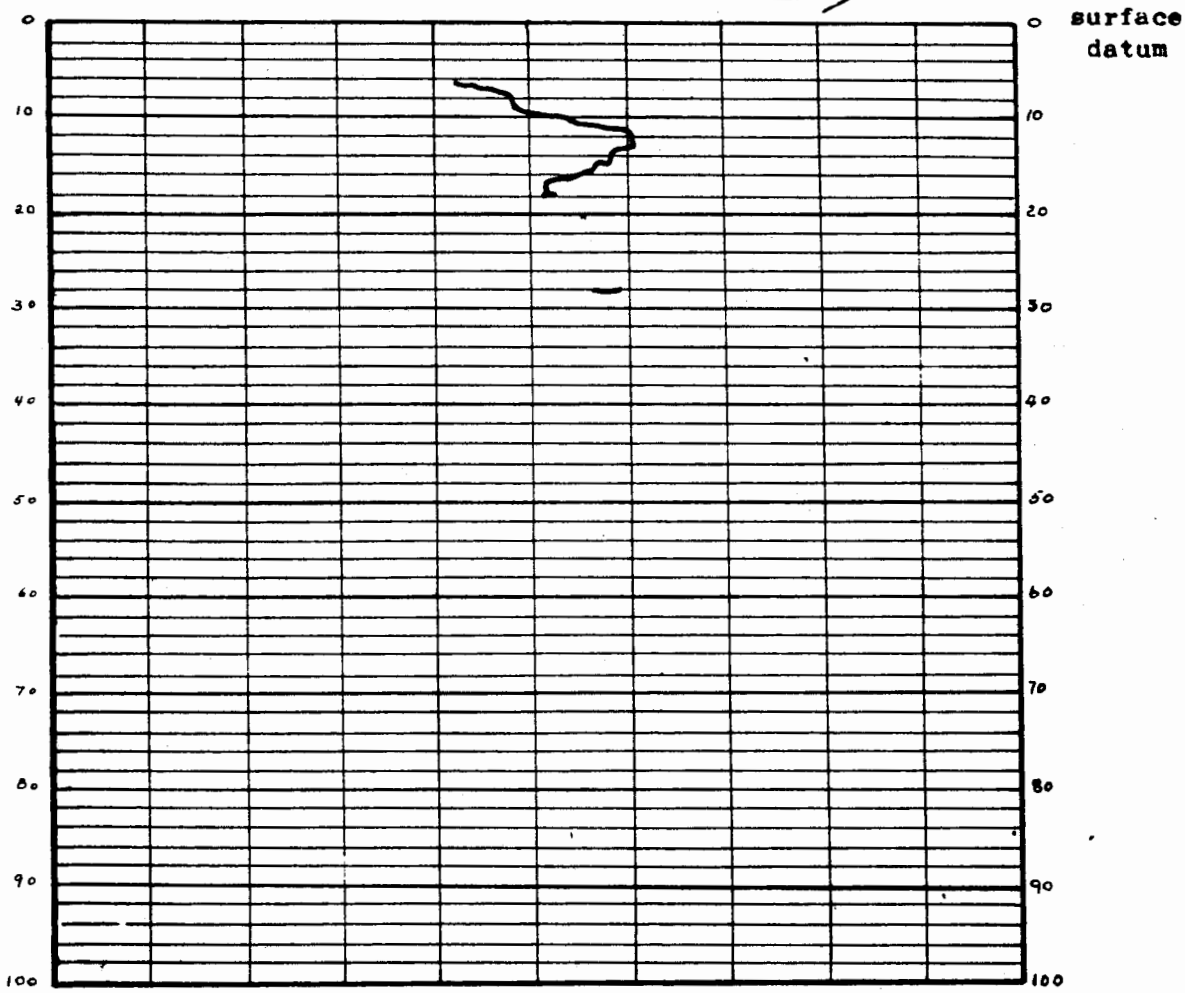


Figure 21.--Gamma-radiation log MCM-6B.

Field No. MCM-6B Casing diameter (inches) 2 Length of casing below land surface (ft) 51.8 Depth to water below land surface (ft) 34.8

Logging datum land surface

Altitude of land surface (ft) 6,851.2

Date 11-28-61 Equipment USGS I-65717

Logging Data

Run No. 1 of 1 runs. Probe sensitivity High. Logged out 12 ft/min

Gamma-Ray circuit scale 0.01 Potential circuit scale 5 Time constant 10

Statistical Variation 1/8 in. at 52 ft G-R Scale 0.01 Time constant 10

Calibration in hole: (G-R Scale 0.01 Pot. circ. scale 5)

Depth (ft)	Obs. Time (min)	Meter Reading
52	1	0.0068 MRH

Remarks Plastic casing

Depth Scale 20 ft /in.

Radiation Intensity Increasing →

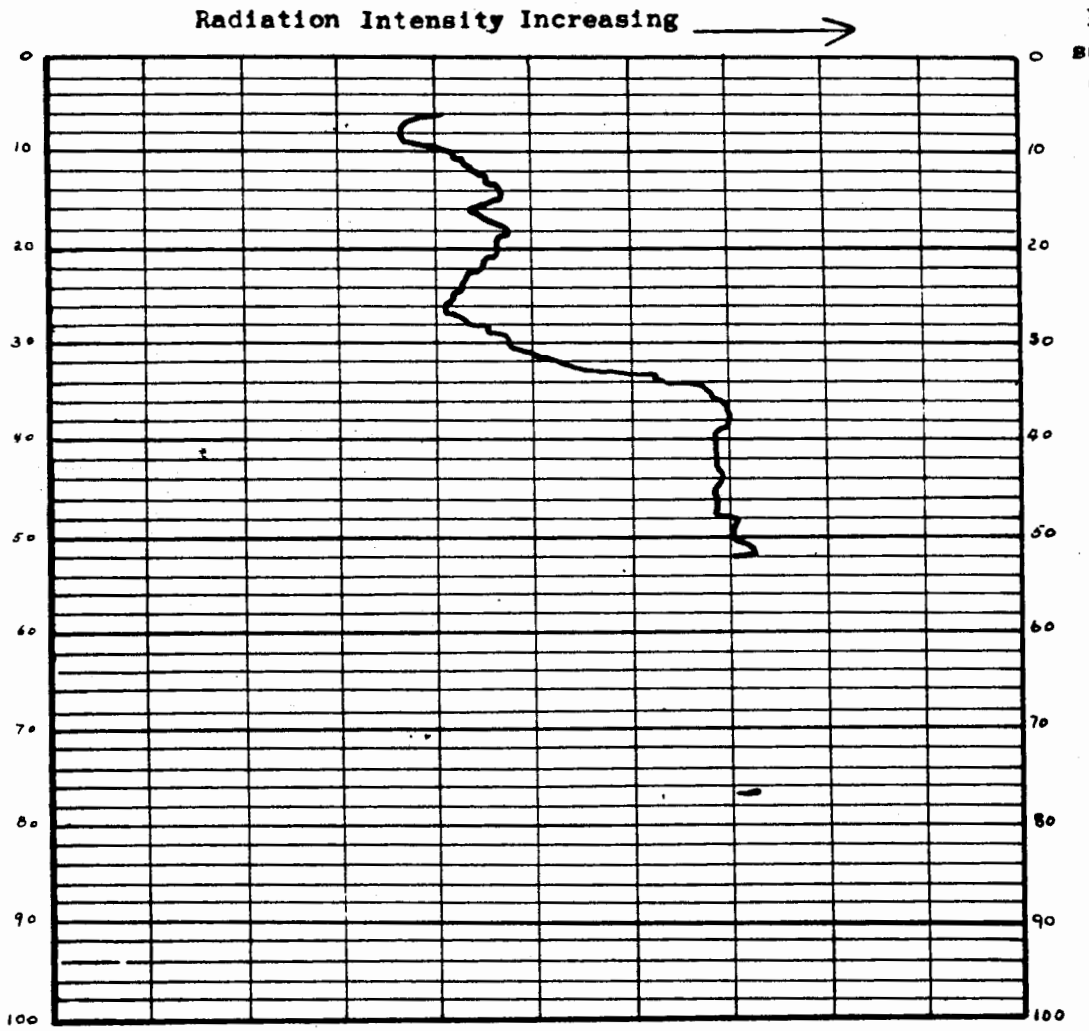


figure 22.--Gamma-radiation log MCM-6C.

Field No. MCM-6C Casing diameter (inches) 2 Length of casing below land surface (ft) 56.8 Depth to water below land surface (ft) 34.6

Logging datum land surface

Altitude of land surface (ft) 6,851.0

Date 11-28-61 Equipment USGS I-65717

Logging Data

Run No. 1 of 1 runs. Probe sensitivity High. Logged out 12 ft/min

Gamma-Ray circuit scale 0.01 Potential circuit scale 5 Time constant 10

Statistical Variation 1/4 in. at 56 ft G-R Scale 0.01 Time constant 10

Calibration in hole: (G-R Scale 0.01 Pot. circ. scale 5)

Depth (ft)	Obs. Time (min)	Meter Reading
56	1	0.0069 MRH

Remarks Plastic casing

Depth Scale 20 ft /in.

Radiation Intensity Increasing →

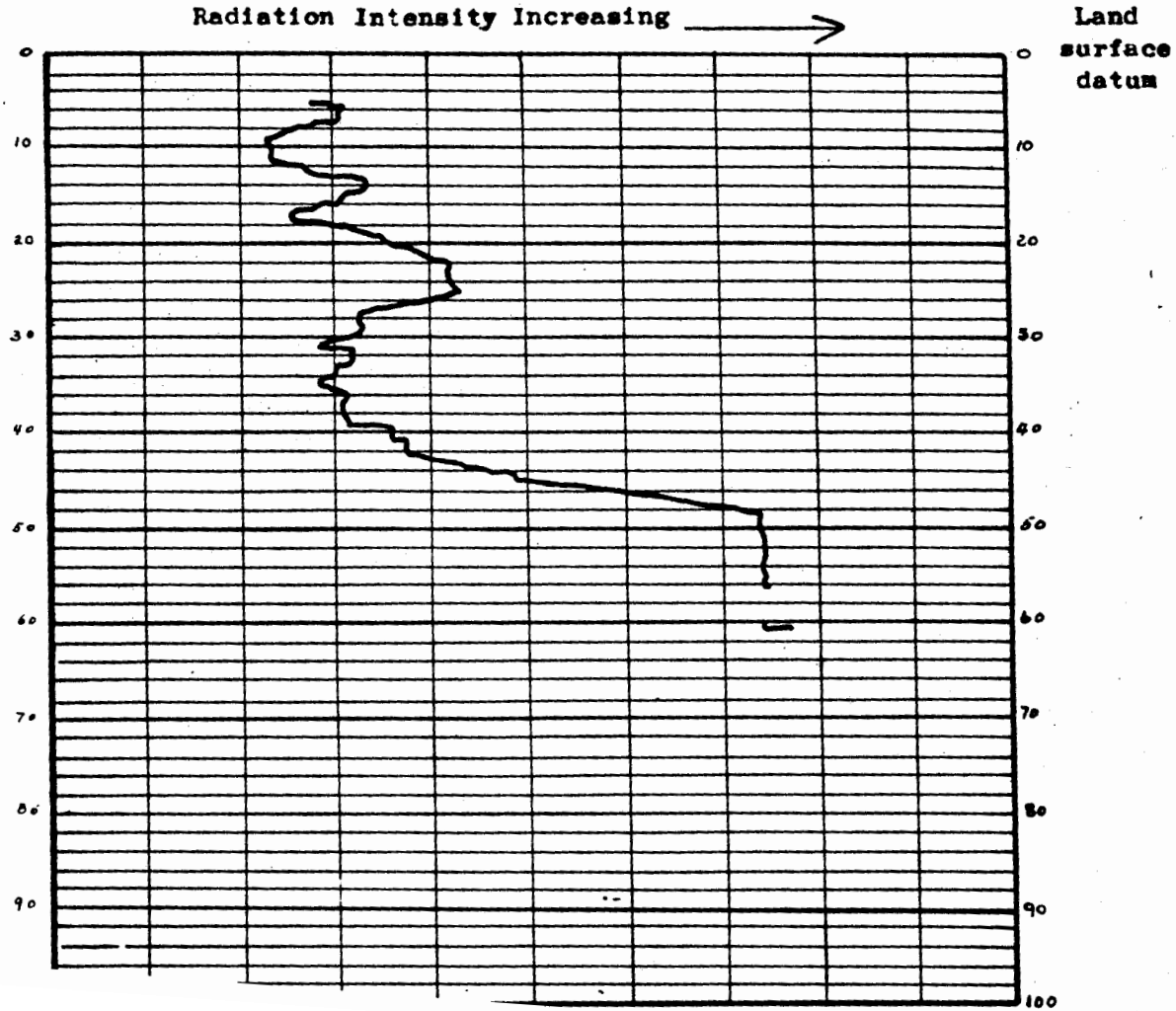


Figure 23.--Gamma-radiation log MCM-6D.

Field No. MCM-6D Casing diameter (inches) 2 Length of casing below land surface (ft) 34.9 Depth to water below land surface (ft) dry

Logging datum land surface

Altitude of land surface (ft) 6,850.0

Date 11-28-61 Equipment USGS I-65717

Logging Data

Run No. 1 of 1 runs. Probe sensitivity High. Logged out 12 ft/min

Gamma-Ray circuit scale 0.01 Potential circuit scale 5 Time constant 10

Statistical Variation 1/8 in. at 35 ft G-R Scale 0.01 Time constant 10

Calibration in hole: (G-R Scale 0.01 Pot. circ. scale 5)

Depth (ft)	Obs. Time (min)	Meter Reading
35	1	0.0059 MRH

Remarks Plastic casing

Depth Scale 20 ft /in.

Radiation Intensity Increasing →

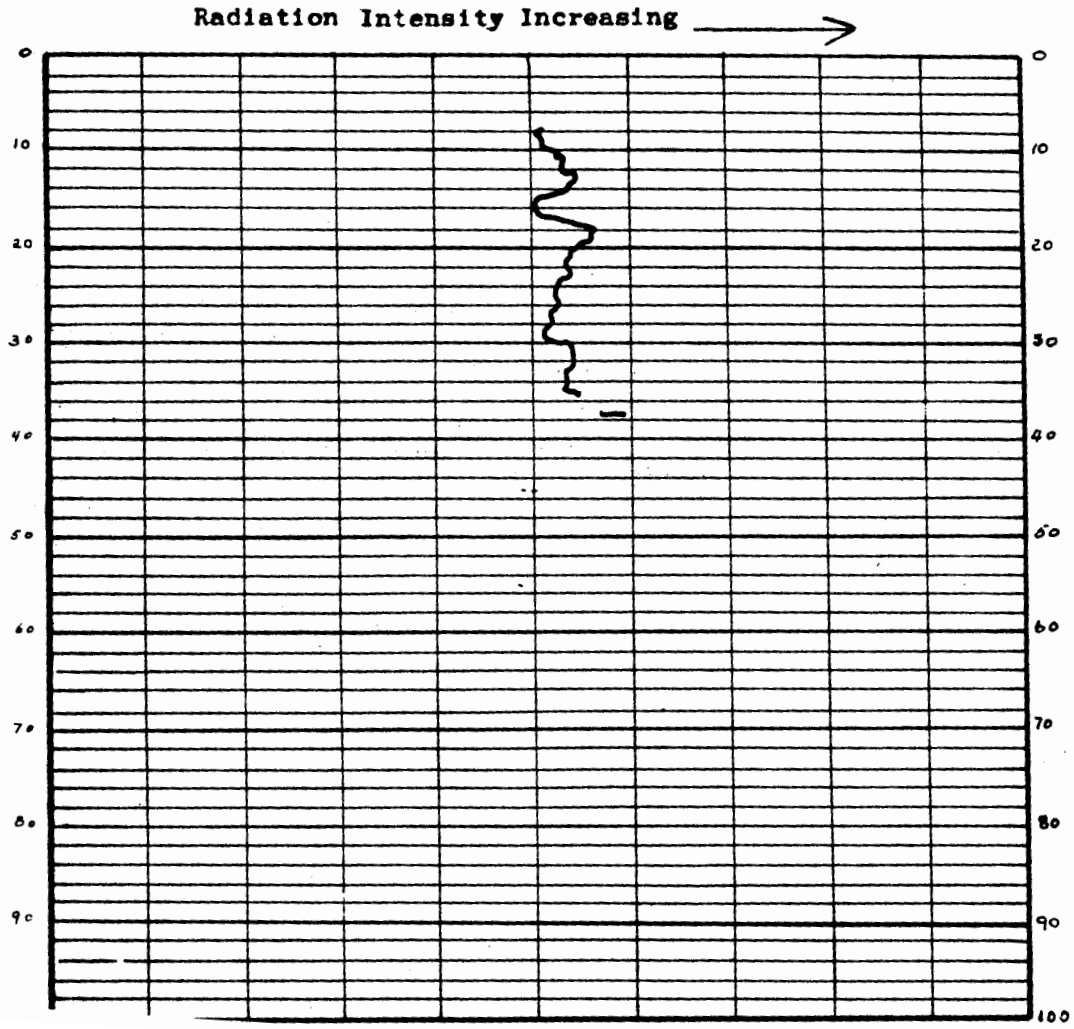


Figure 24.--Gamma-radiation log 6E.

Field No. MCM-6E Casing diameter (inches) 2 Length of casing below land surface (ft) 21 Depth to water below land surface (ft) dry

Logging datum land surface

Altitude of land surface (ft) 6,850.6

Date 11-28-61 Equipment USGS I-65717

Logging Data

Run No. 1 of 1 runs. Probe sensitivity High. Logged out 12 ft/min

Gamma-Ray circuit scale 0.01 Potential circuit scale 5 Time constant 10

Statistical Variation 1/4 in. at 20 ft G-R Scale 0.01 Time constant 10

Calibration in hole: (G-R Scale 0.01 Pot. circ. scale 5)

Depth (ft)	Obs. Time (min)	Meter Reading
20	1	0.0068 MRH

Remarks Plastic casing

Depth Scale 20 ft /in.

Radiation Intensity Increasing →

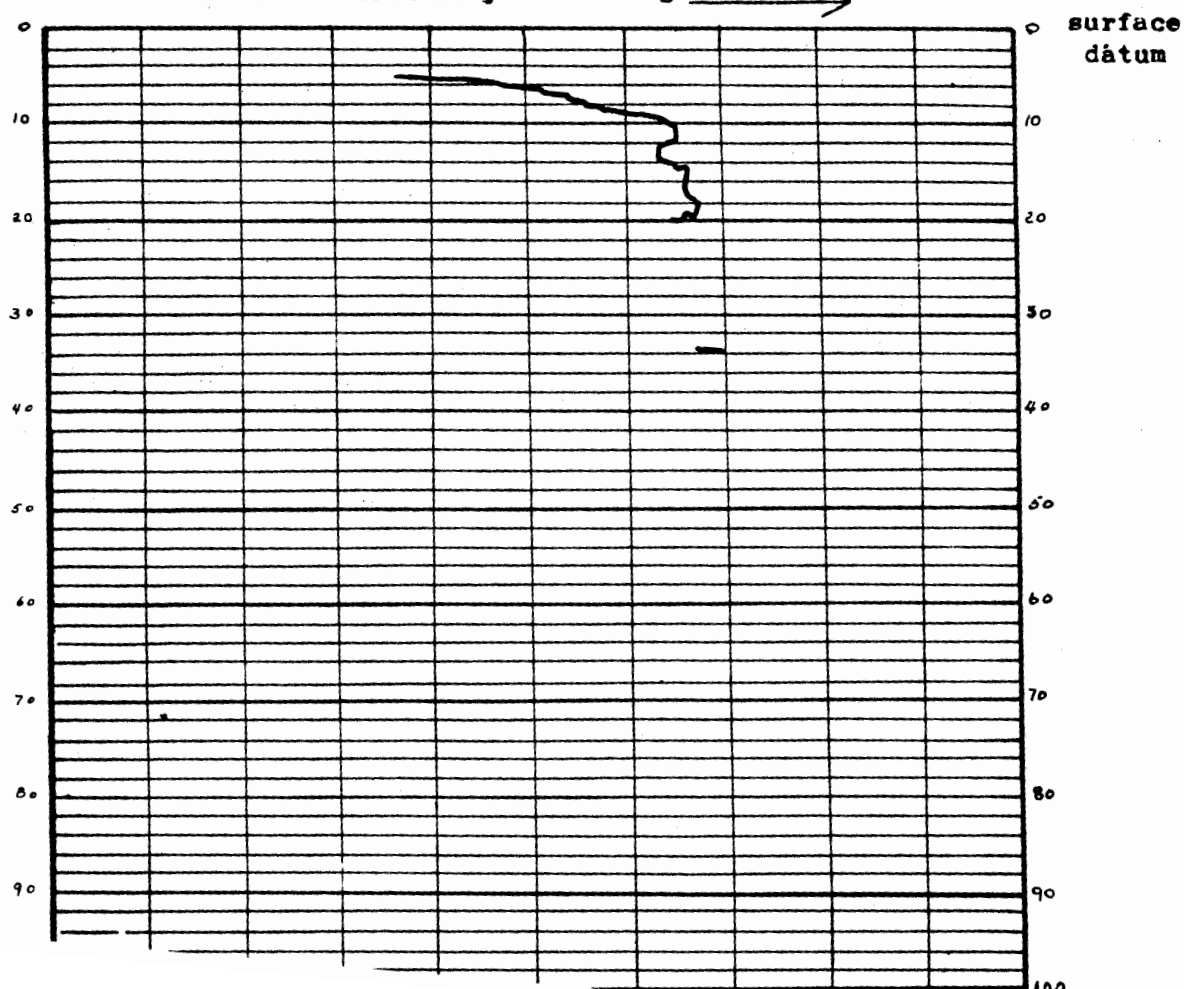


Figure 25.--Gamma-radiation log 6.5.

Field No. MCM-6.5 Casing diameter (inches) 2 Length of casing below land surface (ft) 95 Depth to water below land surface (ft) 37.6

Logging datum land surface

Altitude of land surface (ft) 6,840.2

Date 12-1-61 Equipment USGS 1-65717

Logging Data

Run No. 1 of 1 runs. Probe sensitivity High. Logged out 12 ft/min

Gamma-Ray circuit scale 0.01 Potential circuit scale 5 Time constant 10

Statistical Variation 1/16 in. at 95 ft G-R Scale 0.01 Time constant 10

Calibration in hole: (G-R Scale 0.01 Pot. circ. scale 5)

Depth (ft)	Obs. Time (min)	Meter Reading
95	1	0.0059 MRH
61	1	.0069 MRH
14	1	.0044 MRH

Remarks Double cased 4" steel casing to 51 ft; 95 ft plastic casing

Depth Scale 20 ft /in.

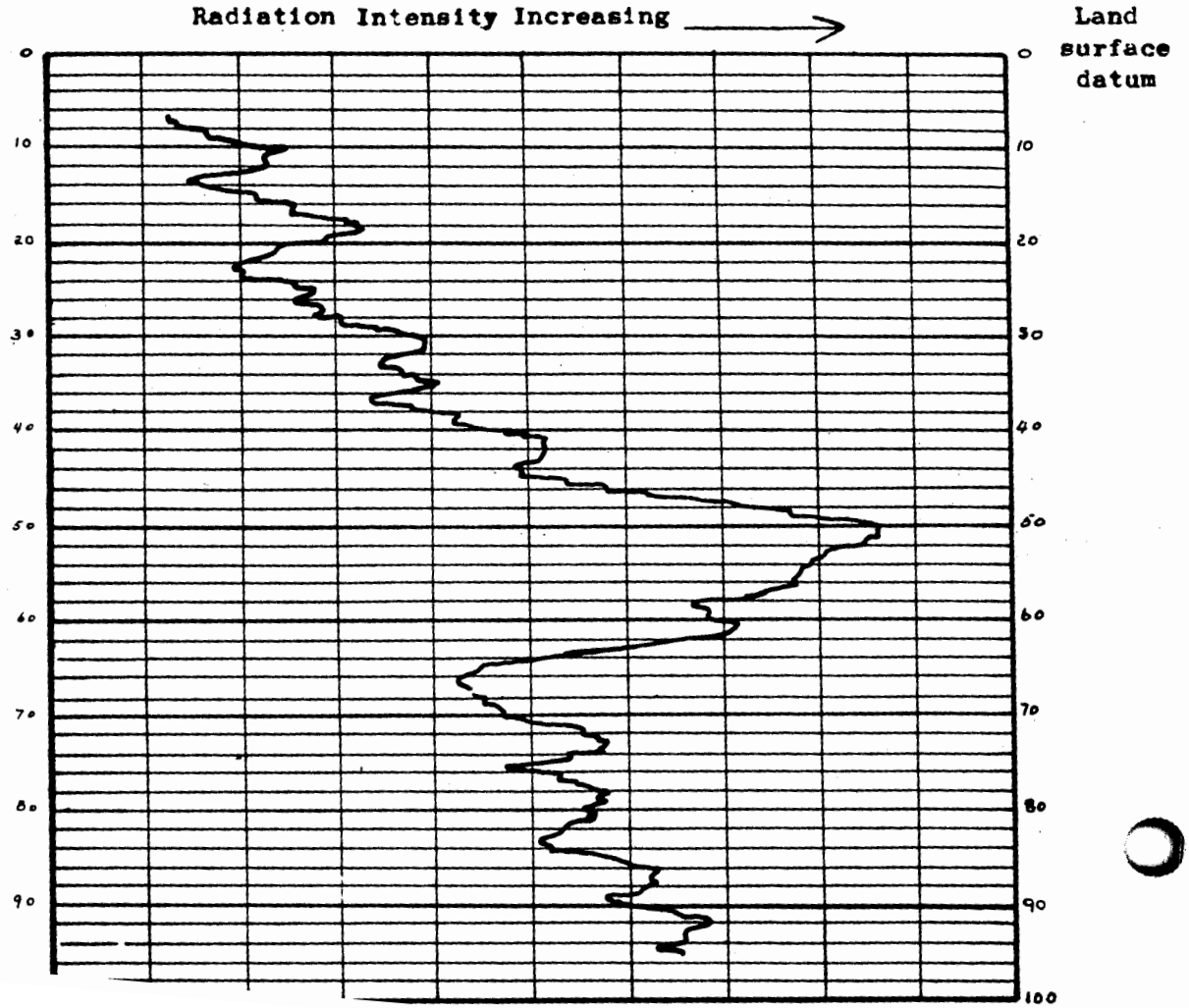


Figure 26.--Gamma-radiation log 7.5.

Field No. MCM-7.5 Casing diameter (inches) 2 Length of casing below land surface (ft) 94 Depth to water below land surface (ft) 40.1

Logging datum land surface

Altitude of land surface (ft) 6,809.4

Date 11-29-61 Equipment USGS I-65717

Logging Data

Run No. 1 of 1 runs. Probe sensitivity High. Logged out 12 ft/min

Gamma-Ray circuit scale 0.01 Potential circuit scale 5 Time constant 10

Statistical Variation 1/8 in. at 56 ft G-R Scale 0.01 Time constant 10

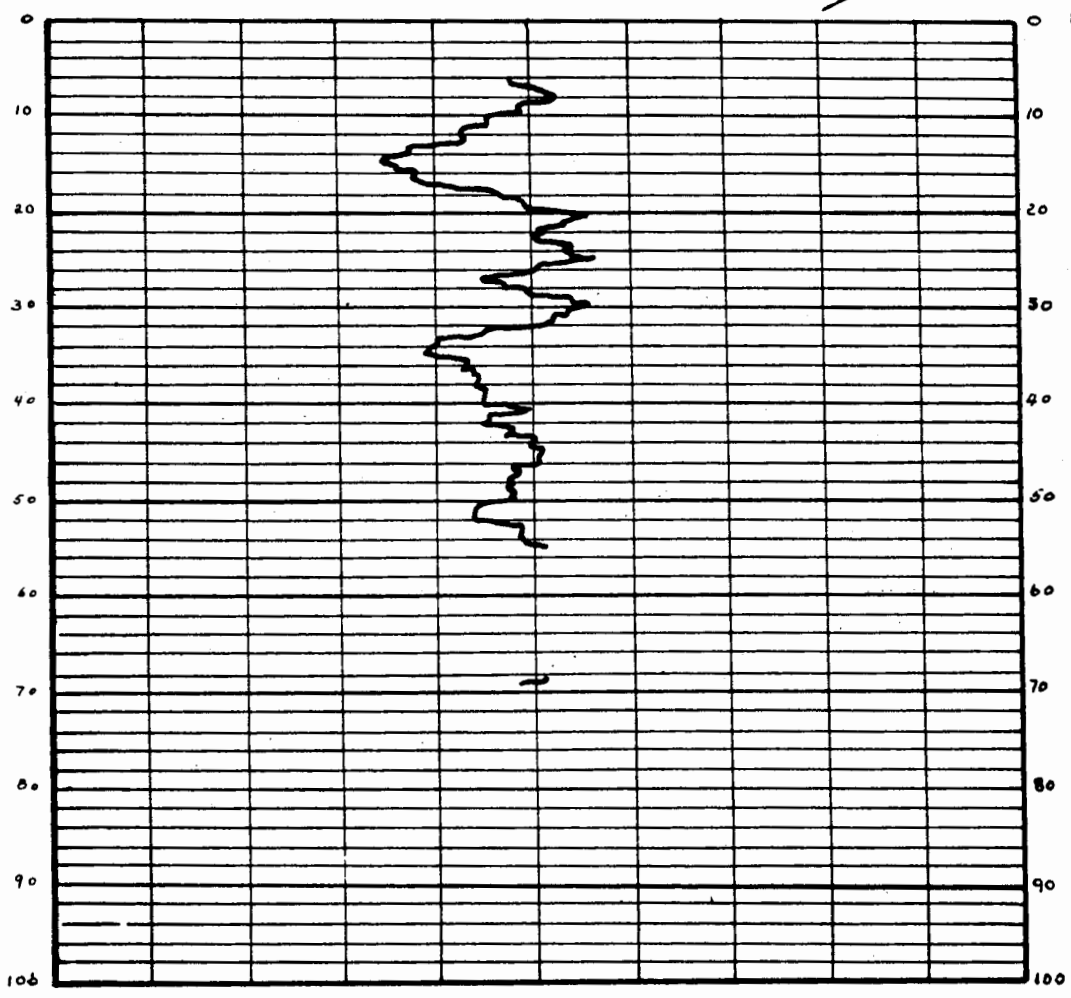
Calibration in hole: (G-R Scale 0.01 Pot. circ. scale 5)

Depth (ft)	Obs. Time (min)	Meter Reading
56	1	0.0056 MRH

Remarks Double cased 66 ft steel casing; 94 ft plastic casing

Depth Scale 20 ft /in.

Radiation Intensity Increasing →



Land surface datum

Figure 27.--Gamma-radiation log MCM-8A.

Field No. MCO-8A Casing diameter (inches) - Length of casing below land surface (ft) - Depth to water below land surface (ft) dry

Logging datum land surface

Altitude of land surface (ft) 6,797.6

Date 11-29-61 Equipment USGS I-65717

Logging Data

Run No. 1 of 1 runs. Probe sensitivity High. Logged out 12 ft/min

Gamma-Ray circuit scale 0.01 Potential circuit scale 5 Time constant 10

Statistical Variation 1/4 in. at 45 ft G-R Scale 0.01 Time constant 10

Calibration in hole: (G-R Scale 0.01 Pot. circ. scale 5)

Depth (ft)	Obs. Time (min)	Meter Reading
45	1	0.0046 MRH

Remarks Open hole, 3 inches in diameter

Depth Scale 20 ft /in.

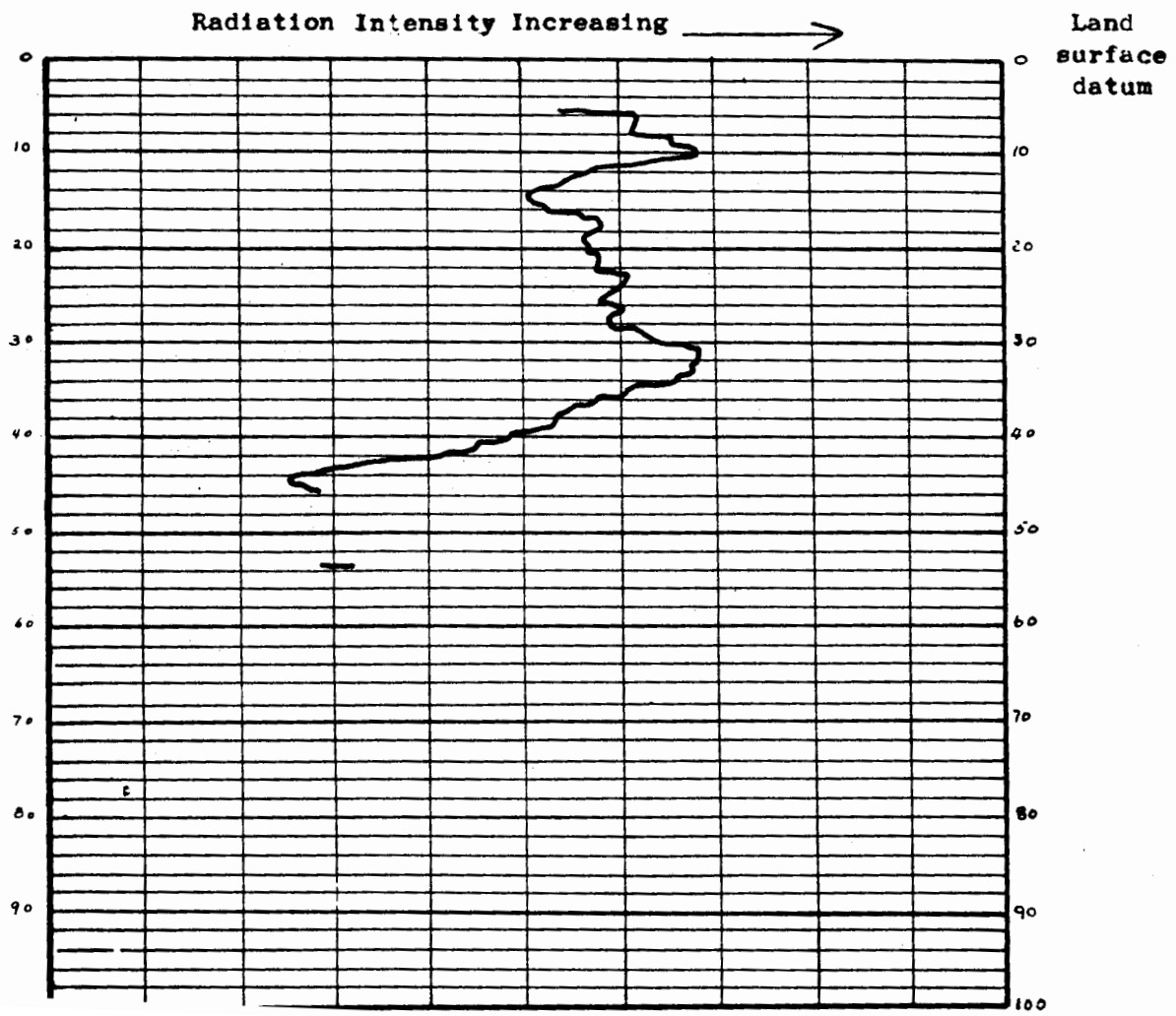


Figure 28.--Gamma-radiation log MCM-8B.

Field No. MCM-8B Casing diameter (inches) 2 Length of casing below land surface (ft) 30 Depth to water below land surface (ft) dry

Logging datum land surface

Altitude of land surface (ft) 6,797.2

Date 11-20-61 Equipment USGS I-65717

Logging Data

Run No. 1 of 1 runs. Probe sensitivity High. Logged out 12 ft/min

Gamma-Ray circuit scale 0.01 Potential circuit scale 5 Time constant 10

Statistical Variation 1/4 in. at 30 ft G-R Scale 0.01 Time constant 10

Calibration in hole: (G-R Scale 0.01 Pot. circ. scale 5)

Depth (ft)	Obs. Time (min)	Meter Reading
30	1	0.0062 MRH

Remarks Plastic casing

Depth Scale 20 ft /in.

Radiation Intensity Increasing →

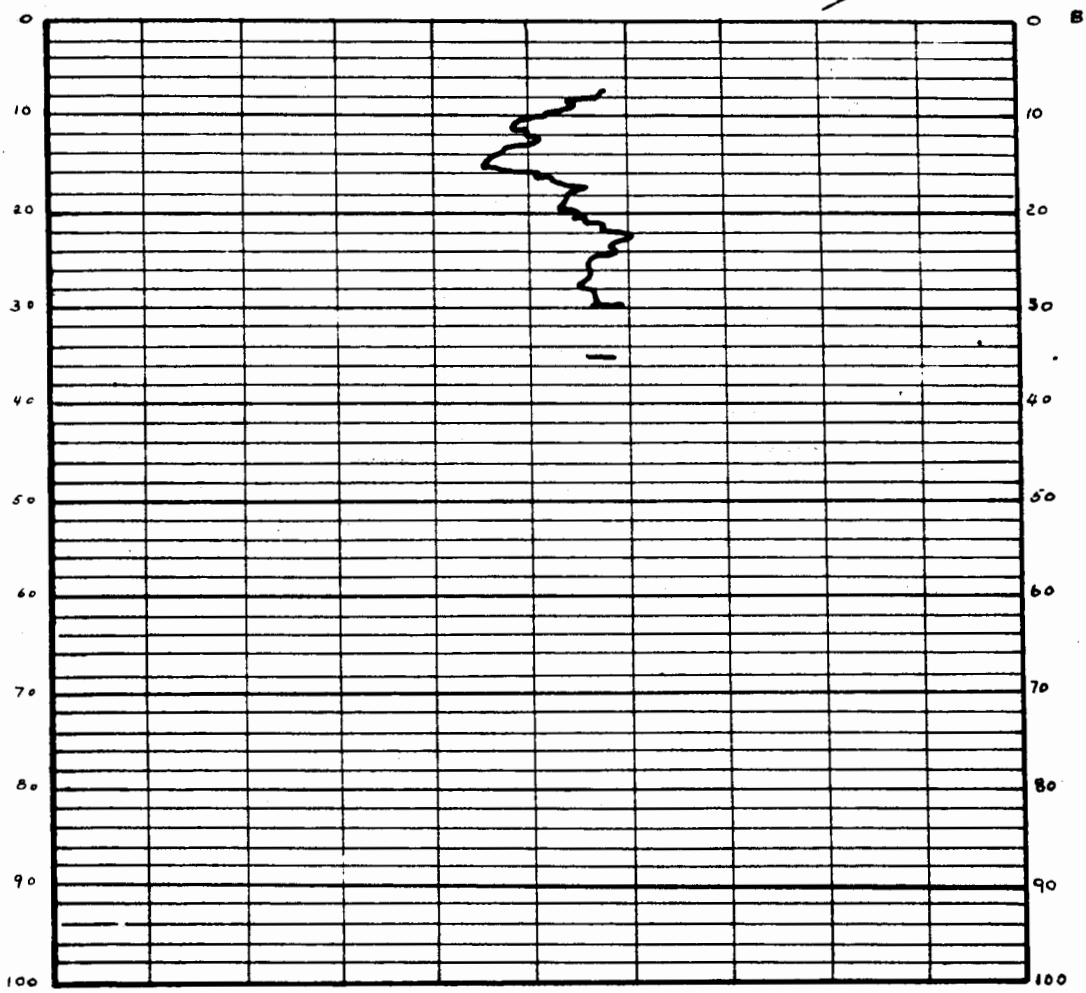


Figure 29.--Gamma-radiation log MCM-8C.

Field No. MCM-8C Casing diameter (inches) 2 Length of casing below land surface (ft) 66 Depth to water below land surface (ft) 60.2

Logging datum land surface

Altitude of land surface (ft) 6,797.3

Date 11-29-61 Equipment USGS I-65717

Logging Data

Run No. 1 of 1 runs. Probe sensitivity High. Logged out 12 ft/min

Gamma-Ray circuit scale 0.01 Potential circuit scale 5 Time constant 10

Statistical Variation 1/4 in. at 66 ft G-R Scale 0.01 Time constant 10

Calibration in hole: (G-R Scale 0.01 Pot. circ. scale 5)

Depth (ft)	Obs. Time (min)	Meter Reading
60	1	0.0051 MRH

Remarks Plastic casing

Depth Scale 20 ft /in.

Radiation Intensity Increasing →

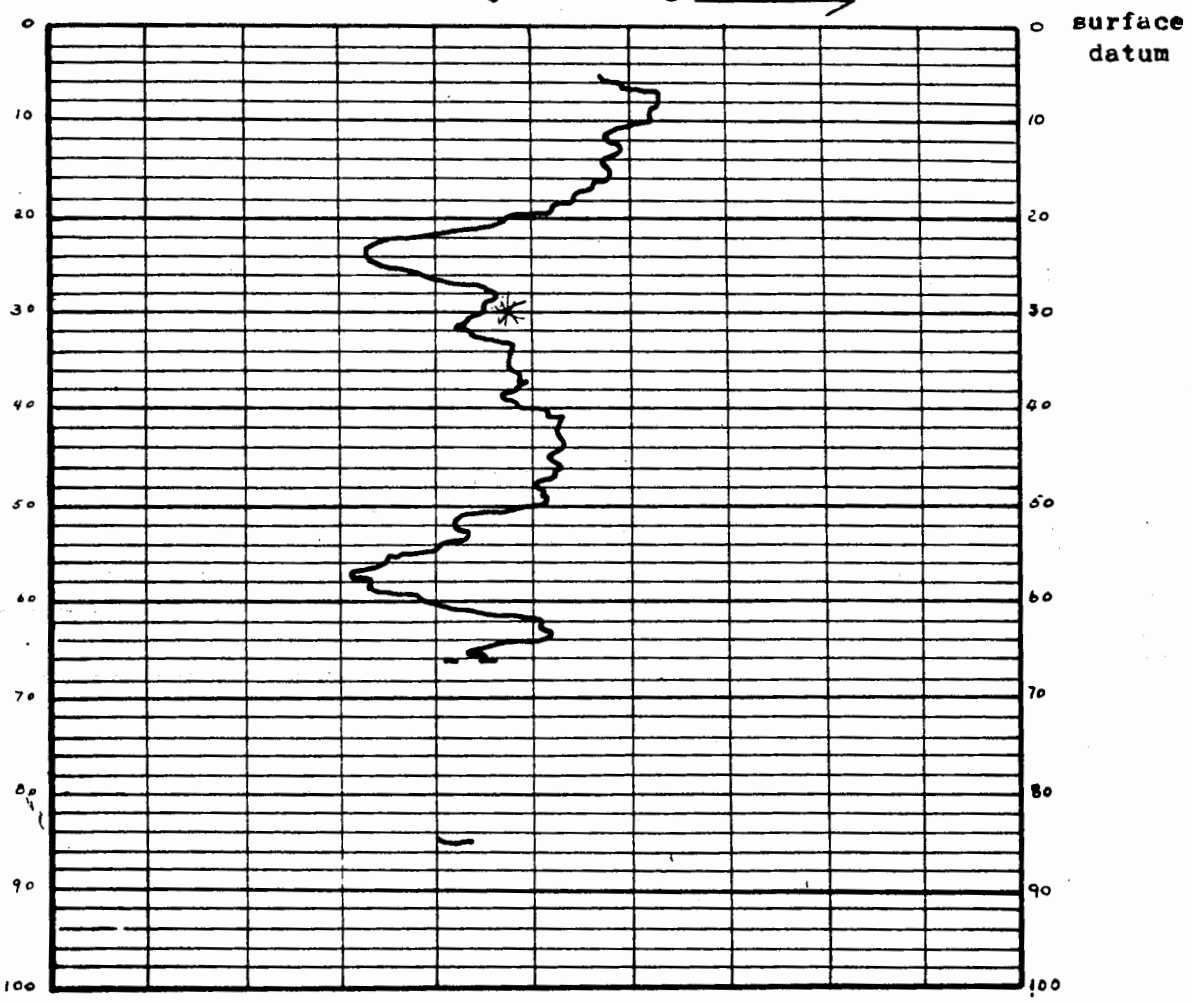


Figure 30.--Gamma-radiation log MCM-8D.

Field No. MCM-8D Casing diameter (inches) 2 Length of casing below land surface (ft) 86.3 Depth to water below land surface (ft) 59.2

Logging datum land surface

Altitude of land surface (ft) 6,796.3

Date 11-29-61 Equipment USGS I-65717

Logging Data

Run No. 1 of 1 runs. Probe sensitivity High. Logged out 12 ft/min

Gamma-Ray circuit scale 0.01 Potential circuit scale 5 Time constant 10

Statistical Variation 1/4 in. at 86 ft G-R Scale 0.01 Time constant 10

Calibration in hole: (G-R Scale 0.01 Pot. circ. scale 5)

Depth (ft)	Obs. Time (min)	Meter Reading
86	1	0.0062 MRH

Remarks Plastic casing

Depth Scale 20 ft /in.

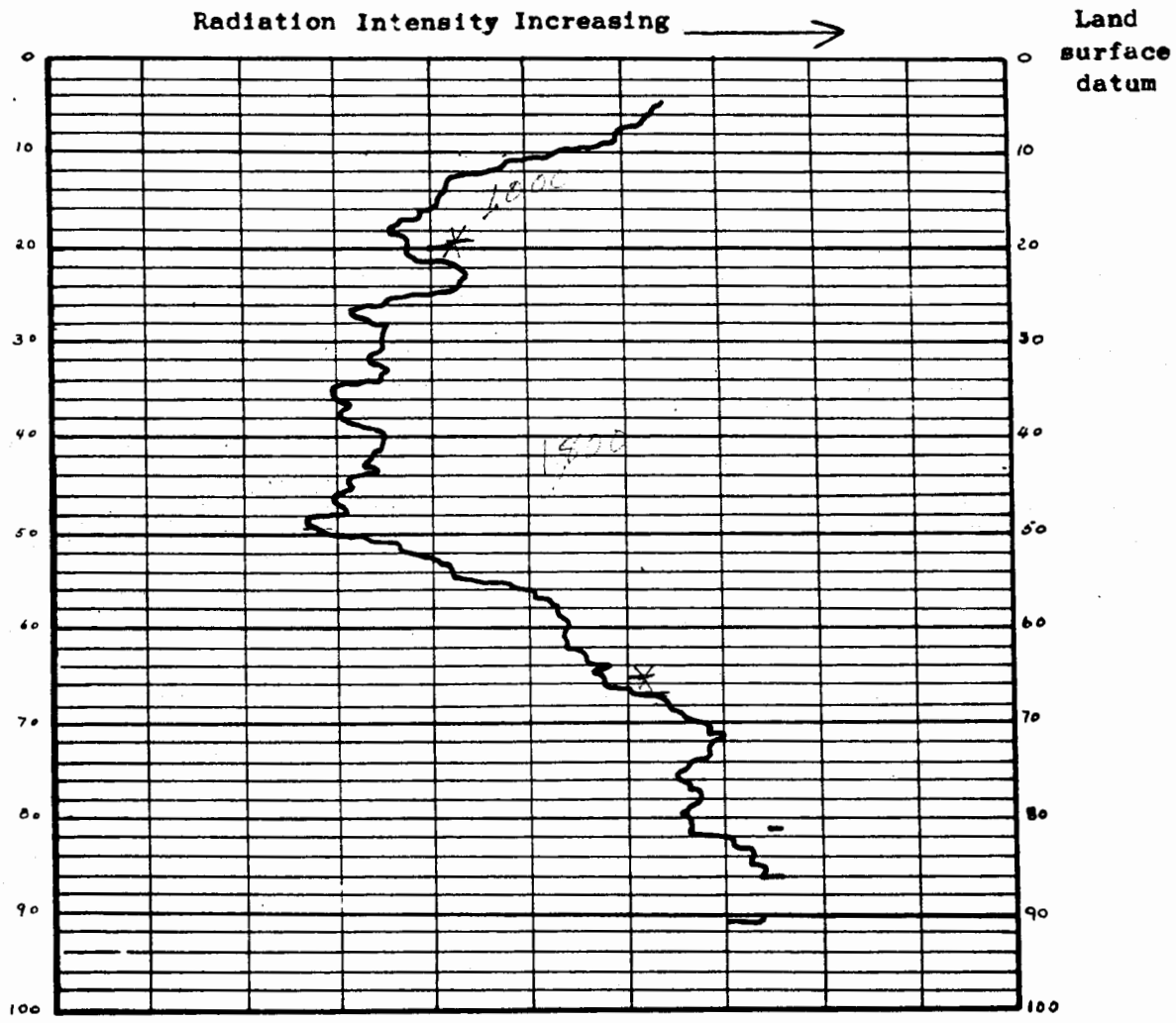


Figure 31.--Gamma-radiation log MCM-8E.

Field No. MCM-8E Casing diameter (inches) 2 Length of casing below land surface (ft) 52.6 Depth to water below land surface (ft) dry

Logging datum land surface

Altitude of land surface (ft) 6,796.9

Date 11-29-61 Equipment USGS I-65717

Logging Data

Run No. 1 of 1 runs. Probe sensitivity High. Logged out 12 ft/min

Gamma-Ray circuit scale 0.01 Potential circuit scale 5 Time constant 10

Statistical Variation 1/8 in. at 53 ft G-R Scale 0.01 Time constant 10

Calibration in hole: (G-R Scale 0.01 Pot. circ. scale 5)

Depth (ft)	Obs. Time (min)	Meter Reading
53	1	0.0068 MRH

Remarks Plastic casing

Depth Scale 20 ft /in.

Radiation Intensity Increasing →

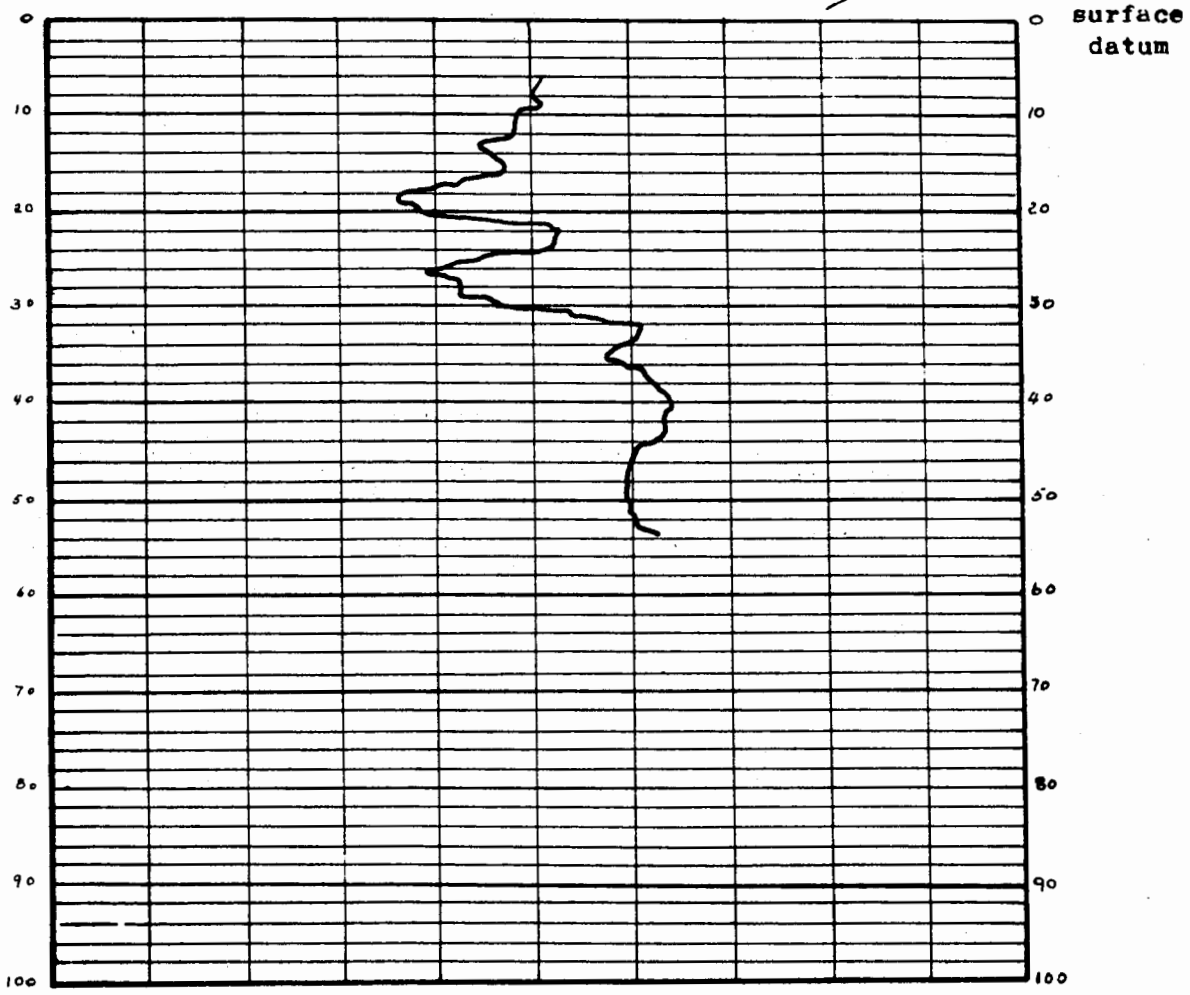


Figure 32.--Gamma-radiation log MCM-8F.

Field No. MCM-8F Casing diameter (inches) 2 Length of casing below land surface (ft) 23.1 Depth to water below land surface (ft) dry

Logging datum land surface

Altitude of land surface (ft) 6,799.2

Date 11-29-61 Equipment USGS I-65717

Logging Data

Run No. 1 of 1 runs. Probe sensitivity High. Logged out 12 ft/min

Gamma-Ray circuit scale 0.01 Potential circuit scale 5 Time constant 10

Statistical Variation 1/4 in. at 23 ft G-R Scale 0.01 Time constant 10

Calibration in hole: (G-R Scale 0.01 Pot. circ. scale 5)

Depth (ft)	Obs. Time (min)	Meter Reading
23	1	0.0073 MRH

Remarks Plastic casing

Depth Scale 20 ft /in.

Radiation Intensity Increasing →

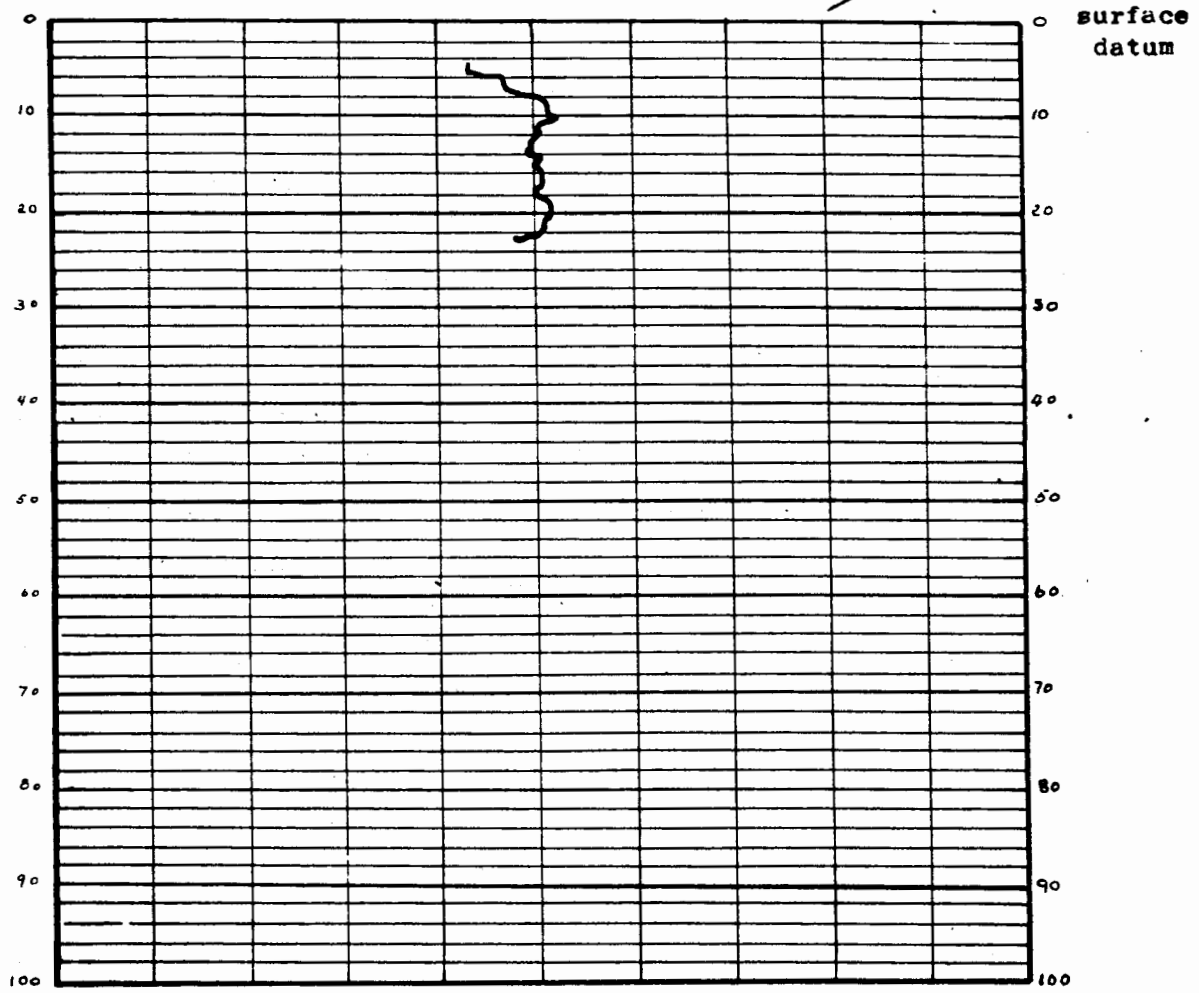


Figure 33.--Gamma-radiation log MCM-10.

Field No. MCM-10 Casing diameter (inches) 2 Length of casing below land surface (ft) 67.2 Depth to water below land surface (ft) dry

Logging datum land surface

Altitude of land surface (ft) 6,730.9

Date 11-29-61 Equipment USGS I-65717

Logging Data

Run No. 1 of 1 runs. Probe sensitivity High. Logged out 12 ft/min

Gamma-Ray circuit scale 0.01 Potential circuit scale 5 Time constant 10

Statistical Variation 1/8 in. at 67 ft G-R Scale 0.01 Time constant 10

Calibration in hole: (G-R Scale 0.01 Pot. circ. scale 5)

Depth (ft)	Obs. Time (min)	Meter Reading
67	1	0.0056 MRH

Remarks Plastic casing

Depth Scale 20 ft /in.

Radiation Intensity Increasing →

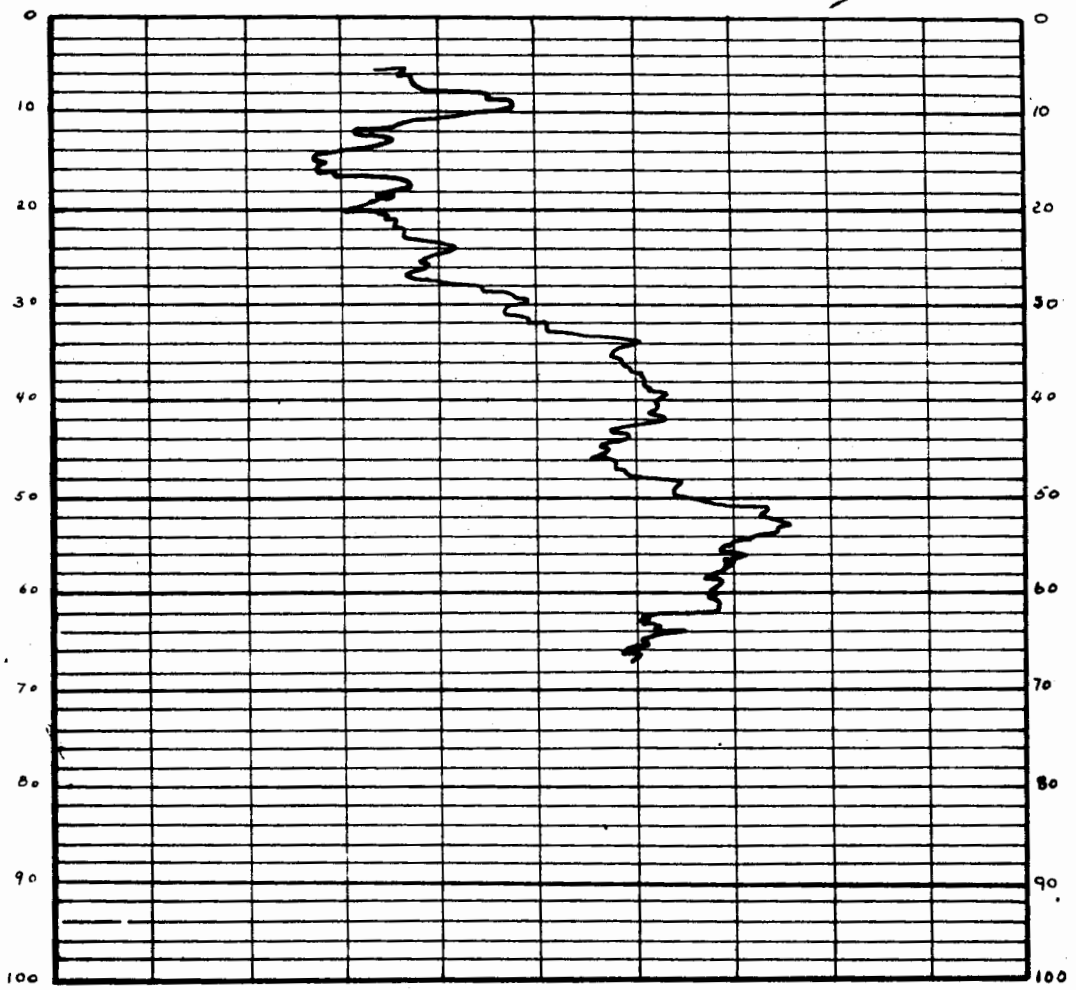


Figure 34.--Gamma-radiation log TSCM-1.

Field No. TSCM-1 Casing diameter (inches) - Length of casing below land surface (ft) - Depth to water below land surface (ft) dry

Logging datum land surface

Altitude of land surface (ft) 6,858.6

Date 11-28-61 Equipment USGS I-65717

Logging Data

Run No. 1 of 1 runs. Probe sensitivity High. Logged out 12 ft/min

Gamma-Ray circuit scale 0.01 Potential circuit scale 5 Time constant 10

Statistical Variation 1/8 in. at 23 ft G-R Scale 0.01 Time constant 10

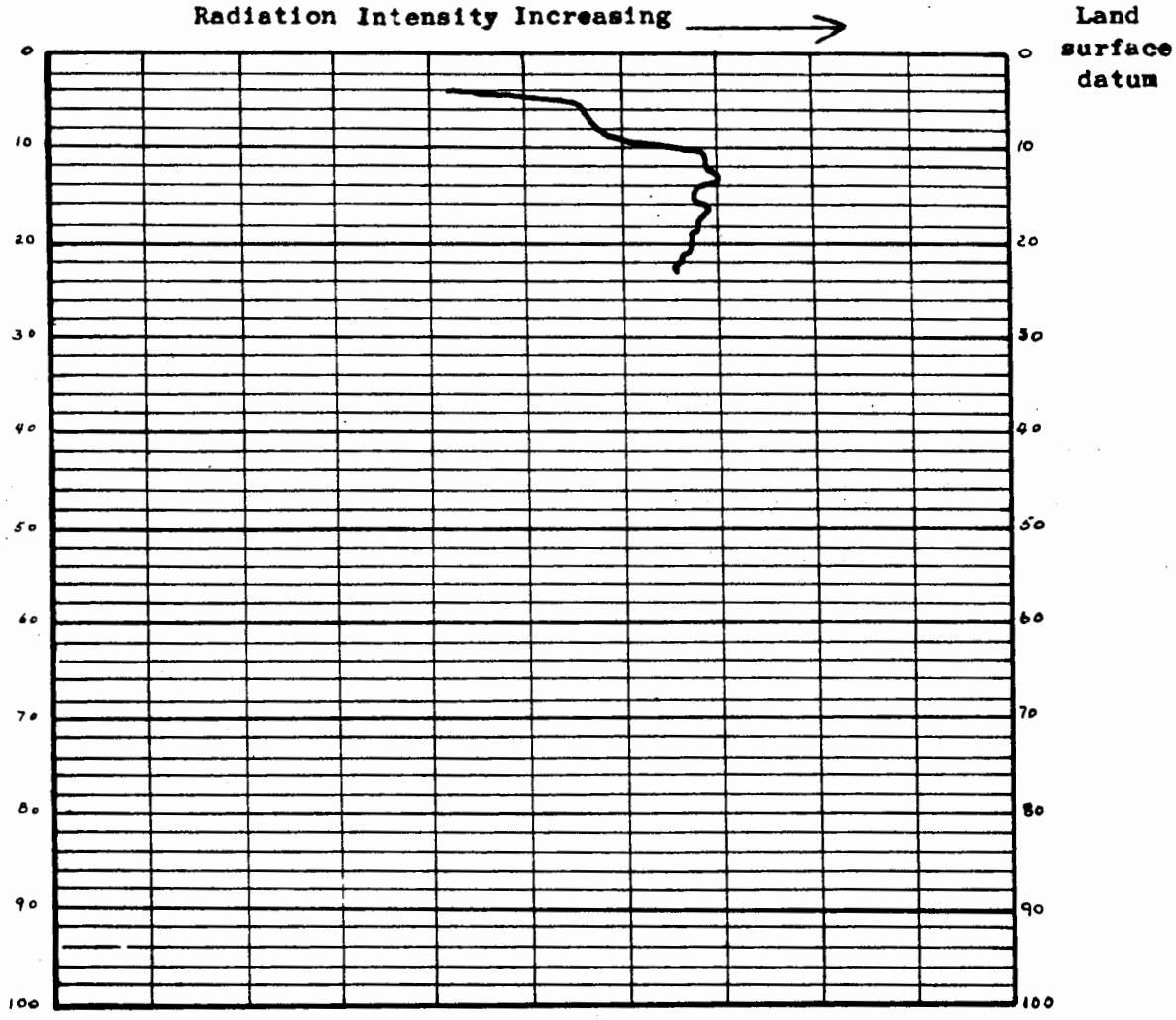
Calibration in hole: (G-R Scale 0.01 Pot. circ. scale 5)

Depth (ft)	Obs. Time (min)	Meter Reading
23	1	0.0062 MRH

Remarks Open hole, 3 inches in diameter

Depth Scale 20 ft /in.

Radiation Intensity Increasing →



U. S. GEOLOGICAL SURVEY
WATER RESOURCES DIVISION [illegible]

[illegible]

WELL [illegible]

Owner or Field No. MCM ba MCM9A

Project Name

Geological Survey No.

State New Mexico County

Location Los Alamos

[illegible] Sec. [illegible] T. [illegible] N/S R. [illegible] E/W

Depth Datum: land surface, which is 0 ft. above/below land surface.

Altitude: MP [illegible] ft. [illegible] ft.
Determined [illegible]

Operator(s) Koopman

Equipment (Vehicle No.) I 65717 Date 11-29-61

Casing Data Open hole

Casing: Diam. [illegible] in. [illegible] ft. to [illegible] ft. Thickness [illegible] in.
Diam. [illegible] in. [illegible] ft. to [illegible] ft. Thickness [illegible] in.
Diam. [illegible] in. [illegible] ft. to [illegible] ft. Thickness [illegible] in.

Bore: Diam. [illegible] in. [illegible] ft. to [illegible] ft.
Diam. [illegible] in. [illegible] ft. to [illegible] ft.
Diam. [illegible] in. [illegible] ft. to [illegible] ft.

Filter: Type [illegible] Thickness [illegible] Characteristics, [illegible]
[illegible] ft. to [illegible]
[illegible] ft. to [illegible]

Perforations, Screen: Type, size [illegible]
[illegible] ft. to [illegible]
[illegible] ft. to [illegible]

Water Level [illegible] ft. (above/below [illegible]
[illegible], which is [illegible] ft. (above/below) surface. Shut-in head after [illegible] (hrs. mins.)
Date [illegible]

Total Depth [illegible] ft. Interval logged [illegible] ft. to 47 ft.

Fluid in hole: [illegible] Characteristics [illegible]
Fluid level [illegible] ft. Fluid Temperature [illegible] °F.
Date [illegible] Date [illegible]

Water: Temperature [illegible] °F. at [illegible]. Field Cond. [illegible]
Ra(uu c/L [illegible] Beta-Gamma(uu c/L [illegible] U(10-8 g/L) [illegible]

Logging Data

Run No. 1 of 1 runs. Probe Sensitivity [illegible] ****

Descent: [illegible] ft./min. Gamma-Ray circuit [illegible]
Potential circuit scale [illegible]

[illegible] 12 ft./min. Gamma-Ray circuit [illegible] .01
Potential circuit scale 5 [illegible] 10

Short-[illegible] Wire [illegible] 1/4 in. 47 [illegible]
[illegible] G-R Scale .01 [illegible] 10

Calibration in hole: G-R Scale .01 Potentiometer 5

Depth (ft.)	Obs. Time [illegible]	Meter Reading
47	1	.0059

Remarks

Radiation Intensity Increases [illegible] >

Depth Scale: 20 ft./in.

U. S. GEOLOGICAL SURVEY
WATER RESOURCES DIVISION GROUND WATER BRANCH

HYDROLOGIC LABORATORY
Denver, Colorado

WELL LOG OF GAMMA RADIATION

Owner or Field No. ~~MCM 9ab~~ MCM9B

Project Name

Geological Survey No.

State New Mexico County

Location Los Alamos

¼ ¼ ¼ ¼ Sec. T N/S R E/W

Depth Datum: land surface, which is 0 ft. (above, below) land surface.

Altitude: MP ft. Land surface ft.
Determined by

Operator(s) Koopman

Equipment (Vehicle No.) I 65717 Date 11-29-61

Casing Data

Open hole

Casing: Diam. in. ft. to ft. Thickness in.
Diam. in. ft. to ft. Thickness in.
Diam. in. ft. to ft. Thickness in.

Bore: Diam. in. ft. to ft.
Diam. in. ft. to ft.
Diam. in. ft. to ft.

Filter: Type Thickness Characteristics,
ft. to
ft. to

Perforations, Screen: Type, size
ft. to
ft. to

Water level ft. (above, below)
, which is ft. (above, below) surface. Shut-in head after (hrs., mins.)
Date

Total Depth ft. Interval logged ft. to 41 ft.

Fluid in hole: Characteristics
Fluid level ft. Fluid Temperature °F.
Date Date

Water: Temperature °F. at . Field Cond.
Ra(uu c/L Beta-Gamma(uu c/L U(10-3 gr/l

Logging Data

Run No. 1 of 1 runs. Probe sensitivity (H: [illegible])

Descent: ft./min. Gamma-Ray circuit scale
Potential circuit scale Time constant

Logged out: 12 ft./min. Gamma-Ray circuit scale .01
Potential circuit scale 5 Time constant 10

Statistical Variation 1/8 ft. at 41 ft. Meter Reading
G-R Scale .01 Time Constant 10

Calibration in hole: (G-R Scale .01 Pot. circ. scale 5)

Depth (ft.)	Obs Time (min.)	Meter Reading
41	1	.0059

Remarks

Radiation Intensity Increases →

Depth Scale: 20 ft./in.

ISCO#1

~~ISCO 6A~~

New Mexico

land surface

Open hole

Koopman

I 05717 11-29-61

1 1 ----

12 .01

5 10

1/4 33

.01 10

.01 5

33 1 .0066

20

U. S. GEOLOGICAL SURVEY
RADIOLOGIC DIVISION GROUND WATER BRANCH

WELL LOG OF LOCAL RADIAT[illegible]

Casing Data

[illegible] 2 in. [illegible] in.
[illegible] in.
[illegible] in.
Diam. [illegible] in. [illegible] ft.
Diam. [illegible] in. [illegible] ft.
Diam. [illegible] in. [illegible] ft.
[illegible]: Type [illegible] thickness [illegible] perforations,
[illegible] ft. to [illegible]
[illegible] ft. to [illegible]
[illegible] Screens [illegible]
[illegible] ft.
[illegible]
[illegible] ft. [illegible] below,
[illegible] above
[illegible]

[illegible] Depth [illegible] ft. Interval [illegible] ft. to [illegible] ft.
[illegible] ft.

Fluid in hole: [illegible] Characteristics [illegible]
Fluid level [illegible] ft. Fluid Temperature [illegible] °F.
Date [illegible] Date [illegible]

[illegible]: Temperature [illegible] °F. at [illegible]. Field Cond. [illegible]
[illegible] (mmho/cm) [illegible] Bulk-Gross [illegible] U(10-[illegible] gr/l) [illegible]

Owner or Field No. MCO 4
Project Name
Geological Survey No.
State New Mexico County
Location Los Alamos
[illegible] Sec. [illegible] T. [illegible] N S R. [illegible] E W

Depth Datum: Top of 2" plastic casing, which is ? ft. (above, below) the surface.

Elevation: GP [illegible] ft. [illegible] ft.
Determined by [illegible]

Operator(s) Koopman

Equipment (Vendor, Mod.) I 65717 Date 11-28-61

Logging Data

Run No. 1 of 2 runs. Recorder [illegible] ---)

[illegible]: [illegible]
Potential [illegible]

[illegible] at 12 [illegible] .05
[illegible] 5 [illegible] 1

Statistics [illegible]

[illegible] Elevation [illegible] Depth [illegible]

Remarks

Radiation Intensity Increases → Depth Scale: 20 ft./in.

[illegible]

WELL LOG OF [illegible]

Field No. MCO 4A

Project Name

Geological Survey No.

State New Mexico County

Location Los Alamos

[illegible] Sec. T N/S R E/W

Depth Datum: ,which is ft.(above,below) land surface.

Elevation: MP ft. [illegible] Surface ft.

Determined by

Operator(s) Koopman

Equipment (Model No.) I 65717 Date 12-1-61

Casing Data

Casing: Diam. ? in. ft.to ft. Thickness in

Diam. in. ft.to ft. Thickness in.

Diam. in. ft.to ft. Thickness in.

Screen: Diam. in. ft.to ft.

Diam. in. ft.to ft.

Diam. in. ft.to ft.

Filter: Type Thickness Characteristics,

ft.to

ft.to

Perforations, Screen: Type, size

ft.to

ft.to

Water Level ft.(above,below)

,which is ft.(above,below) surface. Shut-in head after (hrs., mins.)

Date

Total Depth ft. Interval Logged ft.to ft.

Fluid in hole: Characteristics

Fluid level ft. Fluid Temperature °F.

Date Date

Water: Temperature °F. at . Field Cond.

Ra(uu c/L Beta-Gamma(uu c/l U(10-3 gr/l

Logging Data *

Recorder [illegible] mms. Fluid Resistivity (High,low)

Hence to [illegible] Chart scale

Time constant

[illegible] ft. min. [illegible] Circuit scale

Potential [illegible] Time constant

Artificial Vary [illegible] ft. Meter Reading

Time Constant

Vibration in hole: (G-F Center Pot.circ.scale)

Depth (ft.)	Obs. Time (min.)	Meter Reading

Remarks *Not deep enough to log. Reading from bottom: 0.063 MPH

Radiation Intensity Increases Depth Scale: ft./in.

U. S. GEOLOGICAL SURVEY
WATER RESOURCES DIVISION GROUND WATER BRANCH
HYDROLOGIC LABORATORY
DENVER, Colorado

WELL LOG OF GAMMA RADIATION

Owner or Field No. ~~MCM-8C~~ MCO-8A
Project Name
Geological Survey No.
State New Mexico County
Location Los Alamos
¼ ¼ ¼ Sec. T. R.
Depth Datum: land surface
is 0 ft. (above, below) land surface
Altitude: @ ft. Land surface
Determined by
Operator(s) Koopman
Equipment (Vehicle No.) I 65717 Date 11-29-61

Casing Data

Casing: Diam. in. ft. to ft. Thickness in.
Diam. in. ft. to ft. Thickness in.
Diam. in. ft. to ft. Thickness in.
Liner: Diam. in. ft. to ft.
Diam. in. ft. to ft.
Diam. in. ft. to ft.
Filter: Type Thickness Characteristics,
ft. to
ft. to
Perforations, Screen: Type, size
ft. to
ft. to
Water level ft. (above, below)
which is ft. (above, below)
Surface, Shut-in head after (hrs., min.)
Date
Total Depth ft. Interval logged ft. to
45 ft.
Fluid in hole: Characteristics
Fluid level ft. Fluid Temperature F.
Date Date
Water: Temperature F. at . Field Cond.
Ra(uu c/L Beta-C.(uu c/L U(10-6 c/L

Run No.	1	1	(High-low)
Depth (ft.)	12	5	.01 / 10
Gain Setting	1/4	45	Reading
Gain Setting	.01		10
Calibration in meter (d-P Cell)	.01		Scale 5
Depth (ft.)	Gain Setting		Reading
45	1		.0046

Remarks

Radiation Intensity Increases →

Depth Scale: 12 ft. in.

U. S. GEOLOGICAL SURVEY
WATER RESOURCES DIVISION, GROUND WATER BRANCH

HYDROLOGIC INVESTIGATIONS
DENVER, COLORADO

WELL LOG OF GAMMA RADIATION

Number or Field No. MCM 5C

Project Name

Geological Survey No.

State New Mexico County

Location

Sec. T N/S R E/W

Depth Datum: Top of casing, which is 2 feet above (below) land surface.

Altitude: MSL Determined by

Operator Koopman

Equipment (Serial No.) I 05717 11-28-61

Casing Data

Casing: Diam. in. ft. to ft. Thickness in.
Diam. in. ft. to ft. Thickness in.
Diam. in. ft. to ft. Thickness in.

Bore: Diam. in. ft. to ft.
Diam. in. ft. to ft.
Diam. in. ft. to ft.

Filter: Type Thickness (Gravel, etc.)
ft. to
ft. to

Perforations, Screen: Type, Size
ft. to
ft. to

Water level ft. (above, below)
, which is ft. (above, below) surface. Shut-in head after (hrs., mins.)
Date

Total Depth ft. Interval Logged ft.
39 ft.

Fluid in hole: Characteristics
Fluid level ft. Fluid Temperature °F.
Date Date

Water: Temperature °F at . Field Cond.
Ra(uu c/L Beta-Gamma (uu c/L U(10-6 gr/L

Remarks

	1	1	---
12			.01
		5	10
	1/4	39	
		.01	10
Calibration in hole: (C-R Scale)		.01	5
Depth (ft.)			Meter Reading
39	1		.0063

Radiation Intensity Increases →

Depth Scale: 20 ft./in.

U. S. GEOLOGICAL SURVEY
WATER RESOURCES DIVISION, GROUND WATER BRANCH

Well Log and Water Analysis

Owner or Field No. MCM 6C
Project Name
Geological Survey No.
State New Mexico County
Location Los Alamos
Sec. T. R.

Depth Datum: Top of plastic casing, which is 1 ft. above (below) land surface.

Altitude: TP ft. L.S. ft.
Determined by

Operator(s) Koopman

Equipment (Vehicle No.) I 65717 11-23-61

Casing Data

Casing: Diam. 2 in. ? ft. to ft. Thickness in.
Diam. in. ft. to ft. Thickness in.
Diam. in. ft. to ft. Thickness in.

Bore: Diam. in. ft. to ft.
Diam. in. ft. to ft.
Diam. in. ft. to ft.

Filter: Type Thickness Characteristics,
ft. to
ft. to

Perforations, Screen: Type, size
ft. to
ft. to

Water Level ft. (above, below)
, which is ft. (above, below)
surface. Shut-in head after (min.)
Date

Total Depth ft. Interval Logged ft. to
57 ft.

Fluid in hole: Characteristics
Fluid level ft. Fluid Temperature °F.
Date Date

Water: Temperature °F. at . Fluid Cond.
Ra(uu c/L Beta-Gamma(uc c/l U(10-6 g/l

Run No. 1 of 1 Date Time Figures

Logged ft. to ft.
12 .01
5 10

Statistics: Int. 1/4 57 Meter Reading
.01 10

Calibration Formula: (K-K) .01 (Microrads 5)
Depth (ft.) Meter Reading
57 1 .0069

Remarks

Radiation Intensity Increases >

Depth Scale 20 ft./in.

U. S. GEOLOGICAL SURVEY
WATER RESOURCES DIVISION GROUND WATER BRANCH

RADIOLOGY LABORATORY
Denver, Colorado

GAMMA RADIATION

Casing Data

Casing: Diam. 2 in. ____ ft. to ____ ft. Thickness ____ in.
Diam. ____ in. ____ ft. to ____ ft. Thickness ____ in.
Diam. ____ in. ____ ft. to ____ ft. Thickness ____ in.

Bore: Diam. ____ in. ____ ft. to ____ ft.
Diam. ____ in. ____ ft. to ____ ft.
Diam. ____ in. ____ ft. to ____ ft.

Filter: Type ____ Thickness ____ Characteristics ____
____ ft. to ____
____ ft. to ____

Perforations, Screen: Type, size ____
____ ft. to ____
____ ft. to ____

Water level ____ ft. (above, below) ____
____ (which is ____ ft. (above, below) land surface. Shut-in head after ____ (hrs., mins.)
Date ____

Total Depth ____ ft. Interval logged ____ ft. to ____ ft.
56 ft.

Fluid in hole: ____ Characteristics ____
Fluid level ____ ft. Fluid Temperature ____ °F.
Date ____ Date ____

Water: Temperature ____ °F. at ____. Field Cond. ____
Ra(uc c/L ____ Beta-Gamma(uc c/L ____ U(10-3 gr/l ____

Client or Field No. MCM 6D
Project Name ____
Geological Survey No. ____
State New Mexico County ____
Location Los Alamos
____ ¼ ¼ Sec. ____ T ____ N/S R ____ E/W

Depth Datum: Top of 2" plastic casing which is 1 ft. (above, below) land surface.

Altitude of ____ ft. Land surface ____ ft.
Determined by ____

Operator Koopman

Equipment (Vehicle No.) I 65717 Date 11-28-61

Logging Data

Run No. 1 of 1 Speed (High, ____

Sensitivity 12 Time constant .01
Gain 5 Scale factor 10

Collimator Material 1/8 36
Length .01 Diameter 10

Calibration in hole: (C-Factor) .01 Irg. scale 5
Depth (ft.) Obs. Time Water Reading
36 1 .0059
____ ____ ____
____ ____ ____
____ ____ ____

Remarks ____

Radiation Intensity Increases ____ →

Depth Scale: 20 ft./in.

U. S. GEOLOGICAL SURVEY
WATER RESOURCES DIVISION GROUND WATER BRANCH

[illegible] INFORMATION
[illegible]

[illegible] DATA SHEET

Owner or Field No. MCM 6B
Project Name
Geological Survey No.
State New Mexico County
Location Los Alamos
Lat. Long. Sec. T. N S R. E W
Depth Datum: Top of plastic casing, which is 1 ft. above, below land surface.
Altitude: [illegible] ft. Land [illegible]
Determined by
Driller Koopman
Equipment (Vehicle No.) I 65717 11-28-61

Casing Data

Casing: Diam. 2 in. [illegible] ft. to [illegible] ft. [illegible]
Diam. in. ft. to ft. [illegible]
Diam. in. ft. to ft. [illegible]

Bore: Diam. in. ft. to ft.
Diam. in. ft. to ft.
Diam. in. ft. to ft.

Filter: Type Thickness [illegible]
ft. to
ft. to

Perforations, Screen: Type, size
ft.
ft.

Water level ft. (above, below)
, which is ft. (above, below) surface. [illegible] after hrs., mins.
Date

Total Depth ft. Interval [illegible] ft. to 53 ft.

Fluid in hole: Characteristic
Fluid level ft. Fluid Temperature °F.
Date Date

Water: Temperature °F. at . Field Cond.
Ra(uu c/L Beta-Gamma(uu c/L U(10-3 gr/L

Logging

Run No. 1 of 1 runs [illegible]

[illegible] ft. [illegible]
[illegible]

[illegible]	12		.01
Potentiometer		5	10
Statistical Variation	1/8	53	
[illegible]		.01	10
Calibration [illegible]		.01	[illegible] 5
Depth (ft.)	[illegible]	[illegible]	[illegible] Reading
53	1		.0068

Remarks

Additional Composite Logs

Depth Scale: 20 ft.

Operator or Field No. MCQ 6

Project Name

Geological Survey No.

State New Mexico County

Location Los Alamos

Depth Datum: Top of 3" plastic pipe, which is 8.0 ft. above land surface

Altitude: MP ft.
Datum ft.

Operator Koopman

Contractor or Serial No. I 65717 11-28-61

	1	1	--5
	12		.01
		5	10
		1/4	69
		.01	10
		.01	5
	69	1	.0060

Casing: Diam. 3 in. ft. to ft. Thickness in.
Diam. in. ft. to ft. Thickness in.
Diam. in. ft. to ft. Thickness in.

Bore: Diam. in. ft. to ft.
Diam. in. ft. to ft.
Diam. in. ft. to ft.

Filter: Type Thickness Characteristic
ft. to
ft. to

Perforation: Screen: Type
ft.
ft.

Intervals ft. open hole
which ft.
Surface: Set-up
Date

Total Depth ft. Interval ft.
69

Fluid in hole: Characteristics
Fluid level ft. Fluid Temperature °F
Date Date

Water temperature °F. at . Field Cond.
Radon c/l Beta-Gamma c/l c/10-3 pr/l

Remarks

Deflection Intensity Increases →

Depth Scale: 20 ft./in.

U. S. GEOLOGICAL SURVEY
WATER RESOURCES DIVISION GROUND WATER BRANCH

HYDROLOGIC LABORATORY
Denver, Colorado

WELL LOG OF GAMMA RADIATION

Owner or Field No. MCM 8D

Project Name

Geological Survey No.

State New Mexico County

Location Los Alamos

¼ ¼ ¼ ¼ Sec. T N/S R E/W

Depth Datum: Top of 2" plastic pipe, which is 1.0 ft. above/below land surface.

Altitude MP ft. L.S. ft. determined by

Logged by(s) Koopman

Equipment (Vehicle No.) I-65717 11-29-61

Casing Data

Casing: Diam. 2 in. ft. to ft. Thickness in.
Diam. in. ft. to ft. Thickness in.
Diam. in. ft. to ft. Thickness in.

Bore: Diam. in. ft. to ft.
Diam. in. ft. to ft.
Diam. in. ft. to ft.

Filter: Type Thickness Characteristics,
ft. to
ft. to

Perforations, Screen: Type, size
ft. to
ft. to

Water level ft. (above, below)
, which is ft. (above, below) surface. Shut-in head after (hrs., min.)
Date

Total Depth ft. Interval logged ft. to 87 ft.

Fluid in hole: Characteristics
Fluid level ft. Fluid Temperature °F.
Date Date

Water: Temperature °F. at . Field Cond.
Rn(uu c/L Beta-Gamma(uu c/L U(10-3 gr/l

Logging Data

Run No. 1 of 1 runs. Pump ---
Intervals ft., min. Gamma
Potential current

Logged at 12 .01
Potential 5 10

Standard Current 1/4 87
Gamma .01 10

Calibration in hole: Gamma Scale .01 Rate 5
Depth (ft.) Gamma Lines Gamma Reading
87 1 .0062

Remarks

Radiation Intensity Increases →

Depth Scale 20 ft. in.

U. S. GEOLOGICAL SURVEY
WATER RESOURCES DIVISION GROUND WATER BRANCH

HYDROLOGIC LABORATORY
Denver, Colorado

WELL LOG: GAMMA RADIATION

Casing Data

Casing: Diam. ___ in. ___ ft. to ___ ft. Thickness ___ in.
Diam. ___ in. ___ ft. to ___ ft. Thickness ___ in.
Diam. ___ in. ___ ft. to ___ ft. Thickness ___ in.

Bore: Diam. ___ in. ___ ft. to ___ ft.
Diam. ___ in. ___ ft. to ___ ft.
Diam. ___ in. ___ ft. to ___ ft.

Filter: Type ___ Thickness ___ Characteristics, ___
___ ft. to ___
___ ft. to ___

Perforation, Screen, Type, size ___
___ ft. to ___
___ ft. to ___

Water level ___ ft. (above, below) ___
___ ft. (above, below) ___, which is ___ ft. (above, below)
surface. Shut-in head after ___ days, ___ psi.
Date ___

Total Depth ___ ft. Interval logged ___ ft. to ___ ft.

Fluid in hole ___ Characteristics ___
Fluid level ___ ft. Fluid temperature ___ °F.
Date ___ Date ___

Water: Temperature ___ °F. at ___. Field Cond. ___
Radon c/l ___ Beta-Gamma (uu c/l) ___ (10-3 μr/l) ___

Well or Field No. MCM 8C
Project Name ___
Geological Survey No. ___
State New Mexico County ___
Location Los Alamos
___ ¼ ___ ¼ ___ ¼ ___ ¼ Sec. ___ T ___ N S R ___ E W

Depth Datum: Top of 2" plastic casing, which is 1.0 ft. (above, below) land surface.

Altitude MP ___ ft. Land surface ___ ft.
Determined by ___

Operator(s) Koopman

Equipment (Vehicle No.) I 65717 11-29-61

Run No.	1	1	---
Depth (ft.)	12		.01
		5	10
Sensitivity	1/4	67	
		.01	10
Calibration		.01	5
Depth (ft.)	67	1	.0051

Remarks ___

Radiation Intensity Increases ___ Depth Scale: ___ ft. in.

U. S. GEOLOGICAL SURVEY
WATER RESOURCES DIVISION GROUND WATER BRANCH

HYDROLOGIC LABORATORY
DENVER, COLORADO

WELL LOG OF GAMMA RADIATION

Owner or Field No. MCO 8

Project Name

Geological Survey No.

State New Mexico County

Location Los Alamos

___ ¼ ___ ¼ ___ ¼ ___ ¼ Sec. ___ T ___ N/S R ___ E/W

Depth Datum: top of recorder platform, which is 4 ft. (above, below) land surface.

Altitude: MP ___ ft. Land surface ___ ft.
Determined by

Operator(s) Koopman

Equipment (Vehicle No.) I 65717 Date 11-29-61

Casing Data Plastic

Casing: Diam. 3 in. ___ ft. to ___ ft. Thickness ___ in.
Diam. ___ in. ___ ft. to ___ ft. Thickness ___ in.
Diam. ___ in. ___ ft. to ___ ft. Thickness ___ in.

Bore: Diam. ___ in. ___ ft. to ___ ft.
Diam. ___ in. ___ ft. to ___ ft.
Diam. ___ in. ___ ft. to ___ ft.

Filter: Type ___ Thickness ___ Characteristics, ___
___ ft. to ___
___ ft. to ___

Perforations, Screen: Type, size ___
___ ft. to ___
___ ft. to ___

Water Level ___ ft. (above, below) ___
___, which is ___ ft. (above, below) surface. Shut-in head after ___ (hrs., min.)
Date

Total Depth ___ ft. Interval logged ___ ft. to 83 ft.

Fluid in hole: ___ Characteristics ___
Fluid level ___ ft. Fluid Temperature ___ °F.
Date Date

Water: Temperature ___ °F. at ___. Field Cond. ___
Ra(uu c/L ___ Beta-Gamma(uu c/L ___ U(10-3 gr/l ___

Logging Data

Run No. 1 of 1 runs. Probe Sensitivity [illegible]

Descent ___ ft./min. Gamma-Ray circuit [illegible]
Potential circuit scale [illegible]

Ascend out: 12 ft./min. G-R Scale .01
Potential circuit scale 5 [illegible] 10

Stationary Variation 1/4 in. at 83 Meter Reading
G-R Scale .01 Time Const. 10

Calibration in hole: (G-R Scale .01 pot. circ. scale 5)

Depth (ft.)	Obs. Time (min.)	Meter Reading
83	1	.0043

Remarks

Radiation Intensity Increases ___ >

Depth Scale: 20 ft./in.

U. S. GEOLOGICAL SURVEY
WATER RESOURCES DIVISION GROUND WATER BRANCH

HYDROLOGIC LABORATORY
Denver, Colorado

WELL LOG OF GAMMA RADIATION

Owner or Field No. MCO 9
Project Name
Geological Survey No.
State New Mexico County
Location Los Alamos
___ ¼ ___ ¼ ___ ¼ ___ ¼ Sec. ___ T ___ N/S R ___ E/W
Depth Datum: top of 3" plastic casing, which is 1 ft. (above, below) land surface.
Altitude: MP ___ ft. Land surface ___ ft.
Determined by
Operator(s) Koopman
Equipment (Vehicle No.) I 65717 Date 11-29-61

Casing Data

Casing: Diam. 3 in. ___ ft. to ___ ft. Thickness ___ in.
Diam. ___ in. ___ ft. to ___ ft. Thickness ___ in.
Diam. ___ in. ___ ft. to ___ ft. Thickness ___ in.

Bore: Diam. ___ in. ___ ft. to ___ ft.
Diam. ___ in. ___ ft. to ___ ft.
Diam. ___ in. ___ ft. to ___ ft.

Filter: Type ___ Thickness ___ Characteristics, ___
___ ft. to ___
___ ft. to ___

Perforations, Screen: Type, size ___
___ ft. to ___
___ ft. to ___

Water Level ___ ft. (above, below) ___
___, which is ___ ft. (above, below) surface. Shut-in head after ___ (hrs., mins.)
Date

Total Depth ___ ft. Interval logged 56 ft. to ___ ft.

Fluid in hole: ___ Characteristics ___
Fluid level ___ ft. Fluid Temperature ___ °F.
Date Date

Water: Temperature ___ °F. at ___. Field Cond. ___
Ra(uu c/L ___ Beta-Gamma(uu c/L ___ U(10-3 gr/l ___

Logging Data

Run No. 1 of 1 runs. Probe Sensitivity (High, Low)

Descent: ___ ft./min. Gamma-Ray circuit scale ___
Potential circuit scale ___ Time constant ___

Logging out: 12 ft./min. Gamma-Ray circuit scale .01
Potential circuit scale 5 Time constant 10

Statistical variation 1/8 in. at 56 ft. Meter Reading ___
G-R Scale .01 Time Constant 10

Calibration in hole: (G-R Scale .01 Pot. circ. scale 5)

Depth (ft.)	Obs. Time (min.)	Meter Reading
56	1	.0068

Remarks

Radiation Intensity Increases ___ → Depth Scale: 20 ft./in.

U. S. G[illegible] SURVEY
[illegible] GROUND WATER BRANCH
[illegible] LABORATORY
[illegible] Colorado

WELL [illegible] RADIATION

Owner or Field No. MCO 7.5
Project Name
Geological Survey No.
State New Mexico County
Location Los Alamos
___ ¼ ___ ¼ ___ ¼ ___ ¼ Sec. ___ T ___ N/S R ___ E/W

Depth Datum: Top of 3" plastic casing [illegible]
[illegible] is ___ ft. (above, below) land surface

Altitude: MP ___ ft. Land surface ___
Determined by

Operator(s) Koopman

Equipment (Vehicle No.) I 65717 Date 11-29-61

Casing Data

Casing No. 3 ___ ft. to ___ ft. Thickness ___ in.
[illegible] ___ ft. to ___ ft. Thickness ___ in.
[illegible] ___ ft. to ___ ft. Thickness ___ in.

[illegible] ___ ft. to ___ ft.
[illegible] ___ ft. to ___ ft.
[illegible] ___ ft. to ___ ft.

Filter [illegible] Thickness ___ Characteristics,
___ ft. to ___
___ to ___

[illegible] Screen: Type, size
___ ft. to ___
___ ft. to ___

[illegible] ___ ft. (above, below) ___
___, which is ___ ft. (above, below)
surface. Shut-in head after ___ (hrs., mins.)
Date

[illegible] Depth ___ ft. Interval logged ___ ft. to
53 ft.

Fluid in hole: ___ Characteristics
Fluid level ___ ft. Fluid Temperature ___ °F.
Date Date

Water: Temperature ___ °F. at ___. Field Cond. ___
Ra(uu c/L ___ Beta-Gamma(uu c/L ___ U(10-3 gr/l ___

Logging Data

Run No. 1 of 1 runs. Probe Sensitivity ---

Descent: ___ ft./min. Gamma-Ray circuit
Potential circuit scale

Logged out: 12 ft./min. Gamma R[illegible] .01
Potential circuit scale 5 10

Statistical Variation 1/8 [illegible] 53
G-R Scale .01 10

Calibration in hole: (G-R Scale .01 5
Depth (ft.) Obs. Time [illegible]
53 1 .0058
___ ___ ___
___ ___ ___
___ ___ ___

Remarks

Radiation Intensity Increases ___ →

Depth Scale: 20 ft. in.

GEOLOGICAL SURVEY
[illegible] GROUND WATER BRANCH
[illegible] LABORATORY
[illegible]

[illegible] RADIATION

Casing Data

Casing: Diam. ____ in. ____ ft. to ____ ft. Thickness ____ in.
Diam. ____ in. ____ ft. to ____ ft. Thickness ____ in.
Diam. ____ in. ____ ft. to ____ ft. Thickness ____ in.

Bore: Diam. ____ in. ____ ft. to ____ ft.
Diam. ____ in. ____ ft. to ____ ft.
Diam. ____ in. ____ ft. to ____ ft.

Filter: Type ____ Thickness ____ Material (Plastic, [illegible])
____ ft. to ____
____ ft. to ____

Perforations, Screen: Type, size ____
____ ft. to ____
____ ft. to ____

Water level ____ ft. (above, below) ____
____, which is ____ ft. (above, below) land surface. Shut-in head after ____ (hrs., min.)
Date ____

Total Depth ____ ft. Interval logged ____ ft. to ____ ft.

Fluid in hole: ____ Characteristics ____
Fluid level ____ ft. Fluid Temperature ____ °F.
Date ____ Date ____

Water: Temperature ____ °F. at ____. Field Cond. ____
Ra(uu c/L ____ Beta-Gamma(u c/L ____ U(10-3 gr/l ____

er or Field No. MCO 4
Project Name ____
Geological Survey No. ____
State New Mexico County ____
Location Los Alamos
____ ¼ ____ ¼ ____ ¼ ____ ¼ Sec. ____ T ____ N/S ____ E/W
Depth Datum: ____, which is ____ ft. (above, below) land surface.
Elevation: G ____ ft. K.B. ____ ft.
Date: T ____ ____

Koopman

I 05717 11-28-61

Logging [illegible]

[illegible] 2 [illegible] 2 runs. [illegible]

[illegible] ____ ft. [illegible]

[illegible] 12 [illegible] .05
[illegible] 5 10

[illegible] Vari[illegible] 1/4 21 [illegible]
____ [illegible] .05 [illegible] 10

[illegible] .05 [illegible] 5

Depth (ft.)	[illegible]	[illegible]
21	1	.007

Remarks ____

Radiation Intensity Increases ____ →

Depth Scale: 20 ft. in.

U. S. GEOLOGICAL SURVEY
WATER RESOURCES DIVISION GROUND WATER BRANCH

[illegible] LABORATORY
[illegible], Colorado

[illegible] RADIATION

Owner or Field No. MCO 5
Project Name
Geological Survey No.
State New Mexico County
Location
___ ¼ ___ ¼ ___ ¼ ___ ¼ Sec. ___ T ___ N/S R ___ E/W

Depth Datum: Top of 3" plastic casing, which is 1 ft. (above, below) land surface.

Altitude: [illegible] ft. [illegible] ft.
Determined by [illegible]

Operator(s) Koopman

Equipment (Model No.) I 65717 Date 11-28-61

Casing Data

Casing: [illegible] 3 in. ___ ft. to ___ ft. Thickness ___ in.
[illegible] in. ___ ft. to ___ ft. Thickness ___ in.
[illegible] in. ___ ft. to ___ ft. Thickness ___ in.

Bore: [illegible] in. ___ ft. to ___ ft.
[illegible] in. ___ ft. to ___ ft.
[illegible] in. ___ ft. to ___ ft.

Filter: Type ___ Thickness ___ Characteristics
___ ft. to ___
___ ft. to ___

[illegible] Screen: Type, size ___
___ ft. to ___
___ ft. to ___

Water level ___ ft. (above, below) ___
___ which is ___ ft. (above, below)
Surface. Shut-in [illegible] after ___ (hrs., min.)
Date ___

Total Depth ___ ft. Interval logged ___ ft. to 34 ft.

Fluid in hole: ___ Characteristics ___
Fluid level ___ ft. Fluid Temperature ___ °F.
Date ___ Date ___

Water: Temperature ___ °F. at ___. Field Cond. ___
Rafuu c/L ___ Beta-Gamma (uc c/L ___ U (10-9 gr/l ___

Logging Data

Run No. 1 of 1 runs. [illegible] (weight, ---)

Descent: ___ ft. min. Gam[illegible]
[illegible]

Damped out: 12 [illegible] .01
Poten[illegible] 5 10

Start scale of Variable: 1/8 34 [illegible]
G-R [illegible] .01 [illegible] 10

Calibration in hole: [illegible] .01 [illegible] 5)
Depth (ft.) obs. [illegible] [illegible]
34 1 .0062

Remarks

Radiation Intensity Increases ——→ Depth Scale: 20 ft./in.

U. S. GEOLOGICAL SURVEY
WATER RESOURCES DIVISION GROUND WATER BRANCH
HYDROLOGIC LABORATORY
DENVER, COLORADO

WELL LOG OF LOCAL RADIO CO.

Casing Data

Casing: Dia. 2 in. ft. to ft. Thickness in.
Dia. in. ft. to ft. Thickness in.
Dia. in. ft. to ft. Thickness in.

Bore: Dia. in. ft. to ft.
Dia. in. ft. to ft.
Dia. in. ft. to ft.

Filter: Type Thickness Characteristics,
ft. to
ft. to

Perforations, Screen: Type, size
ft. to
ft. to

Static Level ft. above, below
, which is ft. above, below
Surface (at time of last after hrs., mins.)
Date

Total Depth ft. Interval log ft. to
26 ft.

Fluid in Hole: Characteristics
Fluid Level ft. Fluid Temperature °F.
Date Date

Water Temperature °F. at , Field Cond.
Radioactivity Intensity Increases

Owner or Field No. MCM 5A
Project Name
Geological Survey No.
State New Mexico County
Location Los Alamos
¼ ¼ ¼ ¼ Sec. T N/S R E/W

Depth Datum: , which is ft. (above, below) land surface.

Altitude: ft. Land surface ft.
Determined by

Operator( ) Koopman

Equipment (Electric Log) I 65717 11-28-61

Run No. 1 1 ---

Bore: in.

12 .01
5 10

3/16 26
.01 10

.01 5

26 1 .0068

Remarks

Depth Scale: 20 in.

U. S. GEOLOGICAL SURVEY
WATER RESOURCES DIVISION GROUND WATER BRANCH
GEOLOGIC LABORATORY
DENVER, COLORADO

WELL LOG AND DATA RECORD

Owner or Field No. MCM 5B
Project Name
Geological Survey No.
State New Mexico County
Location Los Alamos
Sec. T R

Depth Datum: Top of 2" plastic casing, which is 0.5 ft. above (below) land surface.

Altitude: MP ft. Above ft.
Determined by

Driller Koopman

I 65717 11-28-61

Casing: 2 in. ? ft. Diameter in.
Bore: in. ft.
Diam. in. ft.

Filter: Type
ft.
ft.

Perforations: Type
ft.
ft.

Water level:
Date
Surface: Shut-in head after
Date

Total Depth ft. Interval Logged ft. to 31 ft.

Fluid in hole: Characteristics
Fluid level ft. Fluid Temperature °F.
Date Date

Water: Temperature °F. at , Field Cond.
Ra(uu c/L Beta-Gamma(uu c/L U(10-9 gr/L

1	1		---
	12		.01
		5	10
	1/4	31	Reading
		.01	10
Calibration		.01	Scale 5
Depth (ft.)	Chart Div.		Reading
31	1	.0067	

Remarks

Radiation Intensity Increases →

Depth Scale: 20 ft. in.

U. S. GEOLOGICAL SURVEY
WATER RESOURCES DIVISION PROJECT WATER BRANCH

[illegible] LABORATORY
[illegible]

WELL [illegible] RADIATION

Well Data

Casing: Dia. 2" in. [illegible] ft. Thickness [illegible] in.
Dia. [illegible] in. [illegible] ft. to [illegible] ft. Thickness [illegible] in.
Dia. [illegible] in. [illegible] ft. to [illegible] ft. [illegible]

Bore: Dia. [illegible] in. [illegible] ft. to [illegible] ft.
Dia. [illegible] in. [illegible] ft. to [illegible] ft.
Dia. [illegible] in. [illegible] ft. to [illegible] ft.

Filter: Type [illegible] Thickness [illegible]
[illegible] ft. to [illegible]
[illegible] ft. to [illegible]

Perforations, Screen: [illegible]
[illegible] ft. to [illegible]
[illegible] ft. to [illegible]

Water Level: [illegible]
Surface [illegible] ft. [illegible]
Date [illegible]

Total Depth [illegible] ft. Interval [illegible]
[illegible] ft.

Fluid in hole [illegible] Characteristics [illegible]
Fluid level [illegible] ft. Fluid Temperature [illegible] °F.
Date [illegible] Date [illegible]

Water: Temperature [illegible] °F. at [illegible] Field [illegible]
Ra(uu c/L [illegible] Beta-Gamma(uu c/L [illegible] U(10-3 gr/l [illegible]

Owner or Field No. MCO 4B
Project Name
Geological Survey No.
State New Mexico County
Location Los Alamos
[illegible] Sec. [illegible] T [illegible] N/S [illegible] E/W
Depth Datum: Top of 2" plastic casing, which is ? ft. [illegible] land surface.
Altitude: [illegible] ft. [illegible]
Driller [illegible]
Owner Koopman
[illegible] No.) I 65717 [illegible] 11-28-61

[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	1	1	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	12	[illegible]	.01
[illegible]	[illegible]	5	10
[illegible]	[illegible]	1/4	24
[illegible]	[illegible]	.01	10
[illegible]	[illegible]	.01	5
[illegible]	24	1	.0071
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

Remarks

Radiation Intensity Increases ——————> Depth Scale: 20 ft. in.

MCM 8E

New Mexico

Los Alamos

Top of 2" plastic

1

2

Koopman

I 65717 11-29-61

1 1 ---

12 .01

5 10

54

.01 10

.01 5

U. S. GEOLOGICAL SURVEY
WATER RESOURCES DIVISION GROUND WATER BRANCH

HYDROLOGIC LABORATORY
Denver, Colorado

WELL LOG OF GAMMA RADIATION

Casing Data

Casing: Diam. 2 in. ____ ft. to ____ ft. Thickness ____ in.
Diam. ____ in. ____ ft. to ____ ft. Thickness ____ in.
Diam. ____ in. ____ ft. to ____ ft. Thickness ____ in.

Bore: Diam. ____ in. ____ ft. to ____ ft.
Diam. ____ in. ____ ft. to ____ ft.
Diam. ____ in. ____ ft. to ____ ft.

Filter: Type ____ Thickness ____ Characteristics ____
____ ft. to ____
____ ft. to ____

Perforations, Screen: Type, Size ____
____ ft. to ____
____ ft. to ____

Water Level ____ ft. (above, below) ____
____ (which is ____ ft. (above, below) surface. Shut-in head after ____ hrs. and
Date ____

Total Depth ____ ft. Interval logged ____ ft. to 21 ft.

Fluid in hole: ____ Characteristics ____
Fluid level ____ ft. Fluid temperature ____ °F.
Date ____ Date ____

Water: Temperature ____ °F. at ____. Field Cond. ____
Ra(uu c/L ____ Beta-Gamma (uu c/L ____ U(10-3 gr/L ____

Number or Field No. MCM 6E
Project Name ____
Geological Survey No. ____
State New Mexico County ____
Location Los Alamos
____ ¼ ____ ¼ ____ ¼ ____ Sec. ____ T ____ S R ____ W
Depth Datum: Top of 2" plastic pipe which is 1.0 ft. (above or below) first surface.
Altitude: MP ____ ft. Land surface ____ ft.
Determined by ____
Operator(s) Koopman
Equipment (Vehicle No.) I 65717 Date 11-2 -61

Logging Data

Run No. 1 of 1 runs. Probe sensitivity (Hi, Lo, etc.) ____

Depth (ft.)	Time (min.)	Gamma-Ray Count (Count scale)	Gamma-Ray Count (Count scale)
12	5	.01	10
1/4	21	.01	10
21	1	.0068	

Remarks ____

Radiation Intensity Increases ____ >

Depth Scale: 20 ft./in.

Owner or Field No. MCM 8A

Project Name

Geological Survey No.

State New Mexico County

Location Los Alamos

Depth Datum Top of 2" plastic pipe which is 1 ft. above ----- level.

Latitude

Longitude

Driller Koopman

1	1				---
	12				.01
		5			10
		1/8		22	
		.01			10
		.01			5
	22	1		.0069	

Remarks

Casing Data

Casing: Diam. 2 in. ft. to ft.

Diam. in. ft. to ft.

Diam. in. ft. to ft.

Diam. in. ft. to ft.

Diam. in. ft. to ft.

Diam. in. ft. to ft.

Filter: Type Thickness

ft. to ft.

ft. to ft.

22

Depth Scale 20 ft. to in.

U. S. GEOLOGICAL SURVEY
WATER RESOURCES DIVISION GROUND WATER BRANCH

HYDROLOGIC LABORATORY
[illegible]

GEOPHYSICAL LOG OF GAMMA RADIATION

Casing Data

Casing: Diam. ? in. ft. to ft. Thickness in.
Diam. in. ft. to ft. Thickness in.
Diam. in. ft. to ft. Thickness in.

Bore: Diam. in. ft. to ft.
Diam. in. ft. to ft.
Diam. in. ft. to ft.

Filter: Type Thickness Characteristics
ft. to
ft. to

Perforations, Screen: Type Size
ft. to
ft. to

Water Level ft. (above, below)
which is ft. (above, below)
surface. Shut-in [illegible] hrs. [illegible]
Date

Total Depth ft. Interval [illegible] ft. to
ft

Fluid in hole: Characteristics
Fluid Level ft. Fluid Temperature °F.
Date Date

Water: Temperature °F. at . Field Cond.
Ra(uu c/L Beta-Gamma (uu c/L U(10-3 gr/l

Owner or Field No. MCM 6A
Project Name
Geological Survey No.
State New Mexico County
Location Los Alamos
¼ ¼ ¼ ¼ Sec. T S
Depth Datum: Top of casing
is 1 ft. (above, below) land surface
Altitude: ft. Land surface
Det. [illegible] by
Operator(Koopman
Equipment (Log No.) I 65717 Date 11-27-61

Logging Data

Run No. 1 of 1 [illegible] High ---

[illegible]	12		.01
[illegible]		5	10
Statistics [illegible]	1/8	19	
[illegible]	.01		10
Calibration [illegible]		.01	[illegible] 5
Depth (ft.)	[illegible]	[illegible]	[illegible] Reading
29	1		.0071

Remarks: 19

Radiation Intensity Increases →

Depth Scale: 20 ft. in.

U. S. GEOLOGICAL SURVEY
WATER RESOURCES DIVISION GROUND WATER BRANCH

HYDROLOGIC LABORATORY
Denver, Colorado

WELL LOG OF GAMMA RADIATION

Owner or Field No. MCO 7

Project Name

Geological Survey No.

State New Mexico County

Location Los Alamos

___ ¼ ___ ¼ ___ ¼ ___ ¼ Sec. ___ T ___ N/S R ___ E/W

Depth Datum: Top of recorder platform, which is 4 ft. (above, below) land surface.

Altitude: MP ___ ft. Land surface ___ ft.
Determined by

Operator(s) Koopman

Equipment (Vehicle No.) I 65717 Date 11-30-61

Casing Data

Casing: Diam. 3 in. ___ ft. to ___ ft. Thickness ___ in.
Diam. ___ in. ___ ft. to ___ ft. Thickness ___ in.
Diam. ___ in. ___ ft. to ___ ft. Thickness ___ in.

Bore: Diam. ___ in. ___ ft. to ___ ft.
Diam. ___ in. ___ ft. to ___ ft.
Diam. ___ in. ___ ft. to ___ ft.

Filter: Type ___ Thickness ___ Characteristics,
___ ft. to ___
___ ft. to ___

Perforations, Screen: Type, size ___
___ ft. to ___
___ ft. to ___

Water Level ___ ft. (above, below)
___, which is ___ ft. (above, below)
surface. Shut-in head after ___ (hrs., mins.)
Date

Total Depth ___ ft. Interval logged ___ ft. to
68 ft.

Fluid in hole. Characteristics
Fluid level ___ ft. Fluid Temperature ___ °F.
Date Date

Water: Temperature ___ °F. at ___. Field Cond. ___
Ra(uu c/L ___ Beta-Gamma(uu c/L ___ U(10-3 gr/l ___

Logging Data

Run No. 1 of 1 runs. Probe sensitivity (H) (----)

[illegible] ft. min. Gamma [illegible] scale
[illegible] ft. [illegible]

[illegible] 12 [illegible] .01
[illegible] 5 [illegible] 10

[illegible] 1/4 in. at 68 ft. [illegible] Reading
C-R [illegible] .01 Time Constant 10

Calibration [illegible]: (C-R Scale .01 Potentiometer scale 5)

Depth (ft.)	Obs. Time (min.)	Meter Reading
68	1	.0059

Remarks

Radiation Intensity Increases →

Depth Scale: 20 ft./in.

[illegible] SURVEY
[illegible] WATER BRANCH
[illegible] LABORATORY
[illegible] CO.
[illegible] RADIATION

Owner or Field No. MCM 6.5
Project Name
Geological Survey No.
State New Mexico County
Location Los Alamos
¼ ¼ Sec. T. S. R.
Depth Datum: Top of 2" casing which is 1.5 ft. above ------ surface.
Drilled: MP ft. [illegible] in.
Date [illegible]
Driller Koopman
Equipment [illegible] I 65717 12-1-61

Casing Data

Diam. *2" in. ft. to ft. Thickness in.
Diam. in. ft. to ft. Thickness in.
Diam. in. ft. to ft. Thickness in.
Diam. in. ft. to ft.
Diam. in. ft. to ft.
Diam. in. ft. to ft.
Filter: Type Thickness Characteristics,
ft. to
ft. to
Perforations, Screen: Type, Size
ft. to
ft. to
Water Level ft. above, below surface. Shut-in head after hrs. min.
Date
Total Depth ft. Interval cored ft. to 97 ft.
Fluid in hole: Characteristics
Fluid level ft. Fluid Temperature °F.
Date Date
Water: Temperature °F. at . Field Cond.
Ra(uu c/L Beta-Gamma(uu c/L U(10-3 gr/L

Casing Data

Diam. 1 in. 1 ft. [illegible] ft.
[illegible]
[illegible] 12 [illegible] .01
[illegible] 5 10
[illegible] 1/16 97 [illegible] Reading
[illegible] .01 10
[illegible] .01 5

Depth (ft.)	[illegible]	[illegible]
97	1	.0059
63	1	.0069
16	1	.0044

Remarks *Hole in double cased 4" stal and 2" plastic

Radiation Intensity Increases >

Depth Scale: 20 ft. in.

Number of Field No. MCM 8F

Project Name

Geological Survey No.

State New Mexico County

Location Los Alamos

___ ¼ ___ ¼ ___ ¼ ___ ¼ Sec. ___ T ___ N/S R ___ E/W

Depth Datum: Top of 2" plastic pipe, which is 1.0 ft (above, below) land surface.

Altitude: MP ___ ft. Land surface ___ ft.
Determined by

Operator(s) Koopman

Equipment (Vehicle No.) I 65717 Date 11-29-61

Logging Data

Run No. 1 of 1 runs. Probe Sensitivity (High, Low)

Descent: ___ ft./min. Gamma-Ray circuit scale
Potential circuit scale ___ Time constant

Logged out: 12 ft./min. Gamma-Ray circuit scale .01
Potential circuit scale 5 Time constant 10

Statistical Variation 1/4 in. at 25 ft. Depth Reading
G-R Scale .01 Time Constant 10

Calibration in hole. (G-R Scale .01 Pot. circuit scale 5)

Depth (ft.)	Obs. Time (min.)	Meter Reading
25	1	.0073

Remarks

Casing Data

Casing: 2 ___ ft. to ___ ft. Thickness ___ in.
___ ft. to ___ ft. Thickness ___ in.
___ ft. to ___ ft. Thickness ___ in.

Sole: Dia. ___ in. ___ ft. to ___ ft.
Dia. ___ in. ___ ft. to ___ ft.
Dia. ___ in. ___ ft. to ___ ft.

Filter: Type ___ Thickness ___ Characteristics,
___ ft. to ___
___ ft. to ___

Perforations, Screen: Type, size
___ ft. to ___
___ ft. to ___

Water level ___ ft. (above, below) ___
___, which is ___ ft. (above, below)
surface. Shut-in head after ___ (hrs., mins.)
Date ___

Total Depth ___ ft. Interval logged ___ ft. to 25 ft.

Fluid in hole: ___ Characteristics ___
Fluid level ___ ft. Fluid Temperature ___ °F.
Date ___ Date ___

Water: Temperature ___ °F. at ___. Field Cond. ___
Ra(uu c/L ___ Beta-Gamma(uu c/L ___ U(10-3 gr/l ___

Radiation Intensity Increases ___ ___ > Depth Scale: 20 ft./"

GEOLOGICAL SURVEY
WATER RESOURCES DIVISION GROUND WATER BRANCH
HYDROLOGIC LABORATORY
Denver, Colorado

WELL LOG OF GAMMA RADIATION

Casing Data

Casing: Diam. 2 in. ____ ft. to ____ ft. Thickness ____ in.
Diam. ____ in. ____ ft. to ____ ft. Thickness ____ in.
Diam. ____ in. ____ ft. to ____ ft. Thickness ____ in.

Bore: Diam. ____ in. ____ ft. to ____ ft.
Diam. ____ in. ____ ft. to ____ ft.
Diam. ____ in. ____ ft. to ____ ft.

Filter: Type ____ Thickness ____ Characteristics ____
____ ft. to ____
____ ft. to ____

Perforations, Screen: Type, size ____
____ ft. to ____
____ ft. to ____

Water Level ____ ft. (above, below ____)
____ (water is ____ ft. (above, below) land surface. Shut-in head after ____ (days, hrs.)
Date ____

Total Depth ____ ft. Interval logged ____ ft. to 32 ft.

Fluid in hole: ____ Characteristics ____
Fluid level ____ ft. Fluid Temperature ____ °F.
Date ____ Date ____

Water: Temperature ____ °F. at ____. Field Cond. ____
Ra(uu c/L ____ Beta-Gamma(uu c/L ____ Pb(10-3 gr/L ____

Hole or Field No. MCM 8B
Project Name ____
Geological Survey No. ____
State New Mexico County ____
Location Los Alamos
____ ¼ ____ ¼ ____ ¼ ____ ¼ Sec. ____ T ____ N/S R ____ E/W
Depth Datum: top of 2" plastic pipe, which is 2 ft. (above, below) land surface.
Altitude: MP ____ ft. Land surface ____ ft.
Determined by ____
Operator(s): Koopman
Equipment (Well Log No.) I 65717 Date 11-20-61

Logging Data

Run No. 1 of 1 runs. Probe serial no. (high, low) ____
Instrument ____ ft. Gamma-Ray circuit ____
Potential circuit scale ____ Instrument ____

Time constant	12	Sensitivity	.01
Lead filter	5	Scale	10
Start-stop switch	1/4	Sec. to 32	Sec.
Sensitivity	.01	Scale	10
Calibration source: Gamma scale	.01	Scale	5

Depth (ft.)	Obs. Time (sec.)	Gamma Reading
32	1	.0062

Remarks ____

Radiation Intensity Increases ____ >

Depth Scale: 20 ft./in.

Owner or Field No. ~~No number~~ MCM-10

Project Name

Geological Survey No.

State New Mexico County

Location Los Alamos

Sec. S R

Depth Datum: Top of 2" plastic pipe which is 1.0 ft. above land surface.

Drilled MP ft.

Determined by

Operator Koopman

I 65717 11-29-61

1 1 ---

12 .01

5 10

1/8 68

.01 10

.01 5

68 1 .0056

Remarks

Radiation Intensity Increases >

Depth Scale 20 ft. in.

GEOLOGICAL SURVEY
DIVISION ISSUED WATER BRANCH
RADIO LABORATORY
DENVER, COLORADO

GAMMA RADIALOG

Casing Data: Open hole

Diam. in. ft. to ft. Thickness in.
Diam. in. ft. to ft. Thickness in.
Diam. in. ft. to ft. Thickness in.
Diam. in. ft. to ft.
Diam. in. ft. to ft.
Diam. in. ft. to ft.

Filter: Type Thickness Characteristics,
ft. to
ft. to

Perforations, screen: Type, Size
ft. to
ft. to

Level ft. above below
surface. Shut-in hrs., mins.
Date

Total Depth ft. Interval logged ft. to
23 ft.

Fluid in hole: Characteristics
Fluid level ft. Fluid Temperature °F.
Date Date

Water: Temperature °F at . Field Cond.
Ra(uu c/L Beta-Gamma(uu c/L U(10-6 gr/L

Number or Field No. ~~TS-6B~~ ISCMM1
Project Name
Geological Survey No.
State New Mexico County
Location Los Alamos
¼ ¼ ¼ ¼ Sec. T. N. R. E.

Depth Datum: land surface, which
is 0 ft. above/below land surface.

Altitude: MP ft. above/below surface
Determined

Geologist Koopman

Logging Date I 05717 11-28-61

Run No. 1 Run 1

12 5 .01 10

Calibration in hole: .01 5
Depth (ft.)
23 1 .0062

Remarks

Radiation Intensity Increases >

Depth Scale: 20 in.

Owner or Field No. MCM 2.~~1~~ 2

Project Name

Geological Survey N

State New Mexico County

Location Los Alamos

Sec. T S R E W

Depth Datum: *Top of land surface which is 0 ft below land surface

Koopman

I 65717 12-1-61

1 1 8

12 .01

5 10

1/8 87

.01 10

.01 5

87 1 .0063

*Inclinded hole 30° from vertical

Geologist ?

Total Depth 87

Fluid in hole Characteristic

Fluid level Fluid Temperature

Date Date

Inter. Temperature Flow

Radiation Intensity Increases →

Depth Scale 20

New Mexico

Los Alamos

land surface

Open hole

Koopman

I 5717

11-29-61

1 1 ---

12 .01

5 10

1/4 64

.01 10

.01 5

64 1 .0070

20 1 .0050

U. S. GEOLOGICAL SURVEY
WATER RESOURCES DIVISION GROUND WATER BRANCH

WELL LOG

Owner or Field No. ~~MCM 9A~~ MCM 9C

Project Name

Geological Survey No.

State New Mexico County

Location Los Alamos

Lat. Long. Sec. T N/S R E/W

Depth Datum land surface, which is 0 ft. (above, below) land surface.

Drilled by Koopman

Date I 65717 Date 11-29-61

Casing: Open hole

Casing: Diam. ft. ft. ft.
Diam. ft. ft. ft.
Diam. ft. ft. ft.

Bore: Diam. ft. ft.
Diam. ft. ft.
Diam. ft. ft.

Filter: Type Thickness Slots,
ft.
ft.

Perforations, Screen: Type, size
ft.

Water level ft. (above, below)
, which is ft. (above, below)
surface. (Shut-in head after hrs., mins.)
Date

Total Depth ft. Interval logged ft. to
27 ft.

Fluid in hole: Characteristics
Fluid level ft. Fluid Temperature °F.
Date Date

Water: Temperature °F. at . Field Cond.
Ra(mu c/L Beta-Gamma(mu c/L U(10-3 gr/l

Drain Data

1 1 hrs. To the nearest tenth (ft.) ---

12 .01
5 10

1/8 27
.01 10

Calibration in hole: (CPR Scale .01 Sensitivity Scale 5)

Depth (ft.)	Obs. Time (min.)	Meter Reading
27	1	.0061

Remarks

Radiation Intensity Increases ——————>

Depth Scale: 20 ft./in.

U. S. GEOLOGICAL SURVEY
WATER RESOURCES DIVISION, GROUND WATER BRANCH
HYDROLOGIC LABORATORY
DENVER, COLORADO

WELL LOG OF GAMMA RADIATION

Casing Data

Casing: Diam. 4" in. ____ ft. to ____ ft. Thickness ____ in.
Diam. ____ in. ____ ft. to ____ ft. Thickness ____ in.
Diam. ____ in. ____ ft. to ____ ft. Thickness ____ in.

Bore: Diam. ____ in. ____ ft. to ____ ft.
Diam. ____ in. ____ ft. to ____ ft.
Diam. ____ in. ____ ft. to ____ ft.

Filter: Type ____ Thickness ____ Grain size ____
____ ft. to ____
____ ft. to ____

Perforations, Screen: Type, size ____
____ ft. to ____
____ ft. to ____

Water level ____ ft. below ____
____ which is ____ ft. above/below
Surface. Shut-in ____ ft. ____
Date ____

Total Depth ____ ft. Interval logged ____ ft. to ____ ft.

Fluid in hole: ____ Characteristics ____
Fluid level ____ ft. Fluid Temperature ____ °F.
Date ____ Date ____

Water: Temperature ____ °F. at ____. Field Cond. ____
Ra(mu c/L ____ Beta-Gamma(mu c/L ____ U(10-9 gr/l ____

Well or Field No. MCM 4.5
Project Name ____
Geological Survey No. ____
State New Mexico County ____
Location Los Alamos
____ Sec. ____ T ____ N ____ R ____
Depth Datum: Top of 4" casing, which is 2 ft. above/below land surface.
Altitude ____ ft. Land surface ____
Date drilled ____
Driller Koopman
Equipment Serial No. I 65717 Date 11-28-61

Log Data

Run No. 1 of 1 Run ____ Date ---

	12		.01
		5	10

Calibration Date ____ .01 ____ 5
Depth (ft.) ____ Source ____
21 1 .0053

Remarks ____

Radiation Intensity Increases ____ → Depth Scale: 20 ft./in.

GEOLOGICAL SURVEY
WATER RESOURCES DIVISION, NORTH WATER BRANCH

Owner or Field No. MCO 6.5 B

Project Name

Geological Survey No.

State New Mexico County

Location Los Alamos

¼ ¼ ¼ ¼ Sec. T N/S R E/W

Depth Datum: top of 4" casing, which is 1 ft. (above/below) land surface.

Altitude MP ft. Land surface ft.
Determined by

Operator Koopman

Equipment (Vehicle) I 65717 Date 12-1-61

Casing: 4 -1 ft. 39 ft. Thickness
Diam. ft. ft. ft. Thickness
Diam. ft. ft. ft. Thickness

Screen: Diam. ft. ft. ft.
Diam. ft. ft. ft.
Diam. ft. ft. ft.

Filter: Type Thickness Characteristics,
ft. to
ft. to

Perforations, Screens: Type Size
ft. to
ft. to

Water at ft. (above/below
,which is ft. (above/below)
surface. Shut-in pressure (psi)
Date

Total Depth ft. Drilled Depth ft.

Fluid in hole Characteristics
Fluid level ft. Fluid Temperature °F.
Date Date

Water: Temperature °F. at . Field Cond.
Ra(uu c/L Beta-Gamma(uu c/L U(10-3 gr/l

Logging Data

Log No. 1 Run 1 Date (mm-dd-yy) ===

Log Interval ft. ft.

Channel			
	12		.01
		5	10
	1/16	39	Reading

Data Taken in hole (Yes/No)

Depth (ft.)			Scale
39	1	0.005	

Remarks

Radiation Intensity Increases >

Depth Scale: 20 ft./in.

U. S. GEOLOGICAL SURVEY
WATER RESOURCES DIVISION GROUND WATER BRANCH
HYDROLOGIC LABORATORY
WASHINGTON, D. C.

WELL [illegible] FIELD [illegible]

Casing Data

Casing: No. 2 -2 ft. to 95 ft. Thickness ____ in.
Diam. ____ in. ____ ft. to ____ ft. Thickness ____ in.
Diam. ____ in. ____ ft. to ____ ft. Thickness ____ in.

Bore: Diam. ____ in. ____ ft. to ____ ft.
Diam. ____ in. ____ ft. to ____ ft.
Diam. ____ in. ____ ft. to ____ ft.

Filter: Type ____ Thickness ____ Characteristics, ____
____ ft. to ____
____ ft. to ____

Perforations, Screen: Type, size ____
____ ft. to ____
____ ft. to ____

Water level ____ ft. (above, below) ____
____ (which is ____ ft. above, below)
surface. Shut-in head after ____ (hrs., mins.)
Date ____

Total Depth ____ ft. Interval logged ____ ft. to
56 ft.

Fluid in hole ____ Characteristics ____
Fluid level ____ ft. Fluid Temperature ____ °F.
Date ____ Date ____

Water: Temperature ____ °F. at ____ Fluid loss ____
Ra(uu c/l. ____ Beta-Gamma(uu c/l) ____

Radiation Int[illegible] Inc. [illegible]

Owner or Field No. MCM 7.5
Project Name ____
Geological Survey No. ____
State New Mexico County ____
Location Los Alamos
____ ¼ ____ ¼ ____ ¼ ____ ¼ Sec. ____ T ____ N/S R ____ E/W
Depth Datum: Top of 2" plastic pipe ____, which is ____ ft. (above, below) land surface.
Altitude: MP ____ ft. Land surface ____ ft.
Determined by ____
Operator(s) Koopman
Equipment (Vehicle No.) I 65717 Date 11-29-61

Logging Data

Run No. 1 of 1 Temp. Probe [illegible]
[illegible] ft. [illegible]
[illegible] .01
[illegible] 12 ft. [illegible]
[illegible] 5 [illegible] 10
Sta[illegible] 1/8 56 [illegible] min.
[illegible] .01 [illegible] 10
[illegible] .01 [illegible] 5
Depth [illegible] [illegible] Reading
56 1 .0056
[illegible]
Remarks ____
[illegible]
Depth S[illegible] 20 [illegible]