RECEIVED
JUN 24 2015
EDMC

Stoller
Hanford Office

1230011
[0081086H]

699-48-50B (C5196)
Log Data Report

Borehole Information:

Borehole: 699-48-50B (C5196)			Site: 600 Area, north of 200 east		
Coordinates (WA St Plane)		GWL[1] (ft): Unknown		GWL Date:	11/10/06
North (m)	East (m)	Drill Date	Top of casing Elevation (ft)	Total Depth (ft)	Type
Not available	Not available	11/06	Not available	~210	Cable

Casing Information:

Casing Type	Stickup (ft)	Outer Diameter (in.)	Inside Diameter (in.)	Thickness (in.)	Top (ft)	Bottom (ft)
Welded Steel	4.2	8 5/8	7 5/8	1/2	4.2	~210

Borehole Notes:

Casing diameter and casing stickup measurements were acquired by the logging engineer using a caliper and steel tape. Groundwater level is not determined. At the time of logging it was reported at 207.2 ft. However, because water was introduced into the borehole near this depth to aid in drilling, it is not certain whether groundwater was actually encountered. Logging measurements are referenced to the ground surface.

Logging Equipment Information:

Logging System:	Gamma 4N		Type:	SGLS (60%) SN: 45TP22010A
Effective Calibration Date:	04/06/06	Calibration Reference:	DOE/EM-GJ1177-2006	
--		Logging Procedure:	HGLP-MAN-002, Rev. 0	

Logging System:	Gamma 4H		Type:	NMLS SN: H310700352
Effective Calibration Date:	11/22/06	Calibration Reference:	HGLP-CC-002	
		Logging Procedure:	HGLP-MAN-002, Rev. 0	

Spectral Gamma Logging System (SGLS) Log Run Information:

Log Run	1	2 Repeat	3		
Date	11/10/06	11/13/06	11/13/06		
Logging Engineer	McClellan	McClellan	McClellan		
Start Depth (ft)	0.0	50.0	71.0		
Finish Depth (ft)	70.0	70.0	212.0		
Count Time (sec)	100	100	100		
Live/Real	R	R	R		
Shield (Y/N)	N	N	N		
MSA Interval (ft)	1.0	1.0	1.0		
ft/min	N/A[2]	N/A	N/A		
Pre-Verification	DN441CAB	DN451CAB	DN451CAB		
Start File	DN441000	DN451000	DN451071		

14

Log Run	1	2 Repeat	3		
Finish File	DN441070	DN451020	DN451162		
Post-Verification	DN441CAA	DN451CAA	DN451CAA		
Depth Return Error (in.)	- 0.5	N/A	- 2.0		
Comments	No fine gain adjustment.	No fine gain adjustment.	Fine gain adjustment before file -60.		

Neutron Moisture Logging System (NMLS) Log Run Information:

Log Run	4	5	6	37 Repeat	
Date	11/13/06	11/13/06	11/13/06	11/13/06	
Logging Engineer	McClellan	McClellan	McClellan	McClellan	
Start Depth (ft)	0.0	79.0	159.0	207.5	
Finish Depth (ft)	80.0	160.0	207.5	187.0	
Count Time (sec)	15	15	15	15	
Live/Real	R	R	R	R	
Shield (Y/N)	N	N	N	N	
Sample Interval (ft)	0.25	0.25	0.25	0.25	
ft/min	N/A	N/A	N/A	N/A	
Pre-Verification	DH282CAB	DH282CAB	DH282CAB	DH282CAB	
Start File	DH282000	DH282321	DH282645	DH282840	
Finish File	DH282320	DH282644	DH282839	DH282922	
Post-Verification	DH282CAA	DH282CAA	DH282CAA	DH282CAA	
Depth Return Error (in.)	N/A	N/A	N/A	N/A	
Comments	Stopped logging to change file directories	Stopped logging to change file directories	None	None	

Logging Operation Notes:

Logging was conducted with a centralizer on each sonde. Logging data acquisition is referenced to the ground surface. Repeat data were collected for the SGLS and NMLS to evaluate system performance.

Analysis Notes:

Analyst:	Henwood	Date:	11/22/06	Reference:	GJO-HGLP 1.6.3, Rev. 0

Pre-run and post-run verifications for the logging systems were performed before and after the day's data acquisition. The acceptance criteria were met.

A casing correction for 0.5-in.-thick casing was applied to the SGLS data.

SGLS spectra were processed in batch mode using APTEC SUPERVISOR to identify individual energy peaks and determine count rates. Concentrations were calculated with an EXCEL worksheet template identified as G4NApr06.xls using efficiency functions and corrections for casing, water, and dead time as determined from annual calibrations. The NMLS data were converted to percent volumetric moisture using calibrations established for 8-in. boreholes.

Log data for the bottom 3 ft of the borehole suggested 1) casing did not extend to the bottom of the logged depth, 2) sediment with the consistency of mud was encountered, and 3) groundwater was not encountered. When corrections for water in the borehole and casing were applied, an over correction in KUT concentration values resulted. Therefore, the above assumptions are considered valid and corrections for casing and water are not applied to the bottom three ft of log data.

Results and Interpretations:

No manmade radionuclides were detected in this borehole. Two detections by the routine processing software of ^{137}Cs at 40 and 42 ft were further evaluated. The detections were determined to be statistical fluctuations and not representative of valid full energy peaks.

Moisture measurements indicate some variability, most notably between 126 and 140 ft and between 195 and 206 ft. Both depth intervals correspond with relatively high ^{232}Th concentrations. Elevated ^{232}Th concentrations generally indicate fine-grained sediment such as clay. The relatively high moisture content between 195 and 206 ft could be, at least partially, the result of water introduced into the borehole.

The repeat sections indicate good agreement of the naturally occurring KUT and moisture.

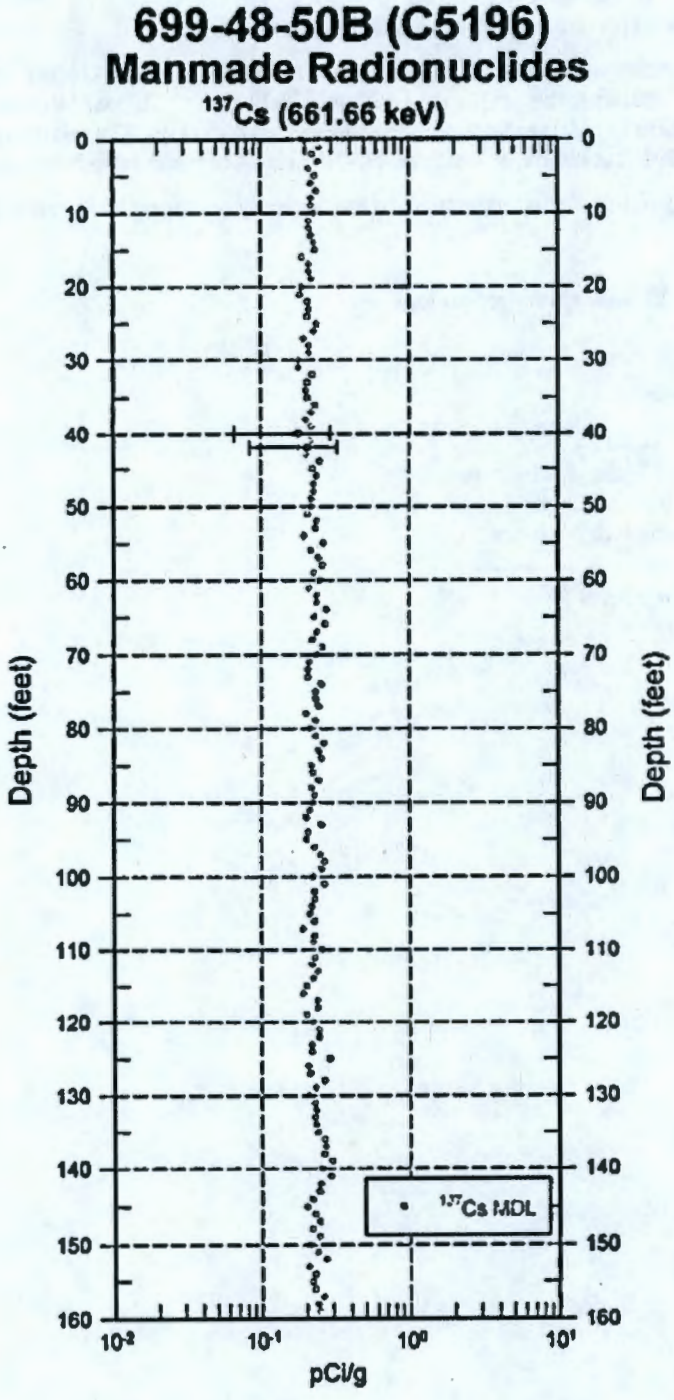
List of Plots:

Depth Scale: 1" = 20 ft except for repeat logs

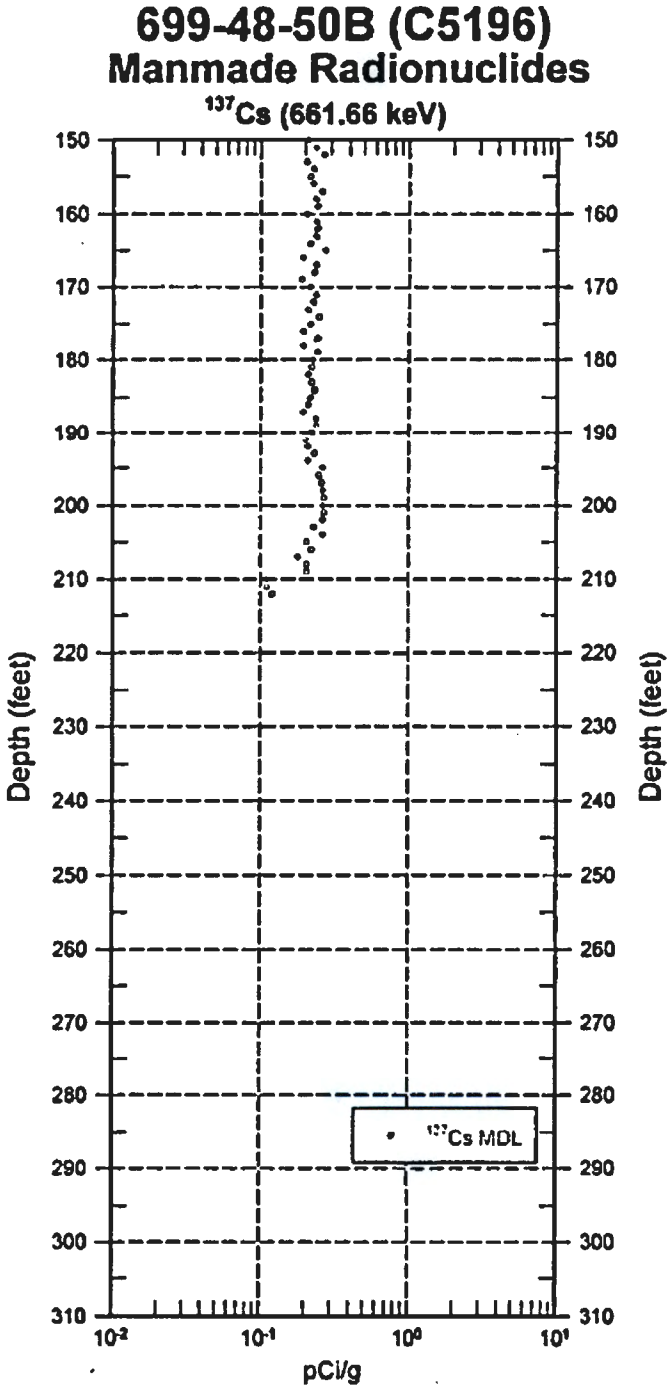
Manmade Radionuclides
Natural Gamma Logs
Combination Plot
Combination Plot (0-240 ft)
Total Gamma, Dead Time, & Moisture
Repeat of Natural Gamma Logs
Repeat of Total Gamma & Moisture

---

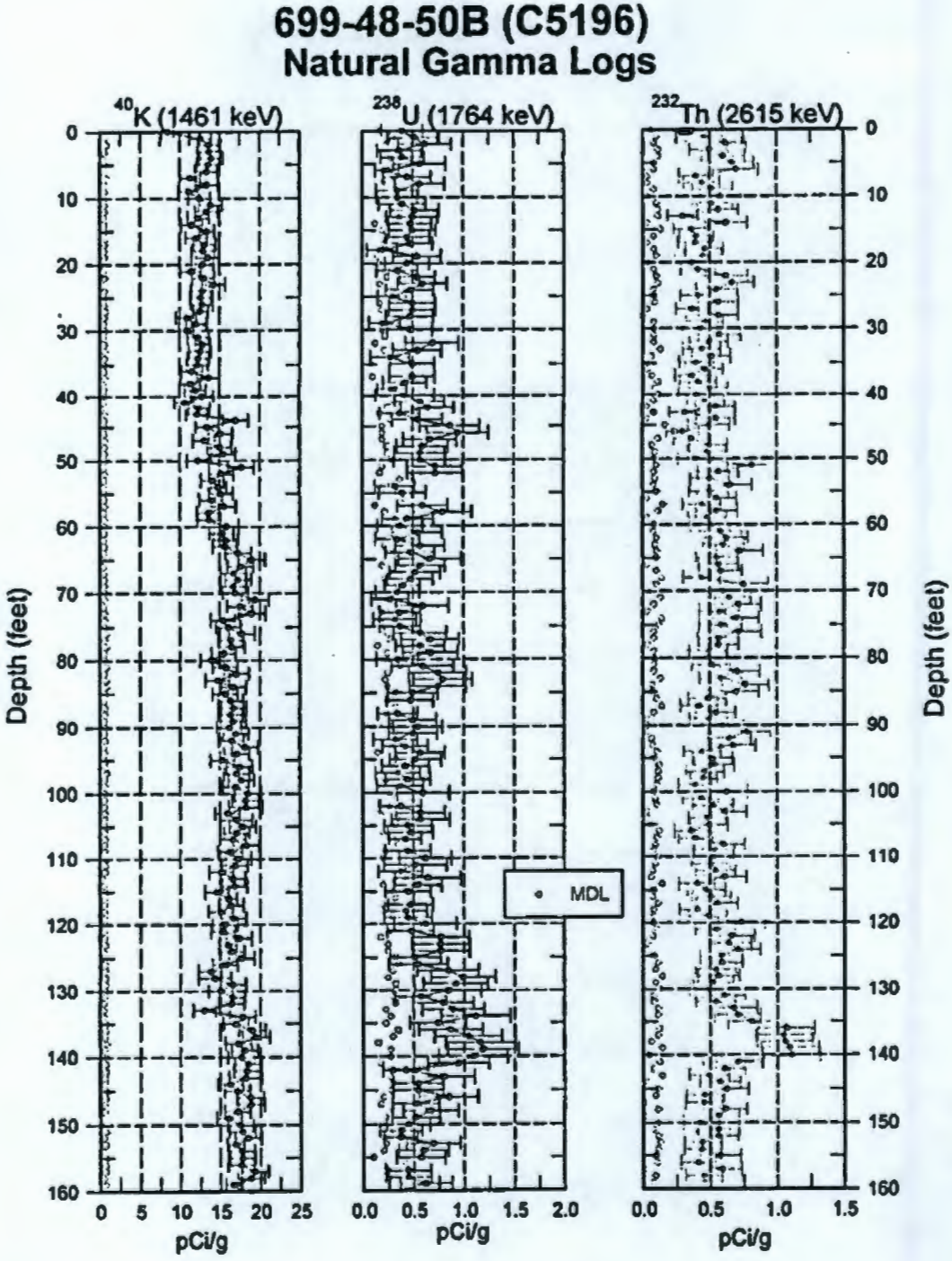
[1] GWL – groundwater level
[2] N/A – not applicable



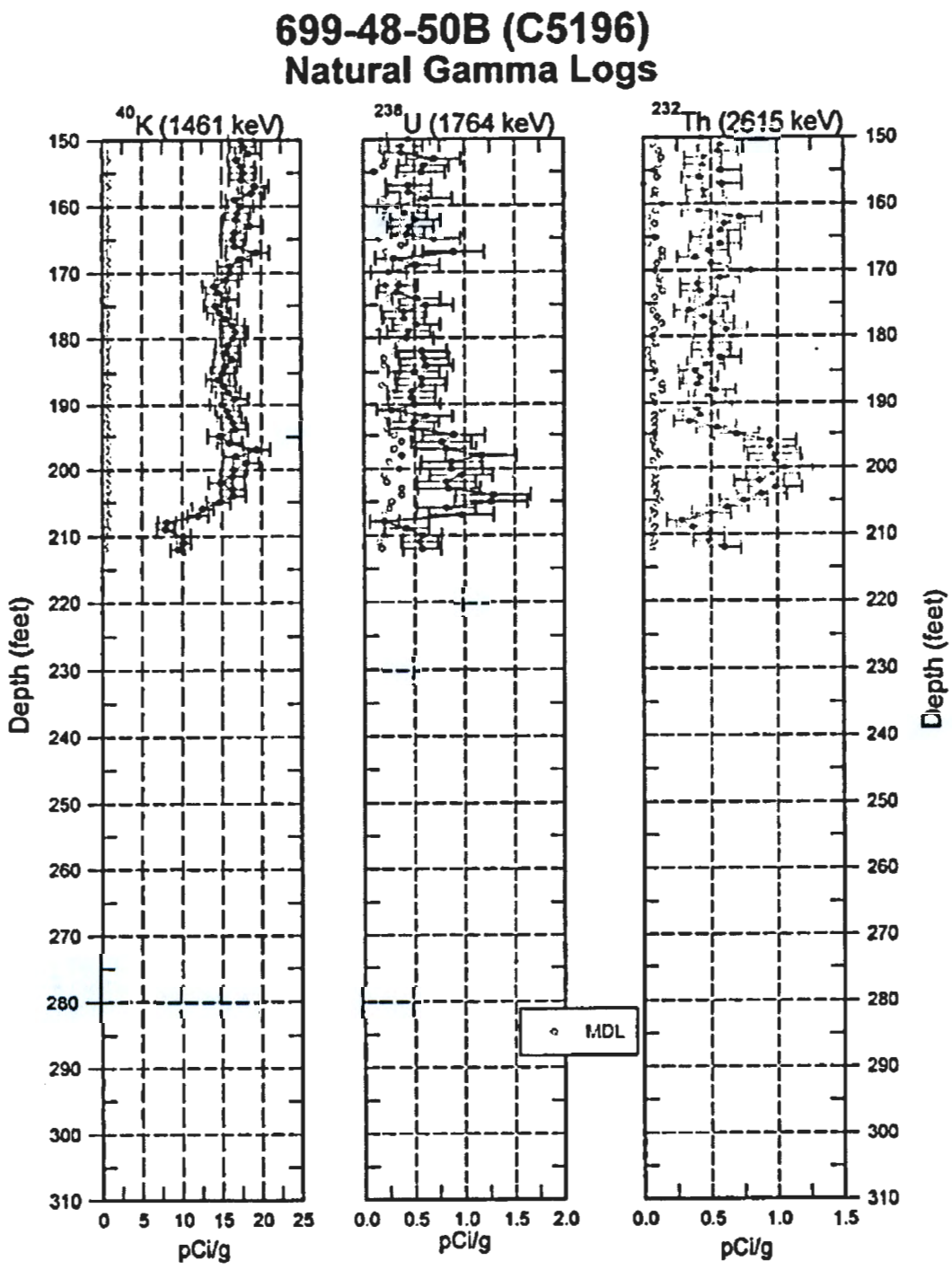
Zero Reference - Ground surface



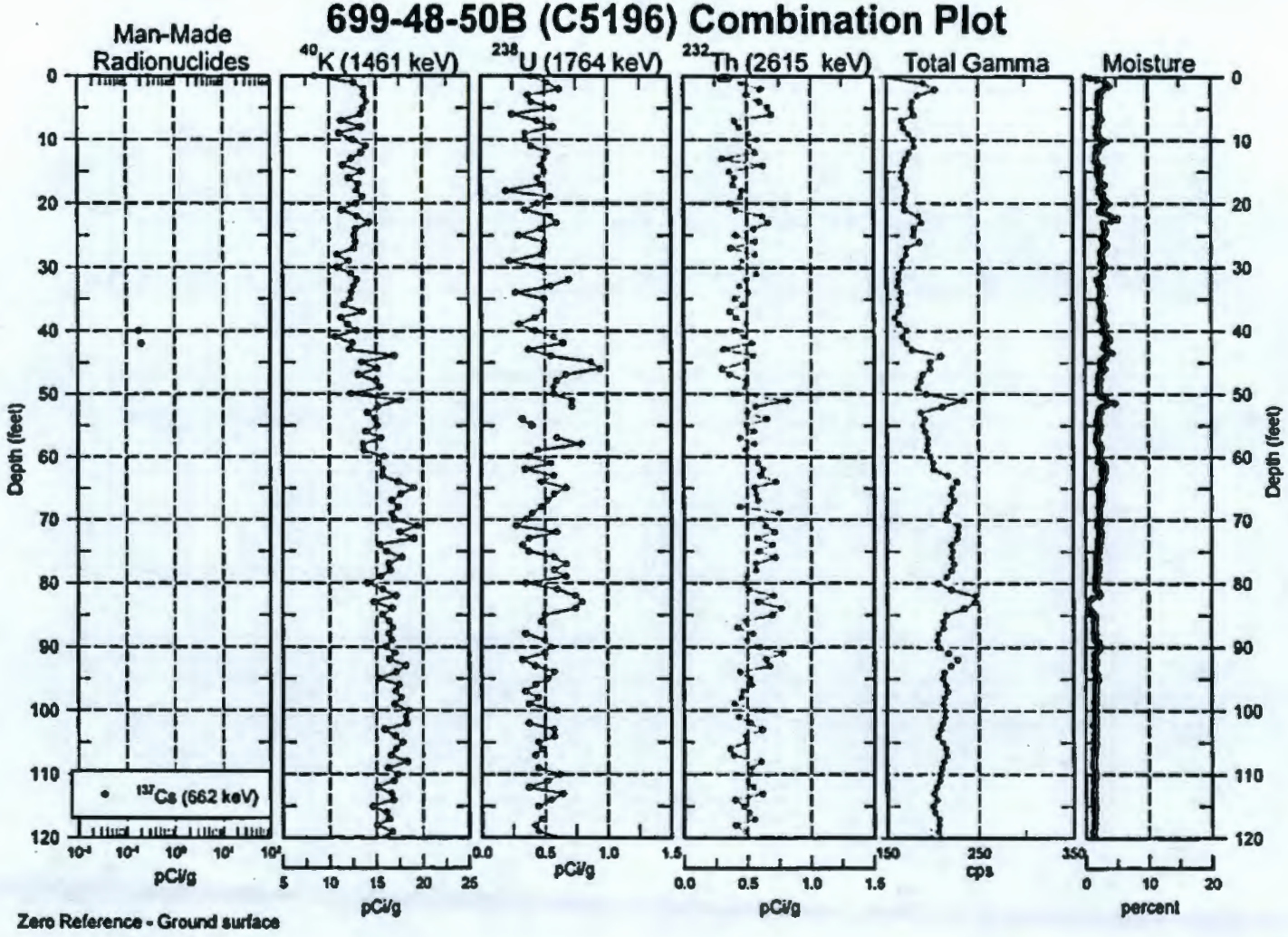
Zero Reference - Ground surface

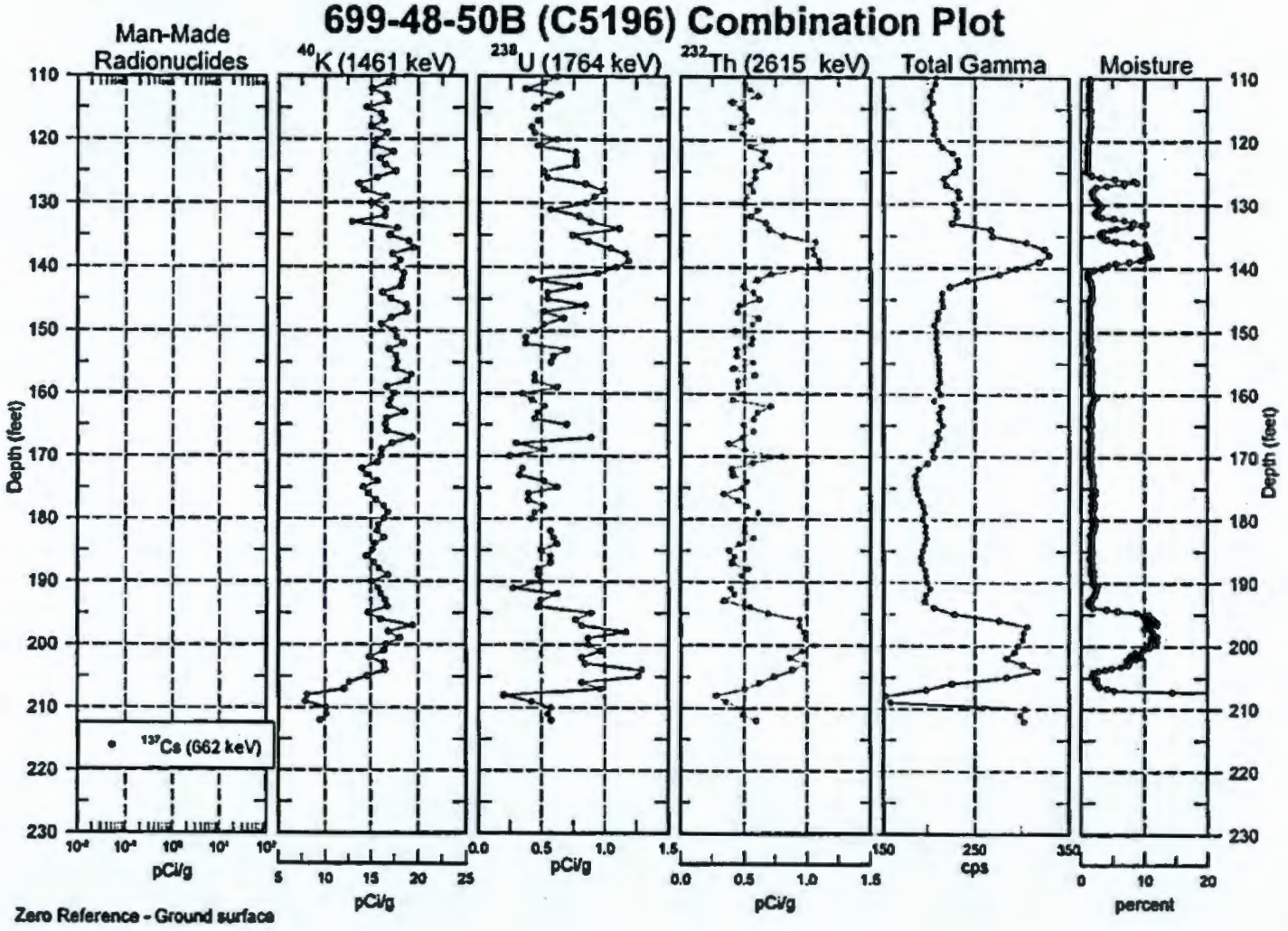


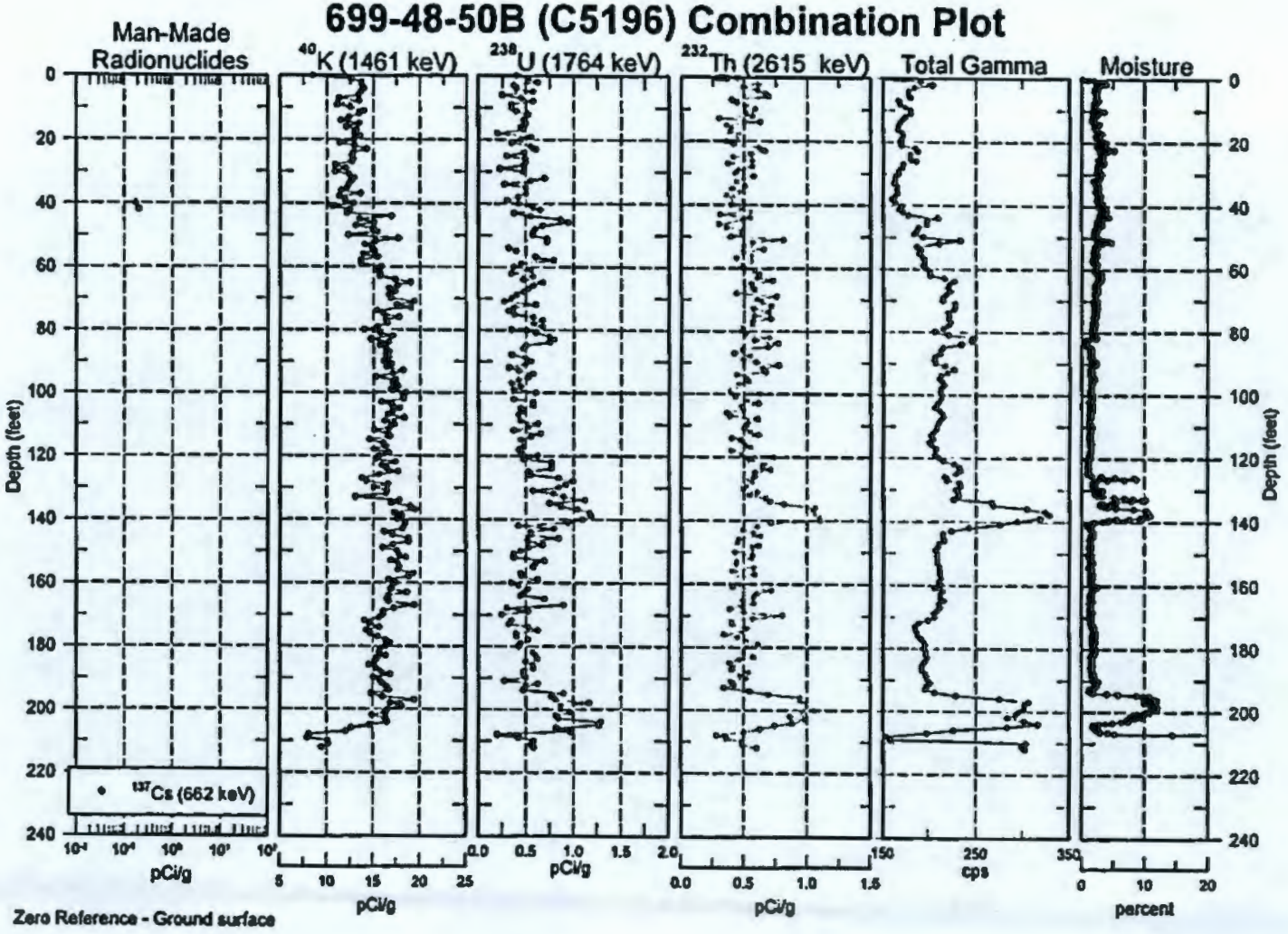
Zero Reference = Ground surface

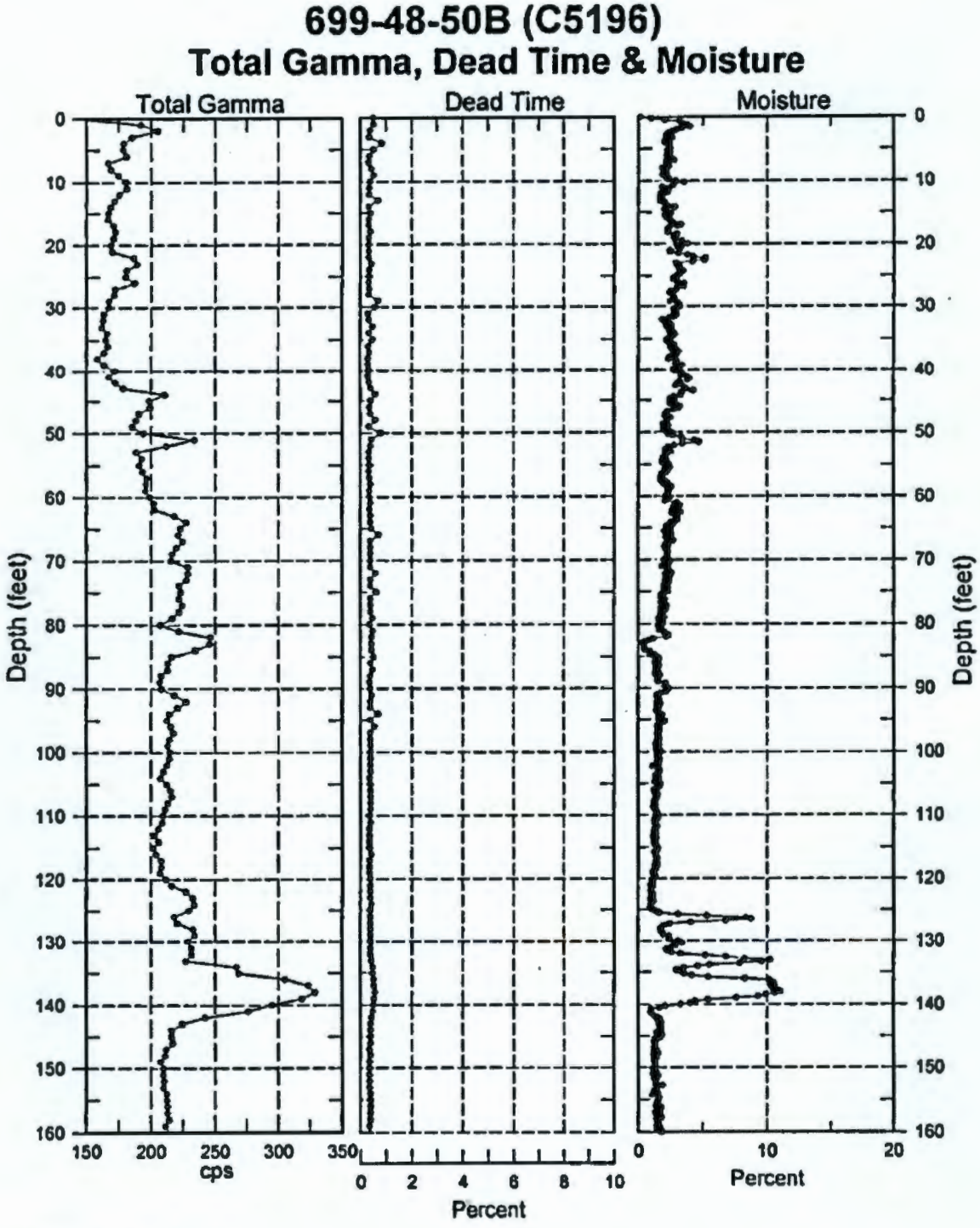


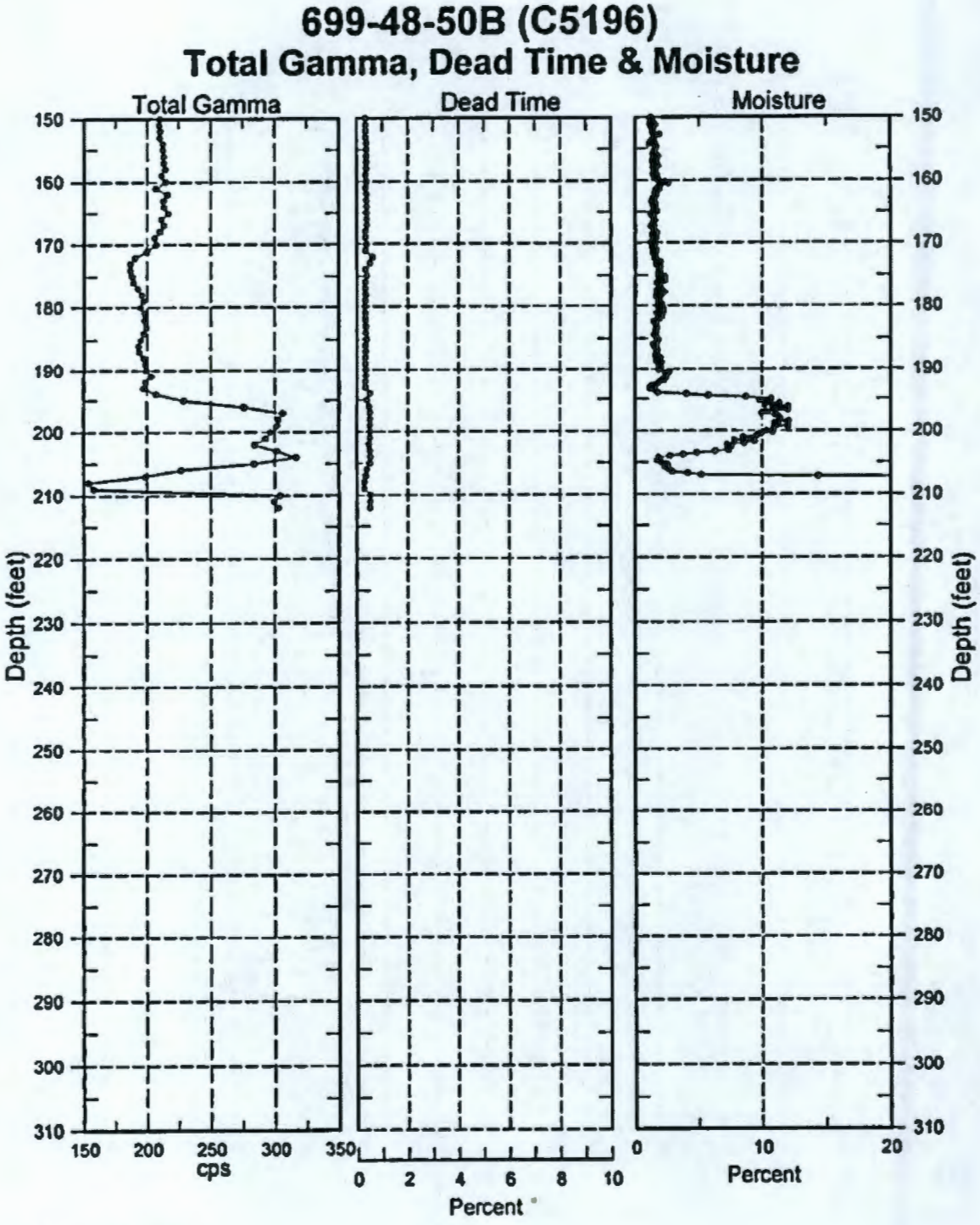
Zero Reference = Ground surface


699-48-50B (C5196) Combination Plot
Man-Made Radionuclides
40K (1461 keV)
238U (1764 keV)
232Th (2615 keV)
Total Gamma
Moisture
Depth (feet)
137Cs (662 keV)
pCi/g
cps
percent
Zero Reference - Ground surface

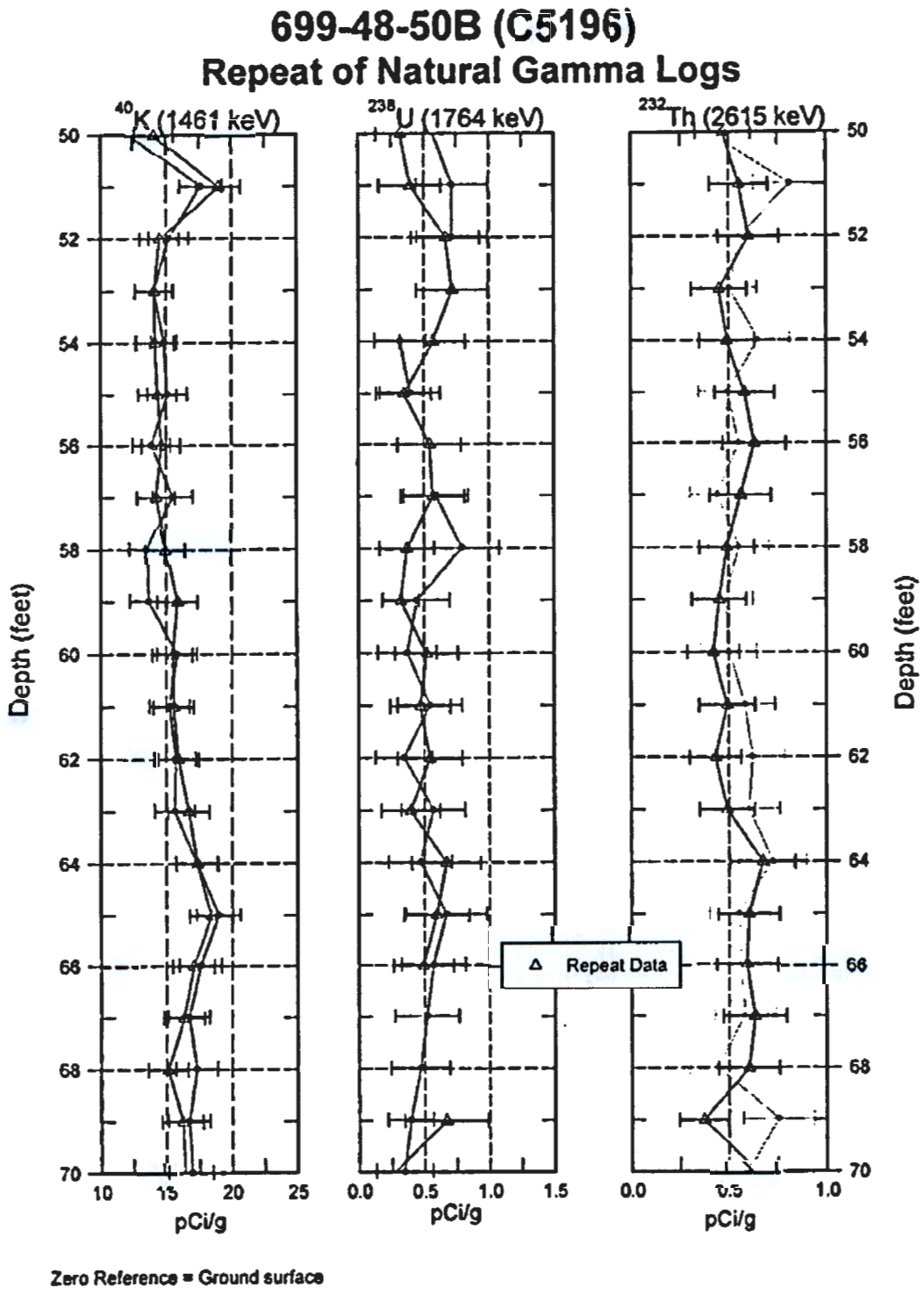

699-48-50B (C5196) Combination Plot
Man-Made Radionuclides
40K (1461 keV)
238U (1764 keV)
232Th (2615 keV)
Total Gamma
Moisture
Depth (feet)
137Cs (662 keV)
pCi/g
cps
percent
Zero Reference - Ground surface

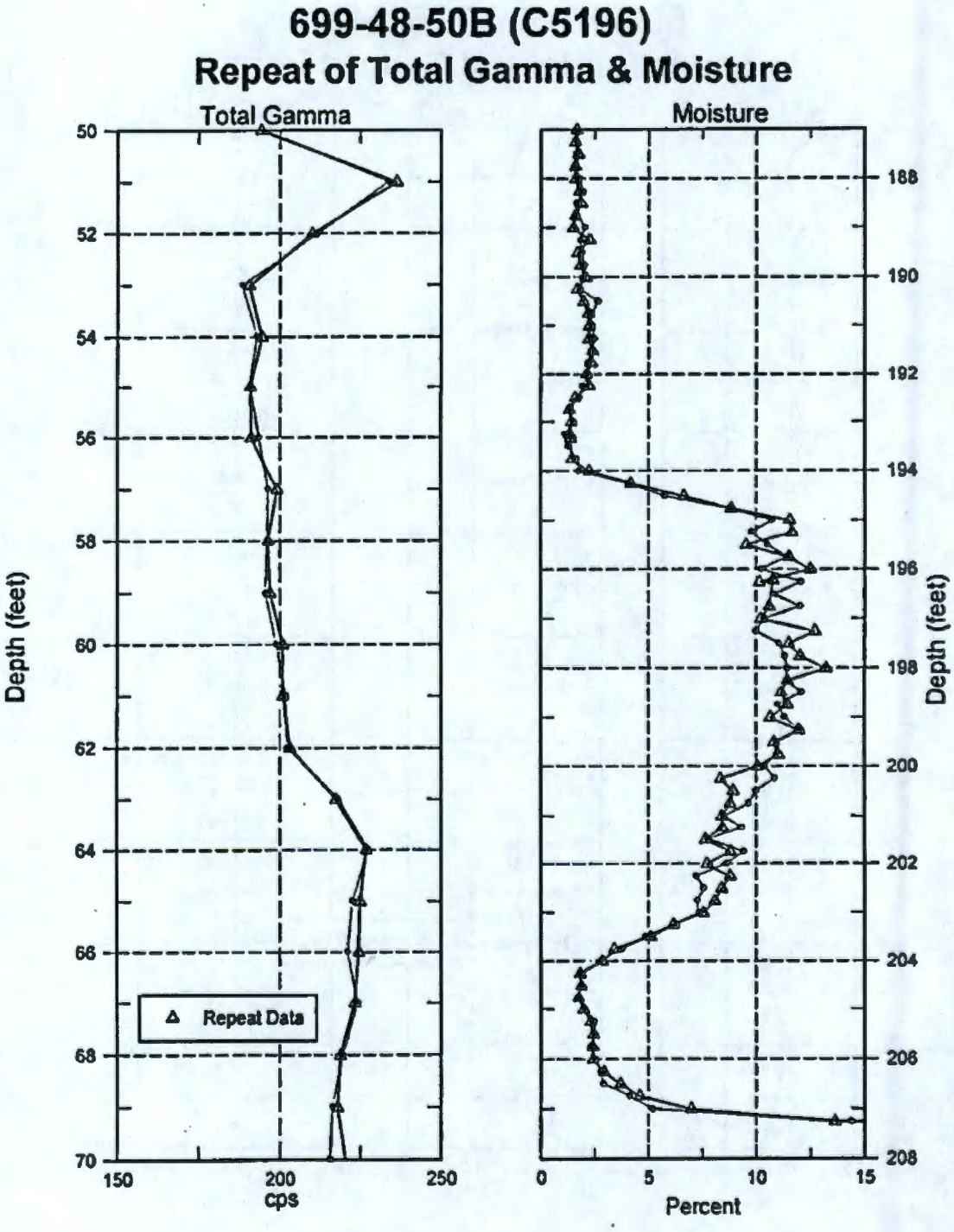

699-48-50B (C5196) Combination Plot
Man-Made Radionuclides
40K (1461 keV)
238U (1764 keV)
232Th (2615 keV)
Total Gamma
Moisture
Depth (feet)
137Cs (662 keV)
pCi/g
pCi/g
pCi/g
pCi/g
cps
percent
Zero Reference - Ground surface


699-48-50B (C5196)
Total Gamma, Dead Time & Moisture
Total Gamma
Dead Time
Moisture
Depth (feet)
Depth (feet)
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
150
200
250
300
350
cps
0
2
4
6
8
10
Percent
0
10
20
Percent
Reference - Ground surface



Reference - Ground surface


699-48-50B (C5196)
Repeat of Natural Gamma Logs
40K (1461 keV)
238U (1764 keV)
232Th (2615 keV)
Depth (feet)
50
52
54
56
58
60
62
64
66
68
70
10
15
20
25
0.0
0.5
1.0
1.5
0.0
0.5
1.0
pCi/g
pCi/g
pCi/g
Δ Repeat Data
Zero Reference = Ground surface



Reference - Ground surface