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UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

PRELIMINARY REPORT OF COAL DRILL-HOLE DATA AND CHEMICAL ANALYSES OF COAL BEDS IN CAMPBELL COUNTY, WYOMING

By U.S. Geological Survey
and
Montana Bureau of Mines and Geology

Open-file report

1974

74-97

This report is preliminary and has not been edited or reviewed for conformity with Geological Survey standards

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PRELIMINARY REPORT OF COAL DRILL-HOLE DATA AND CHEMICAL ANALYSES OF COAL BEDS IN CAMPBELL COUNTY, WYOMING

By U.S. Geological Survey and Montana Bureau of Mines and Geology

Introduction and Acknowledgments

Sixty-seven exploratory holes were drilled in Campbell County, Wyo. from June 21 to October 7, 1973, as part of a U.S. Geological Survey program of evaluating and classifying mineral lands in the public domain. The drilling was done under a U.S. Geological Survey grant to the Montana Bureau of Mines and Geology (USGS Grant 14-08-0001-G-55), for the purpose of gathering data on the thickness, quality, extent, and recoverability of coal beds, and the lithologic characteristics of the rocks in the Fort Union and Wasatch Formations in the Powder River Basin. Similar information on 28 drill holes and 21 coal samples from Sheridan and Campbell Counties, Wyo., and Big Horn County, Mont., was presented in an earlier report by the U.S. Geological Survey and the Montana Bureau of Mines and Geology (1973). Figure 1 shows the location and drill-hole numbers of the 67 exploratory holes and of the holes included in the earlier report.

This report includes driller's logs, corrected to geophysical logs where available, geophysical logs, proximate analyses of the coal beds

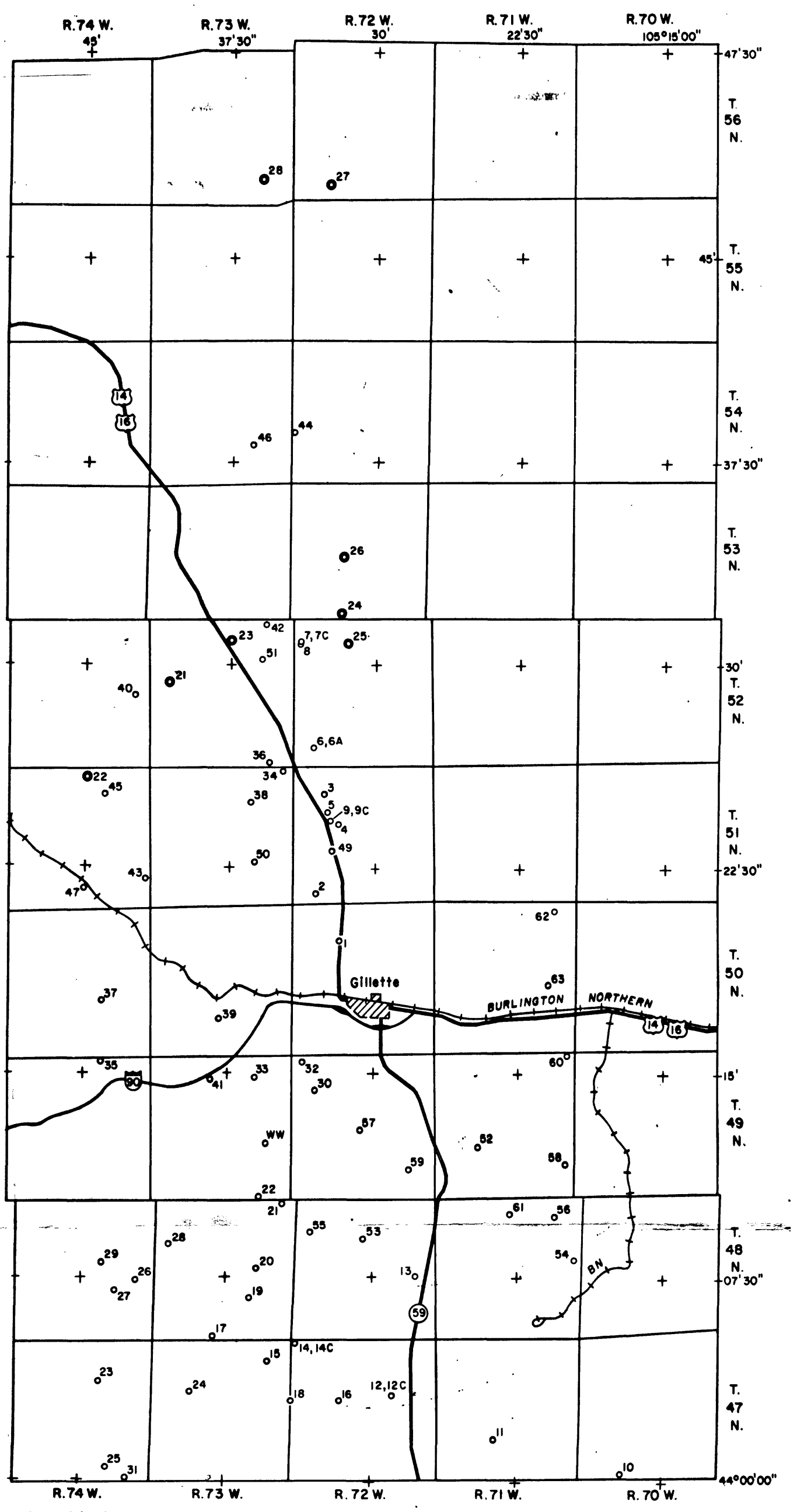


FIGURE 1. – Location of holes drilled by U.S. Geological Survey and Montana Bureau of Mines and Geology in Campbell County, Wyo., 1972 and 1973.

MONTANA BUREAU OF MINES AND GEOLOGY

COAL BED DATA

COAL DIVISION

Recorded by: Blumer Source of data: MBMG Date: July 25, 1973 Loc: Scaper Reservoir (Echeta 4 SE) Photo No.:

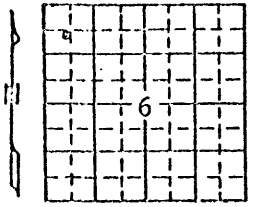
	STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
A	WY	CA										47N	72W	6	bbca	US7314C2	4	4672	44	66			504	68	3	F	P	

Column 3-4 - County
See Appendix A3-4 for Code

Column 19 - Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



900'FWL 750'FNL

Column 33-34 - Bed Number
1. Poland
3. Smith
6. Powers
9. Anderson
12. Delta
No. 1
No. 2
No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Vall, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Popham
33. Knoblock or Lee
36. Schoedel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or P
48. Graham or O
51. M
54. Robinson, M, or Column
57. Barley
60. Other

Column 55 - Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 - Ownership of Coal
505 Federal government
506 Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth in Feet From	Depth in Feet To	Material
0	18	Sand & gumbo
18	20	Sandstone
20	32	Shale
32	35	Sandstone
35	44	Gray shale
44	66	Coal
66	68	Fine sand

DRILL LOG (cont.)

Depth in Feet From	Depth in Feet To	Material

UNCODED INVENTORY DATA

Surface owner I. W. Lynde
Address Gillette, Wyoming

Driller's name Floyd Higgins
Address 721 N. Custer Ave., Miles City, Mont.

Log data: Drillers [X] Gamma [ ] ER-SP [ ] Density [ ] Other

Cored intervals:

Depth			Lab sample #
44'	to	52'	504
52'	to	62'	505
62'	to	66'	506
	to		
	to		
	to		
	to		

Lithologic samples
How stored
Hydrologic data small seep in coal.

REMARKS

Drilled with air.

22

START W P 22

MONTANA BUREAU OF MINES AND GEOLOGY — COAL BED DATA — COAL DIVISION

Recorded by: Granberg Source of data: MBMG Date: July 28, 1973 Map: Scaper Reservoir (Echeta 4 SE) Photo No.:

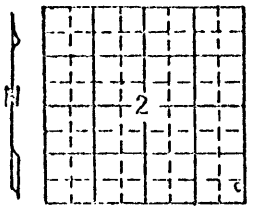
A	STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
	1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	18	19	20	21 22 23	24 25 26	27 28	29 30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70
	W Y	C A											4 7 N	7 3 W	2	d d d a	U S - 7 3 1 5	4	4 7 6 0					5 0 7	2 8 5	3	F	P	

Column 1-4 – County
See Appendix A3-4 for Code

Column 19 – Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 – Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 – Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



400'FSL 150'FEL

Column 53-54 – Bed Number
1. Roland
3. Smith
6. Powers
9. Anderson
12. Dietz
Mo. 1
Mo. 2
Mo. 3
15. Canyon
18. Monarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Procter
27. Brewster-Arnold
30. Popham
33. Knoblock or Lee
35. Schendel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or P
48. Graham or O
51. M
54. Robinson, M, or Colman
57. Hurley
60. Other

Column 55 – Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 – Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

-510 m.s.l.

Column 65 – Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 – Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 – Geologic Code for Montana

DRILL LOG

Depth in Feet From	Depth in Feet To	Material
0	12	Gumbo
12	20	Sand & gravel
20	45	Yellow clay
45	100	Fine sand
100	108	Coal
108	183	Clay
183	208	Coal
208	239	Clay
239	243	Water-sand
243	285	Clay

DRILL LOG (cont.)

Depth in Feet From	Depth in Feet To	Material

UNCODED INVENTORY DATA

Surface owner George Heiland
Address Gillette, Wyoming

Driller's name Floyd Higgins
Address 721 N. Custer Ave., Miles City, Mont.

Log data: Drillers [X] Gamma [X] ER-SP [X] Density [ ] Other

23

Cored intervals: Depth — Lab sample #

104'	to	108'	507
185'	to	195'	508
195'	to	204'	509
204'	to	208'	510
	to		
	to		
	to		

Lithologic samples at 10' below 20'
How stored sample envelopes

Hydrologic data

REMARKS

MONTANA BUREAU OF MINES AND GEOLOGY — COAL BED DATA — COAL DIVISION

Recorded by: Granberg Source of data: MBMG Date: July 29, 1973 Map: Scaper Reservoir (Echeta 4 SE) Photo No.:

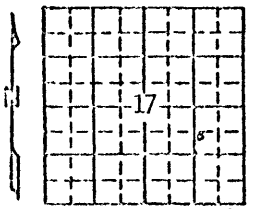
A	STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
	1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	18 19	20	21 22 23	24 25	26 27	28 29 30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70
	W Y	C A										4 7 N	7 2 W	1 7	d a c b	U S - 7 3 1 6	2	4 7 6 4					5 1 1	1 3 5	3	F	P	

Column 3-4 – County
See Appendix A3-4 for Code

Column 19 – Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 – Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 – Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



Column 51-54 – Bed Number
1. Poland
3. Smith
6. Perry
9. Anderson
12. Dolts
No. 1
No. 2
No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Fophee
33. Knoblock or Lee
36. Schoedel
39. Forsted or Q
42. Holt or McKay
45. Stocker Creek or P
48. Graham or O
51. N
54. Robinson, M, or Column
57. Burley
60. Other

Column 55 – Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 – Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 – Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 – Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 – Geologic Code for Montana

512
513

DRILL LOG

Interval From	Interval To	Material
0	8	Sand
8	9	Sandstone
9	30	Variegated shales
30	48	Blue clay
48	56	Coal
56	65	Clay
65	72	Coal
72	75	Clay
75	88	Coal
88	135	Clay

DRILL LOG (cont.)

Interval From	Interval To	Material

UNCODED INVENTORY DATA

Surface owner: Carter Brothers
Address: Gillette, Wyoming

Driller's name: Floyd Higgins
Address: 721 N. Custer Ave., Miles City, Mont.

Log data: Drillers [X] Gamma [X] ER-SP [X] Density [ ] Other

24

Cored Intervals: Depth — Lab sample #

48'	to	56'	511
65'	to	72'	512
79'	to	88'	513
	to		
	to		
	to		
	to		

Lithologic samples
How stored
Hydrologic data

REMARKS

Lost circulation at 110'; regained and drilled to 135' but couldn't hold circulation. Used 3/4 sack fibertex, 2/3 sack hyseal and 3½ sacks of quik-gel.

MONTANA BUREAU OF MINES AND GEOLOGY — COAL BED DATA — COAL DIVISION

Recorded by: Granberg — Source of data: MBMG — Date: July 30, 1973 — Map: Pleasant Dale (Echeta 4 SW) — Photo No.:

A

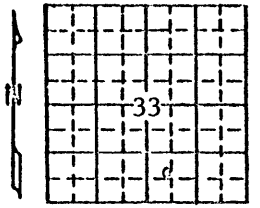
STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	T.	R.	R.	SEC.	SEC.	TRACT	TRACT	DRILL HOLE NUMBER	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	DEPTH TO BOTTOM OF BED	BED NO.	BED NO.	COR.	LAB SAMPLE NUMBER	LAB SAMPLE NUMBER	TOTAL DEPTH	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE	GEOLOGIC CODE
1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	18	19	20	21 22	23	24 25	26	27 28		29 30	31	32	33 34	35	36 37	38	39	40	41 42	43	44	45 46	47	48	49 50	51	52	53 54	55	56 57	58	59	60 61	62	63	64	65	66	67 68	69	70
W Y	C A											4 8	N	7 3	W	3 3		d c	b	d	U S	-	7 3	1	7	4	4 7	8	1	1 8	7		1 9	7							3 6	8	3	F	P			

Column 1-4 - County
See Appendix A3-4 for Code

Column 19 - Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



750'FSL, 2300'FEL

Column 31-34 - Bed Number
1. Roland
3. Smith
6. Powers
9. Anderson
12. Delta
No. 1
No. 2
No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Popham
33. Knoblock or Lee
36. Schoedel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or P
48. Graham or O
51. N
54. Robinson, M, or Colrain
57. Burley
60. Other

Column 55 - Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth Feet From	Depth Feet To	Material
0	8	Sand
8	11	Gravel
11	18	Variegated shales
18	187	Gray shale
187	197	Coal
197	199	Clay
199	224	Coal
224	284	Light shale
284	286	Sandstone
286	367	Sand (fine)
367	368	Sandstone

DRILL LOG (cont.)

Depth Feet From	Depth Feet To	Material

UNCODED INVENTORY DATA

Surface owner: Heiland, George
Address: Gillette, Wyoming

Driller's name: Floyd Higgins
Address: 721 N. Custer Ave., Miles City, Mont.

Log data: Drillers [X] Gamma [X] ER-SP [X] Density [ ] Other

Cored Intervals: Depth — Lab sample #
to
to
to
to
to
to
to

Lithologic samples: 10' intervals below 20'
How stored: paper envelopes

Hydrologic data

REMARKS

25

MONTANA BUREAU OF MINES AND GEOLOGY — COAL BED DATA — COAL DIVISION

Recorded by Granberg Source of data MBMG Date July 31, 1973 Map Scaper Reservoir (Echeta 4 SE) Photo No.

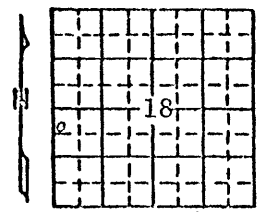
A	STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
	1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	18 19	20	21 22 23	24 25	26 27	28 29 30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70
	WY	C A										4 7 N	7 2 W	1 8	c b b c	U S - 7 3 1 8	4	4 7 7 1						4 9 5	3	F	P	

Column 3-4 - County
See Appendix A3-4 for Code

Column 10 - Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



Column 31-34 - Bed Number
1. Roland
3. Smith
6. Powers
9. Anderson
12. Dietz
No. 1
No. 2
No. 3
15. Canyon
18. Mosarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Pophem
33. Knoblock or Lee
36. Schoedel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or F
48. Graham or O
51. M
54. Robinson, M, or Colman
57. Furley
60. Other

Column 55 - Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth in Feet From	To	Material
0	25	Variegated shales
25	28	Sand
28	89	Blue clay
89	98	Coal
98	135	Clay with sandstone stks.
135	154	Coal
154	155	Rock
155	159	Coal
159	270	Light shale
270	282	Sand
282	302	Sandy clay
302	375	Shale
375	444	Sand
444	447	Coal
447	454	Clay
454	466	Coal
466	495	Shale

DRILL LOG (cont.)

Depth in Feet From	To	Material

UNCODED INVENTORY DATA

Surface owner Carter Brothers
Address Gillette, Wyoming

Driller's name Floyd Higgins
Address 721 N. Custer Ave., Miles City, Mont.

Log data: Drillers [X] Gamma [X] ER-SP [X] Density [ ] Other

Cored Intervals: Depth — Lab sample #
____ to ____
____ to ____
____ to ____
____ to ____
____ to ____
____ to ____
____ to ____

Lithologic samples at 10' intervals below 20'
How stored paper envelopes

Hydrologic data

REMARKS

Lost circulation at 420'; regained with ¼ sack hyseal. Used hyseal and 1 sack mud at 105' to stop seep.

MONTANA BUREAU OF MINES AND GEOLOGY

COAL BED DATA

COAL DIVISION

Recorded by: Cranberg Source of data: MBMG Date: August 2, 1973 Map: Scaper Reservoir (Echeta 4 SE) Photo No.:

A

STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
1 2	3 4	5 6	7 8	9 10	11	12 13 14	15 16	17 18	19	20	21 22 23	24 25 26	27 28	29 30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70
W Y	C A										4 8 N	7 3 W	2 6	b b d b	U S - 7 3 1 9	4	4 7 5 3						2 1 0	3	F	P	

Column 1-4 - County

See Appendix A3-4 for Code

Column 19 - Sequential Number

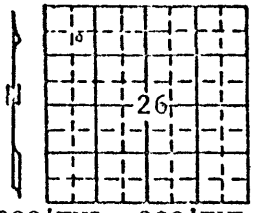
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long

1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.

1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



Column 51-54 - Bed Number

1. Roland
3. Smith
8. Powers
9. Anderson
12. Dietz
    No. 1
    No. 2
    No. 3
15. Canyon
18. Mccarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Procter
27. Brewster-Arnold
30. Poplar
33. Knoblock or Lee
36. Schoedel
39. Rosebud or W
42. Holt or McKay
45. Stocker Creek or F
48. Graham or G
51. H
54. Robinson, M, or Coleam
57. Burley
60. Other

Column 55 - Correlation Interval

Letter designation used to supplement bed number to index stratigraphic position of other coal beds

A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth

0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 - Ownership of Coal

F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner

F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

DEPTH FEET From	To	Material
0	27	Shale
27	29	Sandstone
29	46	Gray shale
46	48	Coal
48	76	Blue clay
76	78	Sandstone (Hard)
78	141	Shale
141	153	Coal
153	155	Clay
155	186	Coal
186	210	Shale
210		Siltstone

DRILL LOG (cont.)

DEPTH FEET From	To	Material

UNCODED INVENTORY DATA

Surface owner: Coldiron, Margaret
Address: Gillette, Wyoming

Driller's name: Floyd Higgins
Address: 721 N. Custer Ave., Miles City, Mont.

Log data: Drillers [X] Gamma [X] ER-SP [X] 27
Density [ ] Other

Cored Intervals: Depth — Lab sample #

to
to
to
to
to
to
to

Lithologic samples at 10' intervals
How stored: paper envelopes

Hydrologic data

REMARKS

MONTANA BUREAU OF MINES AND GEOLOGY — COAL BED DATA — COAL DIVISION

Recorded by: Granberg — Source of data: MBMG — Date: August 7, 1973 — Map: Appel Butte (Echeta 4 NE) — Photo No.:

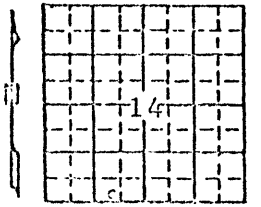
	STATE	COUNTY	LATITUDE DEG.	LAT. MIN.	LAT. SEC.	N.	LONGITUDE DEG.	LONG. MIN.	LONG. SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
	1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	18 19	20	21 22 23	24 25 26	27 28	29 30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70
A	WY	CA										48N	73W	14	c d c d	US-7320	2	4708	133	164			514	195	3	F	P	

Column 1-4 - County
See Appendix A3-4 for Code

Column 19 - Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



230'FSL, 1650'FWL

Col. 29-32 - Tract Number
1. Roland
3. Smith
5. Power's
9. Anderson
11. Saite
No. 1
No. 2
No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Poplar
33. Rockbock or Lee
36. Schaedel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or P
48. Graham or O
51. M
54. Robinson, M, or Colson
57. Burley
60. Other

Column 55 - Correlation Interval -517
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth From	Depth To	Material
0	22	Sand
22	25	Gravel
25	42	Clay
42	85	Sand
85	106	Clay
106	108	Rock
108	133	Clay
133	149	Coal
149	152	Clay
152	164	Coal
164	190	Clay
190	191	Rock
191	195	Sticky clay

DRILL LOG (cont.)

Depth From	Depth To	Material

UNCODED INVENTORY DATA

Surface owner: Coldiron, Margaret
Address: Gillette, Wyoming

Driller's name: Floyd Higgins
Address: 721 N. Custer Ave., Miles City, Mont.

Log data: Drillers [X] Gamma [X] ER-SP [X] Density [ ] Other

28

Cored intervals: Depth — Lab sample #

136'	to	145'	514
145'	to	147'	515
151'	to	160'	516
160'	to	164'	517
	to		
	to		
	to		

Lithologic samples at 10' intervals below 20'
How stored: paper envelopes

Hydrologic data:

REMARKS

MONTANA BUREAU OF MINES AND GEOLOGY — COAL BED DATA — COAL DIVISION

Recorded by: Granberg — Source of data: MBMG — Date: August 8, 1973 — Map: Appel Butte (Echeta 4 NE) — Photo No.:

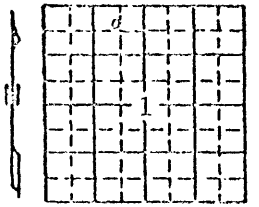
	STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
A																												
	1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	19	20	21 22 23	24 25	26 27	28 29 30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	34	65	66	67 68 69 70
	WY	Ca										48N	73W	1	babd	US-7321	2	4690	86	113			518	195	3	F	P	

Column 1-2 – County
See Appendix A3-4 for Code

Column 19 – Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 – Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 – Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



430'FNL, 1950'FWL

Column 31-34 – Bed Number
1. Roland
3. Smith
6. Powers
9. Anderson
12. Dietz
No. 1
No. 2
No. 3
15. Canyon
18. McKitrick
21. Davis, Carney, Vall, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Popham
33. Knoblock or Lee
36. Schoedel
39. Rosebud or G
42. Holt or McKay
45. Stocker Creek or F
49. Graham or O
51. M
54. Robinson, M, or Colman
57. Burley
60. Other

Column 55 – Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 – Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

-520

Column 65 – Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 – Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 – Geologic Code for Montana

DRILL LOG

Depth From	Depth To	Material
0	40	Shale
40	41	Rock
41	67	Clay
67	69	Rock
69	86	Clay
86	113	Coal
113	155	Clay
155	156	Rock
156	195	Sand

DRILL LOG (cont.)

Depth From	Depth To	Material

UNCODED INVENTORY DATA

Surface owner R. Doud & E. Butler
Address Gillette, Wyoming

Driller's name Floyd Higgins
Address 721 N. Custer Ave., Miles City, Mont.

Log data: Drillers [X] Gamma [X] ER-SP [X] Density [ ] Other

Cored intervals: Depth — Lab sample #

86'	to	95'	518
95'	to	104'	519
104'	to	113'	520
	to		
	to		
	to		
	to		

Lithologic samples 10' intervals below 20'
How stored paper envelopes
Hydrologic data

REMARKS

Either a clay parting or high ash zone from 99-101.

MONTANA BUREAU OF MINES AND GEOLOGY

COAL BED DATA

COAL DIVISION

Recorded by: Blumer Source of data: MBMG Date: August 9, 1973 Map: Appel Butte (Echeta 4 NE) Photo No.:

A

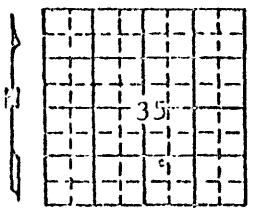
STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
WY	C A										49N	73W	35	dcbaa	US-7322	2	4715					521	400	3	F	P	

Column 3-4 - County
See Appendix A3-4 for Code

Column 19 - Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



1200'FSL, 2150'FEL

Column 51-54 - Bed Number
1. Roland
3. Smith
6. Powers
9. Anderson
12. Felts
No. 1
No. 2
No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Proctor
27. Forrester-Armold
30. Perkins
33. Knoblock or Lee
36. Schoedel
39. Forkbad or O
42. Holt or McKay
45. Stocker Creek or P
48. Grubbs or O
51. M
54. Robinson, M, or Colson
57. Burley
60. Other

Column 55 - Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

-523

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth Set From	Depth Set To	Material
0	25	Sandy brown clay
25	78	Yellow sand
78	118	Blue sand
118	134	Blue clay
134	162	Coal
162	228	Blue Shale
228	240	Blue sand
240	262	Blue shale and sand streaks
262	278	Blue sandy shale
278	308	Blue shale
308	316	Coal
316	343	Blue shale
343	346	Coal
346	392	Blue shale
392	400	Blue sand

DRILL LOG (cont.)

Depth Set From	Depth Set To	Material

UNCODED INVENTORY DATA

Surface owner E. Butler & R. Doud
Address Gillette, Wyoming

Driller's name Allan Drane
Address Broadus, Montana

Log data: Drillers [X] Gamma [X] ER-SP [X] 30
Density [ ] Other

Cored Intervals: Depth — Lab sample #

136'	to	146'		521
146'	to	155'		522
155'	to	162'		523
	to			
	to			
	to			
	to			

Lithologic samples at 10' intervals
How stored paper envelopes

Hydrologic data

REMARKS

MONTANA BUREAU OF MINES AND GEOLOGY — COAL BED DATA — COAL DIVISION

Recorded by: Granberg Source of data: MBMG Date: August 9, 1973 Mine: Pleasant Dale (Echeta 4 SW) Photo No.:

A

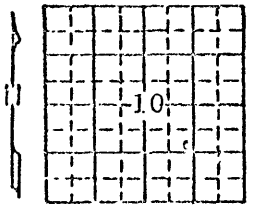
STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE H.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	18 19	20	21 22 23	24 25 26	27 28	29 30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70
W Y	C A					4 7 N	7 4 W	1 0	d a c d		U S - 7 3 2 3				4 5 1 6 7		1 4 1		1 7 1			5 2 4	2 2 5	3	F	F	

Column 3-4 - County
See Appendix A3-4 for Code

Column 19 - Segmental Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Alti-etar
3. Topographic map 7½' quadrangle
4. Other



Column 21-24 - Bed Number
1. Roland
3. Swith
6. Powers
9. Anderson
12. Dolts
No. 1
No. 2
No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Hill, or Richard
24. Carlson or Proctor
27. Forster-Arnold
30. Pophma
33. Knoblock or Lee
36. Schoedel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or P
48. Graham or O
51. M
54. Robinson, M, or Colman
57. Burley
60. Other

Column 55 - Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

-526

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth From	Depth To	Material
0	25	Yellow clay
25	61	Blue clay
61	62	Rock
62	70	Clay
70	81	Coal
81	110	Sand
110	112	Rock
112	140	Sandstone
140	141	Siltstone
141	171	Coal
171	177	Rock
177	180	Coal
180	185	Carb. shale (reddish brown)
185	225	Clay

DRILL LOG (cont.)

Depth From	Depth To	Material

UNCODED INVENTORY DATA

Surface owner: Vernon Huravitch
Address: Gillette, Wyoming

Driller's name: Floyd Higgins
Address: 721 N. Custer Ave., Miles City, Mont.

Log data: Drillers [X] Gamma [X] ER-SP [X] Density [ ] Other

Corod Intervals: Depth / Lab sample #

71'	to	79'	524
79'	to	81'	525
179'	to	180'	526
	to		
	to		
	to		
	to		

Lithologic samples at 10' intervals below 20'
How stored: paper envelopes

Hydrologic data:

REMARKS

MONTANA BUREAU OF MINES AND GEOLOGY

COAL BED DATA

COAL DIVISION

Recorded by: Granberg Source of data: MBMG Date: August 10, 1973 Misc. Pleasant Dale (Echeta 4 SW) Photo No.

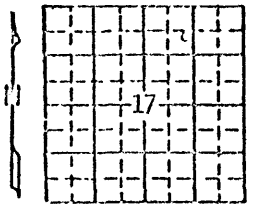
A	STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
	1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	18	19	20	21 22 23	24 25 26	27 28	29 30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	54	65	66	67 68 69 70
	W Y	C A											4 7 N	7 3 W	1 7	a b d a	U S - 7 3 2 4	4	4 8 7 1					5 2 7	5 6 0	3	F	P	

Column 1-4 - County
See Appendix A3-4 for Code

Column 19 - Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



900'FNL 1600'FEL

Column 21-24 - Bed Number
1. Roland
3. Smith
6. Pawby
9. Anderson
12. Dietz
No. 1
No. 2
No. 3
15. Canyon
18. Peterson
21. Davis, Carney, Wall, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Pepino
33. Eschlock or Lee
36. Schendel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or P
48. Graham or O
51. M
54. Robinson, M, or Colman
57. Burley
60. Other

Column 55 - Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

-529

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth from	Depth to	Material
0	18	Yellow Clay
18	20	Yellow sandstone
20	35	Yellow clay
35	72	Blue shale
72	95	Blue sand
95	162	Blue shale
162	164	Hard rock
164	208	Blue shale
208	210	Hard rock
210	261	Blue shale
261	270	Coal
270	302	Blue shale
302	317	Blue sand
317	324	Blue shale
324	348	Coal
348	368	Blue shale
368	470	Blue sand
470	508	Blue shale
508	510	Coal
510	538	Blue shale
538	539	Coal
539	560	Blue shale

DRILL LOG (cont.)

Depth from	Depth to	Material

UNCODED INVENTORY DATA

Surface owner Perry Geer
Address Gillette, Wyoming

Driller's name Allan Drane
Address Broadus, Montana

Log data: Drillers [X] Gamma [X] ER-SP [ ] 32
Density [ ] Other

Cored Intervals: Depth / Lab sample #

265'	to	270'		527
327'	to	337'		528
337'	to	347'		529
	to			
	to			
	to			
	to			

Lithologic samples 10' intervals
How stored paper envelopes
Hydrologic data

REMARKS

MONTANA BUREAU OF MINES AND GEOLOGY

COAL BED DATA

COAL DIVISION

Recorded by: Granberg Source of data: MBMG Date: August 10, 1973 Misc: Pleasant Dale (Echeta 4 SW) Photo No.:

A

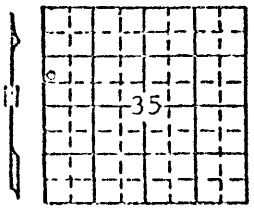
STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	18 19	20	21 22	23 24	25 26	27 28	29 30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70
W Y	C A										4 7 N	7 4 W	3 5	b c b c	U S - 7 3 2 5	4	5 1 1 4	1 1 2	1 1 4			5 3 0	3 0 0	3	F	P	

Column 1-4 - County
See Appendix A3-4 for Code

Column 12 - Sequential Number
Number 1 used for first hole in quadrangle designated by latitude-longitude. Additional holes with same lat-long enter in numerical sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



1720'FNL 200'FWL

Column 33-34 - Bed Number
1. Roland
3. Smith
6. Powers
9. Anderson
12. Dietz
No. 1
No. 2
No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Procter
27. Brewster-Arnold
30. Pepkus
33. Knoblock or Lee
36. Schoedel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or P
48. Graham or O
51. M
54. Robinson, M, or Colman
57. Durley
60. Other

Column 55 - Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

DEPTH FEET FROM	DEPTH FEET TO	Material
0	32	Yellow clay and sand
32	34	Rock
34	112	Sandstone
112	114	Coal (clay partings)
114	175	Clay
175	177	Rock
177	184	Sand
184	200	Clay
200	205	Sand
205	232	Clay
232	236	Carb. Shale
236	250	Clay
250	255	Carb. shale
255	300	Sand and clay

DRILL LOG (cont.)

DEPTH FEET FROM	DEPTH FEET TO	Material

UNCODED INVENTORY DATA

Surface owner: Louis McBeth
Address: Gillette, Wyoming

Driller's name: Floyd Higgins
Address: 721 N. Custer, Miles City, Montana

Log data: Drillers [X] Gamma [X] ER-SP [X] Density [ ] Other

33

Corod Intervals: Depth — Lab sample #
112' to 114' — 530
to
to
to
to
to
to

Lithologic samples at 10' intervals below 20'
How stored: paper envelopes

Hydrologic data

REMARKS

MONTANA BUREAU OF MINES AND GEOLOGY

COAL BED DATA

COAL DIVISION

Recorded by: Granberg Source of data MBMG Date August 11, 1973 Mine Pleasant Dale (Echeta 4 SW) Photo No.

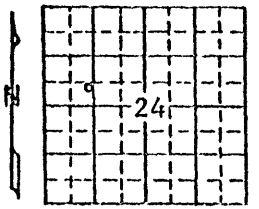
	STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
A	1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	18 19	20	21 22 23	24 25 26	27 28	29 30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70
	W Y	C A										4 8 N	7 4 W	2 4	b c d a	U S - 7 3 2 6	4	4 9 0 2	4 4 1	4 7 1			5 3 1	5 3 2	3	F	P	

Column 1-4 - County
See Appendix A3-4 for Code

Column 19 - Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



3000 'FSL 4200 'FEL

Column 53-54 - Bed Number
1. Roland
3. Smith
6. Powers
9. Anderson
12. Dolts
No. 1
No. 2
No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Pophom
33. Knoblock or Lee
36. Schoedel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or P
48. Crebas or O
51. M
54. Robinson, M, or Colman
57. Burley
60. Other

Column 55 - Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

DEPTH FEET From	DEPTH FEET To	Material
0	18	Yellow clay
18	21	Blue rock
21	32	Yellow clay
32	97	Blue clay
97	99	Blue rock
99	102	Blue shale
102	117	Blue sand
117	148	Blue shale
148	151	Hard rock
151	263	Blue shale
263	265	Hard rock
265	282	Blue shale
282	283	Rock
283	315	Blue shale
315	323	Blue sand
323	327	Sandstone
327	342	Blue sand
342	355	Blue shale and sand streaks
355	380	Blue shale
380	441	Brown shale
441	471	Coal
471	480	Blue shale
480	510	Sandy shale
510	522	Blue shale
522	526	Sand
526	532	Blue shale

DRILL LOG (cont.)

DEPTH FEET From	DEPTH FEET To	Material

UNCODED INVENTORY DATA

Surface owner Lee Mankin
Address Gillette, Wyoming

Driller's name Allan Drane
Address Broadus, Montana

Log data: Drillers [X] Gamma [X] ER-SP [ ] 34
Density [ ] Other

Cored Intervals: Depth — Lab sample #

450' to 458' — 531
to
to
to
to
to
to

Lithologic samples at 10' intervals below 20'
How stored paper envelopes

Hydrologic data

REMARKS

MONTANA BUREAU OF MINES AND GEOLOGY — COAL BED DATA — COAL DIVISION

Recorded by: Granberg Source of data: MBMG Date: August 10, 1973 Map: Pleasant Dale (Echeta 4 SW) Photo No.:

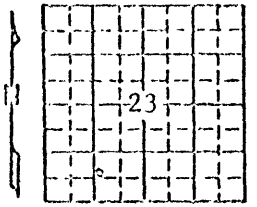
	STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ NO.	ACCURACY	LOCATION AND TOWNSHIP T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
A	1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	18 19	20	21 22 23	24 25	26 27	28 29 30 31	32 33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70
	W	C A										4 8 N	7 4 W	2 3	c d b c	U S - 7 3 2 7	4	5 0 9 2					5 3 2	2 7 0	3	F	P	

Column 3-4 - County
See Appendix A3-4 for Code

Column 10 - Sequential Number
Number 1 used for first hole in quadrangle designated by lettering. Additional holes with same lettering enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



760'FSL, 1400'FWL

Column 33-34 - Drill Hole Number
1. Roland
3. Smith
6. Powers
9. Anderson
12. Foltz
No. 1
No. 2
No. 3
15. Canyon
18. Monarch
21. Davis, Conway, Wall, or Richard
24. Carlson or Proctor
27. Chevalier-Arnold
30. Poplar
33. Knoblock or Lee
36. Schoefel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or P
48. Graham or O
51. M
54. Robinson, M, or Colman
57. Burley
60. Other

Column 55 - Correlation Interval -534
Letter designation used to supplement bed number to infer stratigraphic position of other coal beds
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, Accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

From (Feet)	To (Feet)	Material
0	55	Shale
55	57	Coal
57	105	Blue clay
105	106	Rock
106	142	Grey shale
142	153	Coal
153	192	Sandstone
192	205	Clay
205	207	Rock
207	216	Clay
216	222	Coal
222	270	Sand

DRILL LOG (cont.)

From (Feet)	To (Feet)	Material

UNCODED INVENTORY DATA

Surface owner: Lee Mankin
Address: Gillette, Wyoming

Driller's name: Floyd Higgins
Address: 721 Custer Ave., Miles City, Mont.

Log data: Drillers [X] Gamma [X] ER-SP [ ] SP
Density [ ] Other

Cored Intervals: Depth — Lab sample #

144'	to	150'		532
150'	to	154'		533
219'	to	221'		534
	to			
	to			
	to			
	to			

Lithologic samples at 10' intervals below 20'
How stored: paper envelopes

Hydrologic data:

REMARKS

MONTANA BUREAU OF MINES AND GEOLOGY — COAL BED DATA — COAL DIVISION

Recorded by: Granberg Source of data: MBMG Date: August 13, 1974 Mine: 4-J Ranch (Echeta 4 NW) Photo No.:

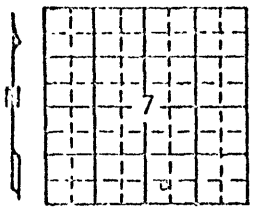
A	STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
	1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	18	19	20	21 22 23	24 25	26	27 28	29 30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70
	W Y	C A											4 8 N	7 3 W		7	d c c a	U S - 7 3 2 8	3	4 8 3 0	3 6 5	3 9 8				4 1 8	0	F	P	

Column 3-4 - County
See Appendix A3-4 for Code

Column 19 - Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



2960'FWL 410'FSL

Column 21-34 - Drill Number
1. Roland
3. Smith
6. Powers
9. Anderson
12. Delta
Mo. 1
Mo. 2
Mo. 3
15. Canyon
18. Moorcroft
21. Davis, Carney, Wall, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Popham
33. Knoblock or Lee
36. Schoedsl
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or P
48. Graham or O
51. M
54. Robinson, M, or Colman
57. Burley
60. Other

Column 55 - Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth Feet From	Depth Feet To	Material
0	8	Sandy yellow clay
8	28	Yellow clay
28	83	Blue clay
83	86	Rock
86	121	Blue shale
121	122	Rock
122	222	Blue shale
222	240	Sand, Blue shale
240	281	Blue sand
281	282	Rock
282	365	Blue shale
365	386	Coal
386	388	Shale
388	398	Coal
398	418	Blue shale
418		Rock

DRILL LOG (cont.)

Depth Feet From	Depth Feet To	Material

UNCODED INVENTORY DATA

Surface owner: Lee Saunders
Address: Gillette, Wyoming

Driller's name: Allan Drane
Address: Broadus, Montana

Log data: Drillers [X] Gamma [X] ER-SP [ ] Density [ ] Other

Corod Intervals: Depth — Lab sample #
____ to ____
____ to ____
____ to ____
____ to ____
____ to ____
____ to ____
____ to ____

Lithologic samples at 10' intervals
How stored: paper envelopes

Hydrologic data

REMARKS

MONTANA BUREAU OF MINES AND GEOLOGY

COAL BED DATA

COAL DIVISION

Recorded by: Granberg Source of data: MBMG Date: August 13, 1973 Map: 4-1 Ranch (Echeta 4 NE) Photo No.:

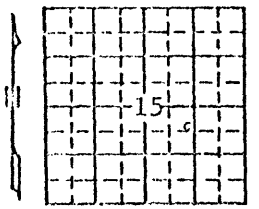
A	STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	SEQ NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
	1 2	3 4	5 6	7 8	9 10	11	12 13 14	15 16	17 18	19	20	21 22 23	24 25 26	27 28	29 30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70
	W	Y	C	A								4 8 N	7 4 W	1 5	d b r a d	U S - 7 3 2 9	4	4 9 9 3	1 4 5	5 8			5 3 5	1 6 5	3	F	P	

Column 3-4 - County
See Appendix A3-4 for Code

Column 19 - Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



2100'FSL 1600'FEL

Column 51-54 - Bed Number
1. Poland
3. Smith
6. Powers
9. Anderson
12. Felts
Mo. 1
Mo. 2
Mo. 3
15. Canyon
18. Monarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Popham
33. Knoblock or Lee
36. Schoedel
39. Rosebud or 9
42. Holt or McKay
45. Stocker Creek or P
49. Graham or O
51. M
54. Robinson, M, or Colman
57. Burley
60. Other

Column 55 - Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

-536

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth From	Depth To	Material
0	45	Sand and shale
45	58	Coal
58	75	Clay
75	76	Rock
76	100	Sand
100	102	Rock
102	113	Clay
113	119	Coal
119	150	Shale
		Total depth drilled 165'

DRILL LOG (cont.)

Depth From	Depth To	Material

UNCODED INVENTORY DATA

Surface owner: Lee Mankin
Address: Gillette, Wyoming

Driller's name: Floyd Higgins
Address: 721 Custer Ave., Miles City, Montana

Log data: Drillers [X] Gamma [X] ER-SP [ ] Density [ ] Other

37

Cored Intervals: Depth — Lab sample #

Depth			Lab sample #
46'	to	55'	535
55'	to	58'	536
	to		
	to		
	to		
	to		
	to		

Lithologic samples: 10' intervals below 20'
How stored: paper envelopes
Hydrologic data:

REMARKS

Drilled with air

MONTANA BUREAU OF MINES AND GEOLOGY

COAL BED DATA

COAL DIVISION

Recorded by: Granberg Source of data: MBMG Date: August 15, 1973 Map: Appel Butte (Echeta 4 NE) Photo No.:

A

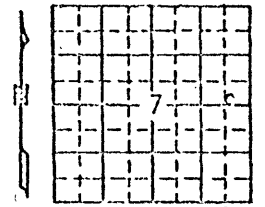
STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	18 19	20	21 22	23 24	25 26	27 28	29 30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 69 69 70
W Y	C A										4 9 N	7 2 W	7	a d d c	U S - 7 3 3 0	2	4 6 5 5					5 4 0	3 6 5	3	F	P	

Column 1-4 - County
See Appendix A3-4 for Code

Column 19 - Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



Column 33-34 - Bed Number
1. Roland
3. Smith
6. Powers
9. Anderson
12. Felts
No. 1
No. 2
No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Vall, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Popham
33. Knoblock or Lee
36. Schoedel
39. Rosebud or Q
42. Holt or McKay
45. Stecker Creek or P
48. Graham or G
51. M
54. Robinson, M, or Colman
57. Burley
60. Other

Column 55 - Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

-542

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth Feet From	Depth Feet To	Material
0	16	Yellow sand
16	26	Blue clay
26	40	Coal
40	50	Blue clay
50	58	Coal
58	66	Blue clay
66	133	Blue sand (coarse)
133	139	Blue shale
139	163	Blue sand (coarse)
163	170	Blue shale
170	192	Very coarse blue sand
192	240	Blue shale
240	243	Coal
243	248	Blue shale
248	250	Coal
250	278	Blue shale
278	303	Blue sand (coarse)
303	305	Blue shale
305	330	Blue sand
330	333	Black shale with coal stks.
333	336	Coal
336	350	Black shale with coal stks.
350	365	Blue shale
365		Hard rock

DRILL LOG (cont.)

Depth Feet From	Depth Feet To	Material

UNCODED INVENTORY DATA

Surface owner: R. Doud & E. Butler
Address: Gillette, Wyoming

Driller's name: Allan Drane
Address: Broadus, Montana

Log data: Drillers [X] Gamma [X] ER-SP [ ] Density [ ] Other

38

Cored intervals: Depth / Lab sample #

26'	to	36'		540
36'	to	40'		541
51'	to	58'		542
	to			
	to			
	to			
	to			

Lithologic samples: 10' intervals
How stored: paper envelopes

Hydrologic data:

REMARKS

Cored sample nos. 540 and 541 with air and no. 542 with water.

MONTANA BUREAU OF MINES AND GEOLOGY — COAL BED DATA — COAL DIVISION

Recorded by: Granberg Source of data: MBMG Date: August 14, 1973 Map: 4-J Ranch (Echeta 4 NW) Photo No.

A

State	County	Latitude Deg.	Min.	Sec.	N.	Longitude Deg.	Min.	Sec.	Seq. No.	Accuracy	T.	R.	Sec.	Tract	Drill Hole Number	Accuracy	Collar Elev.	Depth to Top of Bed	Depth to Bottom of Bed	Bed No.	Cor.	Lab Sample Number	Total Depth	Accuracy	Ownership	Surface	Geologic Code
2–3	3–4	5–6	7–8	9–10	11	12–14	15–16	17–18	19	20	21–23	24–26	27–28	29–32	33–39	40	41–44	45–48	49–52	53–54	55	56–59	60–63	64	65	66	67–70
MT	CA										47N	74W	35	dadd	US-7331	2	4984	59	74			537	195	3	F	P	

-539

Column 3–4 – County
See Appendix A3-4 for Code

Column 19 – Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 – Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 – Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other

(Section diagram: 35)

730' FSL 230' FEL

Column 53–54 – Bed Number
1. Roland
3. Smith
6. Powers
9. Anderson
12. Deits
No. 1
No. 2
No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Pepham
33. Knoblock or Lee
36. Sawdel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or P
48. Graham or O
51. N
54. Robinson, M, or Colman
57. Burley
60. Other

Column 55 – Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 – Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 – Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 – Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67–70 – Geologic Code for Montana

DRILL LOG

Interval From	Interval To	Material
0	47	Yellow sand & clay
47	59	Blue clay
59	74	Coal
74	123	Clay
123	127	Coal
127	180	Sand
180	195	Shale

DRILL LOG (cont.)

Interval From	Interval To	Material

UNCODED INVENTORY DATA

Surface owner R. M. White
Address Gillette, Wyoming

Driller's name Floyd Higgins
Address 721 Custer Ave., Miles City, Mont.

Log data: Drillers [X] Gamma [X] ER-SP [ ] 39
Density [ ] Other

Cored Intervals: Depth		Lab sample #
61' to 71'		537
71' to 74'		538
123' to 127'		539

Lithologic samples at 10' intervals below 20'
How stored paper envelopes

Hydrologic data

REMARKS

MONTANA BUREAU OF MINES AND GEOLOGY

COAL BED DATA

COAL DIVISION

Recorded by: Blumer Source of data: MBMG Date: August 21, 1973 Misc.: Gillette West (Echeta 1 SE) Photo No.:

A	STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
	1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	18 19	20	21 22 23	24 25	26 27	28 29 30 31	32 33 34 35 36 37 38	39	40 41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70
	W	Y	C	A								4 9 N	7 2 W	6	b a d a	U S - 7 3 3 2	2	4 6 1 3					5 4 5	4 6 0	3	F	B	

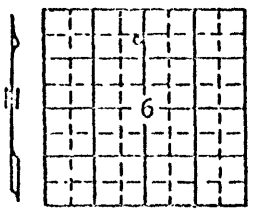
-547

Column 1-4 - County
See Appendix A3-4 for Code

Column 19 - Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



2440'FWL 750'FNL

Column 31-54 - Bed Number
1. Roland
3. Smith
6. Powers
9. Anderson
12. Dietz
No. 1
No. 2
No. 3
15. Canyon
18. Monarch
21. Davis, Cerney, Vall, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Popham
33. Knoblock or Lee
36. Schoedel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or P
48. Graham or O
51. M
54. Robinson, N, or Colman
57. Burley
60. Other

Column 55 - Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth Feet From	Depth Feet To	Material
0	23	Yellow clay
23	40	Blue clay
40	55	Coal
55	60	Blue shale
60	68	Coal
68	138	Blue sand
138	140	Blue shale
140	150	Blue sand
150	162	Blue shale
162	208	Blue sand
208	234	Blue shale
234	239	Blue shale with coal stks.
239	270	Blue shale
270	274	Coal
274	280	Blue shale
280	282	Coal
282	304	Blue shale
304	393	Blue sand
393	410	Blue shale
410	433	Brown shale
433	438	Coal
438	442	Brown shale with coal stks.
442	460	Blue shale

DRILL LOG (cont.)

Depth Feet From	Depth Feet To	Material

UNCODED INVENTORY DATA

Surface owner E. Butler & R. Doud
Address Gillette, Wyoming

Driller's name Allen Drane
Address Broadus, Montana

Log data: Drillers [X] Gamma [X] ER-SP [ ] 40
Density [ ] Other

Cored Intervals: Depth — Lab sample #

Depth			Lab sample #
43'	to	53'	545-B
53'	to	58'	546
58'	to	67'	547
	to		
	to		
	to		
	to		

Lithologic samples at 10' intervals below 20'
How stored paper envelopes

Hydrologic data

REMARKS

MONTANA BUREAU OF MINES AND GEOLOGY

COAL BED DATA

COAL DIVISION

Recorded by: Cranberg Source of data: MBMG Date: August 13, 1973 Map: Appel Butte (Echeta 4 NE) Photo No.:

A

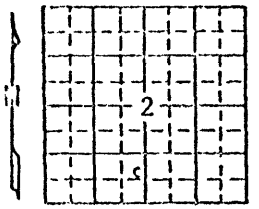
STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	18 19	20	21 22 23	24 25 26	27 28	29 30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70
W Y	C A										4 9 N	7 3 W	2	c d a d	U S - 7 3 3 3	2	4 6 9 0					5 4 3	2 4 0	3	F	F	

Column 1-2 - County
See Appendix A3-4 for Code

Column 12 - Sequential Number
Number 1 used for first hole in quadrangle designated by latitude-longitude. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



950'FSL, 2550'FWL

Column 31-34 - Bed Number
1. Roland
3. Smith
6. Powers
9. Anderson
12. Dietz
No. 1
No. 2
No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Popham
33. Knoblock or Lee
36. Schoedel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or P
48. Graham or O
51. M
54. Robinson, M, or Colman
57. Burley
60. Other

Column 45-48 - Correlation Interval -545
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth From	Depth To	Material
0	28	Yellow clay and sand
28	78	Blue clay
78	80	Coal
80	160	Blue clay
160	176	Coal
176	182	Blue shale
182	192	Coal
192	240	Shale

DRILL LOG (cont.)

Depth From	Depth To	Material

UNCODED INVENTORY DATA

Surface owner R. Doud & E. Butler
Address Gillette, Wyoming

Driller's name Floyd Higgins
Address 721 Custer Ave., Miles City, Mont.

Log data: Drillers [X] Gamma [X] ER-SP [ ] 4
Density [ ] Other

Cored intervals: Depth / Lab sample #

162'	to	172'	543
172'	to	176'	544
183'	to	192'	545
	to		
	to		
	to		
	to		

Lithologic samples 10' intervals below 20'
How stored paper envelopes

Hydrologic data

REMARKS

MONTANA BUREAU OF MINES AND GEOLOGY

COAL BED DATA

COAL DIVISION

Recorded by: Woods Source of data: MBMG Date: August 30, 1973 Map: Rawhide School (Echeta 1 NE) Photo No.:

A

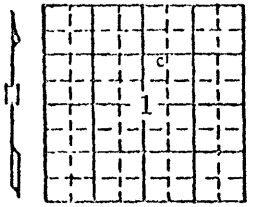
STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	T.	R.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	18	19	20	21 22	23	24 25	26	27 28	29 30	31 32	33 34 35 36 37 38 39	40	41 42	43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70
W Y	C A											5 1	N	7 3	W	1	a c	b a	U S - 7 3 3 4		4 2	0 7						5 5 5	4 4 0 3		F	P	

Column 3-4 - County
See Appendix A3-4 for Code

Column 10 - Sequential Number
Number 1 used for first hole in quadrangle designated by latitude-longitude. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



1600'FNL, 2300'FEL

Column 41-44 - Bed Number
1. Poland
3. Smith
6. Power's
9. Anderson
12. Data
No. 1
No. 2
No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Vall, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Pophum
33. Knoblock or Lee
35. Schoedel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or P
48. Crabtree or O
51. M
54. Robinson, M, or Colman
57. Burley
60. Other

Column 55 - Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

-567

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth From	Depth To	Material
0	8	Yellow clay
8	16	Blue clay
16	19	Brown shale
19	26	Coal
26	28	Shale
28	29	Coal
29	82	Blue shale
82	84	Rock
84	98	Blue shale
98	106	Brown shale with coal stks.
106	144	Coal
144	146	Rock
146	147	Coal
147	282	Blue shale
282	332	Blue sand
332	410	Coal
410	440	Blue shale

DRILL LOG (cont.)

Depth From	Depth To	Material

CORED INTERVALS: LAB SAMPLE#

21'	to 24'	555
111'	to 121'	556
121'	to 131'	557
131'	to 141'	558
141'	to 147'	559
340'	to 350'	560

UNCODED INVENTORY DATA

Surface owner: James Daly
Address: Gillette, Wyoming

Driller's name: Allan Drane
Address: Broadus, Montana

Log data: Drillers [X] Gamma [X] ER--SP [ ] 42
Density [ ] Other

Cored Intervals: Depth — Lab sample #

350'	to 360'	561
360'	to 368'	562
368'	to 370'	563
370'	to 380'	564
380'	to 390'	565
390'	to 400'	566
400'	to 410'	567

Lithologic samples: 10' intervals below 20'
How stored: paper envelopes

Hydrologic data:

REMARKS

MONTANA BUREAU OF MINES AND GEOLOGY — COAL BED DATA — COAL DIVISION

Recorded by: Blumer Source of data: MBMG Date: August 22, 1973 Map: Oriva (Echeta 1 SW) Photo No.:

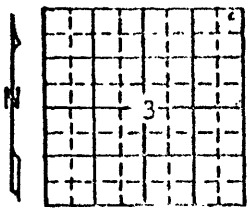
	STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
A	WY	CA										49N	74W	3	aaaa	US-7335	2	4544	230	254			548	300	3	F	P	

Column 3-4 - County
See Appendix A3-4 for Codes

Column 19 - Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



300'FNL, 200'FEL

Column 53-54 - Bed Number
1. Roland
3. Smith
6. Powers
9. Anderson
12. Delta
No. 1
No. 2
No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Popham
33. Knoblock or Lee
36. Schoedel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or P
48. Graham or O
51. N
54. Robinson, M, or Colman
57. Burley
60. Other

Column 55 - Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

-550

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth From	Depth To	Material
0	30	Yellow clay & gravel
30	78	Blue clay
78	80	Coal
80	127	Blue clay
127	157	Sand
157	230	White clay (hard rock 193-195)
230	246	Coal
246	248	Rock
248	254	Coal
254	285	Light clay
285	300	Sand

DRILL LOG (cont.)

From	To	Material

UNCODED INVENTORY DATA

Surface owner R. H. Force
Address Gillette, Wyoming

Driller's name Floyd Higgins
Address 721 Custer Ave., Miles City, Mont.

Log data: Drillers [X] Gamma [X] ER-SP [ ] Density [ ] Other

43

Corod Intervals: Depth — Lab sample #

234'	to	242'	548
242'	to	250'	549
250'	to	253'	550
	to		
	to		
	to		
	to		

Lithologic samples at 10' intervals below 20'
How stored paper envelopes

Hydrologic data

REMARKS

MONTANA BUREAU OF MINES AND GEOLOGY — COAL BED DATA — COAL DIVISION

Recorded by: Woods — Source of data: MBMG — Date: August 30, 1973 — Map: Rawhide School (Echeta 1 NE) — Photo No.:

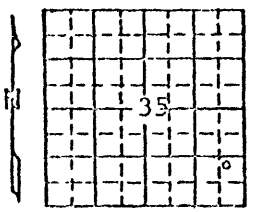
	STATE	COUNTY	LATITUDE DEG.	LAT MIN.	LAT SEC.	LAT N.	LONGITUDE DEG.	LONG MIN.	LONG SEC.	SEQ NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
A	WY	CA										52N	73W	35	ddabUS-7336		4295					569	555	3	F	P	

Column 1-4 - County
See Appendix A3-4 for Code

Column 19 - Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½" quadrangle
4. Other



1000'FSL, 520'FEL

Column 53-54 - Bed Number
1. Roland
3. Smith
6. Pevar's
9. Anderson
12. Smith
No. 1
No. 2
No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Popham
33. Knoblock or Lee
36. Schoedel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or P
48. Graham or O
51. M
54. Robinson, M, or Colman
57. Burley
60. Other

Column 55 - Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

-574

Column 66 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 65 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth Feet From	Depth Feet To	Material
0	8	Yellow sand
8	13	Yellow clay
13	63	Yellow sand
63	98	Blue sand with stks. of coal
98	99	Coal
99	135	Blue sand
135	146	Brown shale with coal stks.
146	150	Blue shale
150	162	Coal
162	177	Blue shale with sand stks.
177	178	Rock
178	182	Blue shale with sand stks.
182	218	Blue shale
218	224	Brown shale with coal stks.
224	266	Coal
266	290	Gray shale with coal stks.
290	352	Blue shale
352	385	Gray sand
385	440	Blue sand
440	461	Gray sand
461	530	Coal
530	555	Brown shale

DRILL LOG (cont.)

Depth Feet From	Depth Feet To	Material

UNCODED INVENTORY DATA

Surface owner: James Daly
Address: Gillette, Wyoming

Driller's name: Allan Drane
Address: Broadus, Montana

Log data: Drillers [X] Gamma [X] ER-SP [ ] Density [ ] Other

44

Cored Intervals: Depth — Lab sample #

150'	to	160'		569
160'	to	162'		570
228'	to	238'		571
238'	to	248'		572
248'	to	258'		573
258'	to	266'		574
	to			

Lithologic samples at 10' intervals below 20'
How stored: paper envelopes

Hydrologic data

REMARKS

MONTANA BUREAU OF MINES AND GEOLOGY

COAL BED DATA

COAL DIVISION

Recorded by: Woods Source of data: MBMG Date: August 22, 1973 Map: Oriva (Echeta 1 SW) Photo No.:

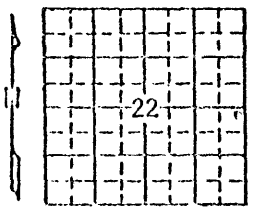
	STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
1	1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	18	19	20	21 22 23	24 25 26	27 28	29 30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70
	M	Y	C	A									5 0 N	7 4 W	2 2	d a a a	U S - 7 3 3 7	2	4 4 8 9	1 6 5	1 9 1			5 5 1	2 8 5	3	F	P	

Column 3-4 - County
See Appendix A3-4 for Code

Column 10 - Sequential Number
Number 1 used for first hole in quadrangle designated by latitude and longitude. Additional holes with same latitude and longitude enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½" quadrangle
4. Other



2600'FSL 250'FEL

Column 21-24 - Bed Number
1. Roland
3. Smith
6. Fowler
9. Anderson
12. Dietz
No. 1
No. 2
No. 3
15. Canyon
18. McKeach
21. Davis, Carney, Wall, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Popham
33. Knoblock or Lee
35. Schoedel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or F
48. Graham or O
51. M
54. Robinson, M, or Coleman
57. Burley
60. Other

Column 55 - Correlation Interval -553
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth Feet From	Depth Feet To	Material
0	28	Yellow clay and gravel
28	46	Blue clay
46	60	Sand
60	62	Rock
62	112	Sand
112	127	Blue clay
127	142	Sand
142	165	Gray shale
165	182	Coal
182	184	Rock
184	191	Coal
191	196	Sand
196	217	Clay
217	237	Sand
237	285	Clay

DRILL LOG (cont.)

Depth Feet From	Depth Feet To	Material

UNCODED INVENTORY DATA

Surface owner: Glen Lowery
Address: Gillette, Wyoming

Driller's name: Floyd Higgins
Address: 721 Custer Ave., Miles City, Mont.

Log data: Drillers [X] Gamma [X] ER-SP [ ] Density [ ] Other

45

Cored Intervals: Depth / Lab sample #

167'	to	175'	551
175'	to	183'	552
183'	to	188'	553
	to		
	to		
	to		
	to		

Lithologic samples at 10' intervals below 20'
How stored: paper envelopes

Hydrologic data:

REMARKS

MONTANA BUREAU OF MINES AND GEOLOGY — COAL BED DATA — COAL DIVISION

Recorded by: Woods — Source of data: MBMG — Date: September 11, 1970 — Rawhide School (Echeta 1 NE) — Photo No.

A

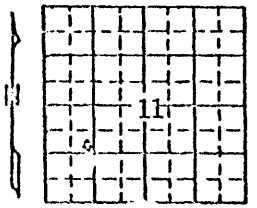
STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	18	19	20	21 22 23	24 25 26	27 28	29 30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70
W Y	C A											5 1 N	7 3 W	1 1	c b d d	U S - 7 3 3 8	2	4 2 6 8					5 7 7	6 2 0	3	F	P	

Column 3-4 - County
See Appendix A3-4 for Code

Column 19 - Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



1340'FSL 1200'FWL

Column 41-54 - Bed Number
1. Poland
3. Smith
6. Powers
9. Anderson
12. Dietz
No. 1
No. 2
No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Popham
33. Knoblock or Lee
36. Schoefel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or P
48. Graham or O
51. N
54. Robinson, M, or Colman
57. Darley
60. Other

Column 55 - Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

-579

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth Feet From	Depth Feet To	Material
0	14	Yellow clay
14	26	Sand and gravel
26	62	Blue sand
62	64	Blue clay
64	73	Coal
73	140	Blue shale
140	170	Blue sand
170	178	Blue shale
178	192	Coal
192	230	Blue shale
230	264	Coal
264	290	Brown shale with coal stks.
290	380	Blue shale
380	480	Grey sand
480	514	Grey shale
514	536	Grey shale with coal stks.
536	600	Coal
600	620	Blue shale

DRILL LOG (cont.)

Depth Feet From	Depth Feet To	Material

UNCODED INVENTORY DATA

Surface owner: James Daly
Address: Gillette, Wyoming

Driller's name: Allan Drane
Address: Broadus, Montana

Log data: Drillers [X] Gamma [X] ER-SP [ ] Density [ ] Other

46

Cored Intervals: Depth			Lab sample #
178'	to	188'	577
188'	to	192'	578
240'	to	250'	579
	to		
	to		
	to		
	to		

Lithologic samples: washed out
How stored:
Hydrologic data:

REMARKS

MONTANA BUREAU OF MINES AND GEOLOGY

COAL BED DATA

COAL DIVISION

Recorded by: Woods Source of data: MBMG Date: August 27, 1973 Map: Oriva (Echeta 1 SW) Photo No.:

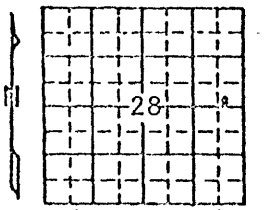
	STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
A	WY	04										50N	73W	28	addc	USGS 7339	2	4765					554	375	3	F	P	

Column 1-4 - County
See Appendix A3-4 for Code

Column 19 - Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



2650'FNL 400'FEL

Column 51-54 - Bed Number
1. Roland
3. Smith
6. Powers
9. Anderson
12. Dietz
Mo. 1
Mo. 2
Mo. 3
15. Canyon
18. Monarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Popham
33. Knoblock or Lee
36. Schoedel
39. Rosebud or 9
42. Holt or McKay
45. Stocker Creek or F
48. Graham or O
51. M
54. Robinson, M, or Coleman
57. Durley
60. Other

Column 55 - Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth Feet From	Depth Feet To	Material
0	30	Yellow clay and sand
30	56	Sand
56	62	Clay
62	64	Coal
64	124	Blue clay
124	146	Clay
146	147	Coal
147	178	Clay
178	180	Hard rock
180	247	Shale
247	249	Coal
249	250	Shale
250	254	Rock
254	312	Clay (sticky gray)
312	330	Coal
330	332	Rock
332	347	Coal
347	375	Clay

DRILL LOG (cont.)

Depth Feet From	Depth Feet To	Material

UNCODED INVENTORY DATA

Surface owner: Frank Beck
Address: Gillette, Wyoming

Driller's name: Floyd Higgins
Address: 721 Custer Ave., Miles City, Mont.

Log data: Drillers [X] Gamma [X] ER-SP [ ] Density [ ] Other

47

Cored Intervals: Depth / Lab sample #
62' to 64' — 554
to
to
to
to
to
to

Lithologic samples: at 10' intervals below 20'
How stored: paper envelopes

Hydrologic data:

REMARKS

MONTANA BUREAU OF MINES AND GEOLOGY

COAL BED DATA

COAL DIVISION

Recorded by: Woods Source of data: MBMG Date: Sept. 11, 1973 Map: Townsend Springs (Echeta 1 NW) Photo No.:

A

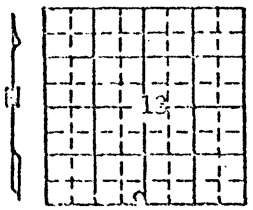
STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	18	19	20	21 22 23	24 25 26	27 28	29 30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70
W Y	C A											5 2N	7 4W	1 3	c d d d	U S - 7 3 4 0	2	4 2 8 5					5 8 1	5 6 0	3	F	P	

Column 1-4 - County
See Appendix A3-4 for Code

Column 19 - Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



275'FSL 2650'FEL

Column 53-5 - Bed Number

1.	Poland	24.	Carlson or Proctor
3.	Smith	27.	Brewster-Arnold
6.	Fever's	30.	Popham
9.	Anderson	33.	Knoblock or Lee
12.	Deits	36.	Schoedel
	No. 1	39.	Roachbud or Q
	No. 2	42.	Holt or McKay
	No. 3	45.	Stocker Creek or P
15.	Canyon	48.	Combsa or O
18.	Monarch	51.	N
21.	Davis, Carney, Wall, or Richard	54.	Robinson, M, or Column
		57.	Burley
		60.	Other

Column 55 - Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Cover
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth From	Depth To	Material
0	50	Yellow sand
50	120	Blue clay
120	137	Blue sand
137	153	Blue shale
153	165	Brown shale with coal stks.
165	180	Blue shale
180	200	Brown shale with coal stks.
200	205	Coal
205	238	Blue shale
238	281	Blue sand
281	291	Brown shale
291	307	Coal
307	379	Blue shale
379	381	Rock
381	417	Brown shale
417	435	Coal
435	441	Brown shale
441	443	Coal
443	447	Brown shale
447	457	Coal
457	491	Blue shale
491	496	Coal
496	498	Shale
498	503	Coal
503	520	Blue shale
520	560	Sandy shale

DRILL LOG (cont.)

Depth From	Depth To	Material

UNCODED INVENTORY DATA

Surface owner: James Daly
Address: Gillette, Wyoming

Driller's name: Allan Drane
Address: Broadus, Montana

Log data: Drillers [X] Gamma [X] ER-SP [X] Density [ ] Other

48

Cored intervals: Depth — Lab sample #

299' to 307' — 581

to

to

to

to

to

to

Lithologic samples: washed out
How stored:

Hydrologic data:

REMARKS

MONTANA BUREAU OF MINES AND GEOLOGY

COAL BED DATA

COAL DIVISION

Recorded by: Woods Source of data: MBMG Date: Sept. 11, 1973 Map: 4-J Ranch (Echeta 4 NW) Photo No.:

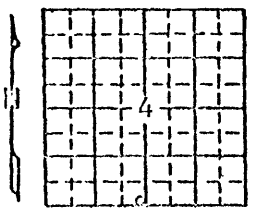
	STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
A	WY	GA										49N	73W	4	cddd	US-7341	2	4785					568	390	3	F	P	

Column 3-4 - County
See Appendix A3-4 for Code

Column 19 - Sequential Number
Number 1 used for first hole in quadrangle designated by letter. Additional holes with same let-ter-ng enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



300'FSL 2650'FWL

Column 31-34 - Bed Number
1. Roland
3. Smith
6. Powers
9. Anderson
12. Dolts
No. 1
No. 2
No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Pophas
33. Knoblock or Lee
35. Schoedel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or P
48. Croken or O
51. M
54. Robinson, M, or Colman
57. Burley
60. Other

Column 55 - Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth in Feet From	Depth in Feet To	Material
0	20	Yellow clay
20	23	Coal
23	30	Yellow clay
30	60	Blue clay
60	62	Coal
62	84	Blue clay
84	86	Coal
86	127	Sandstone
127	182	Shale
182	184	Coal
184	208	Grey shale
208	223	Sand
223	270	Grey shale
270	298	Sand
298	314	Coal
314	317	Rock
317	326	Coal
326	390	Clay

DRILL LOG (cont.)

Depth in Feet From	Depth in Feet To	Material

UNCODED INVENTORY DATA

Surface owner: Ellis Bennor
Address: Gillette, Wyoming

Driller's name: Floyd Higgins
Address: 721 Custer Ave., Miles City, Mont.

Log data: Drillers [X] Gamma [X] ER-SP [ ] 94
Density [ ] Other

Cored Intervals: Depth — Lab sample #
84' to 86' — 568
to
to
to
to
to
to

Lithologic samples: 10' intervals below 20'
How stored: paper envelopes

Hydrologic data:

REMARKS

MONTANA BUREAU OF MINES AND GEOLOGY

COAL BED DATA

COAL DIVISION

Recorded by: Woods Source of data: MBMG Date: Sept. 11, 1973 Map: Calf Creek (Croton 4 SE) Photo No.:

A

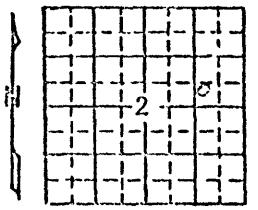
STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
WY	C	A									52N	73W	2	adcb	USI-7342	2	4166						420	3	F	P	

Column 1-4 - County
See Appendix A3-4 for Code

Column 19 - Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



1300'FNL 800'FEL

Column 31-34 - Bed Number
1. Ballard
3. Smith
6. Powers
9. Anderson
12. Smith
No. 1
No. 2
No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Vall, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Popham
33. Knoblock or Lee
36. Schoodel
39. Rosebud or G
42. Holt or McKay
45. Stocker Creek or F
48. Graham or O
51. M
54. Robinson, M, or Colman
57. Burley
60. Other

Column 55 - Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth in Feet From	To	Material
0	35	Yellow clay
35	60	Blue clay
60	74	Coal
74	78	Brown shale
78	83	Blue shale
83	119	Coal
119	143	Blue shale
143	144	Rock
144	146	Blue shale
146	150	Brown shale with coal stks.
150	233	Blue shale
233	260	Sandy blue shale
260	282	Blue shale
282	320	Brown shale
320	388	Coal
388	420	Sandy grey shale

DRILL LOG (cont.)

Depth in Feet From	To	Material

UNCODED INVENTORY DATA

Surface owner: Dean Hull
Address: Gillette, Wyoming

Driller's name: Allan Drane
Address: Broadus, Montana

Log data: Drillers [X] Gamma [X] ER-SP [X] 50
Density [ ] Other

Cored Intervals: Depth — Lab sample #
to
to
to
to
to
to
to

Lithologic samples at 10' intervals below 20'
How stored: paper envelopes

Hydrologic data

REMARKS

MONTANA BUREAU OF MINES AND GEOLOGY

COAL BED DATA

COAL DIVISION

Recorded by: Woods Source of data: MBMG Date: Sept. 11, 1973 Map: Oriva (Echeta 1 SW) Photo No.:

A

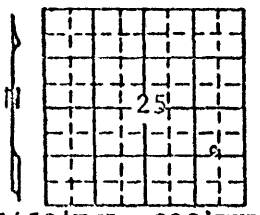
STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
WY	CA										51N	74W	25	dacd	US-7343	2	4496	176	203			575	255	3	F	P	

Column 1-4 - County
See Appendix A3-4 for Code

Column 19 - Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½° quadrangle
4. Other



Column 51-54 - Bed Number
1. Roland
3. Smith
6. Fryer's
9. Anderson
12. Dolts
No. 1
No. 2
No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Procter
27. Brewster-Arnold
30. Popham
33. Knoblock or Lee
36. Schoedel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or P
48. Graham or O
51. M
54. Robinson, M, or Column
57. Burley
60. Other

Column 55 - Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

-576

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth Feet From	Depth Feet To	Material
0	25	Variegated shales
25	95	Clay (2' hard rock at 32')
95	115	Sand
115	124	Shale
124	125	Coal ?
125	134	Shale
134	136	Coal
136	176	Grey shale with stks. of car. shale
176	184	Coal
184	186	Rock
186	203	Coal
203	255	Light clay

DRILL LOG (cont.)

Depth Feet From	Depth Feet To	Material

UNCODED INVENTORY DATA

Surface owner: James Daly
Address: Gillette, Wyoming

Driller's name: Floyd Higgins
Address: 721 Custer Ave., Miles City, Montana

Log data: Drillers [X] Gamma [X] ER-SP [ ] Density [ ] Other

Cored intervals: Depth / Lab sample #

180'	to	190'		575
190'	to	192'		576
	to			
	to			
	to			
	to			
	to			

Lithologic samples: at 10' intervals below 20'
How stored: paper envelopes

Hydrologic data:

REMARKS

MONTANA BUREAU OF MINES AND GEOLOGY

COAL BED DATA

COAL DIVISION

Recorded by: Woods Source of data: MBMG Date: Sept. 12, 1973 Map: Pitch Draw (Croton 4 NE) Photo No.:

A

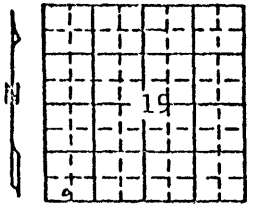
STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	18	19	20 21 22	23 24	25 26	27 28	29 30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70
W Y	C A										5 4 N	7 2 W	1 9	c c c d	U S - 7 3 4 4	2	4 2 1 2						2 5 8	3	F	P	

Column 1-4 - County
See Appendix A3-4 for Code

Column 19 - Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



Column 51-54 - Bed Number
1. Roland
3. Smith
6. Powers
9. Anderson
12. Delta
No. 1
No. 2
No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Popham
33. Knoblock or Lee
36. Schoedel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or P
48. Graham or O
51. M
54. Robinson, M, or Colman
57. Burley
60. Other

Column 55 - Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth in Feet From	To	Material
0	10	Yellow clay
10	53	Blue shale with coal stks.
53	57	Rock
57	122	Blue shale
122	128	Brown shale
128	146	Blue shale
146	172	Blue sand
172	184	Coal
184	203	Brown shale
203	241	Coal
241	258	Blue shale
258		Rock

DRILL LOG (cont.)

Depth in Feet From	To	Material

UNCODED INVENTORY DATA

Surface owner: Ted Norfolk
Address: Gillette, Wyoming

Driller's name: Allan Drane
Address: Broadus, Montana

Log data: Drillers [X] Gamma [X] ER-SP [X] Density [ ] Other

52

Cored Intervals: Depth ____ to ____ Lab sample #

Lithologic samples: at 10' intervals below 20'
How stored: paper envelopes

Hydrologic data:

REMARKS

MONTANA BUREAU OF MINES AND GEOLOGY

COAL BED DATA

COAL DIVISION

Recorded By: Woods Source of data: MBMG Date: Sept. 12, 1973 Map: Townsend Springs (Echeta 1 NW) Photo No.:

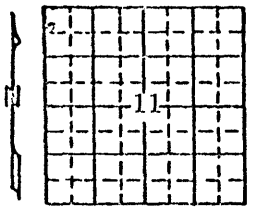
A	STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
	1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	18	19	20 21 22	23 24	25 26	27 28	29 30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70
	W Y	C A										5 1 N	7 4 W	1 1	b b b c	U S - 7 3 4 5	2	4 5 4 2	2 1 4	2 3 6			5 8 0	3 9 0	3	F	P	

Column 1-4 - County
See Appendix A3-4 for Code

Column 19 - Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



620'FNL 350'FWL

Column 51-54 - Bed Number
1. Roland
3. Smith
6. Powers
9. Anderson
12. Dietz
No. 1
No. 2
No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Vell, or Richard
24. Carlson or Proctor
27. Forsster-Arnold
30. Pepban
33. Knoblock or Lee
36. Schoedel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or P
48. Grabau or O
51. M
54. Robinson, M, or Colman
57. Burley
60. Other

Column 55 - Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth Feet From	Depth Feet To	Material
0	20	Sand with yellow clay
20	25	Carb. shale
25	51	Blue clay
51	55	Coal
55	80	Clay
80	117	Grey shale with hard rock - 2' at 80'
117	214	Grey shale
214	236	Coal
236	285	Light clay
285	330	Coarse sand
330	390	Light clay with sandstone at 350

DRILL LOG (cont.)

Depth Feet From	Depth Feet To	Material

UNCODED INVENTORY DATA

Surface owner James Daly
Address Gillette, Wyoming

Driller's name Floyd Higgins
Address 721 N. Custer Ave., Miles City, Mont.

Log data: Drillers [X] Gamma [X] ER-SP [ ] Density [ ] Other

53

Cored Intervals: Depth / Lab sample #
215' to 220' — 580
to
to
to
to
to
to
to

Lithologic samples washed out
How stored
Hydrologic data

REMARKS

MONTANA BUREAU OF MINES AND GEOLOGY

COAL BED DATA

COAL DIVISION

Recorded by: Woods Source of data: MBMG Date: Sept. 13, 1973 Map: Pitch Draw (Croton 4 NE) Photo No.:

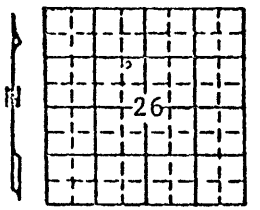
A	STATE	COUNTY	LATITUDE DEG.	LAT MIN.	LAT SEC.	LAT N.	LONGITUDE DEG.	LONG MIN.	LONG SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
	1 2	3 4	5 6	7 8	9 10	11	12 13 14	15 16	17 18	19	20	21 22 23	24 25 26	27 28	29 30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70
	W	Y C	A									5 4 N	7 3 W	2 6	b d a b	U S - 7 3 4 6	2	4 2 0 5						2 4 0	3	F	P	

Column 3-4 - County
See Appendix A3-4 for Code

Column 19 - Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



1780'FNL 3150'FEL

Column 53-54 - Bed Number
1. Roland
3. Smith
6. Powers
9. Anderson
12. Dolts
No. 1
No. 2
No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Procter
27. Brewster-Arnold
30. Pepham
33. Encblock or Lee
36. Schoedel
39. Rosebud or 9
42. Holt or McKay
45. Stocker Creek or P
48. Graham or O
51. M
54. Robinson, M, or Colman
57. Burley
60. Other

Column 55 - Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth in Feet From	To	Material
0	10	Yellow clay
10	73	Blue clay
73	108	Sandy blue shale
108	114	Sandstone
114	152	Blue sand
152	154	Brown shale
154	165	Coal
165	172	Clay
172	178	Coal
178	181	Clay
181	219	Coal
219	240	Blue shale

DRILL LOG (cont.)

Depth in Feet From	To	Material

UNCODED INVENTORY DATA

Surface owner: Lillie Williams
Address: Gillette, Wyoming ?

Driller's name: Allan Drane
Address: Broadus, Montana

Log data: Drillers [X] Gamma [X] ER-SP [ ] 54
Density [ ] Other

Cored Intervals: Depth — Lab sample #
to
to
to
to
to
to
to

Lithologic samples: at 10' intervals below 20'
How stored: paper envelopes

Hydrologic data:

REMARKS

Lost circulation.

MONTANA BUREAU OF MINES AND GEOLOGY

COAL BED DATA

COAL DIVISION

Recorded by: Woods Source of data: MBMG Date: Sept. 12, 1973 Mine: Oriva (Echeta 1 SW) Photo No.:

A

STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	18 19	20	21 22 23	24 25 26	27 28	29 30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70
W Y	C A										5 1 N	7 4 W	3 4	b b a d	U S - 7 3 4 7	2	4 3 7 8						2 6 0	3	F	P	

Column 3-4 - County

See Appendix A3-4 for Code

Column 19 - Sequential Number

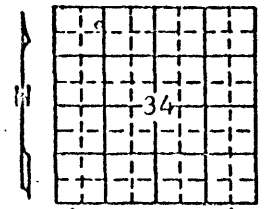
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long

1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.

1. Transit or level
2. Altimeter
3. Topographic map 7½° quadrangle
4. Other



500'FNL 4200'FEL

Column 53-54 - Bed Number

1. Roland
3. Smith
6. Powers
9. Anderson
12. Dietz
   No. 1
   No. 2
   No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Popham
33. Knoblock or Lee
36. Schoedel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or F
48. Graham or O
51. M
54. Robinson, M, or Colman
57. Furley
60. Other

Column 55 - Correlation Interval

Letter designation used to supplement bed number to index stratigraphic position of other coal beds:

A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth

0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 - Ownership of Coal

F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner

F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth Feet From	Depth Feet To	Material
0	20	Sand and yellow clay and gravel
20	35	Yellow clay
35	132	Grey shale
132	134	Coal
134	154	Grey shale
154	172	Coal
172	176	Rock
176	181	Coal
181	210	Sand
210	260	Clay

DRILL LOG (cont.)

Depth Feet From	Depth Feet To	Material

UNCODED INVENTORY DATA

Surface owner: Fred Floyd

Address: Gillette, Wyoming

Driller's name: Floyd Higgins

Address: 721 N. Custer Ave., Miles City, Mont.

Log data: Drillers [X] Gamma [X] ER-SP [X] 55
Density [ ] Other

Cored Intervals: Depth Lab sample #

to
to
to
to
to
to
to

Lithologic samples: at 10' intervals below 20'

How stored: paper envelopes

Hydrologic data:

REMARKS

MONTANA BUREAU OF MINES AND GEOLOGY

COAL BED DATA

COAL DIVISION

Recorded by: Woods Source of data: MBMG Date: Sept. 12, 1973 Map: Rawhide School (Echeta 1 NE) Photo No.:

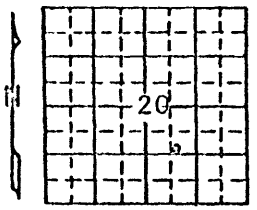
A	STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
	1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	18	19	20	21 22 23	24 25 26	27 28	29 30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70
	WY	CA											51N	72W	20	dbdc	USGS	4	4260						3400	3	F	P	

Column 3-4 - County
See Appendix A3-4 for Code

Column 19 - Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



1500'FSL 1900'FEL

Column 51-54 - Bed Number
1. Roland
3. Smith
6. Powers
9. Anderson
12. Dietz
No. 1
No. 2
No. 3
15. Canyon
18. McCarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Popham
33. Knoblock or Lee
36. Schoedel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or P
48. Graham or O
51. M
54. Robinson, N, or Colman
57. Burley
60. Other

Column 55 - Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth in Feet From	To	Material
0	85	Coarse sand
85	98	Grey shale
98	145	Coarse sand
145	155	Clay
155	158	Carb. shale
158	175	Clay
175	214	Coal
214	222	Clay
222	312	Coal
312	340	Light shale
340		Hard rock

DRILL LOG (cont.)

Depth in Feet From	To	Material

UNCODED INVENTORY DATA

Surface owner E. E. Hladky
Address Gillette, Wyoming

Driller's name Floyd Higgins
Address 721 N. Custer Ave., Miles City, Mont.

Log data: Drillers [X] Gamma [X] ER-SP [X] 56
Density [ ] Other

Cored Intervals: Depth Lab sample #
to
to
to
to
to
to
to

Lithologic samples at 10' intervals below 20'
How stored paper envelopes

Hydrologic data

REMARKS

MONTANA BUREAU OF MINES AND GEOLOGY

COAL BED DATA

COAL DIVISION

Recorded by: Woods Source of data: MBMG Date: October 2, 1973 Map: Oriva (Echeta 1 SW) Photo No.:

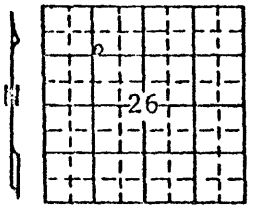
A	STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
	1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	18 19	20	21 22 23	24 25 26	27 28	29 30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70
	WY	CA										51N	73W	26	bacc	US-7350	4	4333	1111	1316				1170	3	F	P	

Column 1-4 - County
See Appendix A3-4 for Code

Column 19 - Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



1350'FNL 1820'FWL

Column 53-54 - Bed Number
1. Poland
3. Smith
6. Powers
9. Anderson
12. Delts
No. 1
No. 2
No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Popham
33. Knoblock or Lee
36. Schoedel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or P
48. Graham or O
51. M
54. Robinson, M, or Colman
57. Burley
60. Other

Column 55 - Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth Feet From	Depth Feet To	Material
0	32	Sandy yellow clay
32	93	Yellow sand
93	111	Blue shale
111	136	Coal
136	170	Blue shale

DRILL LOG (cont.)

Depth Feet From	Depth Feet To	Material

UNCODED INVENTORY DATA

Surface owner James Daly
Address Gillette, Wyoming

Driller's name Allan Drane
Address Broadus, Montana

Log data: Drillers [X] Gamma [ ] ER-SP [ ] 57
Density [ ] Other

Cored Intervals: Depth Lab sample #
to
to
to
to
to
to
to

Lithologic samples no samples
How stored
Hydrologic data

REMARKS

Drilled with air, hit water, hole caved, no logs.

MONTANA BUREAU OF MINES AND GEOLOGY

COAL BED DATA

COAL DIVISION

Recorded by: Woods Source of data: MBMG Date: Sept. 12, 1973 Map: Calf Creek (Croton 4 SE) Photo No.:

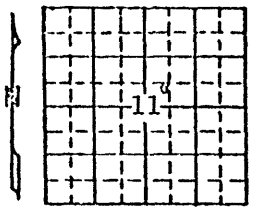
A	STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
	1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	19	20	21 22 23	24 25 26	27 28	29 30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70
	W Y	C A										5 2 N	7 3 W	1 1	a c c a	U S - 7 3 5 1	2	4 2 2 1						3 7 5	3	F	P	

Column 1-4 - County
See Appendix A3-4 for Code

Column 19 - Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½° quadrangle
4. Other



2150'FNL 2360'FEL

Column 53-54 - Bed Number
1. Roland
3. Smith
6. Powers
9. Anderson
12. Delta
No. 1
No. 2
No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Popham
33. Knoblock or Lee
36. Schoedel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or P
48. Graham or O
51. M
54. Robinson, M, or Calman
57. Burley
60. Other

Column 55 - Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth in Feet From	Depth in Feet To	Material
0	30	Sand & yellow clay
30	38	Coal
38	59	Light shale
59	62	Coal
62	92	Sand, rock
92	190	Light clay; 4' rock at 161'
190	236	Light shale; 4' rock at 206'
236	250	Coal
250	260	Light clay
260	262	Coal
262	264	Clay
264	300	Coal
300	320	Light clay
320	323	Rock
323	345	Light clay
345	347	Rock
347	362	Light clay
362	365	Rock
365	375	Light clay

DRILL LOG (cont.)

Depth in Feet From	Depth in Feet To	Material

UNCODED INVENTORY DATA

Surface owner: Dean Hall
Address: Gillette, Wyoming

Driller's name: Floyd Higgins
Address: 721 N. Custer Ave., Miles City, Mont.

Log data: Drillers [X] Gamma [X] ER-SP [ ] Density [ ] Other

58

Cored intervals: Depth / Lab sample #
____ to ____
____ to ____
____ to ____
____ to ____
____ to ____
____ to ____
____ to ____

Lithologic samples: at 10' intervals & below 20'
How stored: paper envelopes

Hydrologic data:

REMARKS

Lost circulation.

MONTANA BUREAU OF MINES AND GEOLOGY

COAL BED DATA

COAL DIVISION

Recorded by: Woods Source of data: MBMG Date: Oct. 3, 1973 Map: The Cap (Rozet 3 NW) Photo No.:

A

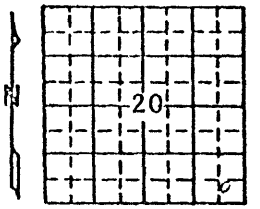
STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	18	19	20 21 22	23 24	25 26	27 28	29 30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70
W Y	C A										4 9 N	7 1 W	2 0	d d d b	U S - 7 3 5 2	4	4 7 1 5						4 7 0	3	F	P	

Column 3-4 - County
See Appendix A3-4 for Code

Column 19 - Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



640'FSL, 640'FEL

Column 51-54 - Bed Number
1. Roland
3. Smith
6. Powers
9. Anderson
12. Dietz
No. 1
No. 2
No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Popham
33. Knoblock or Lee
36. Schoedel
39. Rosebud or R
42. Holt or McKay
45. Stecker Creek or P
48. Graham or O
51. M
54. Robinson, M, or Colman
57. Burley
60. Other

Column 55 - Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth in Feet From	To	Material
0	80	Yellow sand
80	113	Blue sand
113	117	Coal
117	197	Blue sand
197	202	Coal and shale
202	354	Blue shale
354	412	Coal
412	414	Blue shale
414	431	Coal
431	444	Blue shale
444	449	Coal
449	470	Blue shale

DRILL LOG (cont.)

Depth in Feet From	To	Material

UNCODED INVENTORY DATA

Surface owner: Henry Wolff
Address: Gillette, Wyoming

Driller's name: Allan Drane
Address: Broadus, Montana

Log data: Drillers [X] Gamma [X] ER-SP [ ] Density [ ] Other

59

Cored intervals: Depth Lab sample #
_____ to _____ _____
_____ to _____ _____
_____ to _____ _____
_____ to _____ _____
_____ to _____ _____
_____ to _____ _____
_____ to _____ _____

Lithologic samples at 10' intervals below 40'.
How stored: cloth bags

Hydrologic data:

REMARKS

Started drilling with air, changed to water.
Drilled on oil well pad, same elev.

MONTANA BUREAU OF MINES AND GEOLOGY

COAL BED DATA

COAL DIVISION

Recorded by: Woods Source of data: MBMG Date: Sept. 14, 1973 Map: Appel Butte (Echeta 4 NE) Photo No.:

A

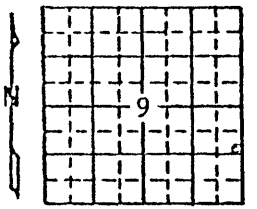
STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	18	19 20	21 22 23	24 25 26	27 28	29 30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70
WY	CA										48N	72W	9	dadd	USA-7353	2	4752	69	96			584	150	3	F	P	

Column 1-4 - County
See Appendix A3-4 for Code

Column 19 - Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



1500'FSL 300'FEL

Column 53-54 - Bed Number
1. Roland
3. Smith
6. Powers
9. Anderson
12. Dietz
Nos. 1
No. 2
No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Popham
33. Knoblock or Lee
36. Schoedel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or P
48. Graham or O
51. M
54. Robinson, M, or Colman
57. Burley
60. Other

Column 55 - Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

-586

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

DEPTH FEET From	DEPTH FEET To	Material
0	35	Yellow clay
35	69	Blue clay; hard rock at 40'
69	83	Coal
83	85	Rock
85	96	Coal
96	125	Light shale
125	150	Sand, rock

DRILL LOG (cont.)

DEPTH FEET From	DEPTH FEET To	Material

UNCODED INVENTORY DATA

Surface owner: Lenord Appel
Address: Gillette, Wyoming

Driller's name: Floyd Higgins
Address: 721 No. Custer Ave., Miles City, Mont.

Log data: Drillers [X] Gamma [X] ER-SP [X] Density [ ] Other

Cored Intervals: Depth / Lab sample #

70'	to	80'	584
80'	to	90'	585
90'	to	96'	586
	to		
	to		
	to		
	to		

Lithologic samples at 10' intervals below 20'
How stored: paper envelopes

Hydrologic data:

REMARKS

MONTANA BUREAU OF MINES AND GEOLOGY

COAL BED DATA

COAL DIVISION

Recorded by: Woods Source of data MBMG Date Oct. 4, 1973 Map Coyote Draw (Rozet 3 NE) Photo No.

A

STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	19	20	21 22 23	24 25	26 27	28 29 30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70
W Y	C A										4 8 N	7 1 W	1 3	d b d b	U S - 7 3 5 4		4 5 5 8						1 4 1 0		F	P	

Column 1-4 - County

See Appendix A3-4 for Code

Column 19 - Sequential Number

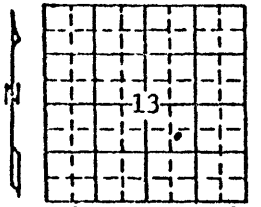
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long

1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.

1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



1700'FSL 1900'FEL

Column 41-54 - Bed Number

1. Roland
3. Smith
6. Powers
9. Anderson
12. Smith
   No. 1
   No. 2
   No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Popham
33. Knoblock or Lee
36. Schoedel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or F
48. Graham or G
51. M
54. Robinson, M, or Colman
57. Burley
60. Other

Column 55 - Correlation Interval

Letter designation used to supplement bed number to index stratigraphic position of other coal beds:

A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth

0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 - Ownership of Coal

F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner

F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth Feet From	Depth Feet To	Material
0	10	Sandy yellow clay
10	23	Blue clay
23	32	Coal
32	88	Blue clay
88	90	Coal
90	93	Blue clay
93	106	Coal
106	140	Blue shale

DRILL LOG (cont.)

Depth Feet From	Depth Feet To	Material

UNCODED INVENTORY DATA

Surface owner T. W. Czapla
Address Gillette, Wyoming

Driller's name Allan Drane
Address Broadus, Montana

Log data: Drillers [X] Gamma [X] ER-SP [ ] Density [ ] Other

Cored Intervals: Depth — Lab sample #

_____ to _____ _____
_____ to _____ _____
_____ to _____ _____
_____ to _____ _____
_____ to _____ _____
_____ to _____ _____
_____ to _____ _____

Lithologic samples none
How stored
Hydrologic data

REMARKS

MONTANA BUREAU OF MINES AND GEOLOGY

COAL BED DATA

COAL DIVISION

Recorded by: Woods Source of data: MBMG Date: Sept. 14, 1973 Map: Appel Butte (Echeta 4 NE) Photo No.:

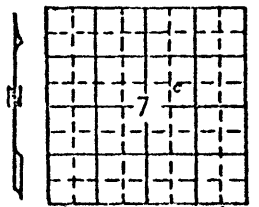
	STATE	COUNTY	LATITUDE DEG.	LAT MIN.	LAT SEC.	N.	LONGITUDE DEG.	LONG MIN.	LONG SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
	1 2	3 4	5 6	7 8	9 10	11	12 13 14	15 16	17 18	19	20	21 22 23	24 25 26	27 28	29 30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70
A	W	Y	CA									4 8 N	7 2 W	7	a c d b	U S - 7 3 5 5	2	4 6 4 6	2 4	5 1			5 8 7	9 0	3	F	P	

Column 3-4 - County
See Appendix A3-4 for Code

Column 19 - Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



Column 53-54 - Bed Number
1. Roland
3. Smith
6. Powers
9. Anderson
12. Dietz
No. 1
No. 2
No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Popham
33. Knoblock or Lee
36. Schoedel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or P
48. Graham or O
51. M
54. Robinson, M, or Colman
57. Burley
60. Other

Column 55 - Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

-589

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth From	Depth To	Material
0	24	Yellow clay and variegated shales
24	51	Coal
51	90	Light shale

DRILL LOG (cont.)

Depth From	Depth To	Material

UNCODED INVENTORY DATA

Surface owner: Lenord Appel
Address: Gillette, Wyoming

Driller's name: Floyd Higgins
Address: 721 N. Custer Ave., Miles City, Mont.

Log data: Drillers [X] Gamma [X] ER-SP [X] 62
Density [ ] Other

Cored intervals: Depth / Lab sample #

26'	to	36'	587
36'	to	46'	588
46'	to	51'	589
	to		
	to		
	to		
	to		

Lithologic samples: at 10' intervals below 20'
How stored: paper envelopes

Hydrologic data:

REMARKS

that were cored, chemical analyses of the ash, and trace-element analyses of the coals. A geophysical log from a water well drilled in the area is also included. Proximate and chemical analyses of ten samples and some of the trace-element analyses were not completed and are not included in this report.

The location of a drill hole within a section is identified on the logs and data sheets by a letter-designated tract system. Each section is subdivided into four quadrants, with the northeast quadrant designated as "a" and continuing counter-clockwise to "d." Each quadrant is then subdivided into four equal parts with a similar letter designation. This is repeated until a section is subdivided into 256 units. Using this system the largest subdivision in a section is listed first. For example, a tract designation of "abcd" would be located in the SE¼SW¼NW¼NE¼ of the section.

Fieldwork was carried out by Robert E. Matson, Chief, Coal Division, assisted by John W. Blumer, geological engineer, and Miller Hansen, geologist, Montana Bureau of Mines and Geology, Butte, Mont. Further assistance was provided by Mel Granberg, student assistant from Montana College of Mineral Science and Technology, and Eldon Woods, technician, Montana Bureau of Mines and Geology. Coordination and technical guidance were provided by Robert E. Matson, Montana Bureau of Mines and Geology, and Elmer M. Schell, U.S. Geological Survey, Casper, Wyo.

Laurence A. Wegelin, chemist in charge of coal analysis, Montana Bureau of Mines and Geology, Butte, Mont., performed the analytical work on the coal cores to obtain the proximate analyses, Btu values, and sulfur forms. All methods used are in accordance with the American Society for

Testing and Materials, Laboratory Sampling and Analysis of Coal and Coke (1967), and U.S. Bureau of Mines (1967) methods of analyzing and testing coal and coke.

The chemical analyses on the ash and the trace-element analyses were made on split-samples of the coal cores at the U.S. Geological Survey laboratories, Denver, Colo. The analysts were P. J. Aruscavage, Ardith Bartel, L. A. Bradley, E. J. Fennelly, Johnnie Gardner, W. D. Goss, J. C. Hamilton, A. W. Haubert, Claude Huffman, Jr., V. M. Merritt, H. T. Millard, Jr., John Moreland, R. L. Rahill, V. E. Shaw, J. A. Thomas, J. S. Wahlberg, and R. A. Zielinski. Vernon E. Swanson and Claude Huffman, Jr., coordinated this part of the analytical study. The methods used to obtain the Geological Survey's chemical analyses on trace elements are reviewed in a report by Swanson (1972); queries on the methods may be directed to either Claude Huffman, Jr., or Vernon E. Swanson, U.S. Geological Survey, Building 25, Federal Center, Lakewood, Colo., 80225.

MONTANA BUREAU OF MINES AND GEOLOGY

COAL BED DATA

COAL DIVISION

Recorded by Granberg Source of data MBMG Date June 21, 1973 Map (Echeta 1 SE) Gillette West Photo No.

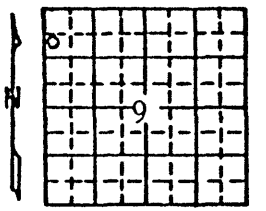
A	STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
	1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	18 19	20	21 22 23	24 25 26	27 28	29 30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70
	W Y	C A										5 0 N	7 2 W	0 9	b b c b	U S - 7 3 1 1	1	4 3 9 5	2 2 4	2 9 3				3 5 6	3	F	P	

Column 1-4 - County
See Appendix A3-4 for Code

Column 19 - Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



100' FWL 850' FNL

Column 53-54 - Bed Number
1. Roland
3. Smith
6. Powers
9. Anderson
12. Dolts
No. 1
No. 2
No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Procter
27. Brewster-Arnold
30. Popham
33. Knoblock or Lee
36. Schoedel
39. Rosebud or 8
42. Holt or McKay
45. Stocker Creek or P
48. Graham or O
51. M
54. Robinson, M, or Colson
57. Burley
60. Other

Column 55 - Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

DEPTH IN FEET From	To	Material
0	30	Coarse Sand
30	31	Sandstone
31	56	Clay w/coal stks
56	85	Sand Clay & coal stks
85	122	Clay w/ coal stks
122	190	Gray Shale
190	191	Hard Rock (siltstone)
191	224	Rock w/coal Stks.
224	260	Coal
260	262	Shale
262	286	Coal
286	288	Shale
288	293	Coal
293	328	Shale (Brown)
328	330	Hard Rock
330	356	Sandstone

DRILL LOG (cont.)

DEPTH IN FEET From	To	Material

UNCODED INVENTORY DATA

Surface owner James T. Fulkerson
Address Gillette, WYoming

Driller's name Floyd Higgins
Address 721 Custer Ave. Miles City, Mont.

Log data: Drillers [X] Gamma [X] ER-SP [ ]
Density [ ] Other

Cored Intervals: Depth — Lab sample #
_____ to _____ _____
_____ to _____ _____
_____ to _____ _____
_____ to _____ _____
_____ to _____ _____
_____ to _____ _____
_____ to _____ _____

Lithologic samples @ 10' after 20'
How stored paper envelopes
Hydrologic data

REMARKS

Circulation losses from 320-356. Used one sack Bentonite @ 30'; used hyseal, Fibertex and 4 sacks of quick gel from 320-355.

MONTANA BUREAU OF MINES AND GEOLOGY

COAL BED DATA

COAL DIVISION

Recorded by: Granberg Source of data: MBMG Date: June 22, 1973 Map: (Echeta 1 SE) Gillette West Photo No.:

A

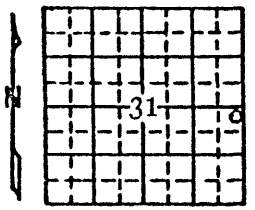
STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
WY	C A										51N	72W	31	daa a	US-7321	4	4359	3816	4977				500	3	RP		

Column 1-4 - County
See Appendix A3-4 for Code

Column 19 - Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



2400'FSL 100'FEL

Column 51-54 - Bed Number
1. Roland
3. Smith
6. Powers
9. Anderson
13. Dietz
No. 1
No. 2
No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Procter
27. Brewster-Arnold
30. Pophan
33. Knoblock or Lee
36. Schoedel
39. Rosebud or G
42. Holt or McKay
45. Stocker Creek or P
48. Cruhan or O
51. H
54. Robinson, M, or Colson
57. Burley
60. Other

Column 55 - Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. 50 ft. below
H. About 50 ft. above
K. 100 ft. below
C. About the same interval

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth Feet From	Depth Feet To	Material
0	42	Coarse Sand
42	45	Yellow Clay
45	242	Gray Sh. w/sand Stks.
242	243	Coal
243	250	Shale
250	252	Coal
252	328	Shale
328	330	Rock
330	386	Shale
386	429	Coal
429	430	Rock
430	434	Coal
434	436	Rock
436	442	Coal
442	444	Rock
444	497	Coal
497	500	Clay

DRILL LOG (cont.)

Depth Feet From	Depth Feet To	Material

UNCODED INVENTORY DATA

Surface owner: Fulkerson, James T.
Address: Gillette, Wyoming

Driller's name: Floyd Higgins
Address: 721 Custer Ave. Miles City, Mont.

Log data: Drillers [X] Gamma [X] ER-SP [X] S
Density [ ] Other

Cored Intervals: Depth — Lab sample #
to
to
to
to
to
to
to

Lithologic samples @ 10' int. below 20'
How stored: paper Envelopes

Hydrologic data

REMARKS

Used 2½ sacks quick gel, ½ sack Hyseal and ½ sack Fibertex @ 420; and 1 sack quick gel and ¼ sack hyseal @ 4.

MONTANA BUREAU OF MINES AND GEOLOGY

COAL BED DATA

COAL DIVISION

Recorded by: Granberg Source of data: MBMG Date: June 23, 1973 Map: (Echeta 1 NE) Rawhide School Photo No.:

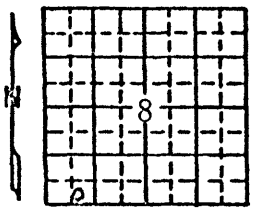
A	STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
	1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	18 19	20	21 22 23	24 25 26	27 28	29 30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70
	WY	CA										51N	72W	8	c c d c	US-7333	4	4270	1197	3413				3900	3	F	B	

Column 1-4 - Cos. Tr
See Appendix A3-4 for Code

Column 19 - Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



730'FWL 300'FSL

Column 51-54 - Bed Number
1. Roland
3. Smith
6. Powers
9. Anderson
12. Belts
No. 1
No. 2
No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Procter
27. Brewster-Arnold
30. Popham
33. Knoblock or Lee
36. Schoedel
39. Rosebud or 8
42. Holt or McKay
45. Stocker Creek or 9
48. Graham or 0
51. H
54. Robinson, M, or Colman
57. Burley
60. Other

Column 55 - Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth Feet From	Depth Feet To	Material
0	15	Sand
15	17	Coal
17	90	Shale
90	117	Sandstone
117	119	Siltstone
119	197	Shale & SS. Stks.
197	221	Coal
221	232	Shale
232	338	Coal
338	341	Rock
341	343	Coal
343	390	Rock

DRILL LOG (cont.)

Depth Feet From	Depth Feet To	Material

UNCODED INVENTORY DATA

Surface owner: Fred Wagenson
Address: Gillette, Wyoming

Driller's name: F. Higgins
Address: Miles City, Mont.

Log data: Drillers [X] Gamma [X] ER-SP [X]
Density [ ] Other

Cored Intervals: Depth Lab sample #
to
to
to
to
to
to
to

Lithologic samples: 10' intervals below 20'
How stored: paper sample sacks

Hydrologic data

REMARKS

MONTANA BUREAU OF MINES AND GEOLOGY

COAL BED DATA

COAL DIVISION

Recorded by: Granberg Source of data: MBMG Date: 6-25-73 (Echeta 1 NE) Rawhide School Photo No.

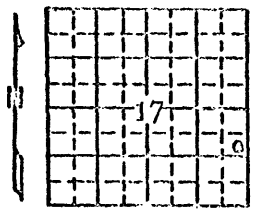
A	STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP C. BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	CONCRETE	SURFACE	GEOLOGIC CODE
	1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	18 19	20	21 22	23 24	25 26	27 28	29 30 31 32	33 34 35 36	37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70
	W	Y	C	A								5 1 N	7 2 W	1 7	a a d d	U S - 7 3 4	2	4 3 0 5	1 0 0	1 4 4			4 8 3	3 6 0	2		P	

Column 1-4 - County
See Appendix A3-4 for Code

Column 19 - Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



1550'FSL 220'FEL

Column 51-54 - Bed Number
1. Roland
3. Smith
6. Parot's
9. Anderson
12. Foltz
No. 1
No. 2
No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Popham
33. Knoblock or Lee
36. Schaefel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or P
48. Graham or O
51. N
54. Robinson, M, or Column
57. Furley
60. Other

Column 55 - Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of File Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 - Control of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Cover
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Horizon

DRILL LOG

Depth Feet From	Depth Feet To	Material
0	12	Sand
12	13	Siltstone
13	42	Variegated shale
42	43	Siltstone
43	100	Gray Shale
100	144	Coal
144	150	Carb. shale w/coal stk.
150	285	Clay
285	317	Sand
317	360	Shale

DRILL LOG (cont.)

Depth Feet From	Depth Feet To	Material

UNCODED INVENTORY DATA

Surface owner: Fred Wagensen
Address: Gillette Wyoming

Driller's name: Floyd Higgins
Address: Miles City, Montana

Log data: Drillers [X] Gamma [X] ER-SP [X]
Density [ ] Other

Cored Intervals: Depth — Lab sample #
101' to 115' — #483
to
to
to
to
to
to

Lithologic samples: 10' inter, beyond 20'
How stored: Paper sample Envelopes

Hydrologic data:

REMARKS

Lost circulation while coring at 126'. Sand about 60' down took water. Regained with loloss & hyseal and some quik-trol. Used 1 sack quik-gel. Lost circ. again at 240'; regained with loloss and hyseal.

MONTANA BUREAU OF MINES AND GEOLOGY

COAL BED DATA

COAL DIVISION

Recorded by: Gramberg Source of data: MBMG Date: 6-26-73 Map: (Echeta 1 NE) Rawhide School Photo No.:

A

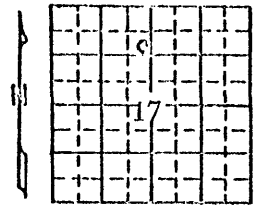
STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
1 2	3 4	5 6	7 8	9 10	11	12 13 14	15 16	17 18	19	20	21 22	23 24	25 26	27 28	29 30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70
MT	CA										51 N	72 W	17	baddd	USA 73151	2	4270	1 74	3 15				319	3	F	F	

Column 1-2 - County
See Appendix A3-4 for Code

Column 19 - Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



1050'FNL 2400'FWL

Column 21-31 - Bed Number
1. Roland
3. Smith
6. Forbes
9. Anderson
12. Dietz
No. 1
No. 2
No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Pophan
33. Knoblock or Lee
36. Schoedel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or P
48. Graham or O
51. N
54. Robinson, M, or Colman
57. Furley
60. Other

Column 55 - Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth From	Depth To	Material
0	12	Sand
12	30	Yellow Clay
30	77	Blue Clay
77	112	Sand
112	174	Gray Shale
174	193	Coal
193	198	Shale
198	315	Coal
315	319	Siltstone

DRILL LOG (cont.)

Depth From	Depth To	Material

UNCODED INVENTORY DATA

Surface owner: Fred Wageusen
Address: Gillette, Wyoming

Driller's name: Floyd Higgins
Address: 721 N. Custer Miles City, Mont.

Log data: Drillers [X] Gamma [X] ER-SP [X] ∞
Density [ ] Other

Cored Intervals: Depth — Lab sample #

to
to
to
to
to
to
to

Lithologic samples: 10' int. below 20'
How stored:

Hydrologic data: making 30 gpm from 60'-100' coarse sand.

REMARKS

Lost circ. in sand at 80'. Could not get probes below 205'; went back in and reamed with air. Could not get probes below 299'. Used ¼ sack hysaal and about 3 lbs. loloss trying to regain circ.

MONTANA BUREAU OF MINES AND GEOLOGY

COAL BED DATA

COAL DIVISION

Recorded by: Granberg Source of data: MBMG Date: 6-28-73 Map: Echeta 1 NE) Rawhide School Photo No.:

A

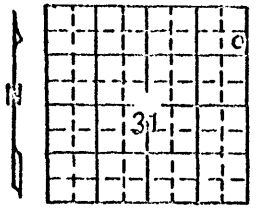
STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	18 19	20	21 22 23	24 25 26	27 28	29 30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70
W Y	C A					5 2 N	7 2 W	3 1	a ad a		U S - 7 3 6					2	4 2 5 0	1 9 0	T D T C				2 7 0	3	F	P	

Column 3rd - County
See Appendix A3-4 for Code

Column 19 - Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



840' FNL, 200' FEL

Column 21-24 - Bed Number
1. Roland
3. Smith
6. Pearl's
9. Anderson
12. Dietz
No. 1
No. 2
No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Pophan
33. Knoblock or Lee
36. Schendel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or P
48. Graham or O
51. M
54. Robinson, M, or Colson
57. Burley
60. Other

Column 55 - Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth Feet From	Depth Feet To	Material
0	62	Variegated shales
62	103	Blue Clay
103	105	Rock (Sandstone)
105	122	Clay
122	148	Sandstone
148	190	Shale & SS. Stks.
190	240	Coal
240	244	Clay
244	270	Coal

DRILL LOG (cont.)

Depth Feet From	Depth Feet To	Material

UNCODED INVENTORY DATA

Surface owner: Fred Wagensen
Address: Gillette Wyoming

Driller's name: Floyd Higgins
Address: 721 N. Custer Miles City, Mont.

Log data: Drillers [X] Gamma [X] ER-SP [X] O
Density [ ] Other

Cored Intervals: Depth — Lab sample #:
to
to
to
to
to
to
to

Lithologic samples: 10' int. below 20'
How stored: paper sample envelopes

Hydrologic data: about 30 gpm. @ 60'

REMARKS

Couldn't regain circulation on morning of 29th. Pulled pipe and logged; couldn't get below 220'; blew with air and could get probe to 240'.

MONTANA BUREAU OF MINES AND GEOLOGY

COAL BED DATA

COAL DIVISION

Recorded by: Granberg Source of data: MBMG Date: 6-29-73 Loc: (Echeta 1 NE) Rawhide School Photo No.:

A

STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	18	19	20	21 22 23	24 25 26	27 28	29 30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70
W Y	C A										5 2 N	7 2 W	3 1	a a d a	US - 7 3 6 A	2	4 2 5 0	1 9 1	3 2 7				3 4 5	3	F	P	

Column 1-4 - County

See Appendix A3-4 for Code

Column 19 - Sequential Number

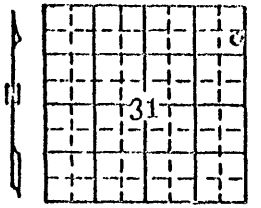
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long

1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.

1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



840'FNL 200'FEL

Column 53-54 - Bed Number

1. Roland
3. Smith
6. Fower's
9. Anderson
12. Deitz
   No. 1
   No. 2
   No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Pophen
33. Knoblock or Lee
36. Schoendel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or P
48. Graham or O
51. M
54. Robinson, M, or Colman
57. Burley
60. Other

Column 55 - Correlation Interval

Letter designation used to supplement bed number to index stratigraphic position of other coal beds:

A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth

0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 - Ownership of Coal

F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner

F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth Feet From	Depth Feet To	Material
0	62	Variegated shales
62	103	Blue Clay
103	105	Sandstone
105	122	Clay
122	148	Sandstone
148	191	Shale w/SS. Stk.
191	241	Coal
241	244	Clay
244	321	Coal
321	324	Clay
324	327	Coal
327	345	Rock

DRILL LOG (cont.)

Depth Feet From	Depth Feet To	Material

UNCODED INVENTORY DATA

Surface owner: Fred Wagensen
Address: Gillette, Wyoming

Driller's name: Floyd Higgins
Address: 721 N. Custer Miles City, Mont.

Log data: Drillers [X] Gamma [ ] ER-SP [ ] O
Density [ ] Other

Cored Intervals: Depth Lab sample #

_____ to _____
_____ to _____
_____ to _____
_____ to _____
_____ to _____
_____ to _____
_____ to _____

Lithologic samples: None taken
How stored:

Hydrologic data: approx.
30 gpm @ 60'

REMARKS

MONTANA BUREAU OF MINES AND GEOLOGY — COAL BED DATA — COAL DIVISION

Recorded by: Granberg — Source of data: M.B.M.G. — Date: 7-1-73 — Map: Calf Creek (Croton 4 SE) — Photo Co.:

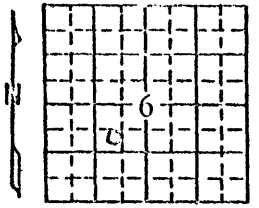
	STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
A	WY	C	A									52N	72W	6	c a r c a	US-737	4	4190						300	3	F	P	
	1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	18	19	20	21 22 23	24 25 26	27 28	29 30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70

Colm 3-4 - County
See Appendix A3-4 for Code

Column 19 - Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



1700'FSL 1800'FWL

Column 51-51 - Bed Number
1. Roland
3. Swith
6. Powers
9. Anderson
12. Smith
No. 1
No. 2
No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Pephen
33. Knoblock or Lee
36. Schoedel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or P
48. Graham or O
51. M
54. Robinson, M, or Colman
57. Furley
60. Other

Column 55 - Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth (Feet) From	To	Material
0	24	Topsoil & Gumbo
24	33	Coal
33	43	Sand
43	78	Coal
78	100	Clay
100	226	Shale
226	295	Coal
295	300	Sand

DRILL LOG (cont.)

Depth (Feet) From	To	Material

UNCODED INVENTORY DATA

Surface owner: Grace McGee
Address: Gillette, Wyoming

Driller's name: Floyd Higgins
Address: 721 N. Custer Miles City, Mont.

Log data: Drillers [X] Gamma [X] ER-SP [ ] =
Density [ ] Other

Cored Intervals: Depth — Lab sample #
to
to
to
to
to
to
to

Lithologic samples: 10' int. below 20'
How stored: paper sample envelopes

Hydrologic data: approx. 10+ g.p.m. at 15'

REMARKS

Lost circulation at 300'.

MONTANA BUREAU OF MINES AND GEOLOGY

COAL BED DATA

COAL DIVISION

Recorded by: Granberg Source of data: M.B.M.G. Date: 7-2-73 Map: Calf Creek (Croton 4 SE) Photo No.:

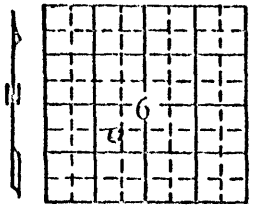
A	STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEC. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
	1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	18 19	20	21 22 23	24 25 26	27 28	29 30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	24	65	66	67 69 69 70
	W Y	C A										5 2 N	7 2 W	6	c a c a	U S - 7 3 7 C	4	4 1 9 0					4 8 4	3 0 0	3	F	P	

Column 3-4 - County
See Appendix A3-4 for Code

Column 19 - Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½" quadrangle
4. Other



Column 53-54 - Bed Number
1. Roland
3. Smith
6. Power's
9. Anderson
12. Dietz
   No. 1
   No. 2
   No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Popham
33. Knoblock or Loe
36. Schoedel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or P
48. Graham or O
51. N
54. Robinson, M, or Colman
57. Burley
60. Other

Column 55 - Correlation Interval — 486
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth From	Depth To	Material
0	24	Topsoil & Gumbo
24	33	Coal
33	43	Sand
43	80	Coal
80	100	Clay
100	226	Shale
226	295	Coal
295	300	Sand
		Lost Circulation

DRILL LOG (cont.)

Depth From	Depth To	Material

UNCODED INVENTORY DATA

Surface owner: Grace McGee
Address: Gillette Wyoming

Driller's name: Floyd Higgins
Address: 721 N. Custer Miles City, Mont.

Log data: Drillers [X] Gamma [ ] ER-SP [ ] 12
Density [ ] Other

Cored Intervals: Depth — Lab sample #

25'	to	32'	484
43'	to	50'	485
50'	to	65'	486
	to		
	to		
	to		
	to		

Lithologic samples: None
How stored:

Hydrologic data:

REMARKS

MONTANA BUREAU OF MINES AND GEOLOGY

COAL BED DATA

COAL DIVISION

Recorded by Granberg Source of data M.G.M.G. Date 7-0-73 Map (Croton 4 SE) Calf Creek Photo No.

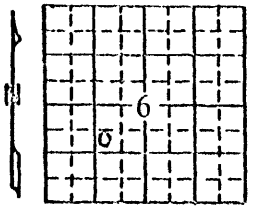
	STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
A	WY	CA										52N	72W	6	cacb	US-7381	4	4192					487	305	4	F	P	
	1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	19	20	21 22 23	24 25	26	27 28	29 30 31 32	33 34 35 36 37 38 39	10	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70

Column 3-4 - County
See Appendix A3-4 for Code

Column 19 - Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½" quadrangle
4. Other



1600' FWL 1700' FSL

Column 53-54 - Bed Number
1. Roland
3. Smith
6. Powers
9. Anderson
12. Dietz
No. 1
No. 2
No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Popham
33. Knoblock or Lee
36. Schoedel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or P
48. Graham or O
51. N
54. Robinson, M, or Colman
57. Farley
60. Other

Column 55 - Correlation Interval -488
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth Feet From	Depth Feet To	Material
0	20	Clay
20	30	Blue Clay
30	40	Coal
40	49	Brown Shale
49	84	Coal
84	165	Clay
165	229	Fine Sand
229	286	Coal
286	305	Clay

DRILL LOG (cont.)

Depth Feet From	Depth Feet To	Material

UNCODED INVENTORY DATA

Surface owner Grace McGee
Address Gillette, Wyoming

Driller's name Floyd Higgins
Address 721 N. Custer Miles City, Mont.

Log data: Drillers [X] Gamma [X] ER-SP [ ] Density [ ] Other

Cored Intervals: Depth — Lab sample #

64' to 74' — 487
74' to 84' — 488
to
to
to
to
to

Lithologic samples 10' int. below 20'
How stored paper sample envelope

Hydrologic data

REMARKS

Used ½ lb. loloss and 3/4 lb. cellex at surface. Drilled last 15' blind attempting to foam.

MONTANA BUREAU OF MINES AND GEOLOGY

COAL BED DATA

COAL DIVISION

Recorded by Granberg Source of data MBMG Date July 11, 1973 Mine Rawhide School (Echeta 1 NE) Photo No.

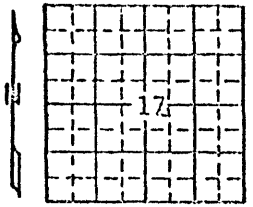
A	STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
	1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	18 19	20	21 22	23 24	25 26	27 28	29 30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70
	W	Y	C	A			1					5	1 N	7 2 W	1 7	d b b a	U S - 7 3 9	2	4 3 0 6	1 2 2	1 6 5			4 8 9	4 5 0	3	F	P	

Column 3-4 - County
See Appendix A3-4 for Code

Column 19 - Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



2620'FSL 2000'FEL

Column 53-54 - Bed Number
1. Boland
3. Smith
6. Powers
9. Anderson
12. Baits
No. 1
No. 2
No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Pophom
33. Knoblock or Lee
36. Schoedel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or P
48. Graham or O
51. M
54. Robinson, M, or Coleman
57. Burley
60. Other

Column 55 - Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth in Feet From	To	Material
0	15	Gray clay
15	25	Yellow sand
25	32	Clay
32	40	Carb. shale
40	45	Blue clay
45	122	Gray shale with sandstone streak
122	165	Coal
165	225	Clay
225	230	Coal
230	450	Shale

DRILL LOG (cont.)

Depth in Feet From	To	Material

UNCODED INVENTORY DATA

Surface owner Fred Wagensen
Address Gillette, Wyoming

Driller's name Floyd Higgins
Address 721 N. Custer, Miles City, Montana

Log data: Drillers [X] Gamma [X] ER-SP [X] Density [ ] Other

Cored Intervals: Depth 128' to 133' Lab sample # 489
to
to
to
to
to
to
to

Lithologic samples 10' int. below 20'
How stored paper sample envelopes

Hydrologic data sand at about 50-60' making approximately 20 GPM.

REMARKS

Used 1 sack quik trol with ½ lb. loloss to core. Cored 128-133 with water. Lost circ. at 133. Could not regain it. Drilled 133-450 with air and foam. Used loloss and hy-seal trying to regain circulation.

MONTANA BUREAU OF MINES AND GEOLOGY

COAL BED DATA

COAL DIVISION

Recorded by: Granberg Source of data: MBMG Date: July 12, 1973 Map: Rawhide School (Echeta 1 NE) Photo No.:

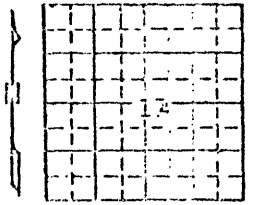
	STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
A	WY	C A										51N	72W	17	dbba	US-7390	C	2430	122	165			490	165	4	F	P	

Column 1-4 - County
See Appendix A3-4 for Code

Column 19 - Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½" quadrangle
4. Other



2620'FSL 2200' FEL

Column 53-54 - Bed Number
1. Roland
3. Smith
6. Dovey's
9. Anderson
12. Dietz
Fo. 1
Fo. 2
Fo. 3
15. Canyon
18. Monarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Forbes
33. Knoblock or Lee
36. Schoedel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or P
49. Graham or O
51. M
54. Robinson, M, or Colson
57. Burley
60. Other

Column 55 - Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Pole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

-494

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

From	To	Material
0	15	Clay
15	25	Yellow sand
25	32	Clay
32	40	Carb. shale
40	45	Blue clay
45	122	Gray shale with sandstone st[illegible]
122	165	Coal

DRILL LOG (cont.)

From	To	Material

UNCODED INVENTORY DATA

Surface owner: Fred Wagensen
Address: Gillette, Wyoming

Driller's name: Floyd Higgins
Address: 721 N. Custer, Miles City, Montana

Log data: Drillers [X] Gamma [ ] ER-SP [ ] 15
Density [ ] Other

Cored intervals: Depth / Lab sample #

126'	to	131'	490
135'	to	144'	491
144'	to	154'	492
154'	to	163'	493
163'	to	165'	494
	to		
	to		

Lithologic samples
How stored
Hydrologic data

REMARKS

Used ½ sack quik gel at surface. Used 1 sack quik trol to core. Cored 126' to 131' with water. Lost circulation at 131'. Regained circulation with 1 sack quik trol and hyseal; cored 131' to 165' with air and foam injection

MONTANA BUREAU OF MINES AND GEOLOGY — COAL BED DATA — COAL DIVISION

Recorded by: Blumer Source of data: MBMG Date: July 17, 1973 Loc: Kicken Creek (Rozet 3 SE) Photo No.:

A

STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	18 19	20	21 22 23	24 25	26 27	28 29 30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70
W Y	C A										4 7 N	7 0 W	3 2	d d c a	U S - 7 3 1 0	2	4 6 6 4	8 5	1 2 0			4 9 5	1 3 8	3	F	P	

Column 3-4 - County
See Appendix A3-4 for Code

Column 19 - Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Nearest 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other

32

470'FSL, 950' FEL

Column 33-34 - Bed Number
1. Poland
3. Smith
6. Powers
9. Anderson
12. Dietz
No. 1
No. 2
No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Procter
27. Brewster-Arnold
30. Popham
33. Knoblock or Lee
36. Schoedel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or P
48. Graham or O
51. M
54. Robinson, M, or Colman
57. Burley
60. Other

Column 55 - Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

-498

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth Drilled From	Depth Drilled To	Material
0	17	Sand
17	85	Clay
85	109	Coal
109	112	Clay
112	120	Coal
120	135	White Shale
135	138	Siltstone

DRILL LOG (cont.)

Depth Drilled From	Depth Drilled To	Material

UNCODED INVENTORY DATA

Surface owner: Freda Dunlap
Address: Dry Creek Ranch, Deaver, Wyoming
(lessee)

Driller's name: Floyd Higgins
Address: 721 Custer, Miles City, Montana

Log data: Drillers [X] Gamma [X] ER-SP [ ] Density [ ] Other

Cored Intervals:

Depth			Lab sample #
85'	to	89'	495
89'	to	98'	496
98'	to	108'	497
115'	to	120'	498
	to		
	to		
	to		

Lithologic samples at 10' intervals below 20'
How stored: paper envelopes

Hydrologic data:

REMARKS

Drilled with air.

MONTANA BUREAU OF MINES AND GEOLOGY — COAL BED DATA — COAL DIVISION

Recorded by: Granberg Source of data: MBMG Date: July 15, 1973 Map: The Gap SW (Rozet 3 SW) Photo No.:

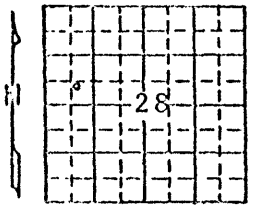
A	STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
	1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	18 19	20	21 22 23	24 25 26	27 28	29 30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70
	W Y	C A										4 7 N	7 1 W	2 8	b c d b	U S - 7 3 1 1	2	4 7 4 6	3 4 2	3 9 3			4 9 9	4 2 0	3	F	P	

Column 1-4 - County
See Appendix A3-4 for Code

Column 19 - Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



2030'FNL 850'FWL

Column 53-54 - Bed Number
1. Roland
3. Smith
6. Powers
9. Anderson
12. Dietz
No. 1
No. 2
No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Popham
33. Knoblock or Lee
36. Schoedel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or P
48. Graham or O
51. M
54. Robinson, M, or Colman
57. Burley
60. Other

Column 55 - Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth in Feet From	To	Material
0	6	Sand
6	22	Clay
22	26	Coal
26	44	Shale
44	45	Coal
45	107	Sandstone
107	196	Clay
196	206	Carb. shale
206	265	Clay
265	285	Clay with coal stks.
285	310	Clay
310	312	Coal
312	342	Clay
342	358	Coal
358	360	Shale
360	385	Coal
385	387	Shale
387	393	Coal
393	420	Sandstone

DRILL LOG (cont.)

Depth in Feet From	To	Material

UNCODED INVENTORY DATA

Surface owner: Glenn Hayden
Address: Gillette, Wyoming

Driller's name: Floyd Higgins
Address: 721 N. Custer, Miles City, Montana

Log data: Drillers [X] Gamma [X] ER-SP [ ] Density [ ] Other

Corod Intervals: Depth 24' to 26' — Lab sample # 499
to
to
to
to
to
to

Lithologic samples
How stored
Hydrologic data

REMARKS

Lost circulation at 349', drilled to 420' with foam and air.

MONTANA BUREAU OF MINES AND GEOLOGY — COAL BED DATA — COAL DIVISION

Recorded by: Granberg Source of data: MBMG Date: July 16, 1973 Map: The Gap SW (Rozet 3 SW) Photo No.:

A

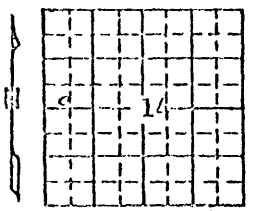
STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	18 19	20	21 22 23	24 25 26	27 28	29 30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70
W Y	C A										4 7 N	7 2 W	1 4	b c c d	U S - 7 3 1 2	4	4 6 6 7						3 6 7	3	F	P	

Column 3-4 – County
See Appendix A3-4 for Code

Column 19 – Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 – Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 – Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½" quadrangle
4. Other



2430'FNL 460'FWL

Column 31-34 – Bed Number
1. Roland
3. Smith
6. Peverly
9. Anderson
12. Dietz
No. 1
No. 2
No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Popham
33. Knoblock or Lee
36. Schoedel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or P
48. Graham or O
51. M
54. Robinson, M, or Colman
57. Burley
60. Other

Column 55 – Correlation Interval
Letter designation used to supplement bed number to indicate stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 – Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 – Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 – Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 – Geologic Code for Montana

DRILL LOG

Depth From	Depth To	Material
0	43	Coarse yellow sand
43	61	Gray clay
61	150	Shale
150	152	Coal
152	160	Shale
160	166	Coal
166	170	Shale
170	172	Coal
172	233	Shale
233	239	Coal
239	367	Shale

DRILL LOG (cont.)

Depth From	Depth To	Material

UNCODED INVENTORY DATA

Surface owner I. W. Lynde
Address Gillette, Wyoming

Driller's name Floyd Higgins
Address 721 N. Custer Ave., Miles City, Mont.

Log data: Drillers [X] Gamma [X] ER-SP [X] Density [ ] Other

Cored Intervals: Depth — Lab sample #
to
to
to
to
to
to
to

Lithologic samples at 10' intervals below 20'
How stored paper envelopes

Hydrologic data

REMARKS

MONTANA BUREAU OF MINES AND GEOLOGY — COAL BED DATA — COAL DIVISION

Recorded by: Granberg Source of data: MBMG Date: July 16, 1973 Misc.: The Gap SW (Rozet 3 SW) Photo No.:

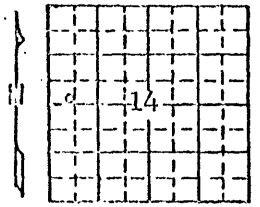
	STATE	COUNTY	LATITUDE DEG.	LAT MIN.	LAT SEC.	LAT N.	LONGITUDE DEG.	LONG MIN.	LONG SEC.	SEQ NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
A	1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	18	19	20 21 22	23 24	25 26	27 28	29 30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70
	W Y	C A										4 7 N	7 2 W	1 4	b c d	U S 7 3 1 2 C	4	4 6 6 7					5 0 0	2 4 0	3	F	P	

Column 1-4 – County
See Appendix A3-4 for Code

Column 19 – Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 – Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 – Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



2430'FNL 460'FWL

Column 53-54 – Bed Number
1. Roland
3. Smith
6. Powers
9. Anderson
12. Dietz
No. 1
No. 2
No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Proctor
27. Forster-Arnold
30. Popham
33. Knoblock or Lee
36. Schendel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or P
48. Graham or O
51. M
54. Robinson, M, or Colson
57. Burley
60. Other

Column 55 – Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 – Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

-503

Column 65 – Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 – Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 – Geologic Code for Montana

DRILL LOG

Depth From	Depth To	Material
0	43	Coarse yellow sand
43	61	Gray clay
61	63	Coal
63	150	Shale
150	153	Coal
153	160	Shale
160	167	Coal
167	169	Shale
169	173	Coal
173	233	Shale
233	240	Coal

DRILL LOG (cont.)

Depth From	Depth To	Material

UNCODED INVENTORY DATA

Surface owner I. W. Lynde
Address Gillette, Wyoming

Driller's name Floyd Higgins
Address 721 N. Custer Ave., Miles City, Mont.

Log data: Drillers [X] Gamma [ ] ER-SP [ ] Ω
Density [ ] Other

Cored Intervals: Depth			Lab sample #
61'	to	63'	500
160'	to	166'	501
169'	to	173'	502
233'	to	240'	503
	to		
	to		
	to		

Lithologic samples
How stored
Hydrologic data

REMARKS

MONTANA BUREAU OF MINES AND GEOLOGY — COAL BED DATA — COAL DIVISION

Recorded by: Granberg Source of data: MBMG Date: July 19, 1973 Map: The Gap SW (Rozet 3 SW) Photo No.:

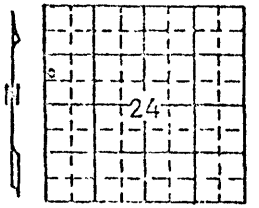
	STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
A	1 2	3 4	5 6	7 8	9 10	11	12 13 14	15 16	17 18	19	20	21 22 23	24 25 26	27 28	29 30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70
	W	Y	C A									4 8 N	7 2 W	2 4	b c b c	U S - 7 3 1 3	2	4 6 5 8	4 8 0	5 5 1				5 7 7	3	F	P	

Column 3-4 - County
See Appendix A3-4 for Code

Column 19 - Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



2000'FNL 300'FWL

Column 31-54 - Bed Number
1. Roland
3. Smith
6. Powers
9. Anderson
12. Dietz
No. 1
No. 2
No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Vell, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Popham
33. Knoblock or Lee
36. Schoedel
39. Rosebud or Q
42. Holt or McKay
45. Stecker Creek or F
48. Graham or O
51. M
54. Robinson, M, or Colman
57. Burley
60. Other

Column 55 - Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth From	Depth To	Material
0	17	Sand
17	55	Yellow clay
55	60	Coal
60	100	Gray shale
100	120	Fine sand
120	137	Coarse sand
137	150	Gray shale
150	152	Coal
152	154	Shale
154	160	Coal
160	260	Shale
260	263	Coal
263	480	Shale
480	557	Coal
557	577	Shale

DRILL LOG (cont.)

Depth From	Depth To	Material

UNCODED INVENTORY DATA

Surface owner: Wilma Gravenfelner
Address: Lessee - I.W. Lynde, Gillette, Wyo.

Driller's name: Floyd Higgins
Address: 721 No. Custer Ave., Miles City, Mont.

Log data: Drillers [X] Gamma [X] ER-SP [X] Density [ ] Other

Cored intervals: Depth — Lab sample #
_____ to _____
_____ to _____
_____ to _____
_____ to _____
_____ to _____
_____ to _____
_____ to _____

Lithologic samples at 10' intervals below 20'
How stored: paper envelopes

Hydrologic data

REMARKS

Lost circulation at 485', drilled with foam to 577'.

MONTANA BUREAU OF MINES AND GEOLOGY — COAL BED DATA — COAL DIVISION

Recorded by: Blumer Source of data: MBMG Date: July 25, 1973 Map: Scaper Reservoir (Echeta 4 SE) Photo No.:

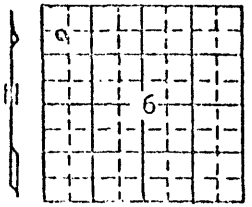
A	STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
	1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	18 19	20	21 22 23	24 25	26 27	28 29	30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70
	W	Y	C	A								4 7 N	7 2 W	6	b b c a	U S - 7 3 1 4	2	4 6 7 2	4 4	6 6				1 7 0	3	F	P	

Column 3-4 - County
See Appendix A3-4 for Code

Column 19 - Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



Column 53-54 - Bed Number
1. Roland
3. Smith
6. Dietz
9. Anderson
12. Dietz
No. 1
No. 2
No. 3
15. Canyon
18. Mosrch
21. Davis, Carney, Wall, or Richard
24. Carlson or Procter
27. Brewster-Arnold
30. Popham
33. Knoblock or Lee
36. Schoedel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or P
48. Graham or O
51. M
54. Robinson, M, or Colson
57. Burley
60. Other

Column 55 - Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth From	Depth To	Material
0	18	Sand & gumbo
18	20	Sandstone
20	32	Shale
32	35	Sandstone
35	44	Gray shale
44	66	Coal
66	100	Fine sand
100	137	Light shale
137	150	Clay
150	170	Gray shale

DRILL LOG (cont.)

Depth From	Depth To	Material

UNCODED INVENTORY DATA

Surface owner: I. W. Lynde
Address: Gillette, Wyoming

Driller's name: Floyd Higgins
Address: 721 N. Custer Ave., Miles City, Mont.

Log data: Drillers [X] Gamma [X] ER-SP [X] Density [ ] Other

Cored intervals: Depth — Lab sample #
to
to
to
to
to
to
to

Lithologic samples: 10' intervals below 20'
How stored: sample envelopes

Hydrologic data: small seep in coal

REMARKS

MONTANA BUREAU OF MINES AND GEOLOGY

COAL BED DATA

COAL DIVISION

Recorded by: Woods Source of data MBMG Date Oct. 4, 1973 Map Coyote Draw (Rozet 3 NE) Photo No.

A

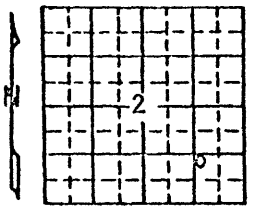
STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	18 19	20	21 22 23	24 25	26 27	28 29 30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70
W Y	C A										4 8 N	7 1 W	2	d d b b	U S - 7 3 5 6	2	4 6 3 8						2 1 5	3	F	P	

Column 3-4 - County
See Appendix A3-4 for Code

Column 19 - Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½° quadrangle
4. Other



950'FSL 1250'FEL

Column 51-54 - Bed Number
1. Roland
3. Smith
6. Powers
9. Anderson
12. Delta
No. 1
No. 2
No. 3
15. Canyon
18. Mocarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Pophan
33. Knoblock or Lee
36. Schoedel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or P
48. Graham or O
51. M
54. Robinson, M, or Colman
57. Burley
60. Other

Column 55 - Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth Feet From	Depth Feet To	Material
0	12	Brown clay
12	14	Coal
14	147	Blue shale
147	181	Coal
181	186	Blue shale
186	192	Coal
192	215	Blue shale

DRILL LOG (cont.)

Depth Feet From	Depth Feet To	Material

UNCODED INVENTORY DATA

Surface owner Melvin Clark
Address Gillette, Wyoming

Driller's name Allan Drane
Address Broadus, Montana

Log data: Drillers [X] Gamma [X] ER-SP [ ] Density [ ] Other

63

Cored intervals: Depth — Lab sample #
to
to
to
to
to
to
to

Lithologic samples no samples
How stored
Hydrologic data

REMARKS

MONTANA BUREAU OF MINES AND GEOLOGY

COAL BED DATA

COAL DIVISION

Recorded by: Woods Source of data: MBMG Date: Sept - 1973 Map: Appel Butte (Echeta 4 NE) Photo No.:

A

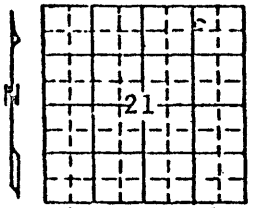
STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	18	19	20	21 22 23	24 25	26	27 28	29 30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70
W Y	C A											4 9 N	7 2 W	2 1	a a b c	U S - 7 3 5 7		2 4 6 8 4		1 1		3 6		5 9 0	9 0	3	F	P	

Column 3-4 - County
See Appendix A3-4 for Code

Column 19 - Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



Column 53-54 - Bed Number
1. Roland
3. Smith
6. Powers
9. Anderson
12. Dietz
Fe. 1
No. 2
No. 3
15. Canyon
18. McKinch
21. Davis, Carney, Wall, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Pepham
33. Knoblock or Lee
36. Schoedel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or P
48. Graham or O
51. M
54. Robinson, M, or Colman
57. Burley
60. Other

Column 55 - Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 64 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth Feet From	Depth Feet To	Material
0	11	Yellow clay
11	24	Coal
24	27	--
27	36	Coal
36	55	Clay
55	75	Sand, rock
75	90	Clay

DRILL LOG (cont.)

Depth Feet From	Depth Feet To	Material

UNCODED INVENTORY DATA

Surface owner: James Meserve
Address: Gillette, Wyoming

Driller's name: Floyd Higgins
Address: 721 N. Custer Ave., Miles City, Mont.

Log data: Drillers [X] Gamma [X] ER-SP [X] 64
Density [ ] Other

Cored intervals: Depth / Lab sample #
26' to 36' — 590
to
to
to
to
to
to
to

Lithologic samples: at 10' intervals below 20'
How stored: paper envelopes

Hydrologic data:

REMARKS

MONTANA BUREAU OF MINES AND GEOLOGY — COAL BED DATA — COAL DIVISION

Recorded by: Woods Source of data: MBMG Date: Oct. 7, 1973 Map: Coyote Draw (Rozet 3 NE) Photo No.:

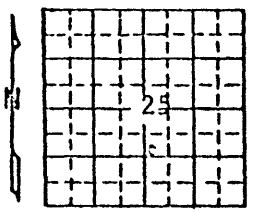
	STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
A	WY	CA										49N	71W	25	dbcc	US-7358	2	4635						180	3	F	P	

Column 3-4 – County
See Appendix A3-4 for Code

Column 19 – Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 – Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 – Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½° quadrangle
4. Other



1450'FSL 2240'FEL

Column 53-54 – Bed Number
1. Roland
3. Smith
6. Powers
9. Anderson
12. Delta
No. 1
No. 2
No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Pophas
33. Knoblock or Lee
36. Schoedel
39. Rosebud or O
42. Holt or McKay
45. Stocker Creek or P
48. Graham or O
51. M
54. Robinson, M, or Colman
57. Burley
60. Other

Column 55 – Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 – Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 – Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 – Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 – Geologic Code for Montana

DRILL LOG

Depth Feet From	Depth Feet To	Material
0	12	Blue shale
12	32	Yellow clay
32	46	Blue shale
46	66	Coal
66	73	Blue shale
73	75	Coal
75	86	Blue shale
86	90	Coal
90	101	Blue shale
101	102	Rock
102	105	Coal
105	126	Blue shale
126	129	Coal
129	136	Rock
136	142	Coal
142	180	Blue shale

DRILL LOG (cont.)

Depth Feet From	Depth Feet To	Material

UNCODED INVENTORY DATA

Surface owner: Paul Sherrard
Address: Gillette, Wyoming

Driller's name: Allan Drane
Address: Broadus, Montana

Log data: Drillers [X] Gamma [X] ER-SP [ ] 65
Density [ ] Other

Cored Intervals: Depth — Lab sample #
to
to
to
to
to
to
to

Lithologic samples: at 10' intervals below 10'
How stored: paper envelopes

Hydrologic data:

REMARKS

Drilled with air.

MONTANA BUREAU OF MINES AND GEOLOGY

COAL BED DATA

COAL DIVISION

Recorded by: Woods Source of data MBMG Date Sept. 25, 1973 Map The Gap (Rozet 3 NW) Photo No.

A

STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOG CODE
1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	18 19	20	21 22 23	24 25 26	27 28	29 30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69
W	Y C	A									4 9 N	7 2 W	2 6	d d d a	U S - 7 3 5 9	2	4 7 7 3	4 3	7 0			5 9 1	9 0	3	F	P	

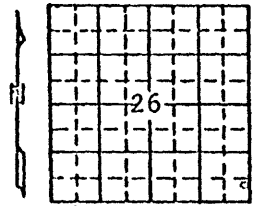
-593

Column 3-4 - County
See Appendix A3-4 for Code

Column 19 - Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½" quadrangle
4. Other



1250'FSL 150'FEL

Column 53-54 - Bed Number
1. Roland
3. Smith
6. Powers
9. Anderson
12. Daitz
No. 1
No. 2
No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Popham
33. Knoblock or Lee
36. Schoedel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or P
48. Graham or O
51. M
54. Robinson, N, or Colman
57. Burley
60. Other

Column 55 - Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

DEPTH FEET From	DEPTH FEET To	Material
0	25	Variegated shales
25	27	Carb. shale
27	43	Blue shale
43	57	Coal
57	59	Shale
59	70	Coal
70	90	Blue shale

DRILL LOG (cont.)

DEPTH FEET From	DEPTH FEET To	Material

UNCODED INVENTORY DATA

Surface owner Henry Wolff
Address Gillette, Wyoming

Driller's name Floyd Higgins
Address 721 N. Custer Ave., Miles City, Mont.

Log data: Drillers [X] Gamma [X] ER-SP [ ] Density [ ] Other

Cored Intervals:

Depth			Lab sample #
45'	to	55'	591
55'	to	65'	592
65'	to	70'	593
	to		
	to		
	to		
	to		

Lithologic samples no samples
How stored
Hydrologic data

REMARKS

Drilled with air.

MONTANA BUREAU OF MINES AND GEOLOGY

COAL BED DATA

COAL DIVISION

Recorded by: Woods Source of data VBMG Date Oct. 7, 1973 Map Fortin Draw (Rozet 2 SE) Photo No.

A	STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
	1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	18	19	20	21 22 23	24 25 26	27 28	29 30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70
	WY	CA											49N	71W	1	abda	US-7360	2	4663						3003		F	P	

Column 3-4 - County

See Appendix A3-4 for Code

Column 19 - Sequential Number

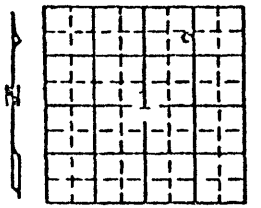
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long

1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.

1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



Column 51-54 - Bed Number

1. Roland
3. Smith
6. Powers
9. Anderson
12. Dietz
   No. 1
   No. 2
   No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Popham
33. Knoblock or Lee
36. Schoedel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or F
48. Graham or O
51. M
54. Robinson, M, or Colman
57. Burley
60. Other

Column 55 - Correlation Interval

Letter designation used to supplement bed number to index stratigraphic position of other coal beds:

A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth

0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 - Ownership of Coal

F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner

F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth in Feet From	To	Material
0	3	Yellow clay
3	17	Blue shale
17	20	Rock
20	50	Blue shale
50	57	Coal
57	65	Blue shale
65	72	Coal
72	76	Blue shale
76	82	Coal
82	84	Rock
84	86	Coal
86	100	Rock
100	106	Coal
106	124	Blue shale
124	127	Coal
127	169	Blue shale
169	173	Coal
173	177	Rock
177	210	Coal
210	300	Blue shale

DRILL LOG (cont.)

Depth in Feet From	To	Material

UNCODED INVENTORY DATA

Surface owner Vincent Thar
Address Gillette, Wyoming

Driller's name Allan Drane
Address Broadus, Montana

Log data: Drillers [X] Gamma [X] ER-SP [ ] 67
Density [ ] Other

Cored intervals: Depth — Lab sample #

_____ to _____ _____
_____ to _____ _____
_____ to _____ _____
_____ to _____ _____
_____ to _____ _____
_____ to _____ _____
_____ to _____ _____

Lithologic samples at 10' intervals below 10'
How stored paper envelopes
Hydrologic data

REMARKS

MONTANA BUREAU OF MINES AND GEOLOGY — COAL BED DATA — COAL DIVISION

Recorded by: Woods Source of data: MBMG Date: Sept. 25, 1973 Map: The Gap (Rozet 3 NW) Photo No.:

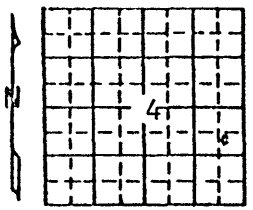
A	STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
	1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	18 19	20	21 22 23	24 25 26	27 28	29 30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70
	W Y	C A										4 8 N	7 1 W	4	d a d b	U S - 7 3 6 1	2	4 5 7 8	1 7 8	T D I C				2 1 5	3	F	P	

Column 3-4 – County
See Appendix A3-4 for Code

Column 19 – Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 – Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 – Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



1800'FSL 350'FEL

Column 53-54 – Bed Number
1. Roland
3. Smith
6. Powers
9. Anderson
12. Dolts
No. 1
No. 2
No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Popham
33. Knoblock or Lee
36. Schoedel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or P
48. Graham or O
51. M
54. Robinson, M, or Colman
57. Burley
60. Other

Column 55 – Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 – Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 – Ownership of Coal
F. Federal government
P. Private
S. State
R. Northern Pacific Railway Co.

Column 66 – Surface Owner
F. Federal government
P. Private
S. State
R. Northern Pacific Railway Co.

Column 67-70 – Geologic Code for Montana

DRILL LOG

Depth Feet From	Depth Feet To	Material
0	25	Variegated shales
25	27	Carb. shale
27	45	Blue clay
45	47	Grey shale
47	75	Light shale
75	77	Sand, rock
77	102	Light shale
102	104	Hard rock
104	115	Light shale
115	117	Rock
117	124	Light shale
124	126	Rock
125	135	Light shale
135	178	Sand, rock
178	215+	Coal
		TDIC

DRILL LOG (cont.)

Depth Feet From	Depth Feet To	Material

UNCODED INVENTORY DATA

Surface owner: James Cassidy
Address: Gillette, Wyoming

Driller's name: Floyd Higgins
Address: 721 N. Custer Ave., Miles City, Mont.

Log data: Drillers [X] Gamma [X] ER-SP [ ] 68
Density [ ] Other

Cored intervals: Depth — Lab sample #
to
to
to
to
to
to
to

Lithologic samples: at 10' intervals below 20'
How stored: cloth bags

Hydrologic data:

REMARKS

Water too far away to fight circulation loss at 215'.

MONTANA BUREAU OF MINES AND GEOLOGY

COAL BED DATA

COAL DIVISION

Recorded by: Woods Source of data: MBMG Date: Oct. 7, 1973 Map: Fortin Draw (Rozet 2 SE) Photo No.:

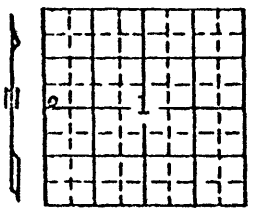
	STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
A	1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	18	19	20	21 22 23	24 25 26	27 28	29 30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70
	W Y	C A											5 0 N	7 1 W	1	b c c c	U S - 7 3 6 2	4	4 5 7 8						1 0 0	3	F	P	

Column 3-4 - County
See Appendix A3-4 for Code

Column 19 - Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½' quadrangle
4. Other



2450'FNL 490'FWL

Column 53-54 - Bed Number

1.	Roland	24.	Carlson or Proctor
3.	Smith	27.	Brewster-Arnold
6.	Powers	30.	Popham
9.	Anderson	33.	Knoblock or Lee
12.	Dolts	36.	Schoedel
	No. 1	39.	Rosebud or Q
	No. 2	42.	Holt or McKay
	No. 3	45.	Stocker Creek or P
15.	Canyon	48.	Graham or O
18.	Mocarch	51.	N
21.	Davis, Carney, Vall, or Richard	54.	Robinson, M, or Colman
		57.	Burley
		60.	Other

Column 55 - Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth in Feet From	To	Material
0	50	Blue clay
50	70	Red clay
70	100+	Red shale (clinker)

DRILL LOG (cont.)

Depth in Feet From	To	Material

UNCODED INVENTORY DATA

Surface owner Robert Heald
Address Gillette, Wyoming

Driller's name Allan Drane
Address Broadus, Montana

Log data: Drillers [X] Gamma [ ] ER-SP [ ] Density [ ] Other _____ 69

Cored intervals: Depth Lab sample #
_____ to _____
_____ to _____
_____ to _____
_____ to _____
_____ to _____
_____ to _____
_____ to _____

Lithologic samples no sample
How stored
Hydrologic data

REMARKS

Circulation problems, clinker hole, no log.

MONTANA BUREAU OF MINES AND GEOLOGY — COAL BED DATA — COAL DIVISION

Recorded by: Woods Source of data: MBMG Date: Oct. 7, 1973 Map: Fortin Draw (Rozet 2 SE) Photo No.:

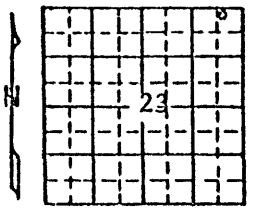
	STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
A	WY	CA										50N	71W	23	aaaab	US-73613	4	4654					594	180	3	F	F	

Column 3-4 - County
See Appendix A3-4 for Code

Column 19 - Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½° quadrangle
4. Other



100'FNL 650'FEL

Column 51-54 - Bed Number
1. Roland
3. Smith
6. Powers
9. Anderson
12. Dietz
No. 1
No. 2
No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Wall, or Richard
24. Carlson or Procter
27. Brewster-Arnold
30. Popham
33. Knoblock or Lee
36. Schoedel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or P
48. Graham or O
51. M
54. Robinson, M, or Colman
57. Burley
60. Other

Column 55 - Correlation Interval -598
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Ownership
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Wyoming

DRILL LOG

Depth Feet From	Depth Feet To	Material
0	32	Yellow sand
32	55	Yellow clay
55	88	Blue shale
88	90	Coal
90	93	Blue shale
93	96	Coal
96	109	Blue shale and coal streaks
109	112	Coal
112	118	Blue shale
118	138	Coal
138	145	Brown shale with coal stks.
145	160	Coal
160	164	Clay
164	180	Coal
		TDIC

DRILL LOG (cont.)

Depth Feet From	Depth Feet To	Material

UNCODED INVENTORY DATA

Surface owner: Eugene Record
Address: Gillette, Wyoming

Driller's name: Allan Drane
Address: Broadus, Montana

Log data: Drillers [X] Gamma [X] ER-SP [ ] 70
Density [ ] Other

Cored Intervals: Depth			Lab sample #
111'	to	121'	594
121'	to	129'	595
129'	to	139'	596
139'	to	144'	597
156'	to	160'	598
	to		
	to		

Lithologic samples: at 10' intervals below 10'
How stored: paper envelopes

Hydrologic data:

REMARKS

Drilled with air changed to mud. Bottom fell out could not get cuttings out of hole. Shale removed from core.

MONTANA BUREAU OF MINES AND GEOLOGY

COAL BED DATA

COAL DIVISION

Recorded by: Granberg Source of data: MBMG Date: Nov. 28, 1973 Map: Appel Butte (Echeta 4 NE) Photo No.:

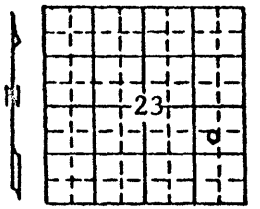
A	STATE	COUNTY	LATITUDE DEG.	LATITUDE MIN.	LATITUDE SEC.	LATITUDE N.	LONGITUDE DEG.	LONGITUDE MIN.	LONGITUDE SEC.	SEQ. NO.	ACCURACY	LOCATION BY TOWNSHIP AND RANGE T.	R.	SEC.	TRACT	DRILL HOLE NUMBER	ACCURACY	COLLAR ELEV.	DEPTH TO TOP OF BED	DEPTH TO BOTTOM OF BED	BED NO.	COR.	LAB SAMPLE NUMBER	TOTAL DEPTH	ACCURACY	OWNERSHIP	SURFACE	GEOLOGIC CODE
	1 2	3 4	5 6	7 8	9 10	11	12 13	14 15	16 17	18	19	20	21 22 23	24 25 26	27 28	29 30 31 32	33 34 35 36 37 38 39	40	41 42 43 44	45 46 47 48	49 50 51 52	53 54	55	56 57 58 59	60 61 62 63	64	65	66	67 68 69 70
	W	Y C	A										49N	73W	23	daca	MANKIN	3	4848	2140	2618			3513	4	F	P	

Column 1-4 - County
See Appendix A3-4 for Code

Column 19 - Sequential Number
Number 1 used for first hole in quadrangle designated by lat-long. Additional holes with same lat-long enter in numbered sequence.

Column 20 - Accuracy of Lat and Long
1. Nearest second
2. Within 10 seconds
3. Nearest 10 seconds
4. Nearest minute

Column 40 - Accuracy of Collar Elev.
1. Transit or level
2. Altimeter
3. Topographic map 7½" quadrangle
4. Other



1725'FSL 750'FEL

Column 53-54 - Bed Number
1. Roland
3. Smith
6. Powers
9. Anderson
12. Dietz
No. 1
No. 2
No. 3
15. Canyon
18. Monarch
21. Davis, Carney, Vell, or Richard
24. Carlson or Proctor
27. Brewster-Arnold
30. Popham
33. Knoblock or Lee
36. Schoedel
39. Rosebud or Q
42. Holt or McKay
45. Stocker Creek or F
48. Crabaa or O
51. M
54. Robinson, M, or Colsma
57. Burley
60. Other

Column 55 - Correlation Interval
Letter designation used to supplement bed number to index stratigraphic position of other coal beds:
A. About 100 ft. above listed bed
B. About 50 ft. above
C. About the same interval
D. 50 ft. below
E. 100 ft. below

Column 64 - Accuracy of Hole Depth
0. Measured, accurate within 1 ft.
1. Measured, less accurate than 1 ft.
3. From driller's log
4. From elec. log
5. Estimated
6. Reported

Column 65 - Ownership of Coal
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 66 - Surface Owner
F. Federal government
P. Private
S. State
N. Northern Pacific Railway Co.

Column 67-70 - Geologic Code for Montana

DRILL LOG

Depth Feet From	Depth Feet To	Material
0	240	Rock
240	268	Coal
268	353	Rock
		Interpretation from gamma log.

DRILL LOG (cont.)

Depth Feet From	Depth Feet To	Material

UNCODED INVENTORY DATA

Surface owner: John Mankin
Address: Gillette, Wyoming

Driller's name: Ruby Drilling Co.
Address: Gillette, Wyoming

Log data: Drillers ☐ Gamma ☒ ER-SP ☐
Density ☐ Other

Cored intervals: Depth — Lab sample #
to
to
to
to
to
to
to

Lithologic samples
How stored
Hydrologic data

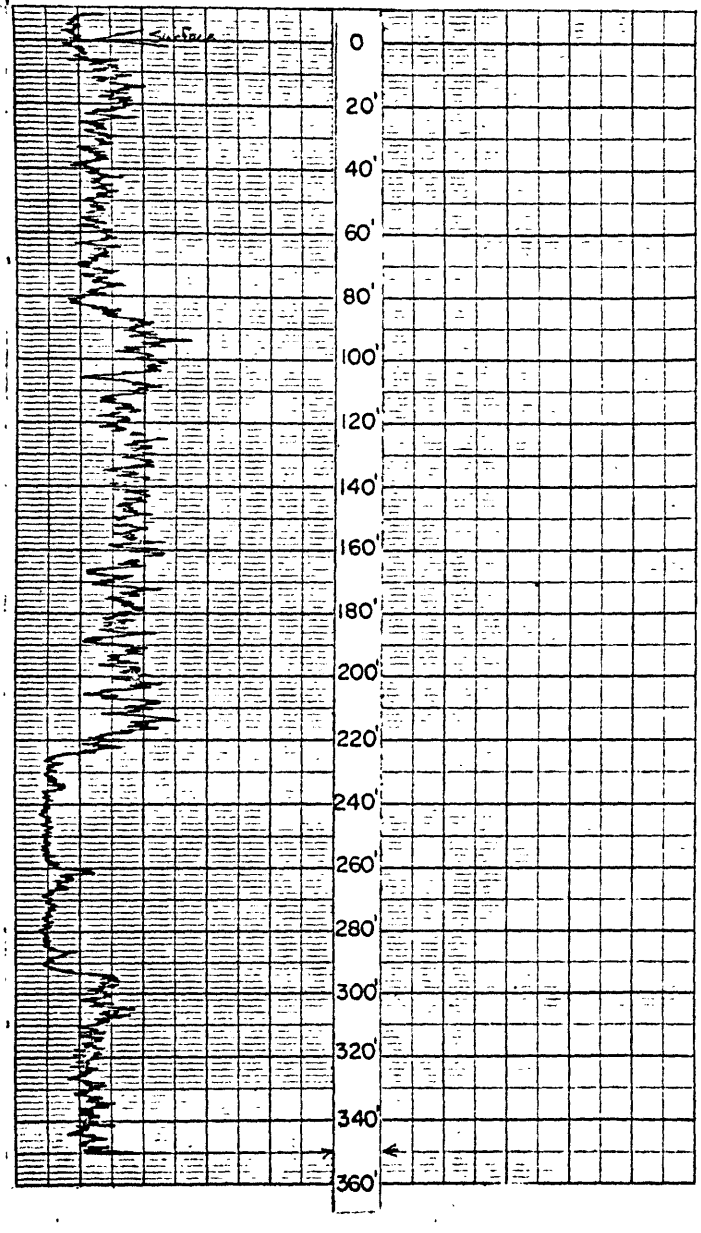
REMARKS

Mankin water well logged by MBMG

US-731

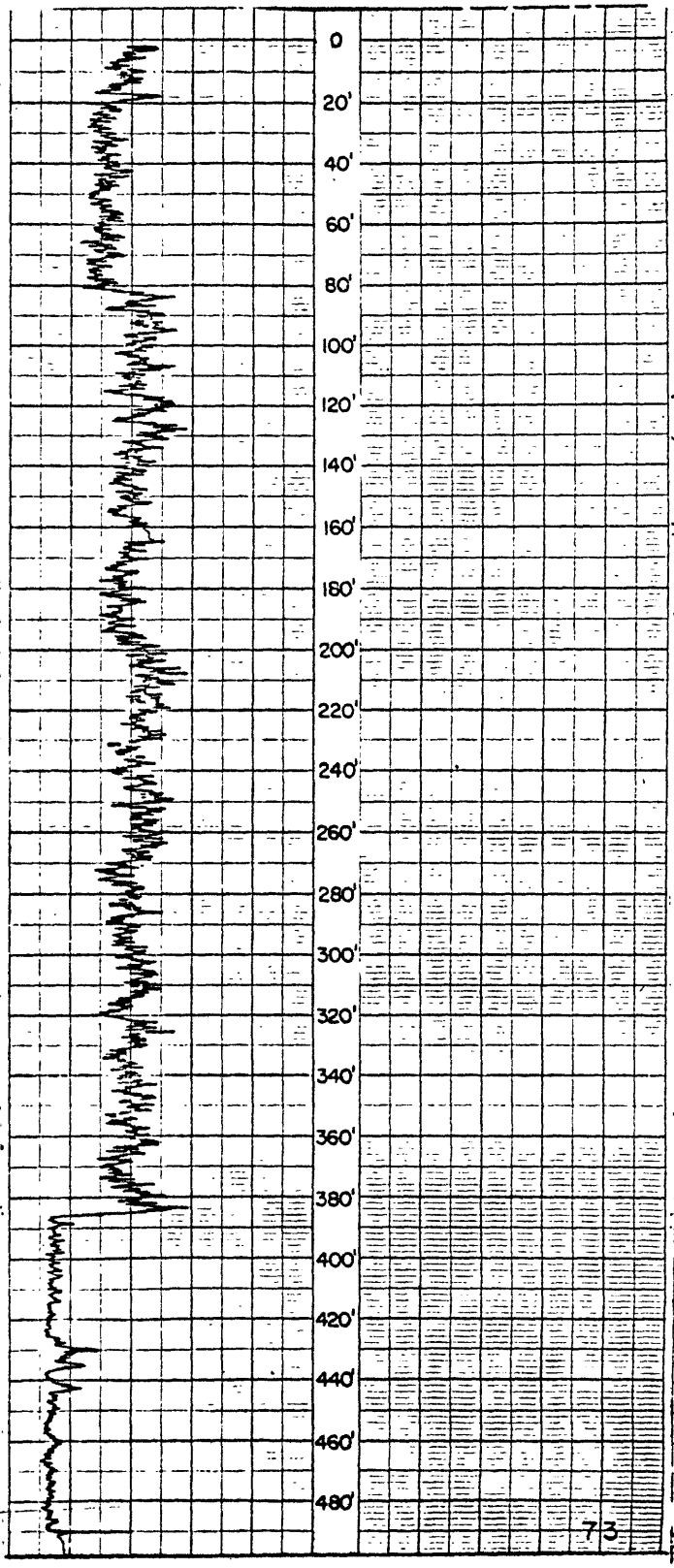
Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. US-731 Date June 21 Recorded by Granberg
State Wyoming County Campbell Map Echeta ISE Photo no. ____
T. 52 (N) R. 72 (E) Sec. 9, Tract SWSW, Measured 100 FWL, 850 FSL
Elevation (ground) 4395' Log measured from Ground
Drilled depth 356' Logged depth 350' Fluid type Water
Recording speed 20 ft/min. (up) down Hole dia. 4 3/4"
Sens. setting Range 100 Time const. 1 Logger no. 1
Run 1 of 1 Tool type Heltronic 3K
Remarks Circulation losses from 320' - 356'.



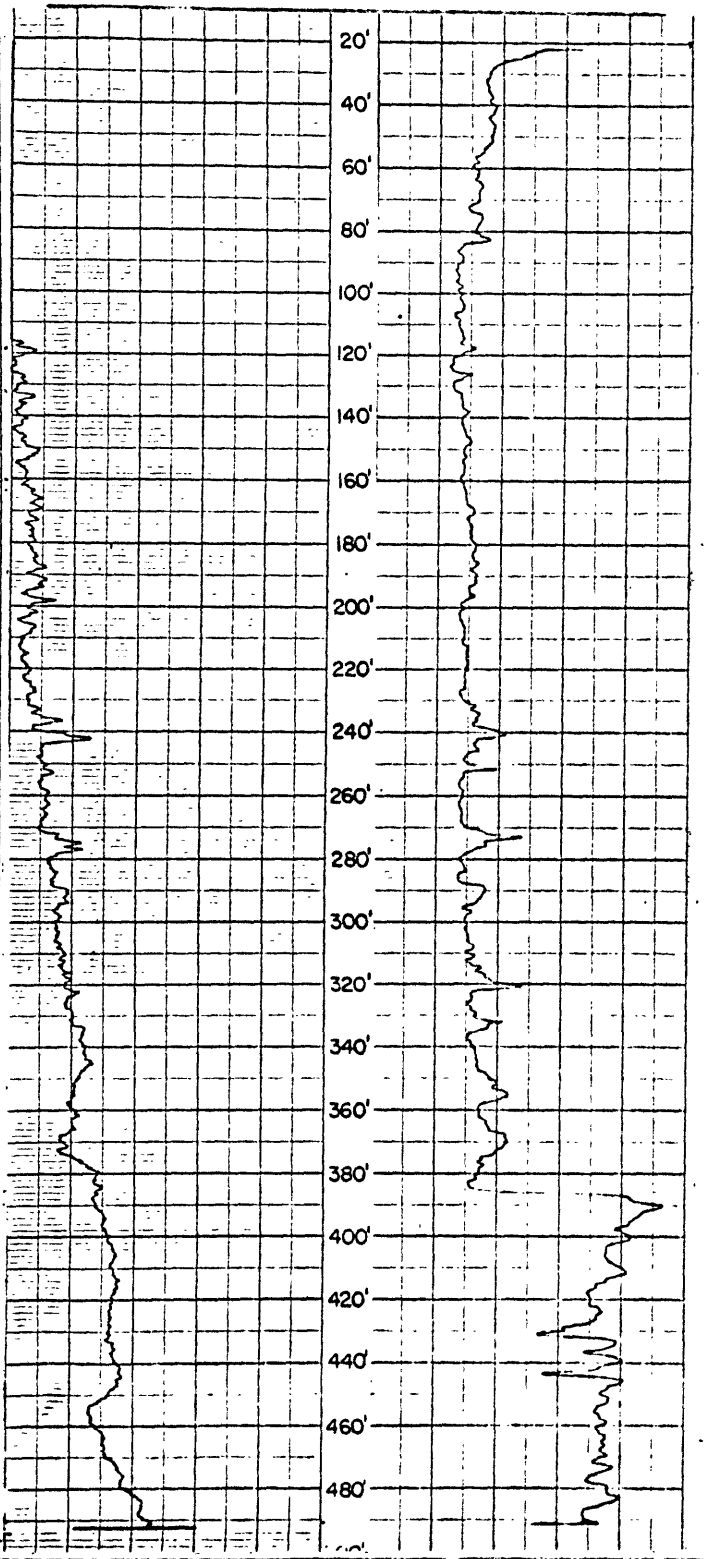
Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. US-732 Date June 22, 1973 Recorded by Granberg
State Wyoming County Campbell Map Echeta SE Photo no. ____
T. 51 (N) S R. 72 (E) W Sec. 31, Tract DAAA, Measured 2,400 FSL 100 FEL
Elevation (ground) 4359 Log measured from Ground
Drilled depth 500' Logged depth 490' Fluid type Mud
Recording speed 20 ft/min. (up) down Hole dia. 4.75"
Sens. setting 100 Time const. 1 Logger no. 1
Run 1 of 2 Tool type Geotronic 3K
Remarks



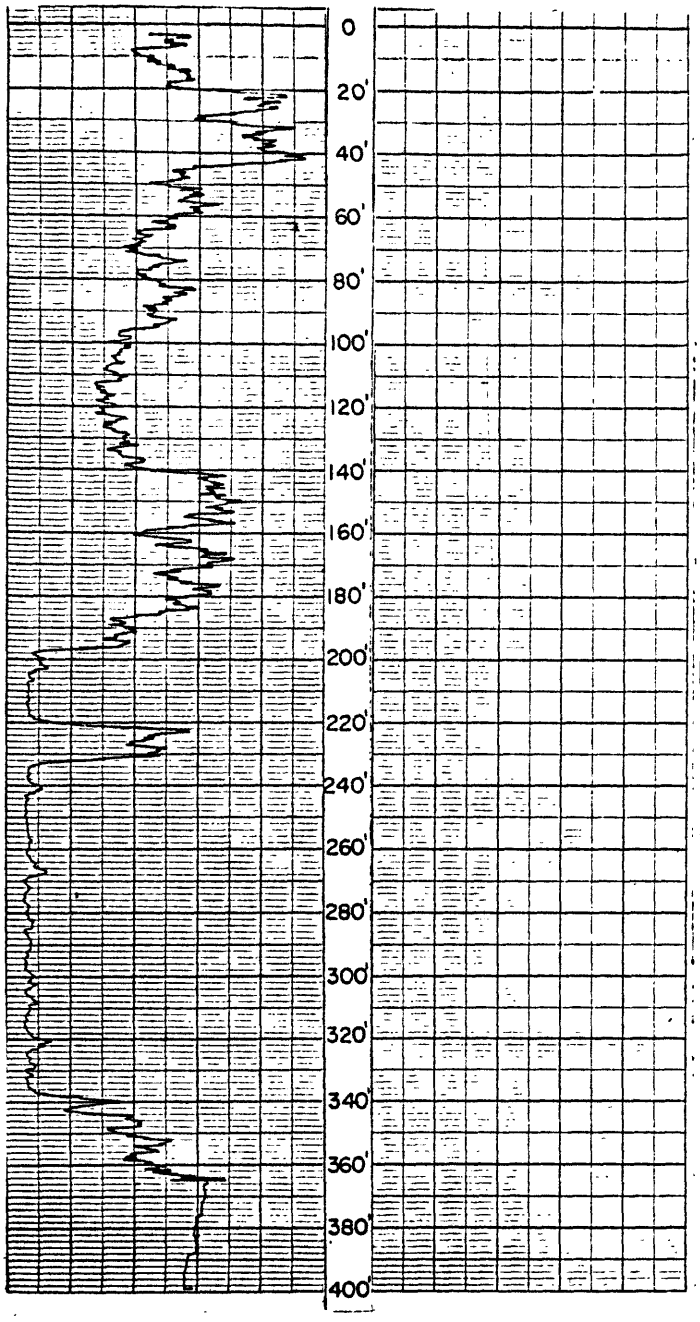
Montana Tech Foundation
Montana Bureau of Mines and Geology
Electric Log

Hole no. US-732 Date June 22, 1973 Recorded by Granberg
State Wyoming County Campbell Map Echeta SE Photo no. ____
T. 51 (N) S R. 72 (E) W Sec. 31, Tract DAAA, Measured 2400 FSL 100 FEL
Elevation (ground) 4359 Log measured from Ground
Drilled depth 500 Logged depth 491 Fluid type Mud
Recording speed 60 ft/min. (up) down Logger no. 1
(S.P.) or S.N. Res. (Single point) or L.N. Res.
Sens. setting 5 Zero pos. ____ Sens. setting 20 Zero pos. ____
Run 2 of 2 Hole dia. 4.75" Tool type Geotronic 3K
Remarks



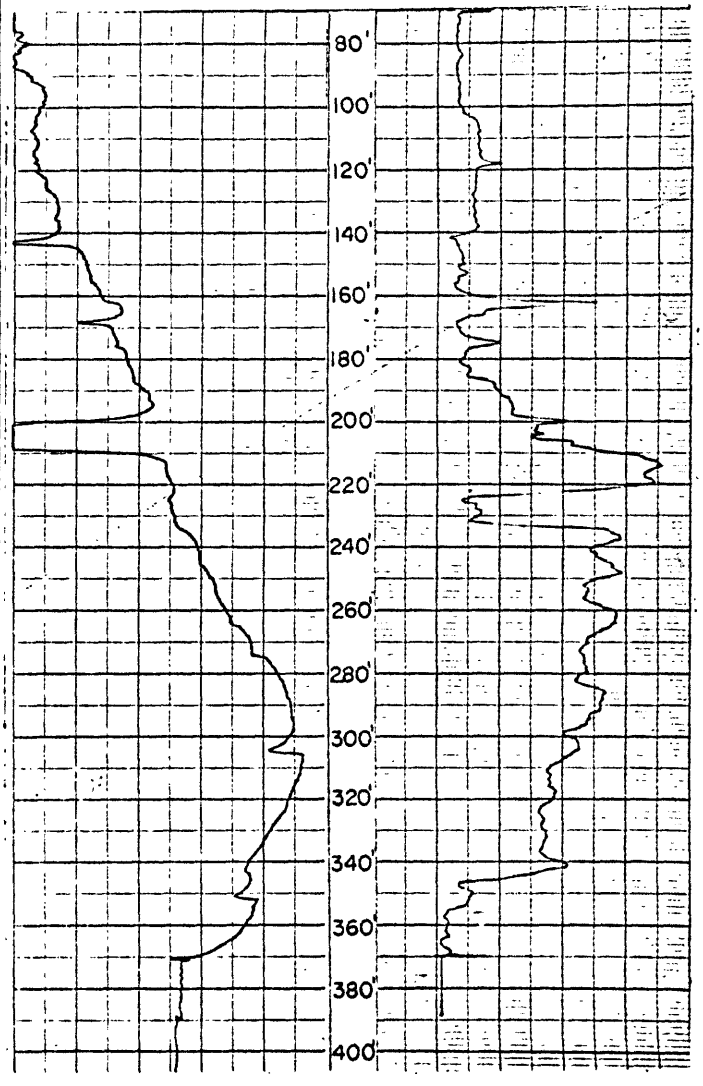
Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. US-733 Date June 23, 1973 Recorded by Mel Granberg
State Wyoming County Campbell Map Esheta NE Photo no.
T. 51 (N) S R. 72 (W) E Sec. 8, Tract CCDC, Measured 730 FWL 300 FSL
Elevation (ground) 4270' Log measured from Ground
Drilled depth 390' Logged depth 365' Fluid type Mud
Recording speed 30 ft/min. (up) down Hole dia. 9.75"
Sens. setting 50 Time const. 2 Logger no. 1
Run 1 of 2 Tool type Neltronic 3K
Remarks



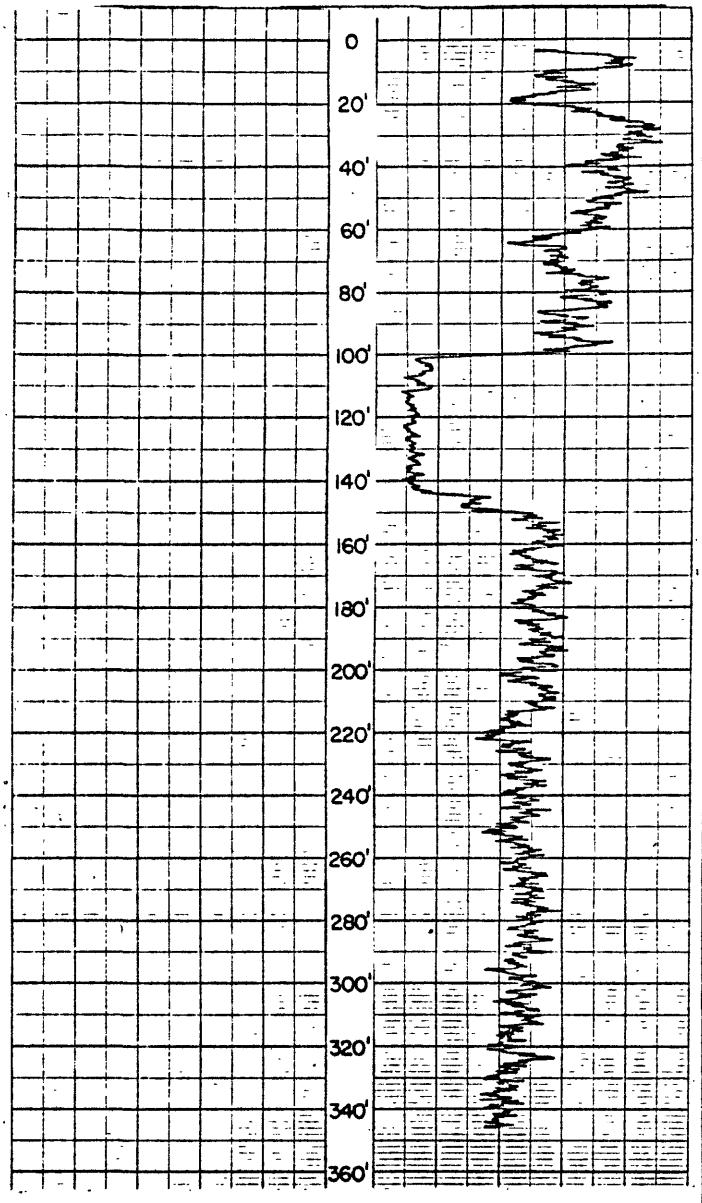
Montana Tech Foundation
Montana Bureau of Mines and Geology
Electric Log

Hole no. US-733 Date June 6, 1973 Recorded by Mel Granberg
State Wyoming County Campbell Map Esheta NE Photo no.
T. 51 (N) S R. 72 (W) E Sec. 8, Tract CCDC, Measured 730 FWL 300 FSL
Elevation (ground) 4270' Log measured from Ground
Drilled depth 390' Logged depth 370' Fluid type Mud
Recording speed 60 ft/min. (up) down Logger no. 1
(S.P.) or S.N. Res. (Single point) or L.N. Res.
Sens. setting 20 Zero pos. Sens. setting 20 Zero pos.
Run 2 of 2 Hole dia. 9.75" Tool type Neltronic 3K
Remarks



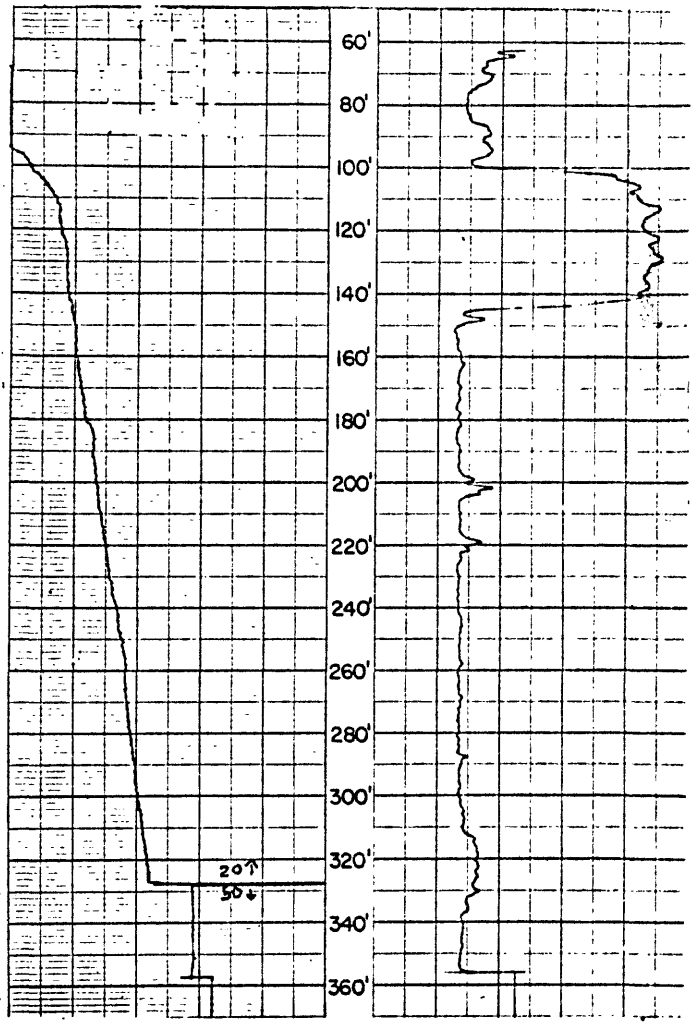
Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. US-734 Date June 25, 1973 Recorded by Mel Granberg
State Wyoming County Campbell Map Echeta NE Photo no.
T. 51 (N/S) R. 72 (E/W) Sec. 17, Tract DADD, Measured 1,550 FSL 220 FEL
Elevation (ground) 4305' Log measured from Ground
Drilled depth 360' Logged depth 350' Fluid type Mud
Recording speed 20 ft/min. (up) down Hole dia. 4.75"
Sens. setting 50 Time const. 2 Logger no. 1
Run 1 of 2 Tool type Heltronic 3A
Remarks Lost circulation while coring @ 126'.



Montana Tech Foundation
Montana Bureau of Mines and Geology
Electric Log

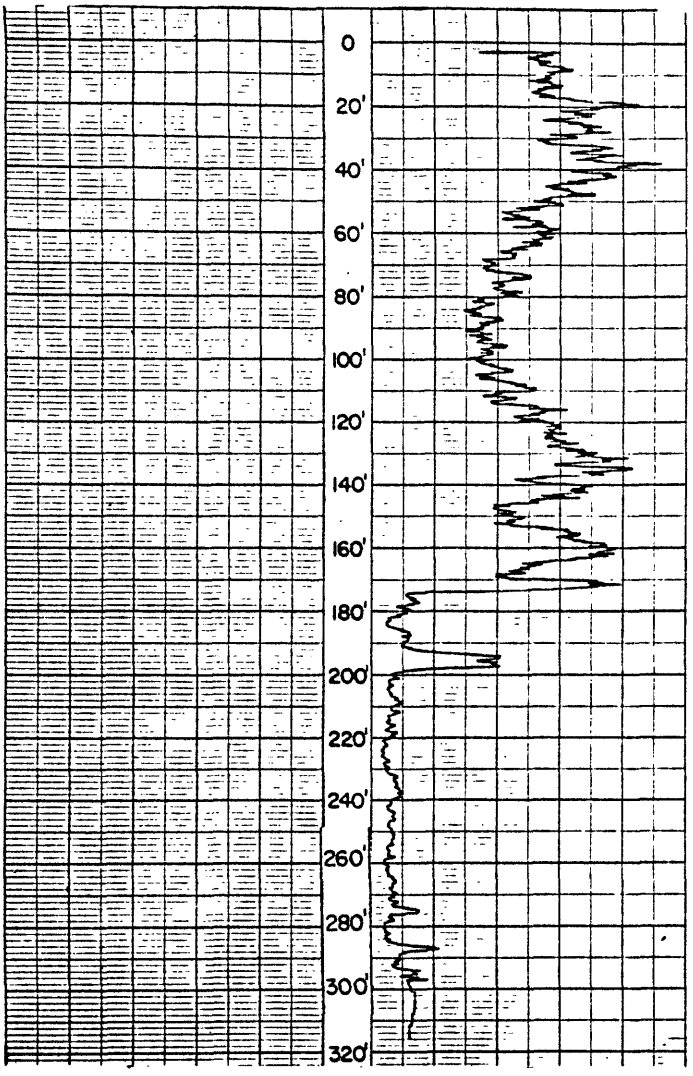
Hole no. US-734 Date June 25, 1973 Recorded by Mel Granberg
State Wyoming County Campbell Map Echeta NE Photo no.
T. 51 (N/S) R. 72 (E/W) Sec. 17, Tract DADD, Measured 1,550 FSL, 220 FEL
Elevation (ground) 4305' Log measured from Ground
Drilled depth 360' Logged depth 352' Fluid type Mud
Recording speed 60 ft/min. (up) down Logger no. 1
(S.P.) or S.N. Res. (Single point) or L.N. Res.
Sens. setting 20-50 Zero pos. ___ Sens. setting 10 Zero pos. ___
Run 2 of 2 Hole dia. 4.75" Tool type Heltronic 3A
Remarks Lost circulation while coring at 126'.



US-735

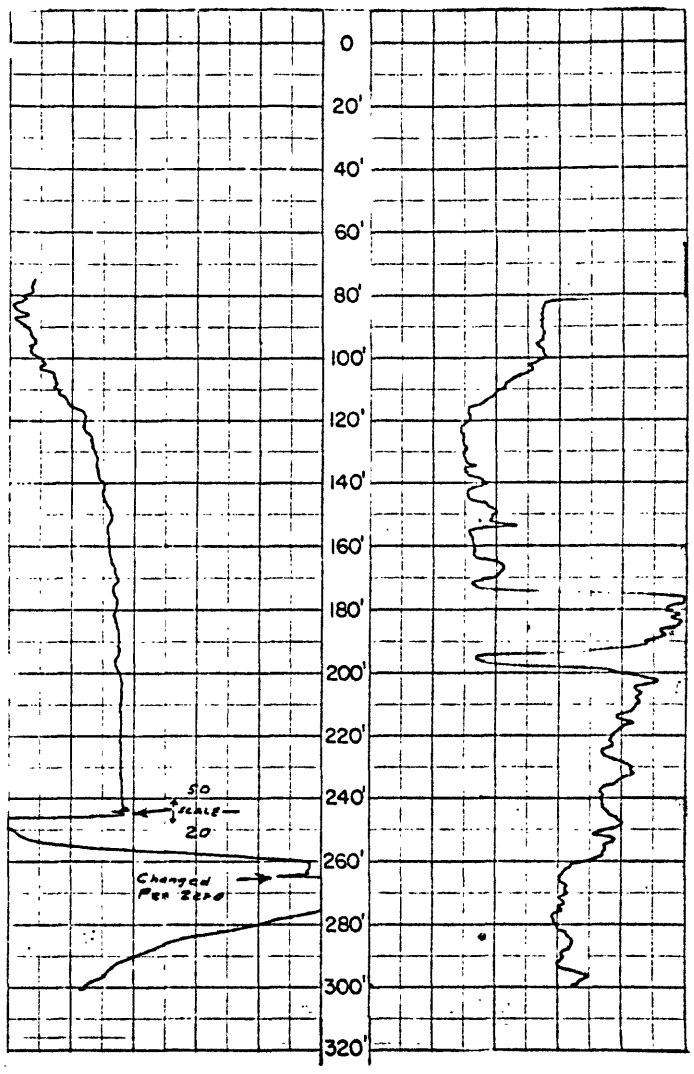
Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. US-735 Date June 26, 1973 Recorded by Mel Granberg
State Wyoming County Campbell Map Echeta NE Photo no. ____
T. 51 (N) S R. 72 (E) W Sec. 17, Tract BADD, Measured 1050 FNL 2400 FWL
Elevation (ground) 4270' Log measured from Ground
Drilled depth 319' Logged depth 297' Fluid type Mud
Recording speed 20 ft/min. (up) down Hole dia. 4.75"
Sens. setting 50 Time const. 2 Logger no. 1
Run 1 of 2 Tool type Heltronic 3K
Remarks Lost circualtion in sand at 80' after drilling thru coal could not regain circ.



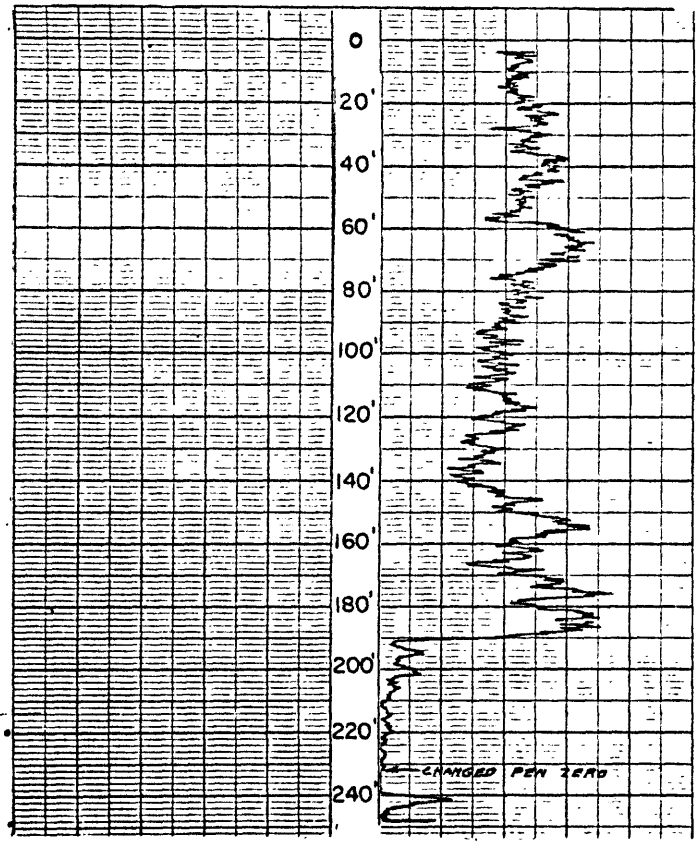
Montana Tech Foundation
Montana Bureau of Mines and Geology
Electric Log

Hole no. US-735 Date June 26, 1973 Recorded by Mel Granberg
State Wyoming County Campbell Map Echeta NE Photo no. ____
T. 51 (N) S R. 72 (E) W Sec. 17, Tract BADD, Measured 1,050 FNL 2,400 FWL
Elevation (ground) 4270' Log measured from Ground
Drilled depth 319' Logged depth 299' Fluid type Mud
Recording speed 60 ft/min. (up) down Logger no. 1
(S.P) or S.N. Res. (Single point) or L.N. Res.
Sens. setting 50 Zero pos. ____ Sens. setting 20 Zero pos. ____
Run 2 of 2 Hole dia. 4.75" Tool type Heltronic 3K
Remarks Lost circulation in sand at 80' after drilling thru coal could not regain circulation



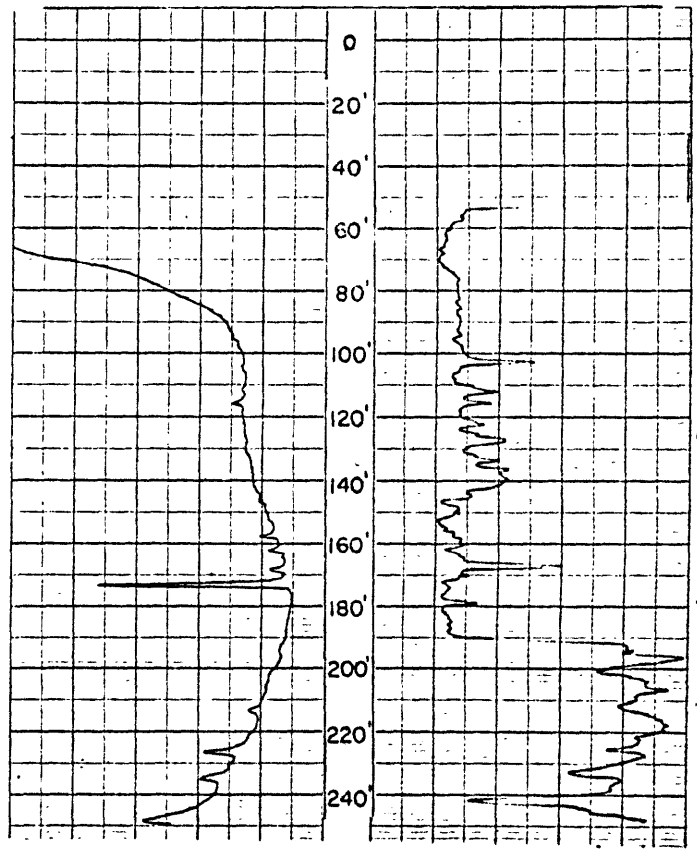
Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. US-736 Date June 28, 1973 Recorded by Mel Granberg
State Wyoming County Campbell Map Echeta NE Photo no. ____
T. 52 (N) S R. 72 (E) W Sec. 31, Tract AADA, Measured 840' FNL, 200' FEL
Elevation (ground) 4250' Log measured from Ground
Drilled depth 270' Logged depth 248' Fluid type Mud
Recording speed 20 ft/min. (up) down Hole dia. 4.75"
Sens. setting 50 Time const. 2 Logger no. 1
Run 1 of 2 Tool type Neltronic 3K
Remarks



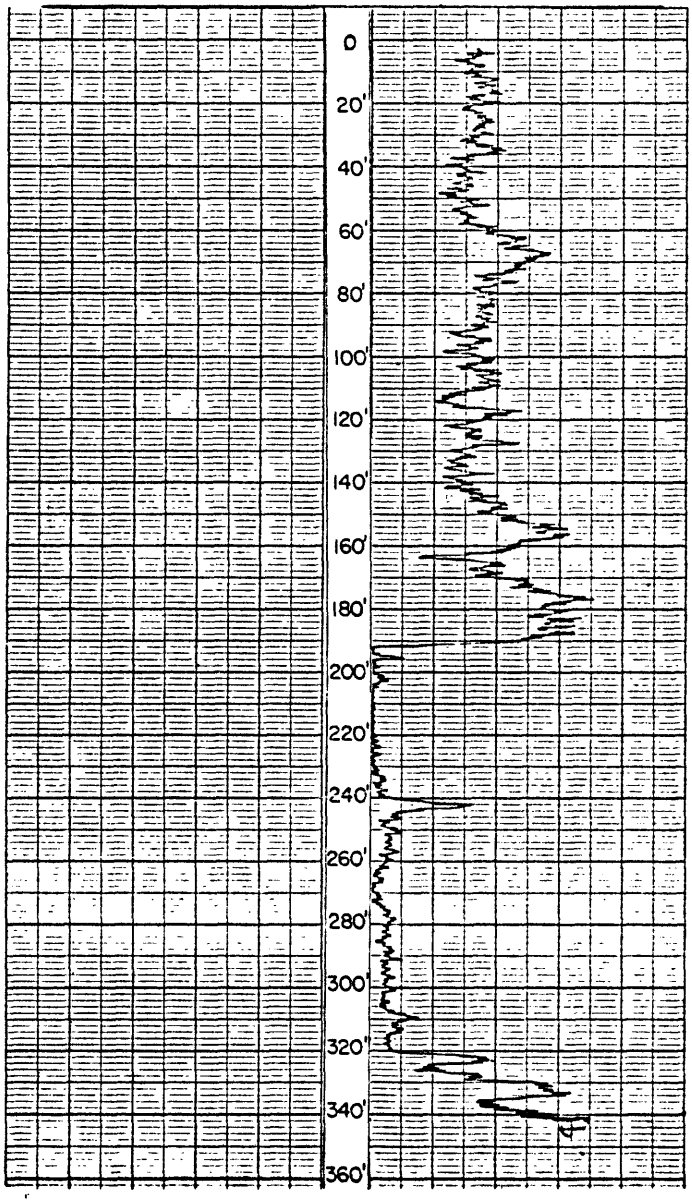
Montana Tech Foundation
Montana Bureau of Mines and Geology
Electric Log

Hole no. US-736 Date June 28,1973 Recorded by Mel Granberg
State Wyoming County Campbell Map Echeta NE Photo no. ____
T. 52 (N) S R. 72 (E) W Sec. 31, Tract AADA, Measured 840' FNL, 200' FEL
Elevation (ground) 4250' Log measured from Ground
Drilled depth 270' Logged depth 248' Fluid type Mud
Recording speed 60 ft/min. (up) down Logger no. 1
(S.P.) or S.N. Res. (Single point) or L.N. Res.
Sens. setting 20 Zero pos. ____ Sens. setting 20 Zero pos. ____
Run 2 of 2 Hole dia. 4.75" Tool type Neltronic 3K
Remarks



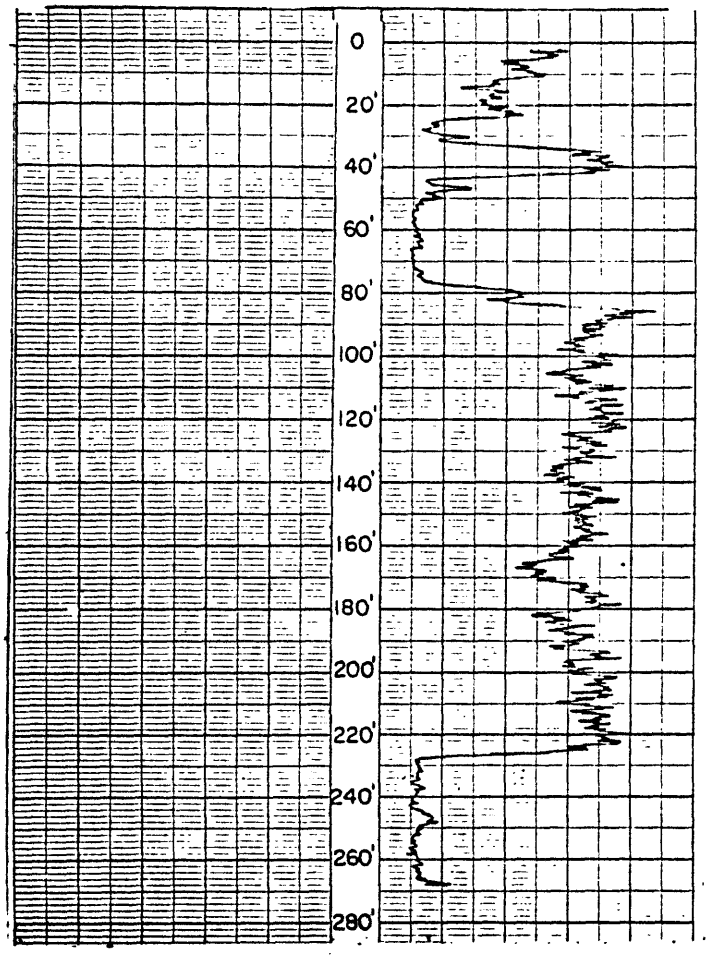
Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. US-736A Date JUNE 29,1973 Recorded by MEL GRANBERG
State WYOMING County CAMPBELL Map ECHETA LAKE Photo no. ____
T. 52 (N) R. 72 (E) Sec. 31 , Tract AADA , Measured 840' FNL, 200' FEL
Elevation (ground) 4250' Log measured from GROUND
Driller's depth 345' Logged depth 341' Fluid type MUD
Recording speed 20 ft/min. (up) down Hole dia. 4.75"
Sens. setting 50 Time const. 2 Logger no. 1
Run 1 of 1 Tool type GEOTRONICS JK
Remarks



Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

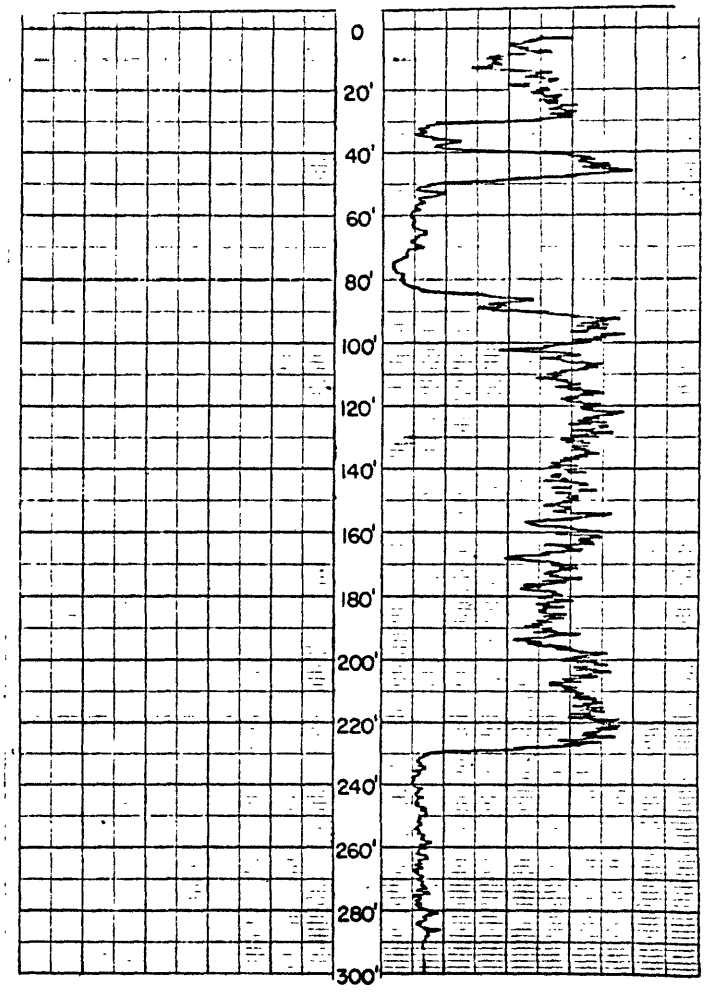
Hole no. US-737 Date July 1, 1973 Recorded by Mel Granberg
State Wyoming County Campbell Map Cale Creek Photo no. ____
T. 52 (N/S) R. 72 (E/W) Sec. 6, Tract CACA, Measured 1700' FSL 1800' FWL
Elevation (ground) 4190' Log measured from Ground
Drilled depth 300' Logged depth 268' Fluid type Mud
Recording speed 20 ft/min. (up) down Hole dia. 4.75"
Sens. setting 50 Time const. 2 Logger no. 1
Run 1 of 1 Tool type Heltronic 3K
Remarks Lost circulation at 300'



US-738

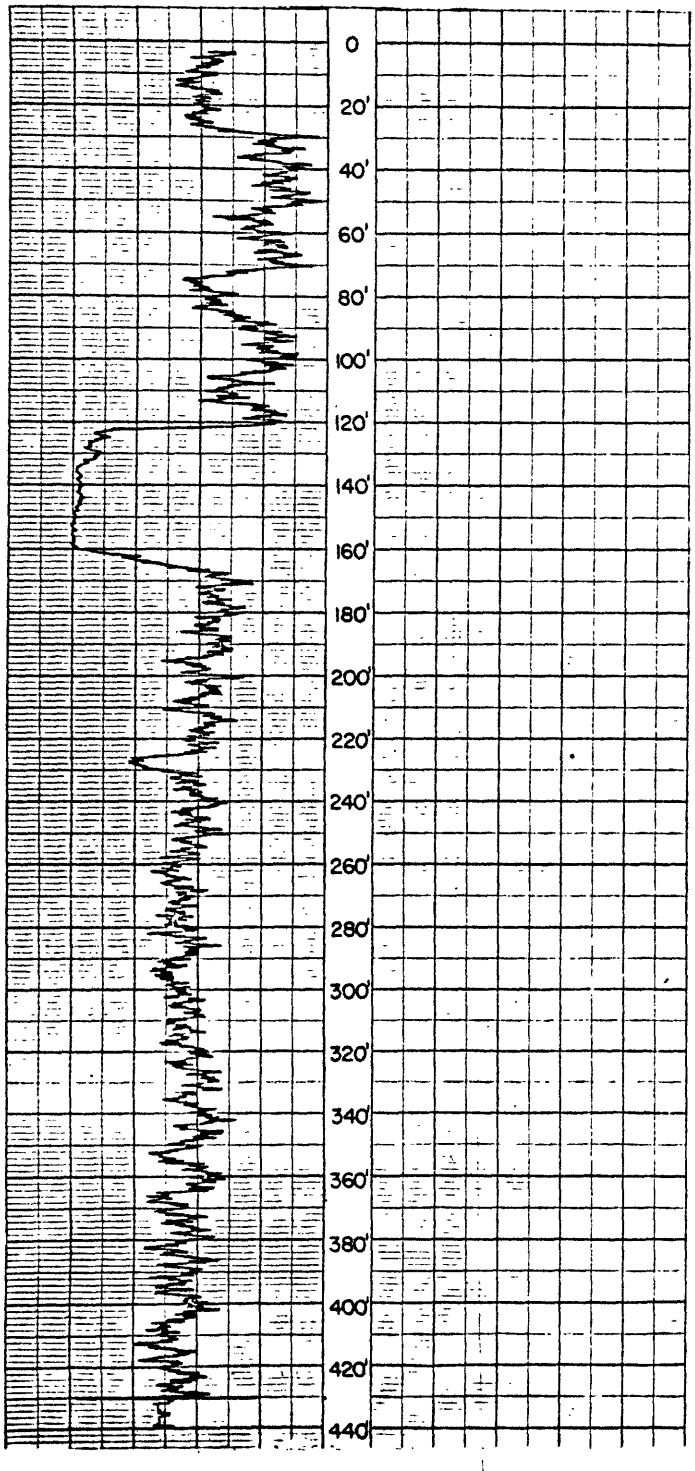
Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. US-738 Date July 9, 1975 Recorded by Mel Grambergs
State Wyoming County Campbell Map Canton 4SE Photo no. ____
T. 52 (N) R. 72 (W) E Sec. 6, Tract CACB, Measured 1,600' FWL, 1,700' FSL
Elevation (ground) 4192' Log measured from Ground
Drilled depth 305' Logged depth 286 Fluid type Mud
Recording speed 20' ft/min. (up) down Hole dia. 4.75"
Sens. setting 50 Time const. 2 Logger no. 1
Run 1 of 1 Tool type Heltronic 3K
Remarks



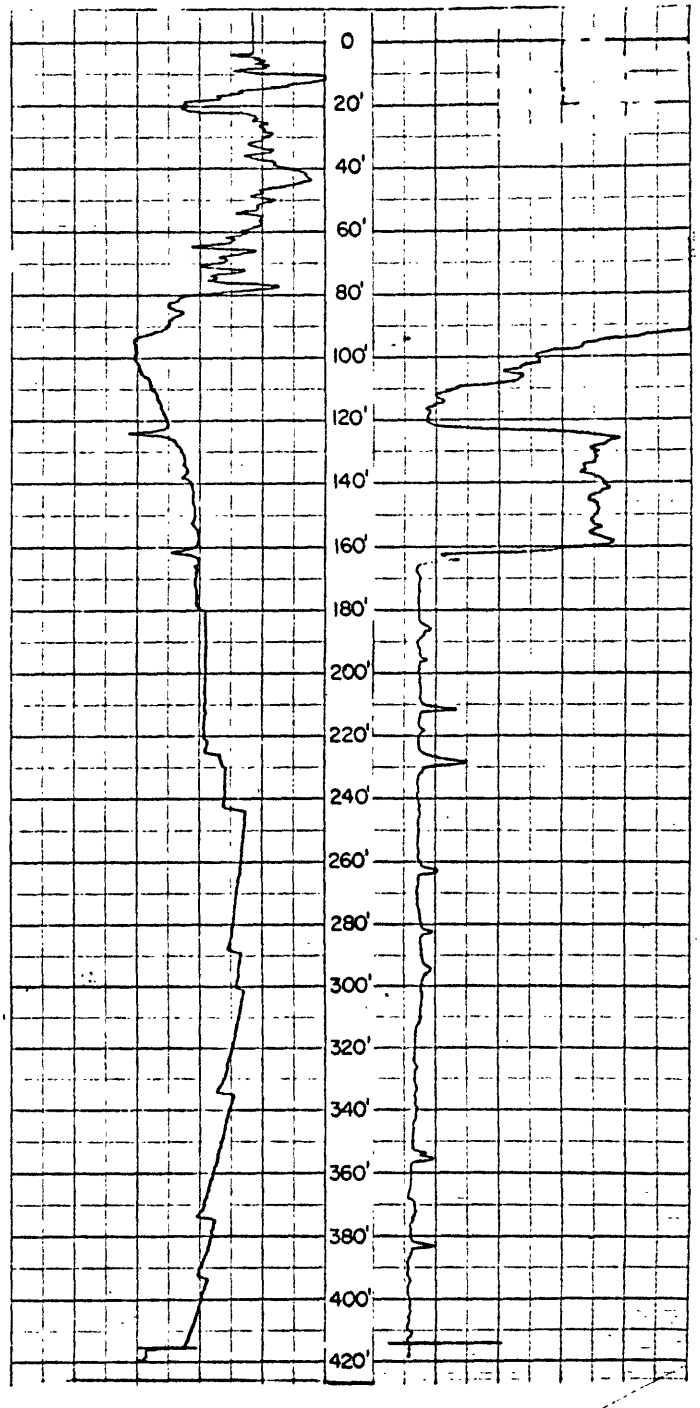
Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. US-739 Date July 11, 1973 Recorded by Mel Greenberg
State Wyoming County Campbell Map Echeta 1 NE Photo no.
T. 51 N/S R. 72 E/W Sec. 17, Tract DBBA, Measured 2,620'FSL 2,020'FEL
Elevation (ground) 4396' Log measured from Ground
Drilled depth 450' Logged depth 439' Fluid type Mud, Air, & Foam
Recording speed 20 ft/min. up down Hole dia. 4.75"
Sens. setting 50 Time const. 2 Logger no. 1
Run 1 of 2 Tool type Heltronic 3K
Remarks



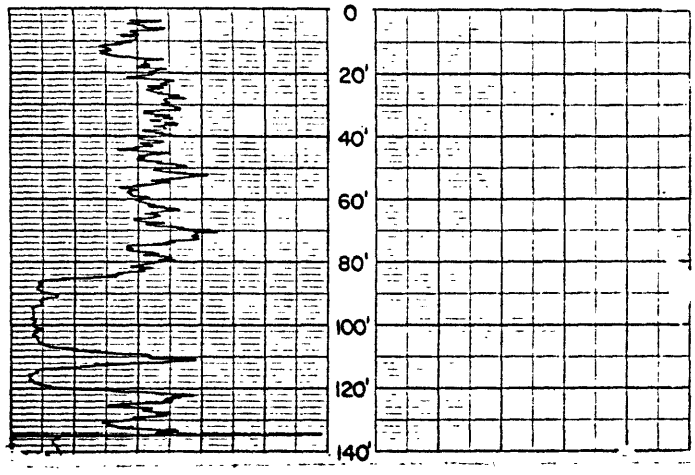
Montana Tech Foundation
Montana Bureau of Mines and Geology
Electric Log

Hole no. US-739 Date July 11, 1973 Recorded by Mel Greenberg
State Wyoming County Campbell Map Echeta NE Photo no.
T. 51 (N/S) R. 72 (E/W) Sec. 17, Tract DBBA, Measured 2,620' FSL, 2,020' FEL
Elevation (ground) 4396' Log measured from Ground
Drilled depth 450' Logged depth 435' Fluid type Mud, Air, & Foam
Recording speed 60 ft/min. (up) down Logger no. 1
(S.P.) or S.N. Res. (Single point) or L.N. Res.
Sens. setting 20 Zero pos. Sens. setting 20 Zero pos.
Run 2 of 2 Hole dia. 4.75" Tool type Heltronic 3K
Remarks Lost circulation at 135' and could not regain it.



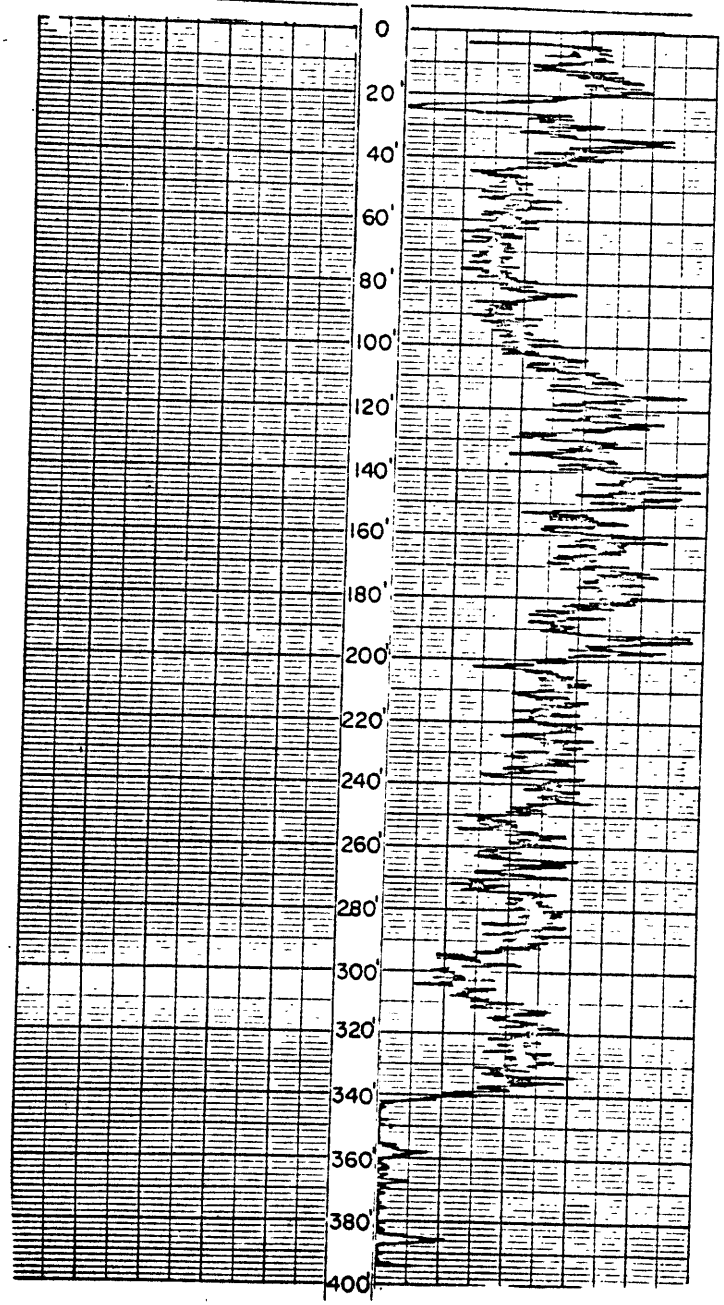
Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. US-7310 Date July 17, 1973 Recorded by John Blumer
State Wyoming County Campbell Map Rozet SSE Photo no. ____
T. 47 (N) (S) R. 70 E (W) Sec. 32, Tract DDCA, Measured 470' FSL, 950' FEL
Elevation (ground) 4660' Log measured from Ground
Drilled depth 138' Logged depth 135' Fluid type Air
Recording speed 20 ft/min. (up) down Hole dia. 4.75"
Sens. setting 50 Time const. 2 Logger no. 1
Run 1 of 1 Tool type Geotronic 3K
Remarks



Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

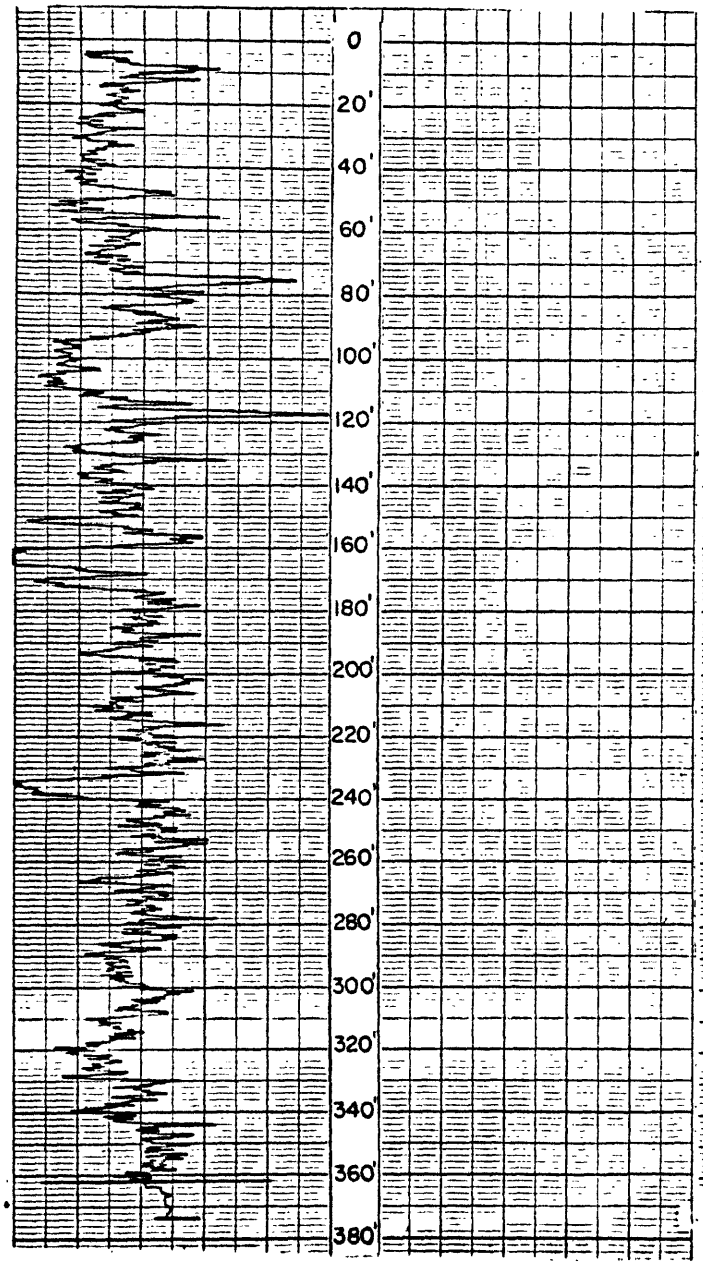
Hole no. US-7311 Date July 15, 1973 Recorded by Mel Grandberg
State Wyoming County Campbell Map Rozet 3SW Photo no. ____
T. 42 (N) (S) R. 71 (E) (W) Sec. 28, Tract BCDB, Measured 2,030' FNL, 850' FWL
Elevation (ground) 4746' Log measured from Ground
Drilled depth 420' Logged depth 394' Fluid type Air-Mud, & Foam
Recording speed 20 ft/min. (up) down Hole dia. 4.75"
Sens. setting 50 Time const. 1 Logger no. 1
Run 1 of 1 Tool type Mt. Tronic 3K
Remarks



US-7312

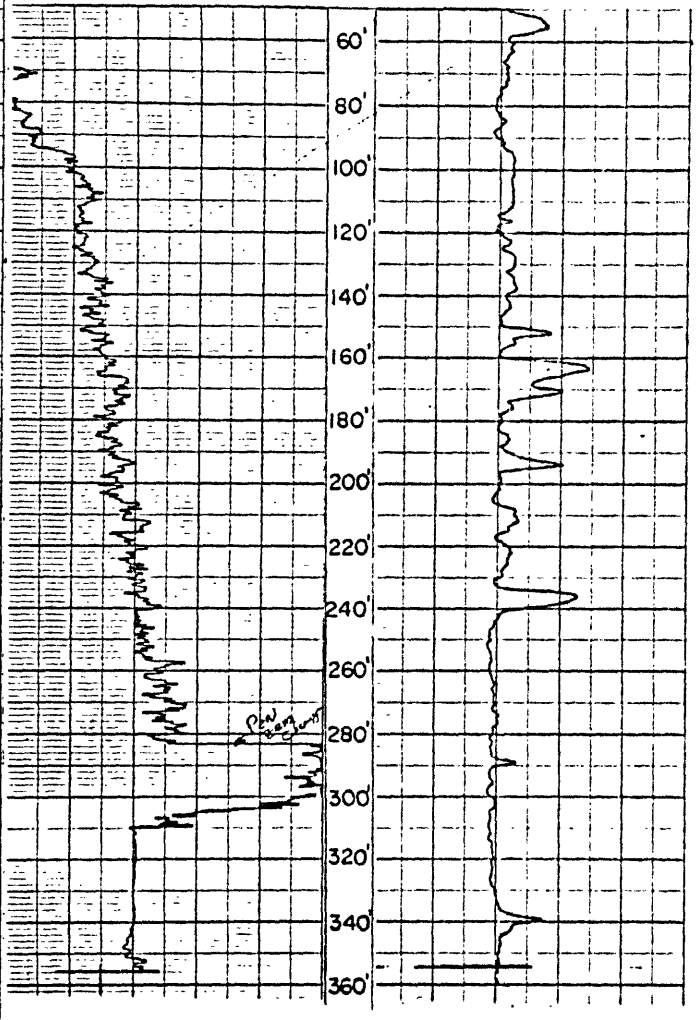
Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. US-7312 Date July 16, 1973 Recorded by Mel Grambergs
State Wyoming County Campbell Map Rozet 1 SW Photo no.
T. 47 (N/S) R. 72 (E/W) Sec. 14, Tract NESW, Measured 2,450' FWL, 460' FNL
Elevation (ground) 4667' Log measured from Ground
Drilled depth 367' Logged depth 362' Fluid type Mud
Recording speed 20 ft/min. (up) down Hole dia. 4.75"
Sens. setting 50 Time const. 2 Logger no. 1
Run 1 of 2 Tool type Heltronic 3K
Remarks



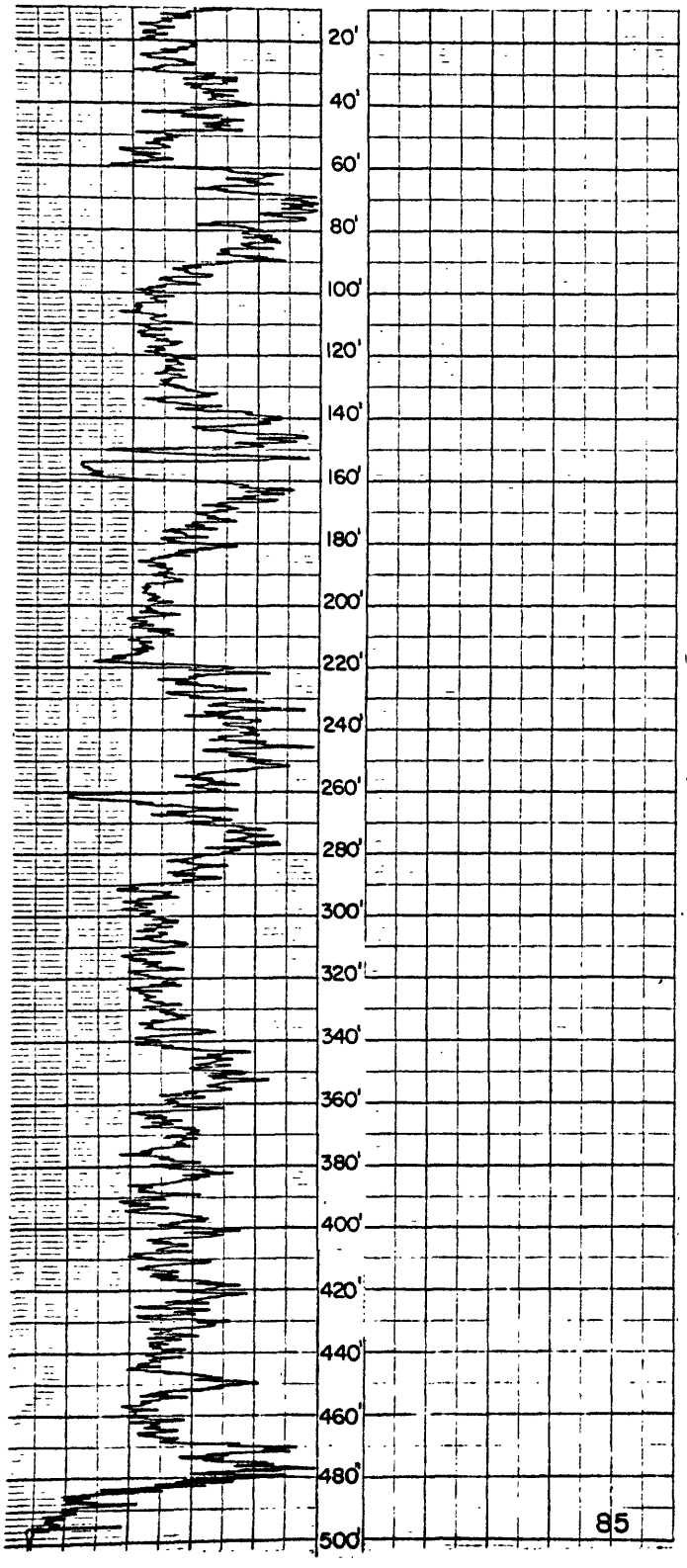
Montana Tech Foundation
Montana Bureau of Mines and Geology
Electric Log

Hole no. US-7312 Date July 16, 1973 Recorded by Mel Grambergs
State Wyoming County Campbell Map Rozet 1 SW Photo no.
T. 47 (N/S) R. 72 (E/W) Sec. 14, Tract NESW, Measured 2,450' FWL, 460' FNL
Elevation (ground) 4667' Log measured from Ground
Drilled depth 367' Logged depth 355' Fluid type Mud
Recording speed 60 ft/min. (up) down Logger no. 1
(S.P.) or S.N. Res. (Single point) or L.N. Res.
Sens. setting 20 Zero pos. Sens. setting 20 Zero pos.
Run 2 of 2 Hole dia. 4.75" Tool type Heltronic 3K
Remarks



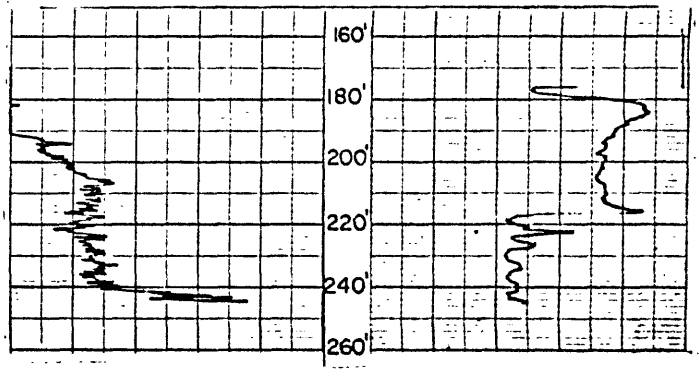
Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. US-7313 Date July 19,1972 Recorded by Mel Granberg
State WYOMING County CAMPBELL Map ROZET 3 SW Photo no. ____
T. 48 (N/S) R. 72 (E/W) Sec. 24, Tract SCSC, Measured 2,300' FWL, 300' FNL
Elevation (ground) 4653' Log measured from GROUND
Drilled depth 577' Logged depth 495' Fluid type MUD-FOAM
Recording speed 20 ft/min. (up) down Hole dia. 4.75"
Sens. setting 50 Time const. 1 Logger no. 1
Run 1 of 2 Tool type GEOTRONIC 3K
Remarks



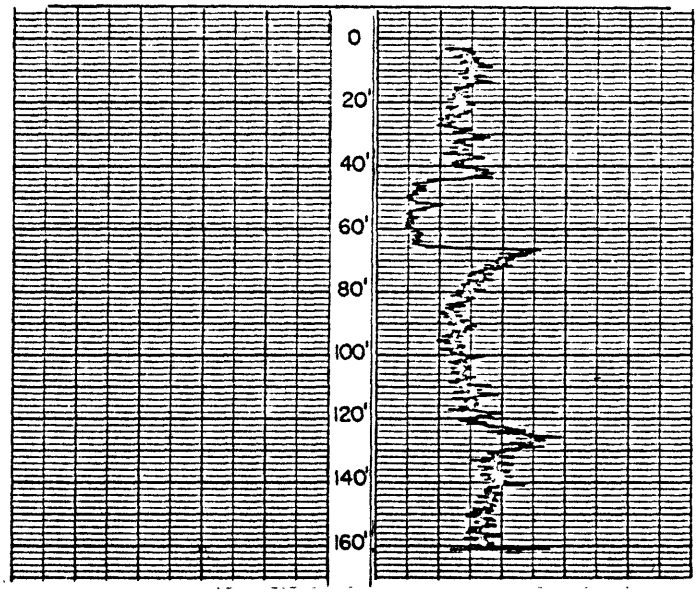
Montana Tech Foundation
Montana Bureau of Mines and Geology
Electric Log

Hole no. US-7313 Date July 19, 1972 Recorded by Mel Granberg
State WYOMING County CAMPBELL Map ROZET 3 SW Photo no. ____
T. 48 (N/S) R. 72 (E/W) Sec. 24, Tract SCSC, Measured 2,300' FWL 300' FNL
Elevation (ground) 4653' Log measured from GROUND
Drilled depth 577' Logged depth 495' Fluid type MUD-FOAM
Recording speed 60 ft/min. (up) down Logger no. 1
(S.P.) or S.N. Res. (Single point) or L.N. Res.
Sens. setting 20 Zero pos. ___ Sens. setting 20 Zero pos. ___
Run 2 of 2 Hole dia. 4.75" Tool type GEOTRONIC
Remarks



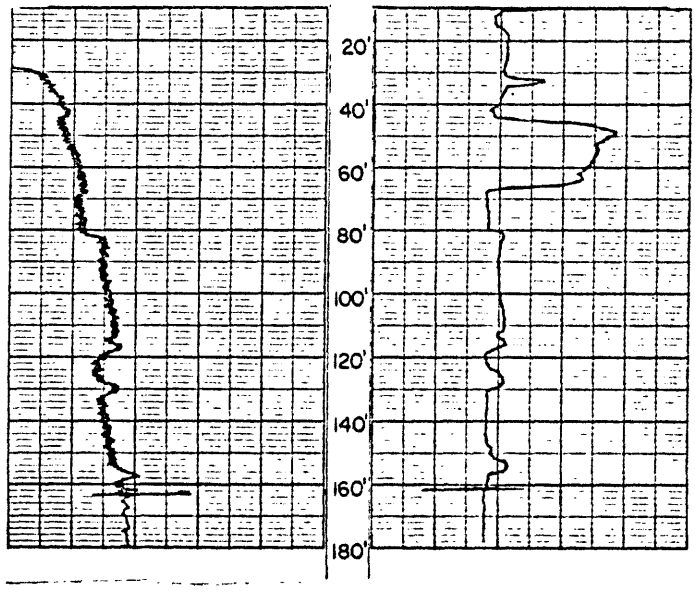
Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. US-7314 Date July 25, 1973 Recorded by Blumer
State Wyoming County Campbell Map Echeta 4SE Photo no.
T. 47 N R. 72 E Sec. 6, Tract SBCA, Measured 900' FNL 750' FWL
Elevation (ground) 4682' Log measured from Ground
Drilled depth 170' Logged depth 161' Fluid type Mud
Recording speed 20 ft/min. (up) down Hole dia. 4.75"
Sens. setting 100 Time const. 1 Logger no. 1
Run 1 of 2 Tool type Neltronic 3K
Remarks



Montana Tech Foundation
Montana Bureau of Mines and Geology
Electric Log

Hole no. US-7314 Date July 25, 1973 Recorded by John Blumer
State Wyoming County Campbell Map Echeta 4 SE Photo no.
T. 47 N R. 72 E Sec. 6, Tract SBCA, Measured 900' FNL 750' FWL
Elevation (ground) 4682' Log measured from Ground
Drilled depth 170' Logged depth 161' Fluid type Mud
Recording speed 60 ft/min. (up) down Logger no. 1
(S.P.) or S.N. Res. (Single point) or L.N. Res.
Sens. setting 20 Zero pos. Sens. setting 20 Zero pos.
Run 2 of 2 Hole dia. 4.75" Tool type Neltronic 3K
Remarks



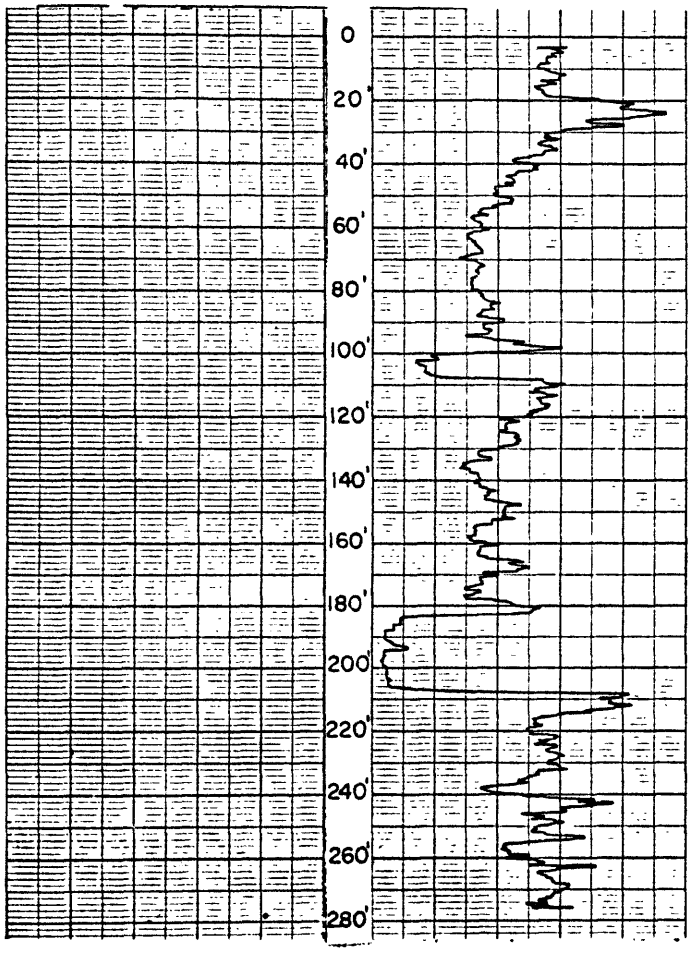
US-7315

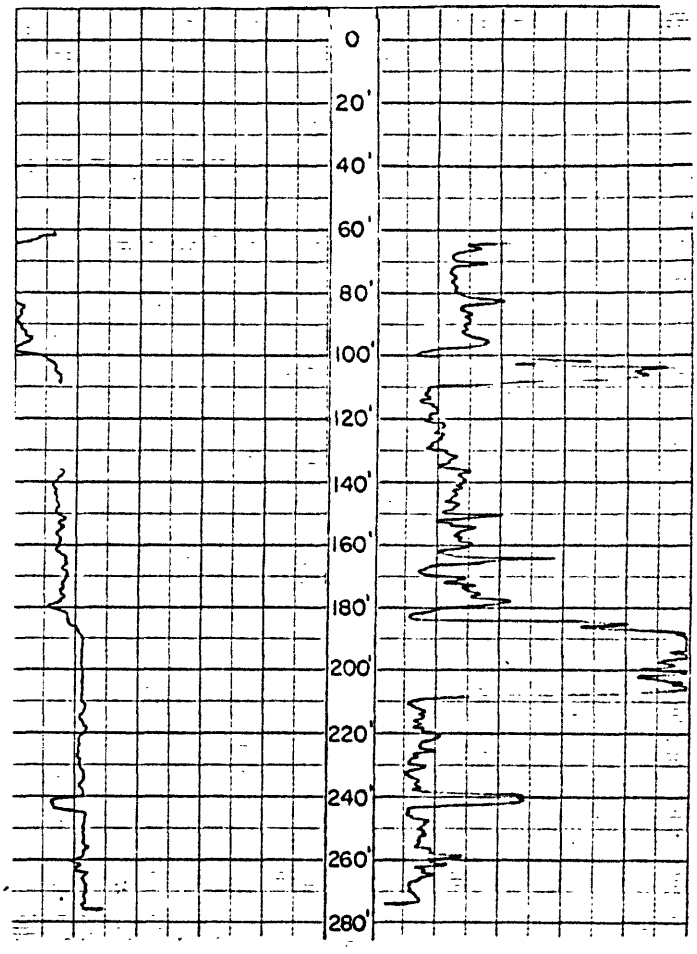
Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. US-7315 Date July 28 1973 Recorded by Mel Granberg
State Wyoming County Campbell Map Echeta 4 SE Photo no. ____
T. 47 (N/S) R. 73 (E/W) Sec. 2, Tract NDDA, Measured 407 FSL 150'FEL
Elevation (ground) 4760' Log measured from Ground
Drilled depth 285' Logged depth 276' Fluid type Mud
Recording speed 20 ft/min. (up) down Hole dia. 4.75"
Sens. setting 50 Time const. 1 Logger no. 1
Run 1 of 2 Tool type Meltronic 3K
Remarks

Montana Tech Foundation
Montana Bureau of Mines and Geology
Electric Log

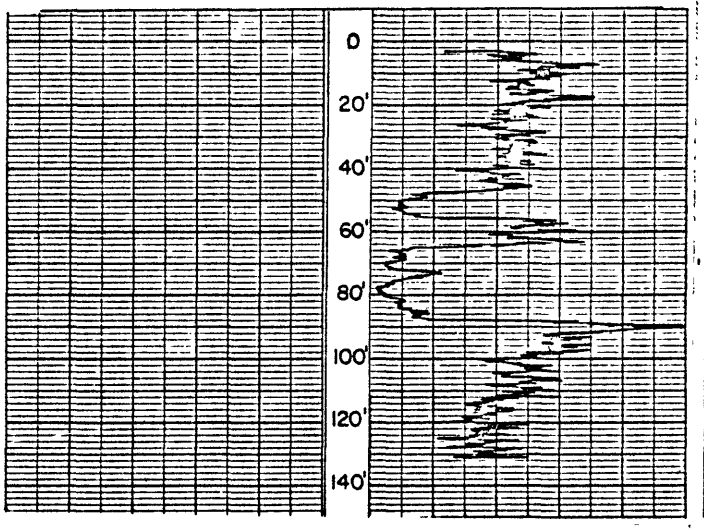
Hole no. US-7315 Date July 28, 1973 Recorded by Mel Granberg
State Wyoming County Campbell Map Echeta 4 SE Photo no. ____
T. 47 (N/S) R. 73 (E/W) Sec. 2, Tract NDDA, Measured 407' FSL 150'
Elevation (ground) 4760' Log measured from Ground
Drilled depth 285' Logged depth 276' Fluid type Mud
Recording speed 60 ft/min. (up) down Logger no. 1
(S.P.) or S.N. Res. (Single point) or L.N. Res.
Sens. setting 20 Zero pos. ____ Sens. setting 20 Zero pos. ____
Run 2 of 2 Hole dia. 4.75" Tool type Meltronic 3K
Remarks





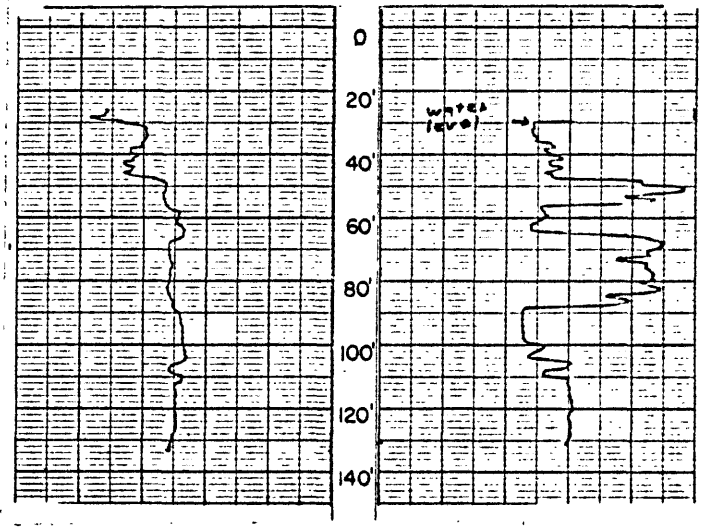
Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. US-7316 Date July 29, 1973 Recorded by Mel Granberg
State Wyoming County Campbell Map Echeta NSE Photo no. ____
T. 47 (N/S) R. 72 (E/W) Sec. 17, Tract DACR, Measured 1,800' FSL 1,310' FEL
Elevation (ground) 4704' Log measured from Ground
Drilled depth 135' Logged depth 131' Fluid type Mud
Recording speed 20 ft/min. (up) down Hole dia. 4.75"
Sens. setting 50 Time const. 2 Logger no. 1
Run 1 of 2 Tool type Neltronic 3K
Remarks



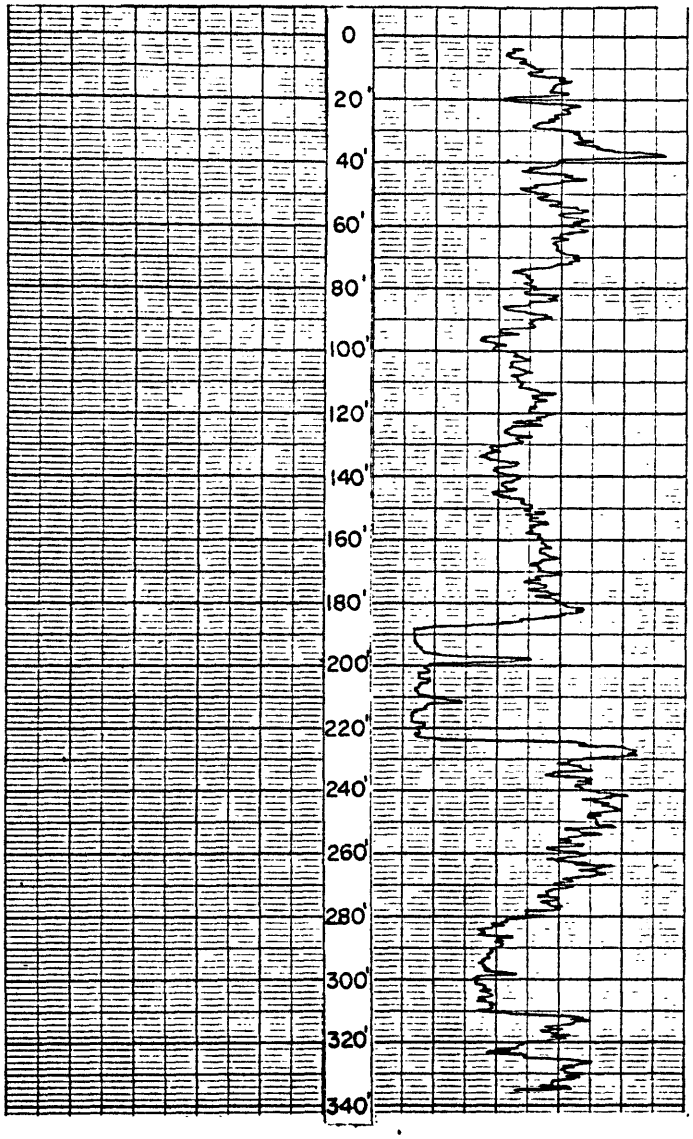
Montana Tech Foundation
Montana Bureau of Mines and Geology
Electric Log

Hole no. US-7316 Date July 29, 1973 Recorded by Mel Granberg
State Wyoming County Campbell Map Echeta 4 SE Photo no. ____
T. 47 (N/S) R. 72 (E/W) Sec. 17, Tract DACR, Measured 1800' FSL 1310' FEL
Elevation (ground) 4764' Log measured from Ground
Drilled depth 135' Logged depth 131' Fluid type Mud
Recording speed 60 ft/min. (up) down Logger no. 1
(S.P.) or S.N. Res. (Single point) or L.N. Res.
Sens. setting 20 Zero pos. ____ Sens. setting 20 Zero pos. ____
Run 2 of 2 Hole dia. 4.75" Tool type Neltronic 3K
Remarks



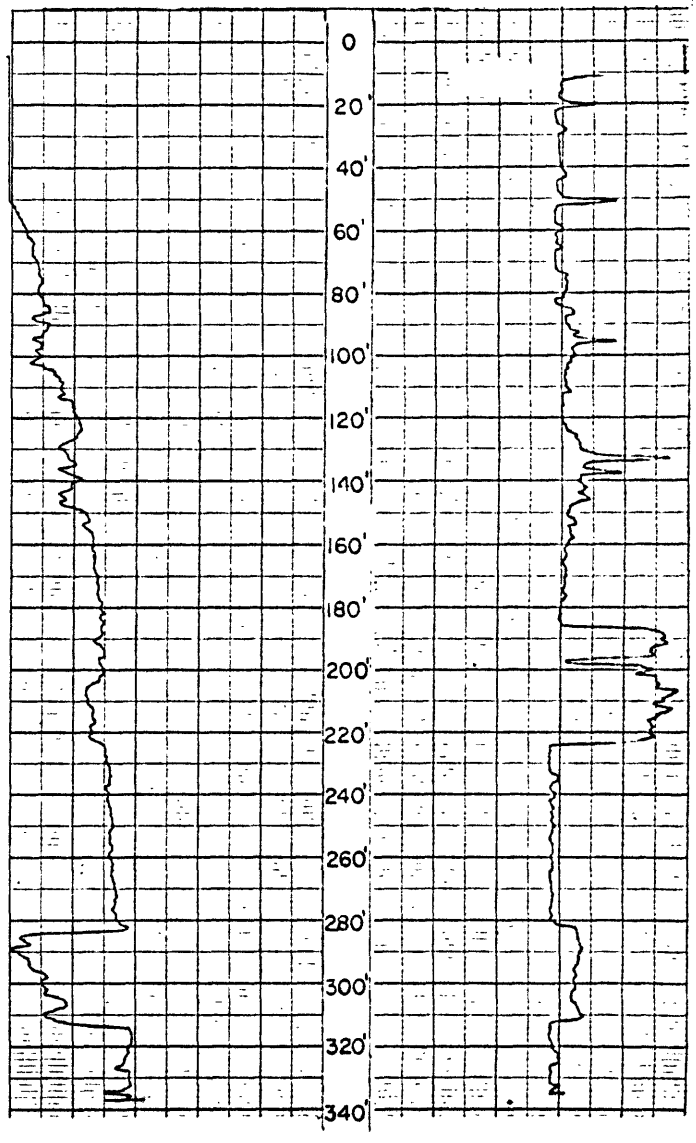
Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. US-7317 Date July 30, 1973 Recorded by Mel Granberg
State Wyoming County Campbell Map Echeta 4 SW Photo no. ____
T. 48 (N)/S R. 73 (E)/W Sec. 33, Tract DCBD, Measured 750' FSL 2,300' FEL
Elevation (ground) 4781' Log measured from Ground
Drilled depth 368' Logged depth 335' Fluid type Mud
Recording speed 20 ft/min. (up) down Hole dia. 4.75"
Sens. setting 50 Time const. 2 Logger no. 1
Run 1 of 2 Tool type Heltronic 3K
Remarks



Montana Tech Foundation
Montana Bureau of Mines and Geology
Electric Log

Hole no. US-7317 Date July 30, 1973 Recorded by Mel Granberg
State Wyoming County Campbell Map Echeta 4 SW Photo no. ____
T. 48 (N)/S R. 73 (E)/W Sec. 33, Tract DCBD, Measured 750' FSL 2,300' FEL
Elevation (ground) 4781' Log measured from Ground
Drilled depth 368' Logged depth 335' Fluid type Mud
Recording speed 60 ft/min. (up) down Logger no. 1
(S.P.) or S.N. Res. (Single point) or L.N. Res.
Sens. setting 10 Zero pos. ____ Sens. setting 2 Zero pos. ____
Run 2 of 2 Hole dia. 4.75" Tool type Heltronic 3K
Remarks



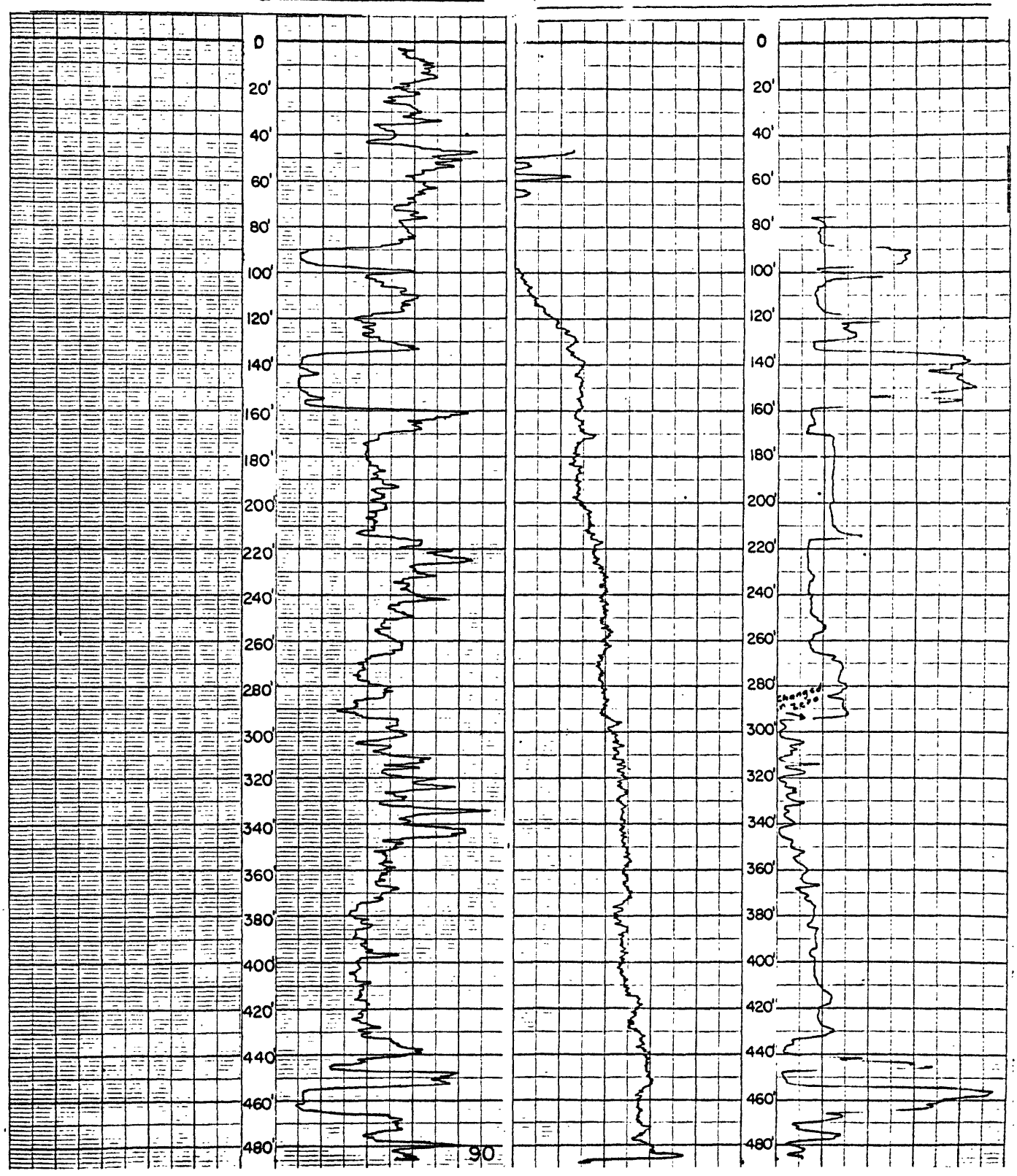
US-7318

Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. US-7318 Date July 31, 1973 Recorded by Mel Granberg
State Wyoming County Campbell Map Echeta 4 SE Photo no. ____
T. 47 (N/S) R. 72 (E/W) Sec. 18, Tract CBBC, Measured 2,350' FSL 0' FWL
Elevation (ground) 4771' Log measured from Ground
Drilled depth 495' Logged depth 486' Fluid type Mud
Recording speed 20 ft/min. (up) down Hole dia. 4.75"
Sens. setting 50 Time const. 2 Logger no. 1
Run 1 of 2 Tool type Mellronic 3K
Remarks

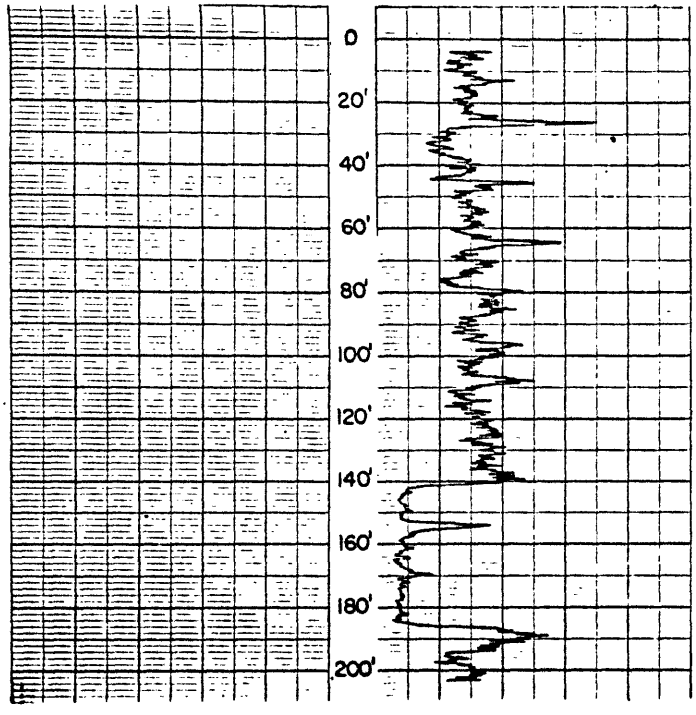
Montana Tech Foundation
Montana Bureau of Mines and Geology
Electric Log

Hole no. US-7318 Date August 1, 1973 Recorded by Mel Granberg
State Wyoming County Campbell Map Echeta 4 SE Photo no. ____
T. 47 (N/S) R. 72 (E/W) Sec. 18, Tract CBBC, Measured 2,350' FSL 0' FWL
Elevation (ground) 4771' Log measured from Ground
Drilled depth 495' Logged depth 481' Fluid type Mud
Recording speed 60 ft/min. up down Logger no. 1
(S.P.) or S.N. Res. (Single point) or L.N. Res.
Sens. setting 10 Zero pos. ____ Sens. setting 32 Zero pos. ____
Run 2 of 2 Hole dia. 4.75" Tool type Mellronic 3K
Remarks



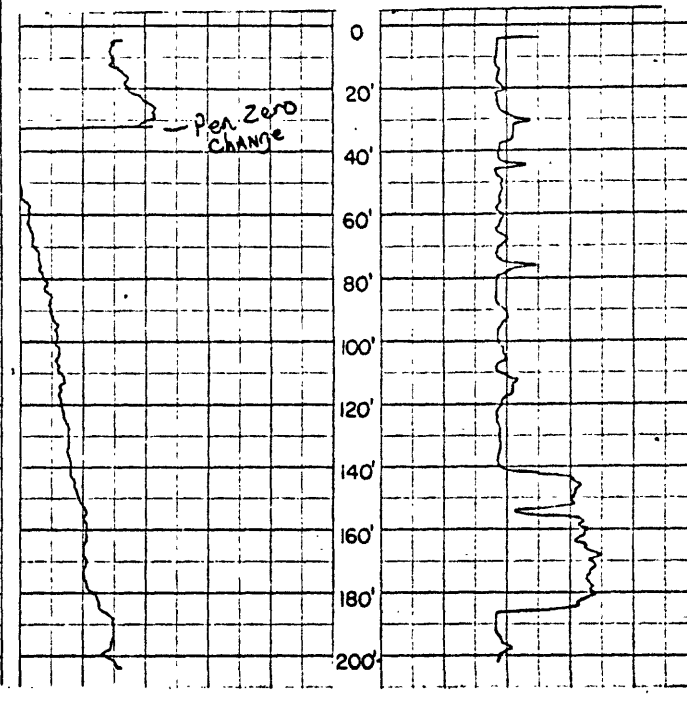
Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. US-7319 Date August 2, 1973 Recorded by John Blumer
State Wyoming County Campbell Map Echeta NSE Photo no.
T. 48 (N/S) R. 73 (E/W) Sec. 26, Tract BBNB, Measured 800' FNL 800' FWL
Elevation (ground) 4753' Log measured from Ground
Drilled depth 210' Logged depth 203' Fluid type Mud
Recording speed 20 ft/min. (up) down Hole dia. 4.75"
Sens. setting 100 Time const. 1 Logger no. 1
Run 1 of 2 Tool type Heltronic 3K
Remarks



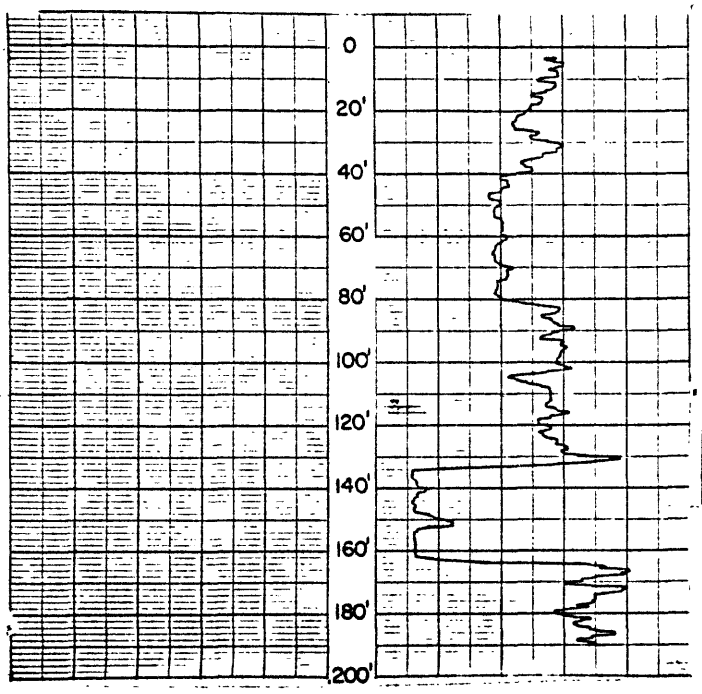
Montana Tech Foundation
Montana Bureau of Mines and Geology
Electric Log

Hole no. US-7319 Date August 2, 1973 Recorded by Mel Granberg
State Wyoming County Campbell Map Echeta 4 SE Photo no.
T. 48 (N/S) R. 73 (E/W) Sec. 26, Tract BBNB, Measured 800' FNL 800' FWL
Elevation (ground) 4753' Log measured from Ground
Drilled depth 210' Logged depth 202 Fluid type Mud
Recording speed 60 ft/min. (up) down Logger no. 1
(S.P.) or S.N. Res. (Single point) or L.N. Res.
Sens. setting 20 Zero pos. Sens. setting 50 Zero pos.
Run 2 of 2 Hole dia. 4.75" Tool type Heltronic 3K
Remarks



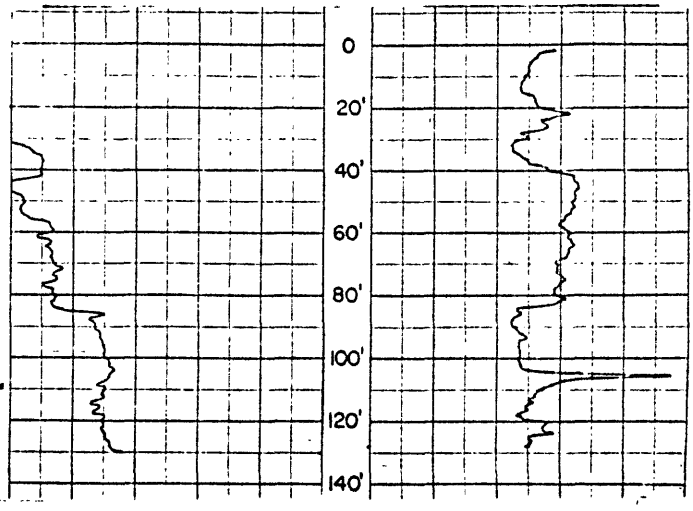
Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. US-7320 Date August 7, 1973 Recorded by Mel Granberg
State Wyoming County Campbell Map Echeta 4 NE Photo no. ____
T. 48 (N)/S R. 73 E/(W) Sec. 14, Tract CDCD, Measured 230' FSL 1,650' FWL
Elevation (ground) 4708' Log measured from Ground
Drilled depth 195' Logged depth 190' Fluid type Mud
Recording speed 20 ft/min. (up) down Hole dia. 4.75"
Sens. setting 50 Time const. 2 Logger no. 1
Run 1 of 2 Tool type Heltronic 3K
Remarks



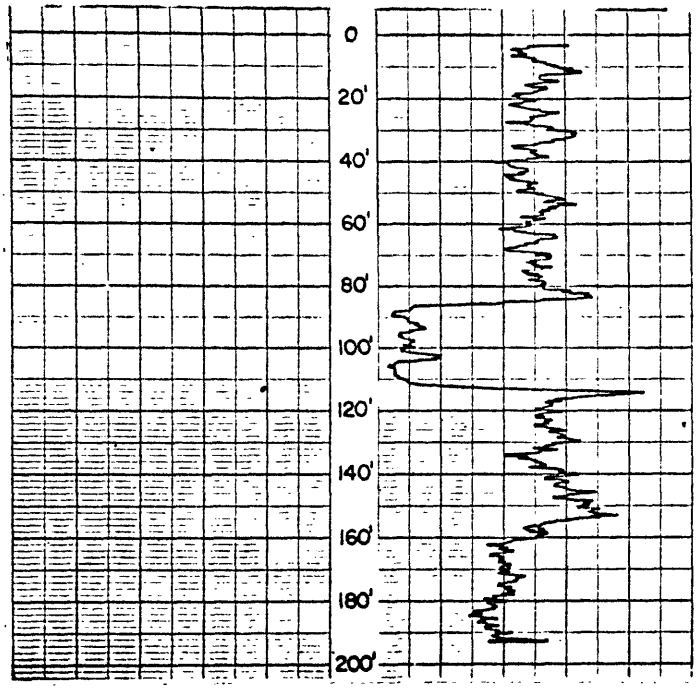
Montana Tech Foundation
Montana Bureau of Mines and Geology
Electric Log

Hole no. US-7320 Date August 7, 1973 Recorded by Mel Granberg
State Wyoming County Campbell Map Echeta 4 NE Photo no. ____
T. 48 (N)/S R. 73 E/(W) Sec. 14, Tract CDCD, Measured 230' FSL 1,650' FWL
Elevation (ground) 4708' Log measured from Ground
Drilled depth 195' Logged depth 129' Fluid type Mud
Recording speed 60 ft/min. (up) down Logger no. 1
(S.P.) or S.N. Res. (Single point) or L.N. Res.
Sens. setting 10 Zero pos. ____ Sens. setting 10 Zero pos. ____
Run 2 of 2 Hole dia. 4.75" Tool type Heltronic 5K
Remarks



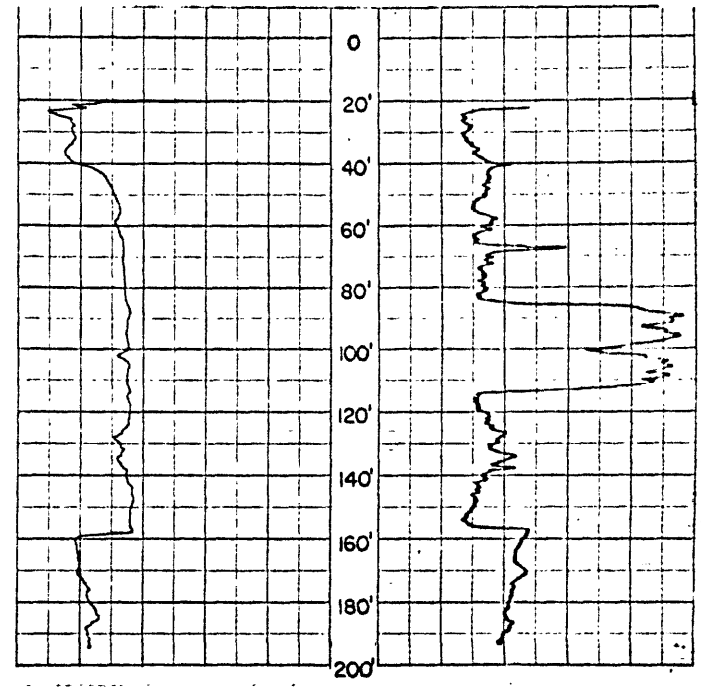
Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. US-7321 Date August 9, 1973 Recorded by John Blumer
State Wyoming County Campbell Map Echeta 4 NE Photo no. ____
T. 48 (N) (S) R. 73 (E) (W) Sec. 1, Tract BABD, Measured 430'FNL 1950'FWL
Elevation (ground) 4690' Log measured from Ground
Drilled depth 195' Logged depth 193' Fluid type Mud
Recording speed 20 ft/min. (up) down Hole dia. 4.75"
Sens. setting 50 Time const. 2 Logger no. 1
Run 1 of 2 Tool type Heltronic 3K
Remarks



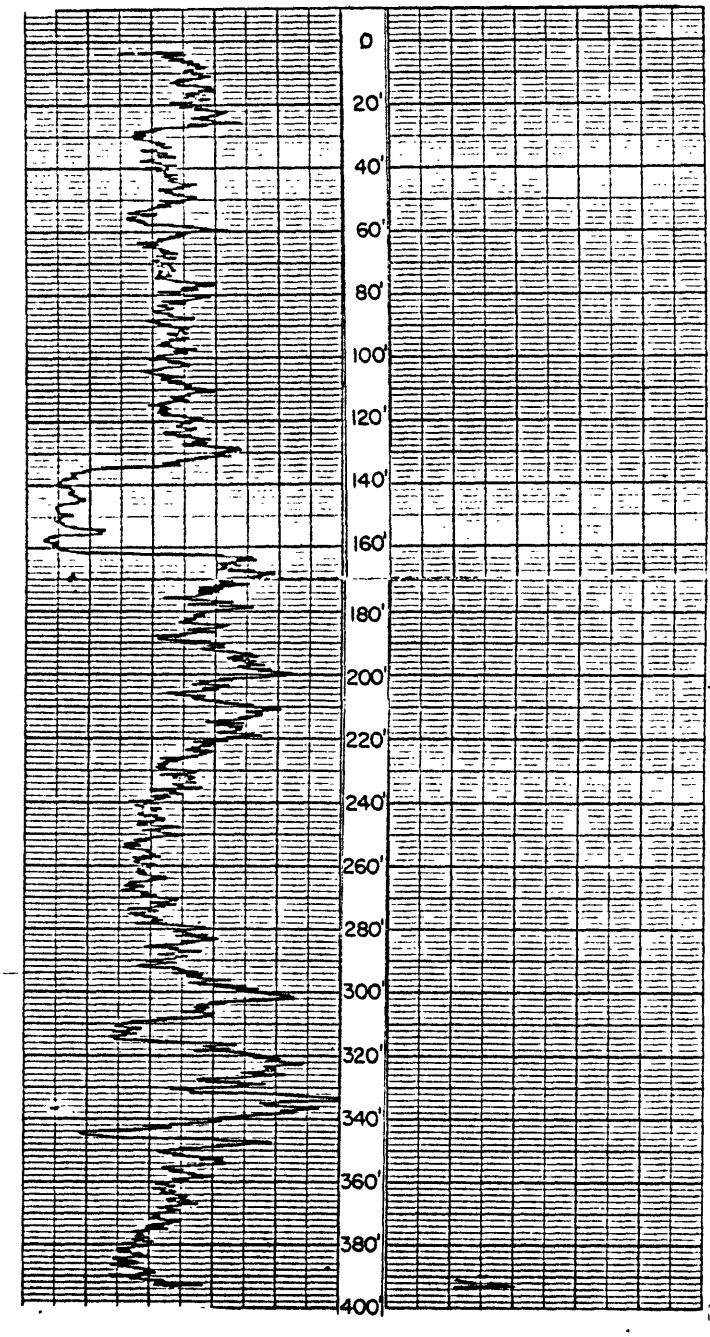
Montana Tech Foundation
Montana Bureau of Mines and Geology
Electric Log

Hole no. US-7321 Date August 9, 1973 Recorded by John Blumer
State Wyoming County Campbell Map Echeta 4 NE Photo no. ____
T. 48 (N) (S) R. 73 (E) (W) Sec. 1, Tract BABD, Measured 430'FNL 1950'FWL
Elevation (ground) 4690' Log measured from Ground
Drilled depth 195' Logged depth 193' Fluid type Mud
Recording speed 60 ft/min. (up) down Logger no. 1
(S.P.) or S.N. Res. (Single point) or L.N. Res.
Sens. setting 10 Zero pos. ____ Sens. setting 22 Zero pos. ____
Run 2 of 2 Hole dia. 4.75" Tool type Heltronic 3K
Remarks



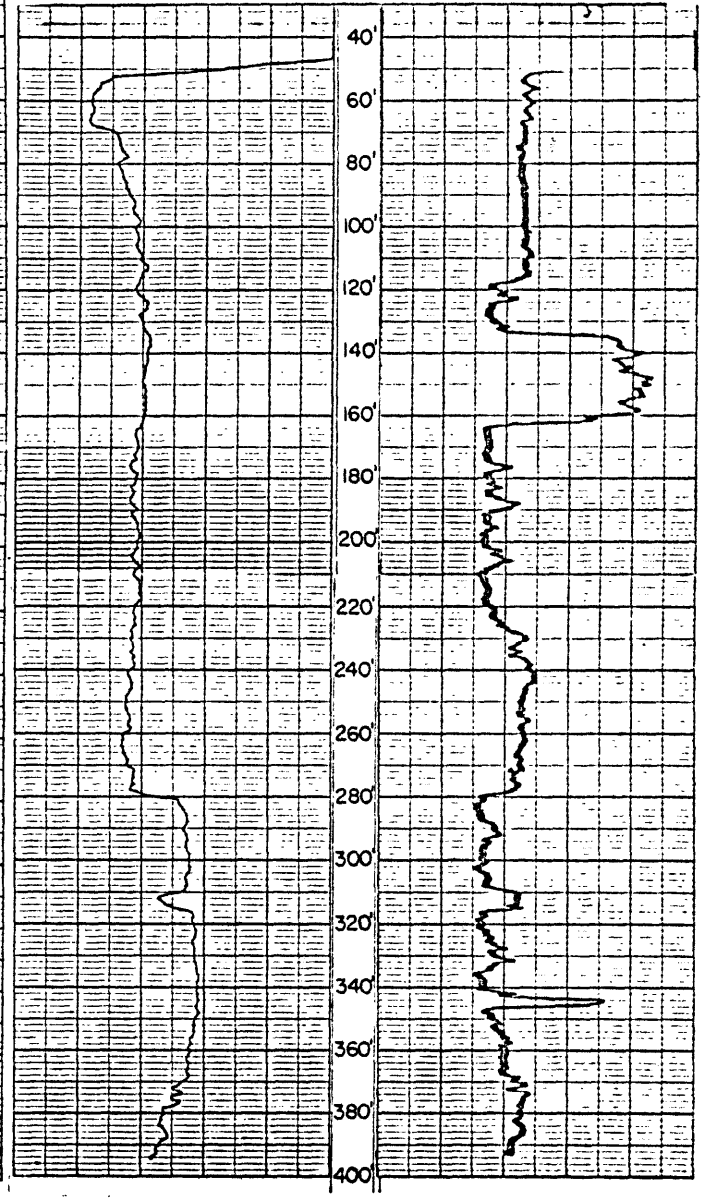
Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. US-7322 Date August 9, 1973 Recorded by John Blumer
State Wyoming County Campbell Map Echeta 4 NE Photo no. ____
T. 49 (N/S) R. 73 (E/W) Sec. 35, Tract DCBA, Measured 1200' FSL, 2150' FEL
Elevation (ground) 4715' Log measured from Ground
Drilled depth 400' Logged depth 393' Fluid type Mud
Recording speed 20 ft/min. (up) down Hole dia. 4.75"
Sens. setting 50 Time const. 2 Logger no. 1
Run 1 of 2 Tool type Neltronic 3K
Remarks



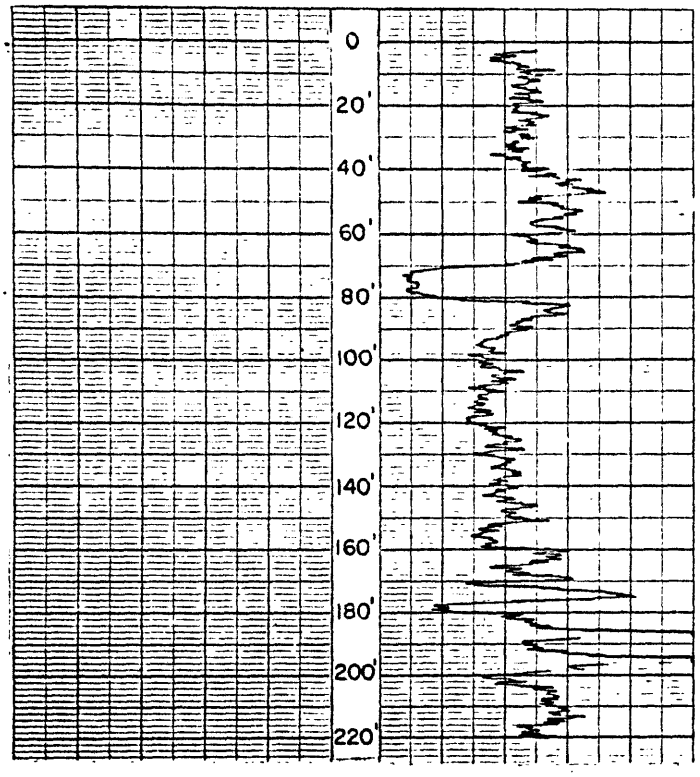
Montana Tech Foundation
Montana Bureau of Mines and Geology
Electric Log

Hole no. US-7322 Date August 9, 1973 Recorded by John Blumer
State Wyoming County Campbell Map Echeta 4 NE Photo no. ____
T. 49 (N/S) R. 73 (E/W) Sec. 35, Tract DCBA, Measured 1200' FSL, 2150' FEL
Elevation (ground) 4715' Log measured from Ground
Drilled depth 400' Logged depth 393' Fluid type Mud
Recording speed 60 ft/min. (up) down Logger no. 1
(S.P.) or S.N. Res. (Single point) or L.N. Res.
Sens. setting 10 Zero pos. ____ Sens. setting 20 Zero pos. ____
Run 2 of 2 Hole dia. 4.75" Tool type Neltronic 3K
Remarks



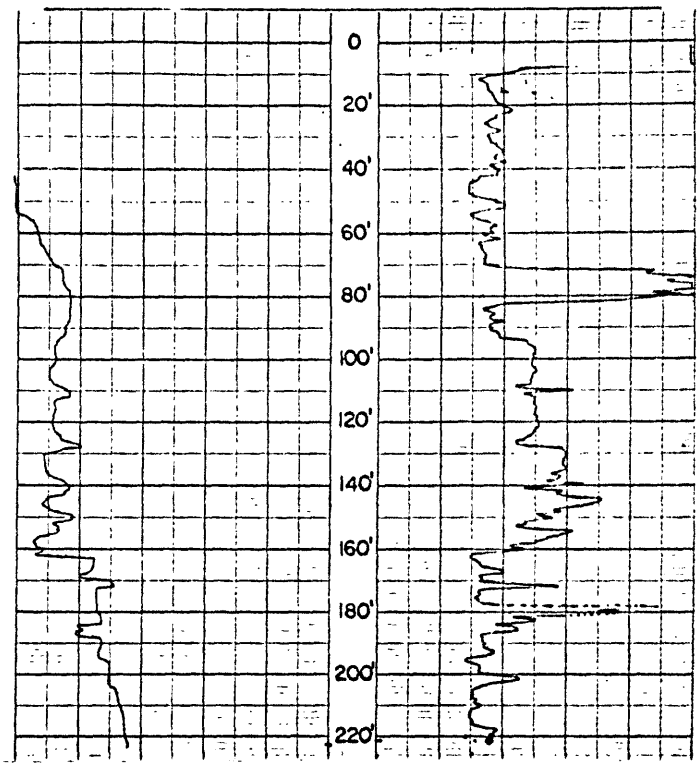
Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. US-7323 Date August 10, 1973 Recorded by Mel Granberg
State Wyoming County Campbell Map Echeta 4 SW Photo no. ____
T. 47 (N) S R. 74 (E) W Sec. 10, Tract DACD, Measured 1,500' FSL 850' FEL
Elevation (ground) 5167' Log measured from Ground
Drilled depth 225' Logged depth 220' Fluid type Mud
Recording speed 20 ft/min. (up) down Hole dia. 4.75"
Sens. setting 50 Time const. 2 Logger no. 1
Run 1 of 2 Tool type Heltronic 3K
Remarks ____



Montana Tech Foundation
Montana Bureau of Mines and Geology
Electric Log

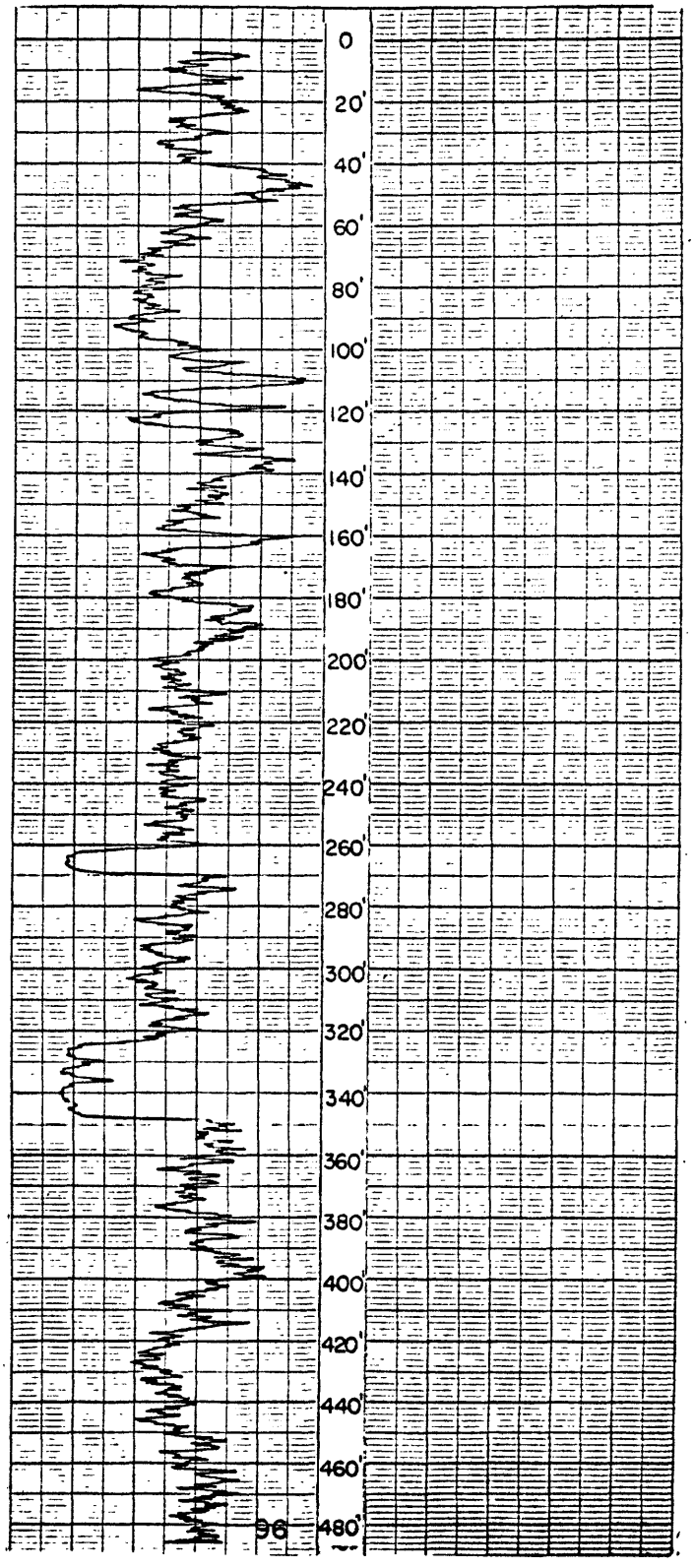
Hole no. US-7323 Date August 10, 1973 Recorded by Mel Granberg
State Wyoming County Campbell Map Echeta 4 SW Photo no. ____
T. 47 (N) S R. 74 (E) W Sec. 10, Tract DACD, Measured 1,500' FSL 850' FEL
Elevation (ground) 5167' Log measured from Ground
Drilled depth 225' Logged depth 220' Fluid type Mud
Recording speed 60 ft/min. (up) down Logger no. 4.75"
(S.P.) or S.N. Res. (Single point) or L.N. Res.
Sens. setting 10 Zero pos. ____ Sens. setting 20 Zero pos. ____
Run 2 of 2 Hole dia. 4.75" Tool type Heltronic 3K
Remarks ____



US- 7324

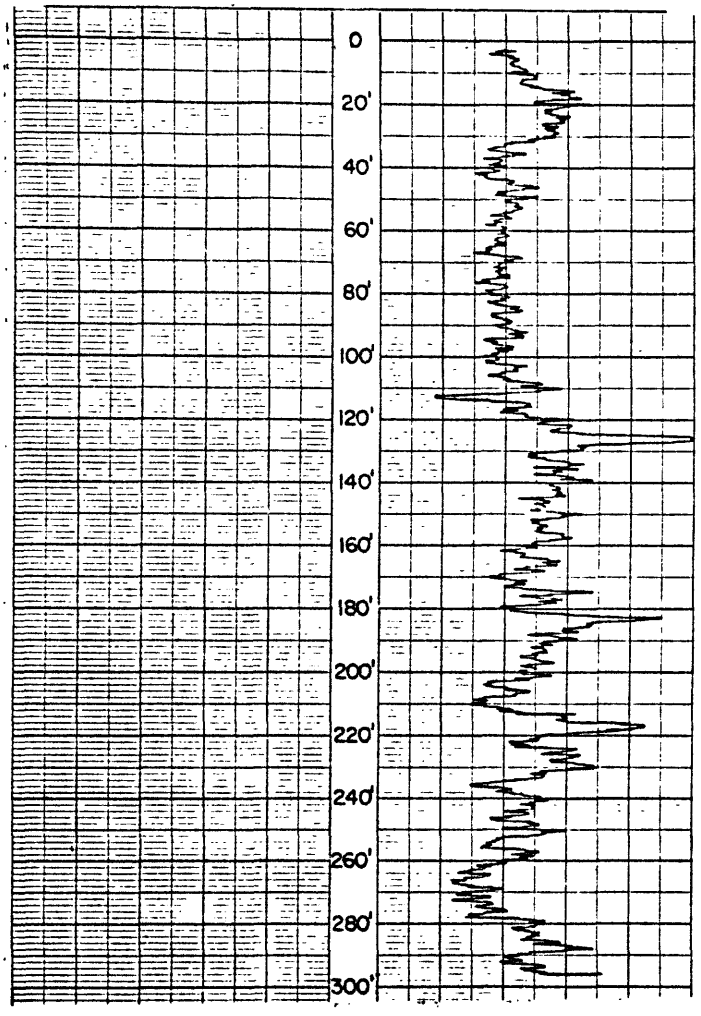
Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. US-7324 Date August 10,1973 Recorded by Mel Gramberg
State Wyoming County Campbell Map Echeta 4 SW Photo no. ____
T. 47 (N/S) R. 73 (E/W) Sec. 17, Tract ASDA, Measured 900' FNL 1,600' FEL
Elevation (ground) 4871' Log measured from Ground
Drilled depth 560' Logged depth 485' Fluid type Mud
Recording speed 20 ft/min. (up) down Hole dia 4.75"
Sens. setting 50 Time const. 2 Logger no. 1
Run 1 of 1 Tool type Neltronic 3K
Remarks ____



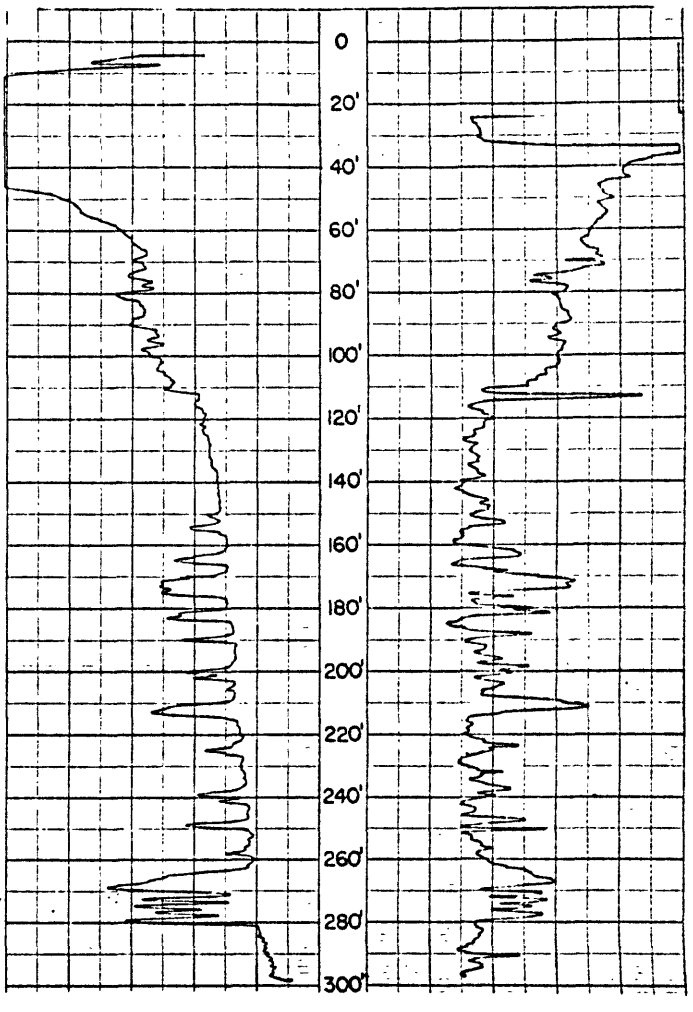
Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. US-7325 Date August 11,1973 Recorded by Mel Granberg
State Wyoming County Campbell Map Echeta 4 SW Photo no.
T. 47 (N) (S) R. 74 (E) (W) Sec. 35, Tract BCBC, Measured 1,720' FWL 200' FWL
Elevation (ground) 5119' Log measured from Ground
Drilled depth 300' Logged depth 296' Fluid type Mud
Recording speed 20 ft/min. (up) down Hole dia. 4.75"
Sens. setting 50 Time const. 2 Logger no. 1
Run 1 of 2 Tool type Heltronic 3K
Remarks



Montana Tech Foundation
Montana Bureau of Mines and Geology
Electric Log

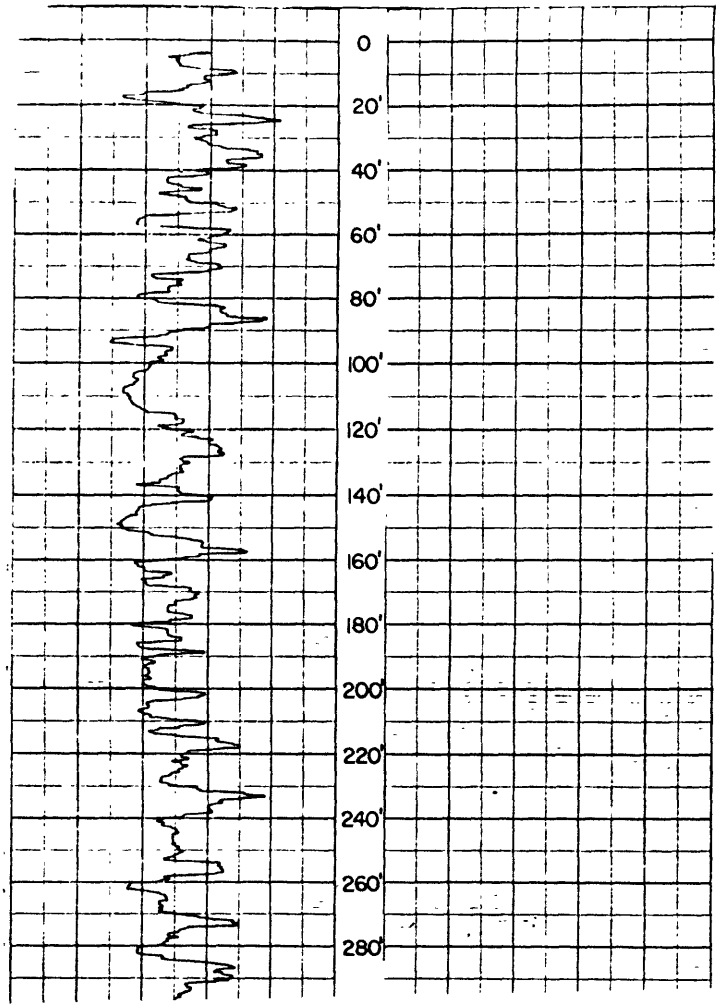
Hole no. US-7325 Date August 11,1973 Recorded by Mel Granberg
State Wyoming County Campbell Map Echeta 4 SW Photo no.
T. 47 (N) (S) R. 74 (E) (W) Sec. 35, Tract BCBC, Measured 1,720' FWL 200'FWL
Elevation (ground) 5119' Log measured from Ground
Drilled depth 300' Logged depth 296' Fluid type Mud
Recording speed 60 ft/min. (up) down Logger no. 1
(S.P.) or S.N. Res. (Single point) or L.N. Res.
Sens. setting 10 Zero pos. Sens. setting 23 Zero pos.
Run 2 of 2 Hole dia. 4.75" Tool type Heltronic 3K
Remarks



US-7326

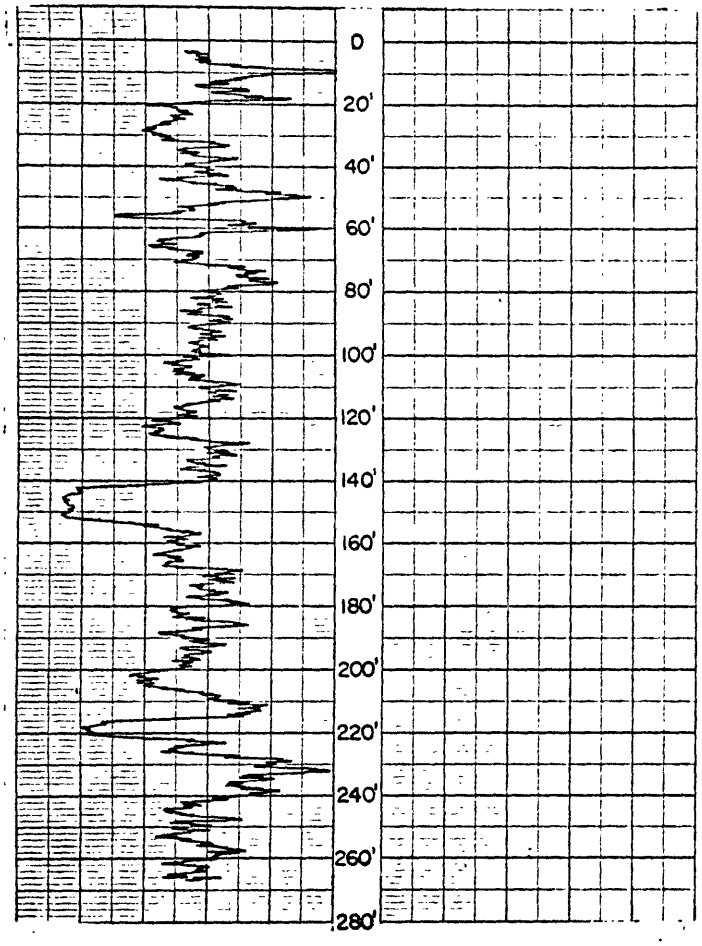
Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. US-7326 Date August 17,1973 Recorded by Mel Grunberg
State Wyoming County Campbell Map Echeta 4 SW Photo no. ____
T. 48 (N)(S) R. 74 (E)(W) Sec. 24, Tract BLM, Measured 3000'FSL 4200'FEL
Elevation (ground) 4442' Log measured from Ground
Drilled depth 532' Logged depth 532' Fluid type Mud
Recording speed 20 ft/min. (up) down Hole dia. 5"
Sens. setting 50 Time const. 2 Logger no. 1
Run 1 of 1 Tool type Heltronic SK
Remarks



Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

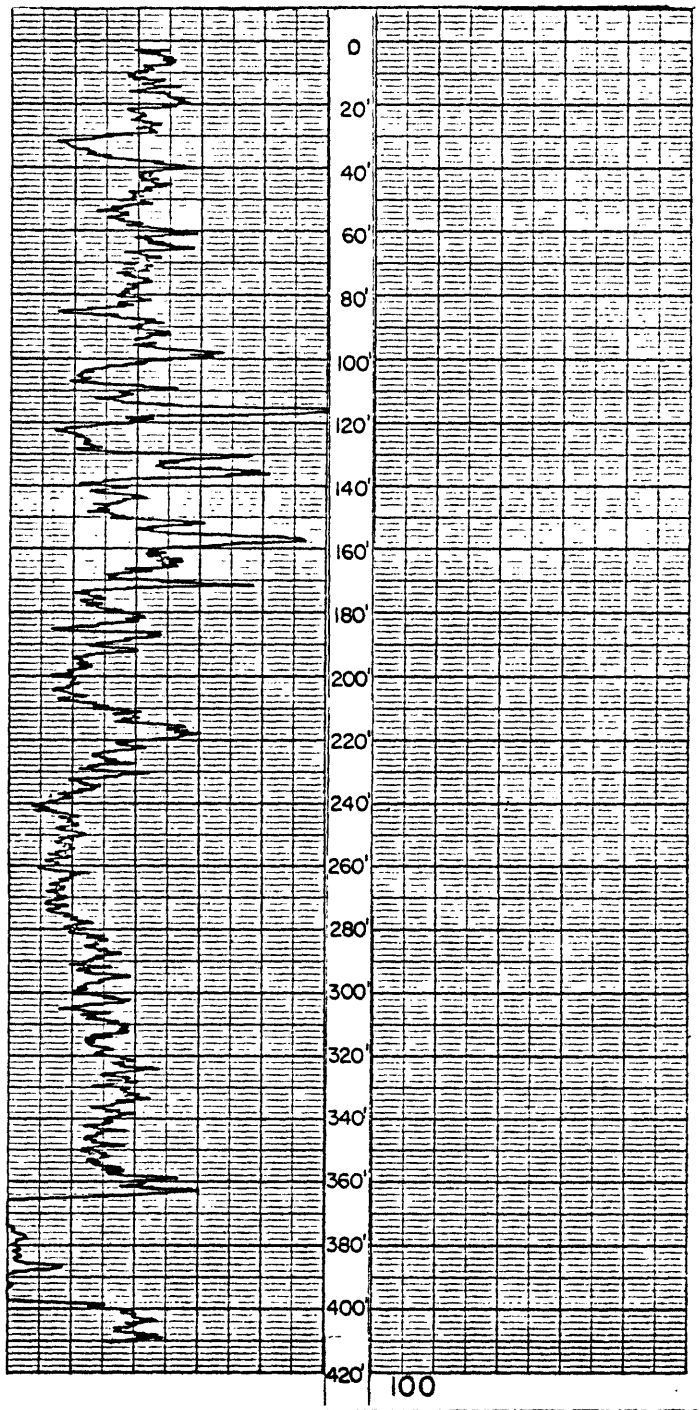
Hole no. US-7327 Date August 12,1975 Recorded by Mel Granberg
State Wyoming County Campbell Map Echeta 4 SW Photo no. ____
T. 48 (N)(S) R. 74 (E)(W) Sec. 23, Tract SESE, Measured 760'FSL 1,400'FWL
Elevation (ground) 5032' Log measured from Ground
Drilled depth 270' Logged depth 266' Fluid type Mud
Recording speed 20 ft/min. (up) down Hole dia. 4.75"
Sens. setting 50 Time const. 2 Logger no. 1
Run 1 of 1 Tool type Heltronic 3K
Remarks



US-7328

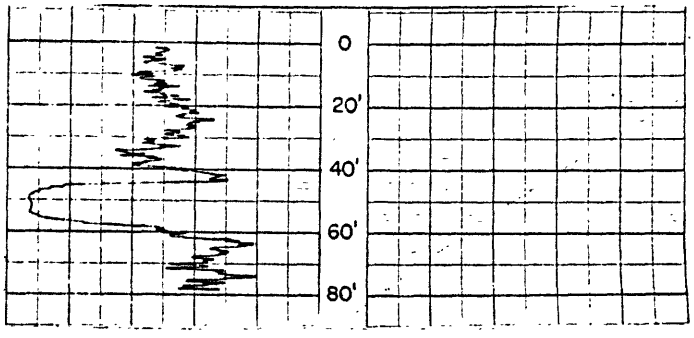
Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. US-7328 Date August 14,1973 Recorded by Mel Grambergs
State Wyoming County Campbell Map Echeta 4 NW Photo no. ____
T. 48 (N) (S) R. 71 (E) (W) Sec. 7, Tract DCCA, Measured 2940'FWL 410'FSL
Elevation (ground) 4832' Log measured from Ground
Drilled depth 418' Logged depth 410' Fluid type Mud
Recording speed 20 ft/min. (up) down Hole dia. 5"
Sens. setting 50 Time const. 2 Logger no. 1
Run 1 of 1 Tool type Mt. Tronic 3K
Remarks



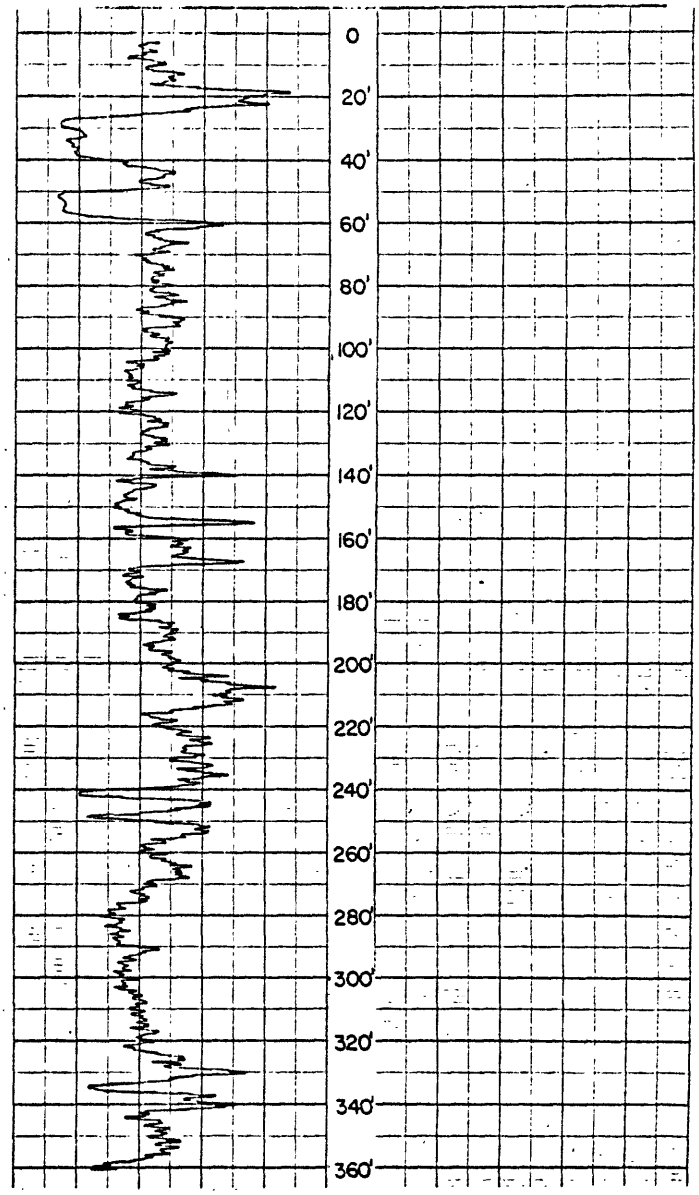
Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. US-7329 Date August 12,1973 Recorded by Mel Gramberg
State Wyoming County Campbell Map Cohieta 4 NW Photo no. ____
T. 48 (N) S R. 74 (E) W Sec. 15, Tract NENW, Measured 2,100'FSL 1,600'FEL
Elevation (ground) 4992' Log measured from Ground
Drilled depth 150' Logged depth 73' Fluid type Air
Recording speed 20 ft/min. (UP) down Hole dia. 4.75"
Sens. setting 50 Time const. 2 Logger no. 1
Run 1 of 1 Tool type Geotronic SK
Remarks ____



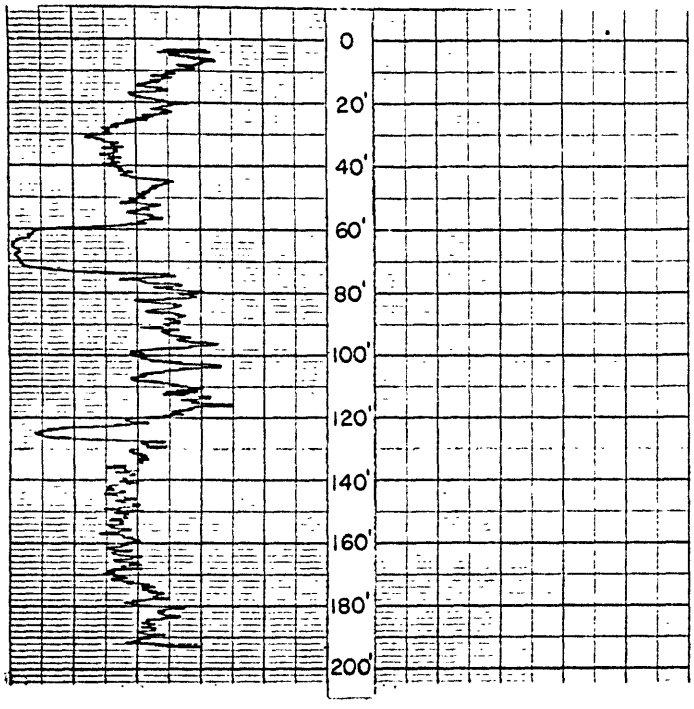
Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. US-7330 Date August 16,1973 Recorded by John Blumer
State Wyoming County Campbell Map Echeta 4 NE Photo no. ____
T. 49 (N) (S) R. 72 (E) (W) Sec. 7, Tract ADDC, Measured 2,609' FNL 500' FEL
Elevation (ground) 4655' Log measured from Ground
Drilled depth 365' Logged depth 360' Fluid type Mud
Recording speed 15 ft/min. (up) down Hole dia. 5"
Sens. setting 50 Time const. 2 Logger no. 1
Run 1 of 1 Tool type Geoprobe 3K
Remarks



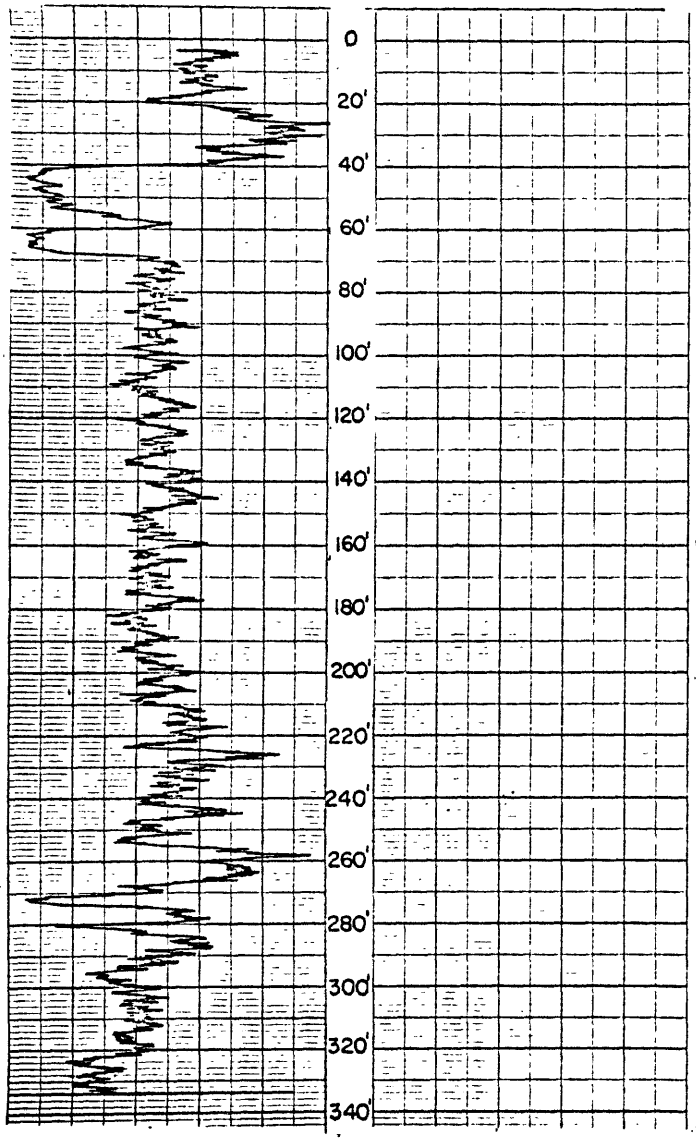
Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. US-7331 Date August 14,1973 Recorded by Del Grandberg
State Wyoming County Campbell Map Echeta 4 NW Photo no. ____
T. 47 (N) R. 74 (W) Sec. 35, Tract DDAD, Measured 730'FSL 230'FEL
Elevation (ground) 4904' Log measured from Ground
Drilled depth 195' Logged depth 193' Fluid type ____
Recording speed 20 ft/min. (up) down Hole dia. 4.75"
Sens. setting 50 Time const. 2 Logger no. 1
Run 1 of 1 Tool type Geltronic 3K
Remarks ____



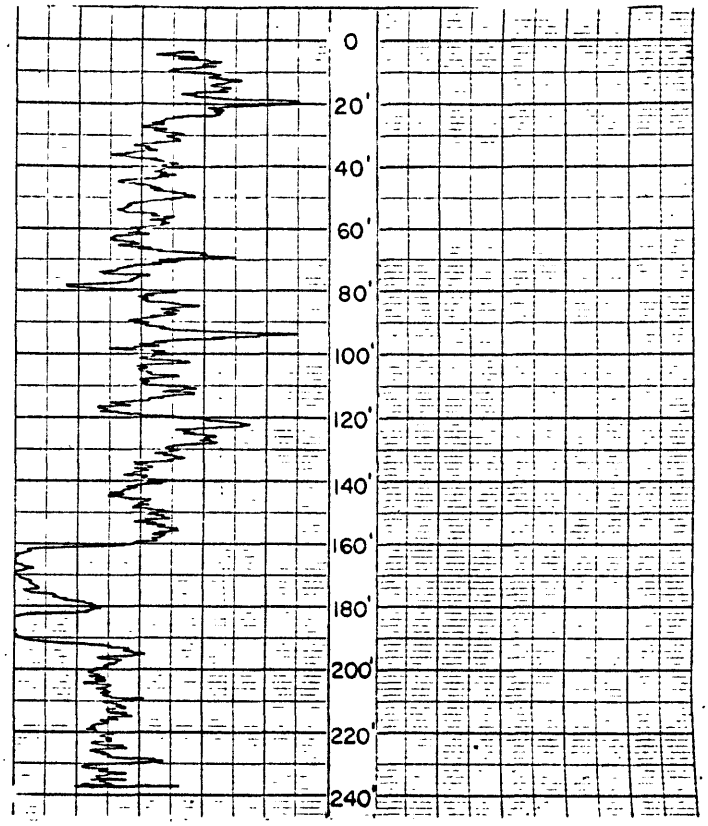
Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. US-7332 Date August 29,1975 Recorded by Bulmer
State Wyoming County Campbell Map Equeta ISE Photo no. ____
T. 49 N R. 72 E Sec. 6, Tract BADA, Measured 2,990'FNL 750'FWL
Elevation (ground) 3615' Log measured from Ground
Drilled depth 460' Logged depth 334' Fluid type Mud
Recording speed 20 ft/min. up down Hole dia. 5"
Sens. setting 50 Time const. 2 Logger no. 1
Run 1 of 1 Tool type Mt. Sopris SK
Remarks



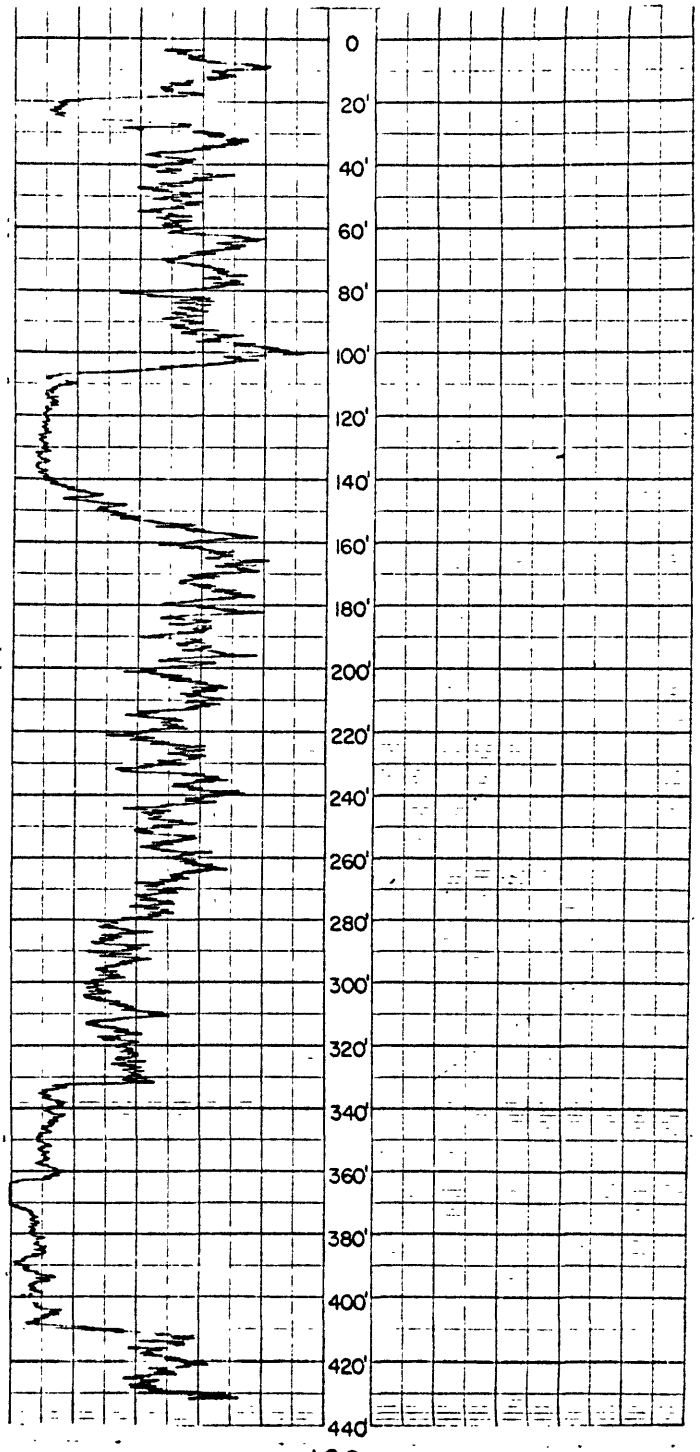
Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. US-7333 Date August 16,1973 Recorded by John Blumer
State Wyoming County Campbell Map Edgerton 4 NE Photo no. ____
T. 40 N R. 73 W Sec. 2, Tract CDAD, Measured 750'FSL 2,550'FWL
Elevation (ground) 4620' Log measured from Ground
Drilled depth 240' Logged depth 237' Fluid type Mud
Recording speed 20 ft/min. (UP) down Hole dia. 4.75"
Sens. setting 50 Time const. 2 Logger no. 1
Run 1 of 1 Tool type Geotronic 3K
Remarks



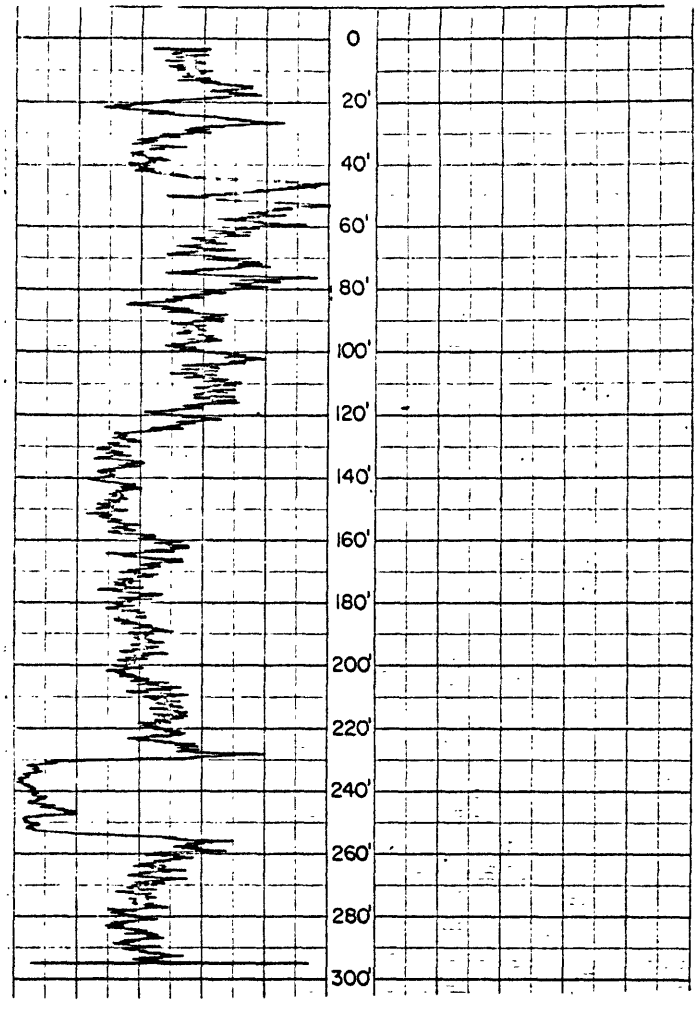
Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. US-7334 Date August 28,1973 Recorded by Elbon Woods
State Wyoming County Campbell Map Echeta 1 NE Photo no. ____
T. 51 (N/S) R. 73 (E/W) Sec. 1, Tract ACBA, Measured 1,600'FNL 2,300'FEL
Elevation (ground) 4207' Log measured from Ground
Drilled depth 440' Logged depth 439' Fluid type Mud
Recording speed 20 ft/min. (up) down Hole dia. 5"
Sens. setting 50 Time const. 2 Logger no. 1
Run 1 of 1 Tool type Heltronic 3K
Remarks



Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

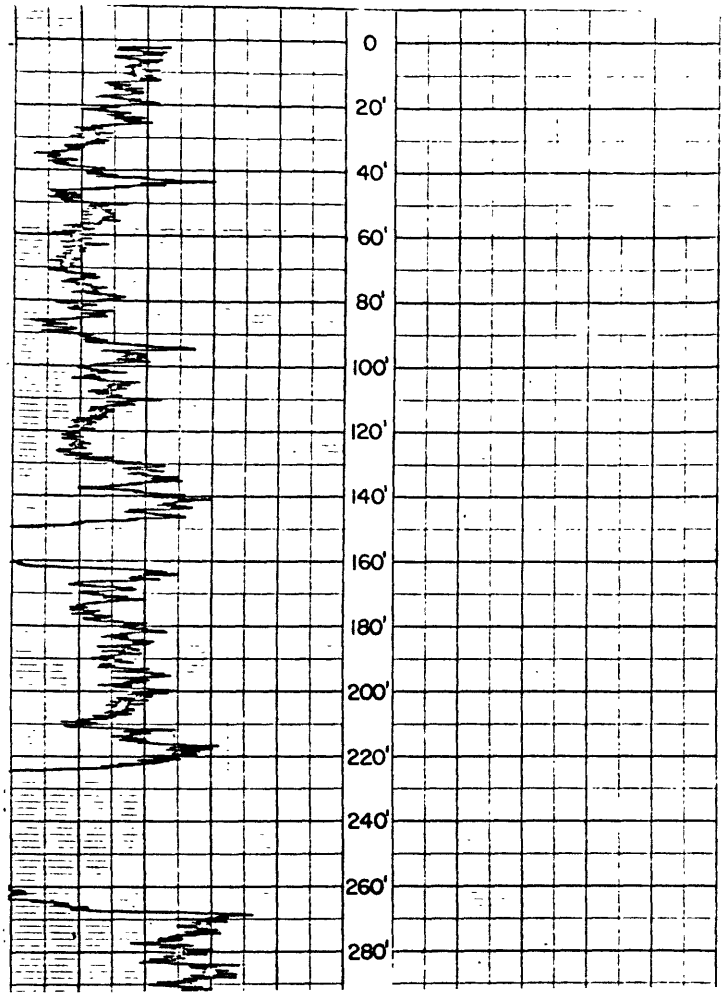
Hole no. US-7335 Date August 29,1973 Recorded by Elbon Woods
State Wyoming County Campbell Map Echeta 1 SW Photo no. ____
T. 49 (N/S) R. 74 (W) Sec. 3, Tract AAAA, Measured 300'FNL 200'FEL
Elevation (ground) 4544' Log measured from Ground
Drilled depth 300' Logged depth 295' Fluid type Mud
Recording speed 20 ft/min. (up/down) Hole dia. 5"
Sens. setting 50 Time const. 2 Logger no. 1
Run 1 of 1 Tool type Heltronic 3K
Remarks ____



US-7336

Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

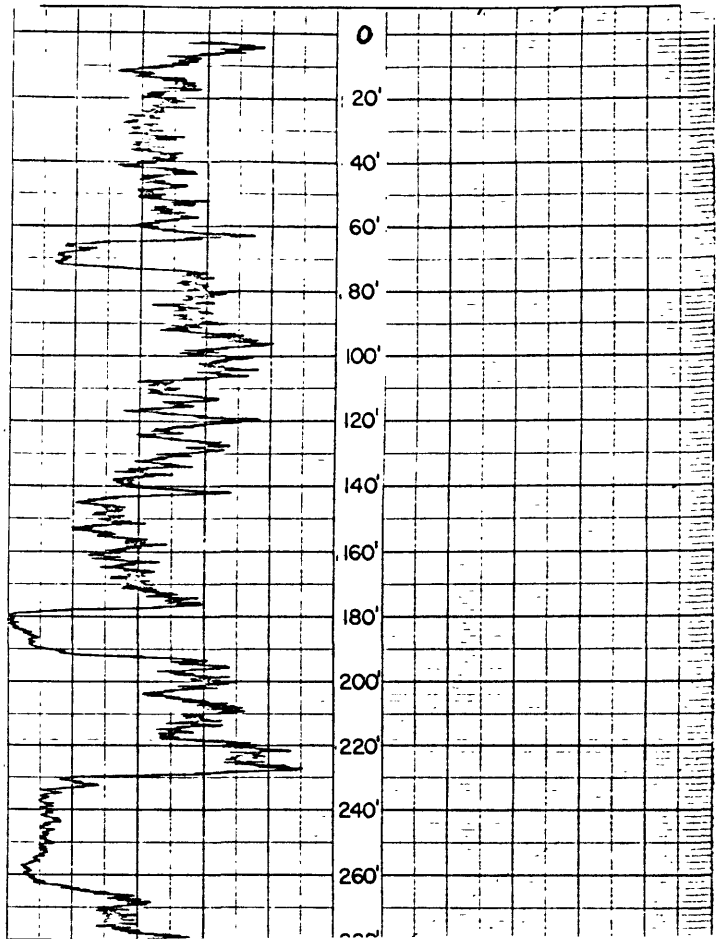
Hole no. US-7336 Date August 30, 1975 Recorded by [illegible]
State Wyoming County Campbell Map Locta NW Photo no. ____
T. 52 N R. 73 W Sec. 35, Tract NW¼, Measured 1,400'FSL 520'FEL
Elevation (ground) 4295' Log measured from Ground
Drilled depth 555' Logged depth 549' Fluid type Mud
Recording speed 20 ft/min. (up) down Hole dia. 5"
Sens. setting 50 Time const. 2 Logger no. 1
Run 1 of 1 Tool type Heltronic JK
Remarks



US-7338

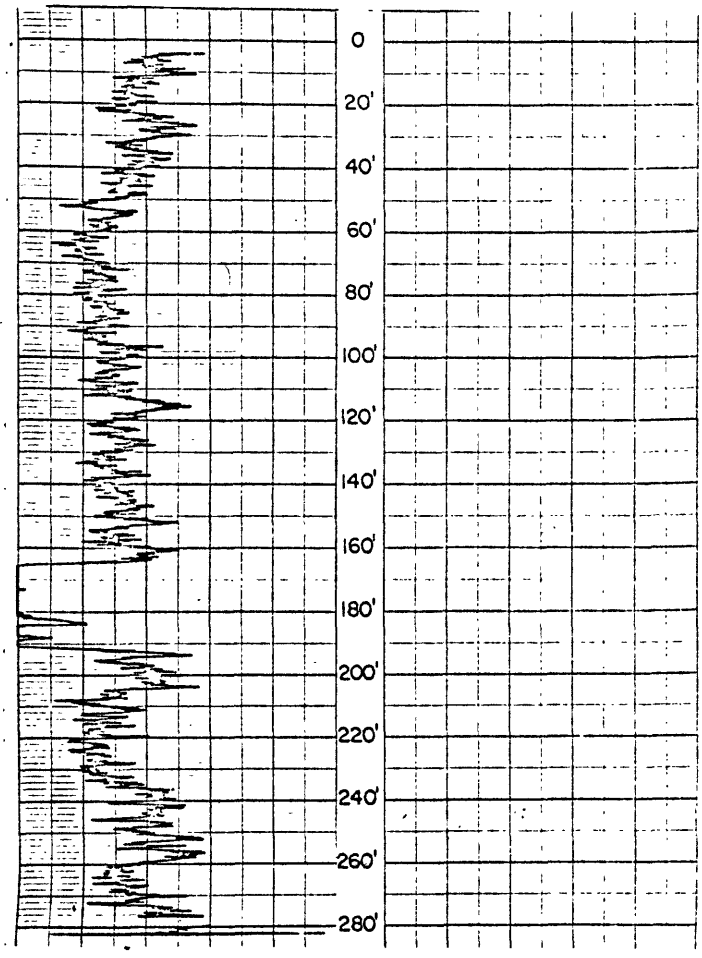
Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. US-7338 Date SEPT. 7, 1973 Recorded by ELDON WOODS
State WYOMING County CAMPBELL Map ECHETA 1 NE Photo no. ____
T. 51 (N/S) R. 73 (E/W) Sec. 11, Tract CBDD, Measured 1340' FSL 1200 FWL
Elevation (ground) 4268' Log measured from GROUND
Drilled depth 620' Logged depth 614' Fluid type MUD
Recording speed 20 ft/min. (up) down Hole dia. 5"
Sens. setting 50 Time const. 2 Logger no. 1
Run 1 of 1 Tool type HELTRONIC 3K
Remarks ____



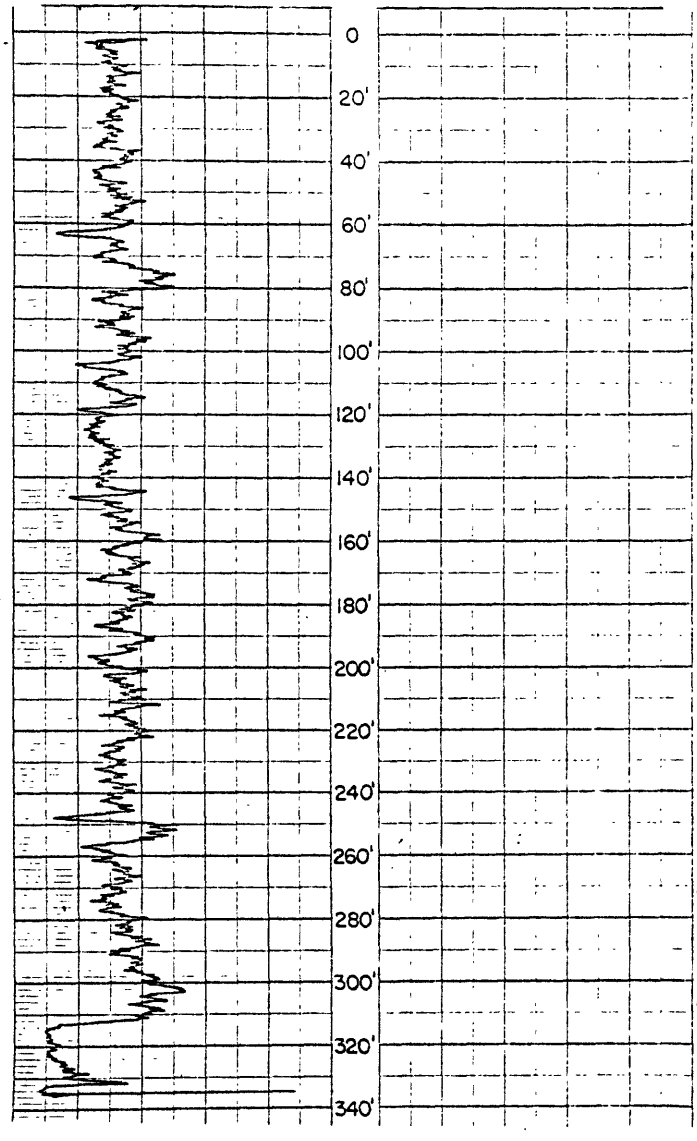
Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. US-7337 Date August 30,1973 Recorded by Elden Woods
State Wyoming County Campbell Map Echeta 1 SW Photo no. ____
T. 50 N R. 74 W Sec. 22, Tract SWNW, Measured 2000'FSL 250'FEL
Elevation (ground) 4439' Log measured from Ground
Drilled depth 285' Logged depth 282' Fluid type Mud
Recording speed 20 ft/min. up down Hole dia. 5"
Sens. setting 50 Time const. 2 Logger no. 1
Run 1 of 1 Tool type Electronic 3K
Remarks



Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

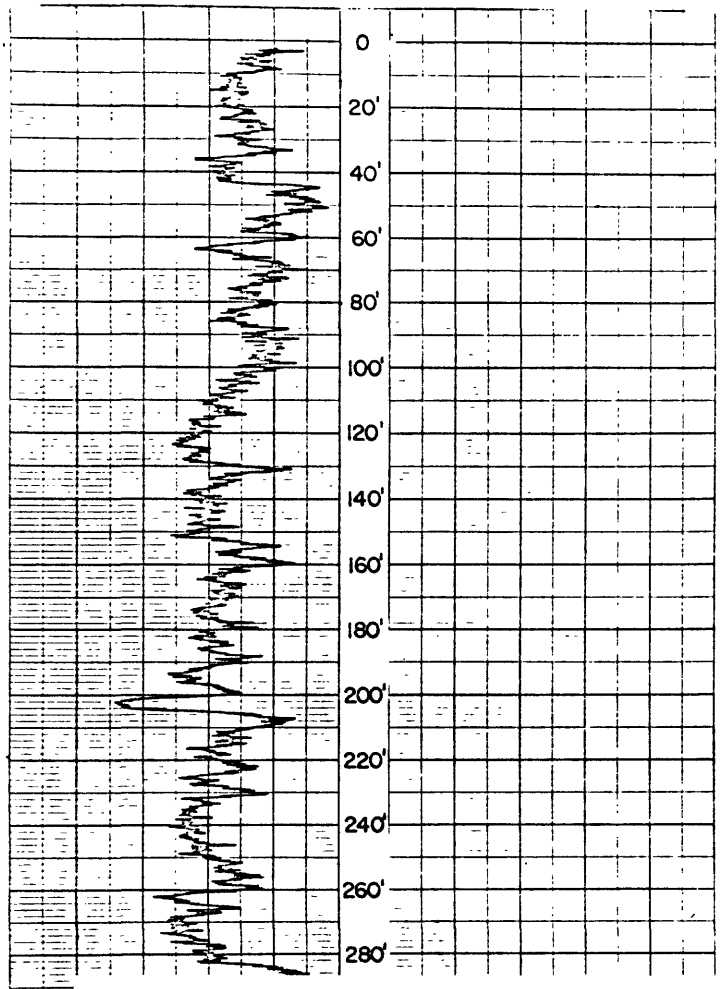
Hole no. US-7339 Date August 27, 1973 Recorded by Lloyd Wilkins
State Wyoming County Campbell Map Echeta 1 SW Photo no. ____
T. 50 (N) R. 73 (E) Sec. 28, Tract ARDC, Measured 2,050'FNL 400'FEL
Elevation (ground) 4765' Log measured from Ground
Drilled depth 375' Logged depth 335' Fluid type Mud
Recording speed 20 ft/min. (up) down Hole dia. 7"
Sens. setting 100 Time const. 2 Logger no. 1
Run 1 of 1 Tool type Geotronic 5K
Remarks



US-7340

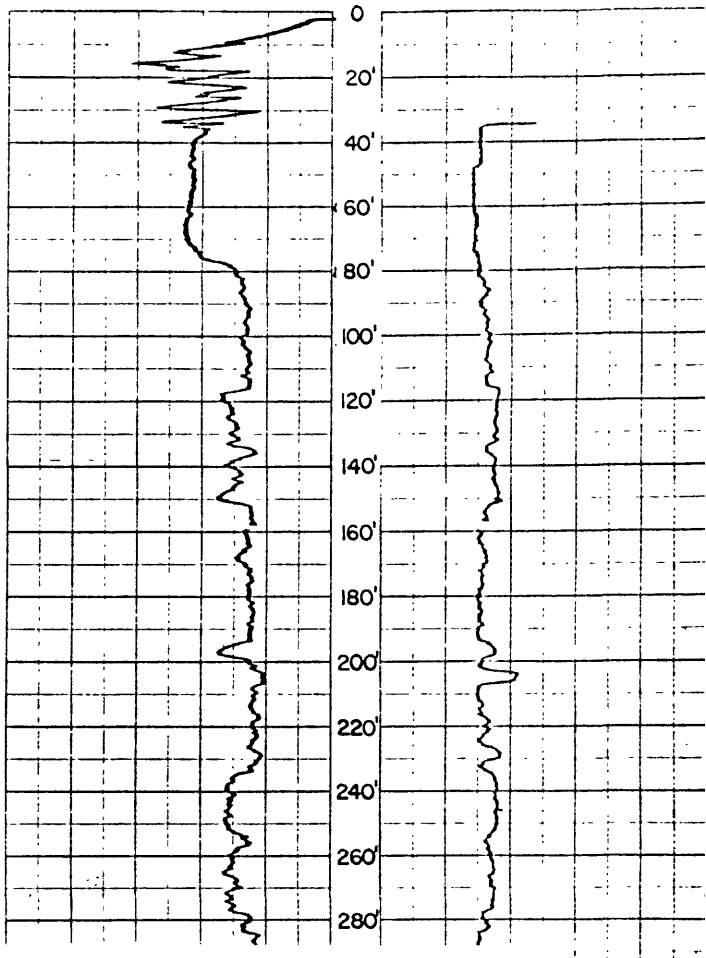
Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. US-7340 Date Sept. 11, 1973 Recorded by Eldon Woods
State Wyoming County Campbell Map Echeta 1 SW Photo no.
T. 52 (N) S R. 74 (E) W Sec. 13, Tract COOO, Measured 275'FSL 2650'FEL
Elevation (ground) 4285' Log measured from Ground
Drilled depth 560' Logged depth 554' Fluid type Mud
Recording speed 20 ft/min. (up) down Hole dia. 5"
Sens. setting 100 Time const. 2 Logger no. 1
Run 1 of 2 Tool type Altronic 5K
Remarks



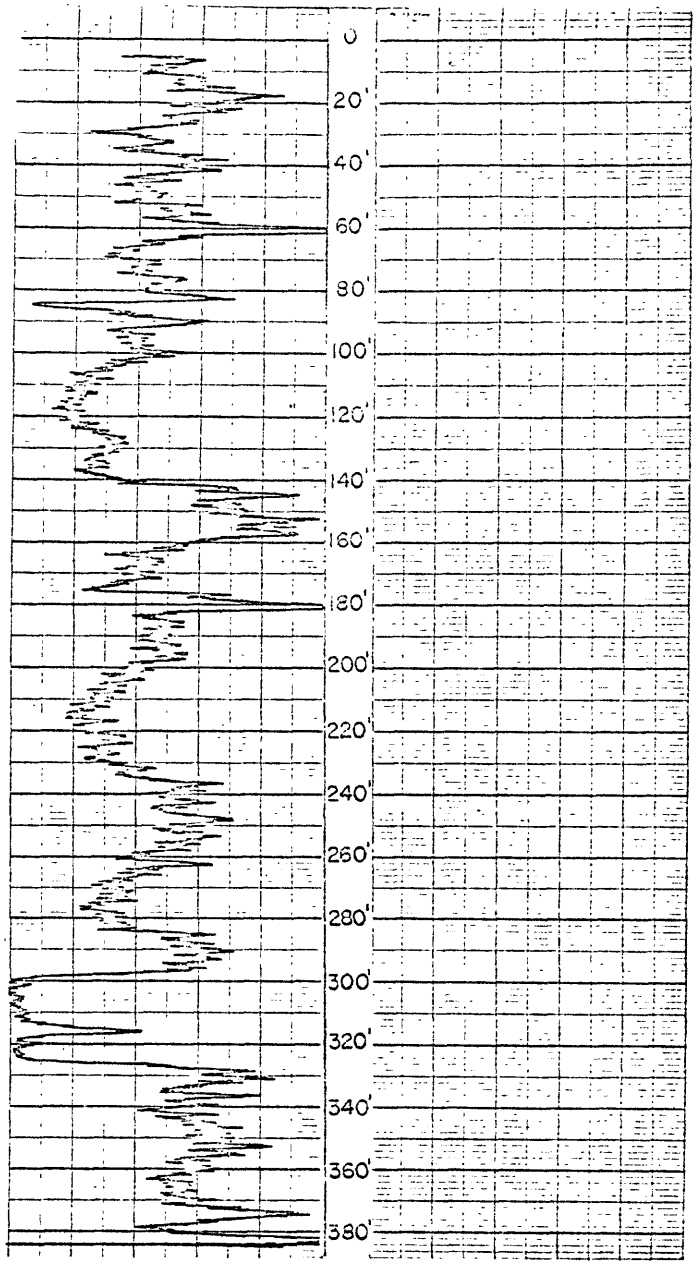
Montana Tech Foundation
Montana Bureau of Mines and Geology
Electric Log

Hole no. US-7340 Date Sept.11,1973 Recorded by Eldon Woods
State Wyoming County Campbell Map Echeta 1 SW Photo no.
T. 52 (N) S R. 74 (E) W Sec. 13, Tract COOO, Measured 275'FSL 2650'FEL
Elevation (ground) 4285' Log measured from Ground
Drilled depth 560' Logged depth 554' Fluid type Mud
Recording speed 20 ft/min. (up) down Logger no. 1
(S.P.) or S.N. Res. (Single point) or L.N. Res.
Sens. setting 20 Zero pos. 0 Sens. setting 2 Zero pos. 0
Run 2 of 2 Hole dia. 5" Tool type Altronic 5K
Remarks



Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

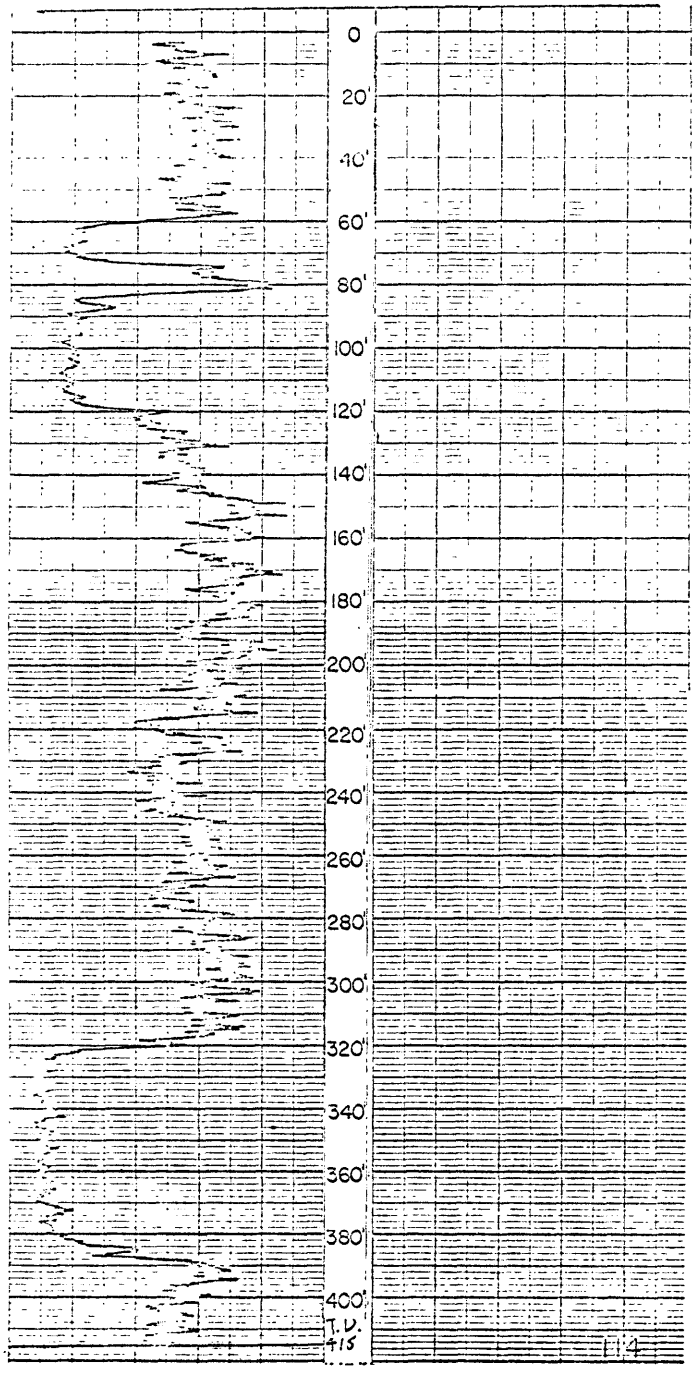
Hole no. MG 7341 Date [illegible] 29, 1974 Recorded by [illegible]
State Wyoming County Campbell Map Reneta 4 NW Photo no. ____
T. 48 N/S R. 73 E/W Sec. 4, Tract CDDZ, Measured 5700'ESL 2,570'ESL
Elevation (ground) 4785' Log measured from Ground
Drilled depth 378' Logged depth 378' Fluid type Air
Recording speed 20 ft/min. (up) down Hole dia. 5"
Sens. setting 50 Time const. 2 Logger no. 1
Run 1 of 1 Tool type Mt. Tech 34
Remarks



US-7342

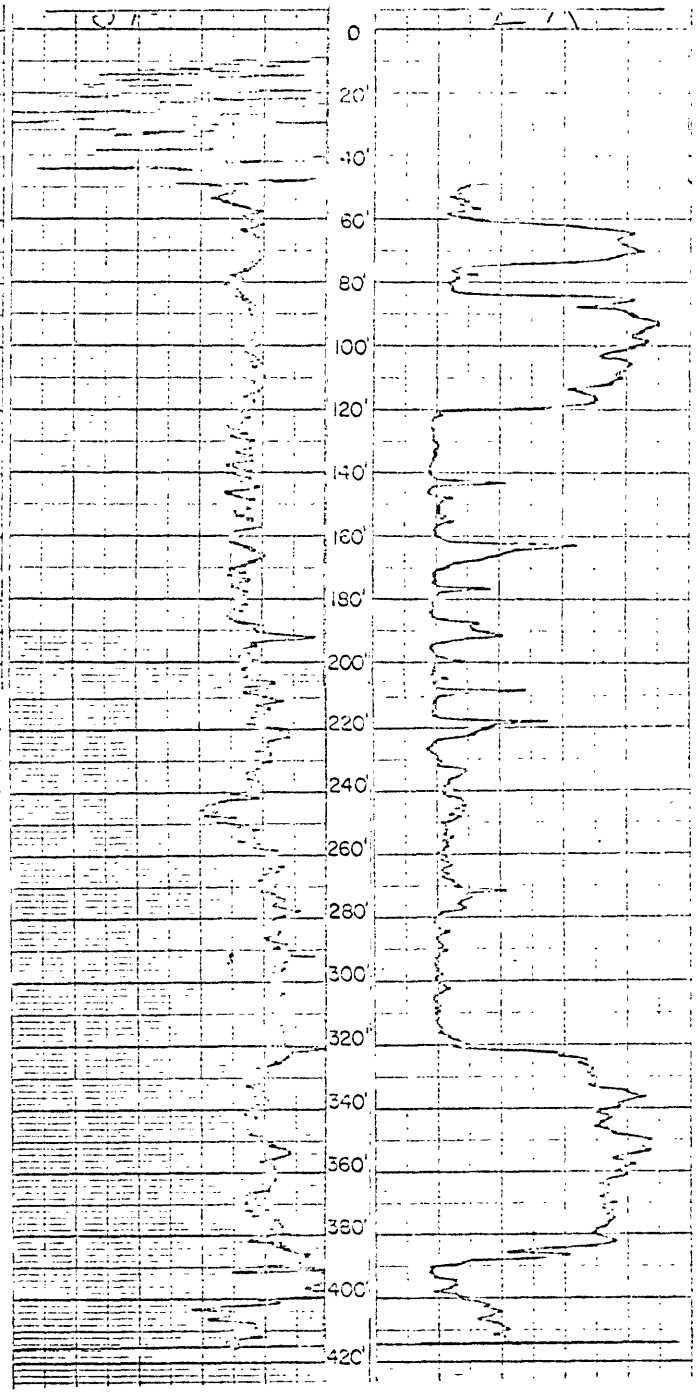
Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. US-7342 Date Sept. 11, 1973 Recorded by [illegible]
State [illegible] County [illegible] Map [illegible] Photo no. [illegible]
T. [illegible] R. 73 E Sec. 2, Tract [illegible], Measured [illegible]
Elevation (ground) [illegible] Log measured from [illegible]
Drilled depth [illegible] Logged depth [illegible] Fluid type [illegible]
Recording speed 20 ft/min. (up) down Hole dia. [illegible]
Sens. setting 100 Time const. 2 Logger no. 1
Run 1 of 2 Tool type Weltronic 3K
Remarks



Montana Tech Foundation
Montana Bureau of Mines and Geology
Electric Log

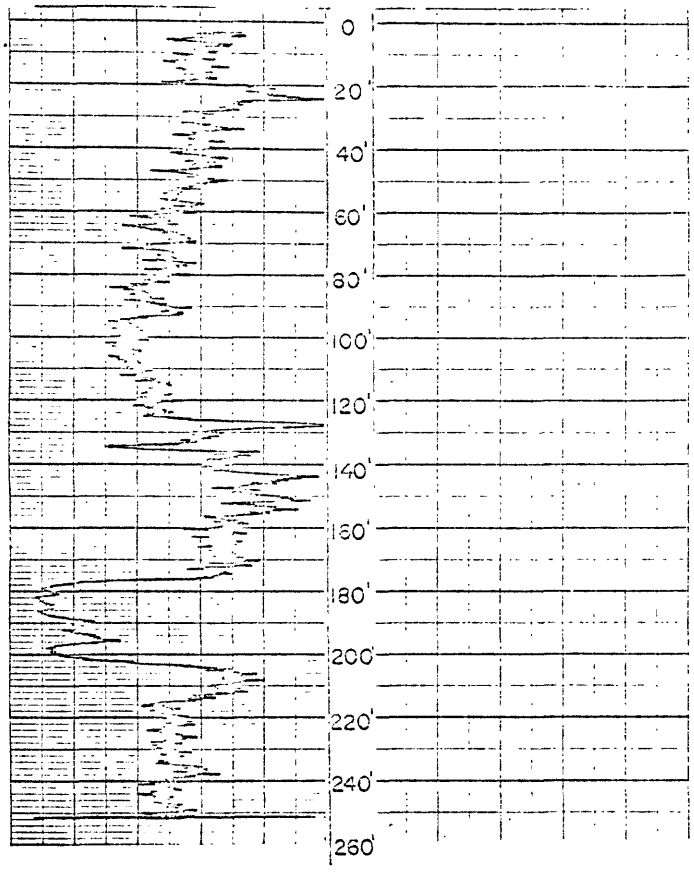
Hole no. US-7342 Date Sept. 11, 1973 Recorded by [illegible]
State [illegible] County [illegible] Map [illegible] Photo no. [illegible]
T. [illegible] R. 73 E Sec. 2, Tract [illegible], Measured [illegible]
Elevation (ground) [illegible] Log measured from [illegible]
Drilled depth [illegible] Logged depth [illegible] Fluid type [illegible]
Recording speed [illegible] ft/min. (up) down Logger no. [illegible]
(S.P.) or S.N. Res. (single point) or L.N. Res.
Sens. setting 5 Zero pos. [illegible] Sens. setting 5 Zero pos. [illegible]
Run 2 of 2 Hole dia. [illegible] Tool type [illegible]
Remarks



US-7343

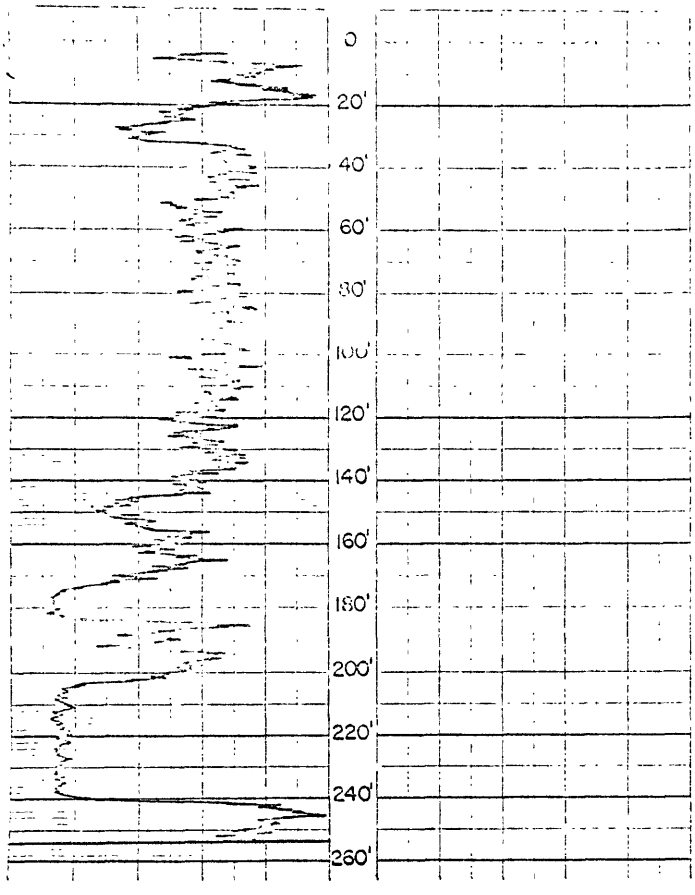
Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. [illegible] Date [illegible] Recorded by [illegible]
State [illegible] County [illegible] Map [illegible] Photo no. [illegible]
T. 51 N S R. 24 E W Sec. 25, Tract [illegible], Measured [illegible]
Elevation (ground) [illegible] Log measured from [illegible]
Drilled depth [illegible] Logged depth [illegible] Fluid type [illegible]
Recording speed [illegible] ft/min. (up) down Hole dia. [illegible]
Sens. setting [illegible] Time const. [illegible] Logger no. [illegible]
Run [illegible] of [illegible] Tool type [illegible]
Remarks [illegible]



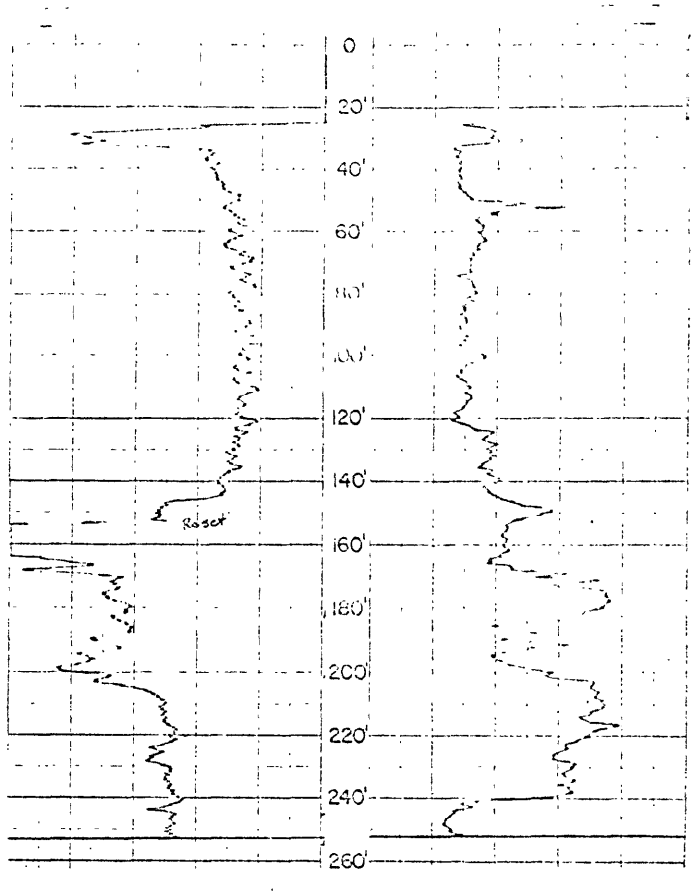
Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. [illegible] Date [illegible] Recorded by [illegible]
State [illegible] County [illegible] Map [illegible] Photo no. [illegible]
T. [illegible] S. R. [illegible] E. Sec. [illegible], Tract [illegible], Measured [illegible]
Elevation (ground) [illegible] Log measured from [illegible]
Drilled depth [illegible] Logged depth [illegible] Fluid type [illegible]
Recording speed [illegible] ft/min. (up) down Hole dia. [illegible]
Sens. setting [illegible] Time const. [illegible] Logger no. [illegible]
Run [illegible] of [illegible] Tool type [illegible]
Remarks [illegible]



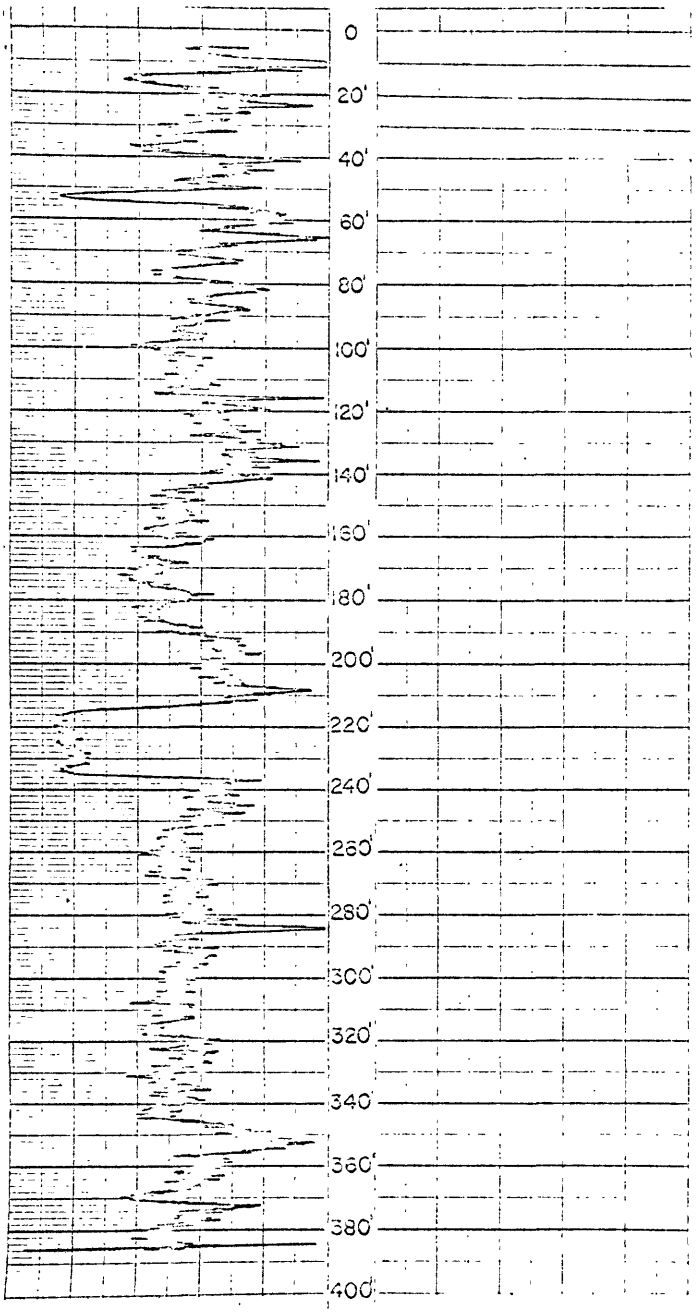
Montana Tech Foundation
Montana Bureau of Mines and Geology
Electric Log

Hole no. [illegible] Date [illegible] Recorded by [illegible]
State [illegible] County [illegible] Map [illegible] Photo no. [illegible]
T. [illegible] S. R. [illegible] E. Sec. [illegible], Tract [illegible], Measured [illegible]
Elevation (ground) [illegible] Log measured from [illegible]
Drilled depth [illegible] Logged depth [illegible] Fluid type [illegible]
Recording speed [illegible] ft/min. (up) down Logger no. [illegible]
(S.P.) or S.N. Res. (Single point) or L.N. Res.
Sens. setting [illegible] Zero pos. [illegible] Sens. setting [illegible] Zero pos. [illegible]
Run [illegible] of [illegible] Hole dia. [illegible] Tool type [illegible]
Remarks [illegible]



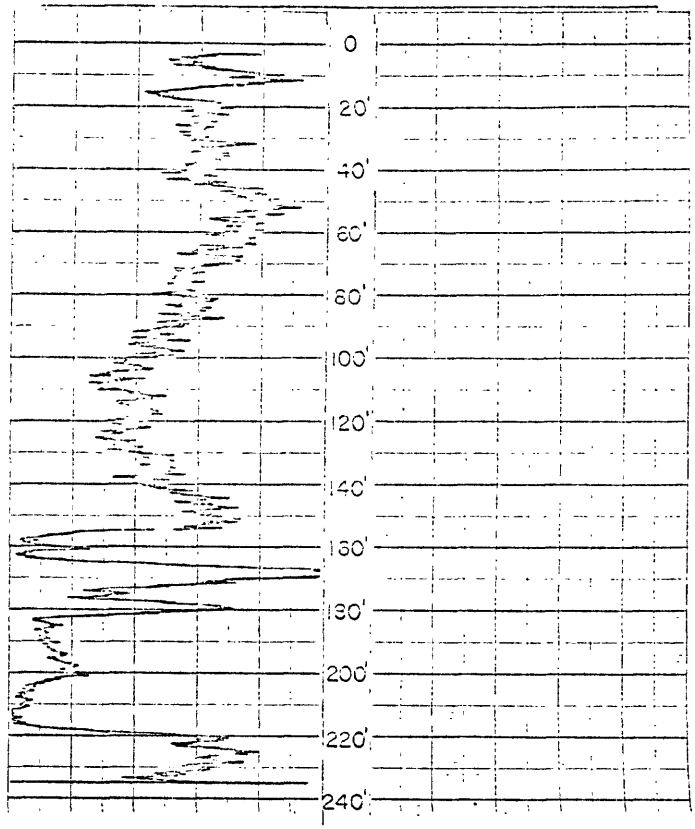
Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. _____ Date _____ Recorded by _____
State _____ County _____ Map _____ Photo no. _____
T. _____ N. R. _____ E. Sec. _____, Tract _____, Measured _____
Elevation (ground) _____ Log measured from _____
Drilled depth _____ Logged depth _____ Fluid type _____
Recording speed _____ ft/min. (up) down Hole dia. _____
Sens. setting _____ Time const. _____ Logger no. _____
Run _____ of _____ Tool type _____
Remarks _____



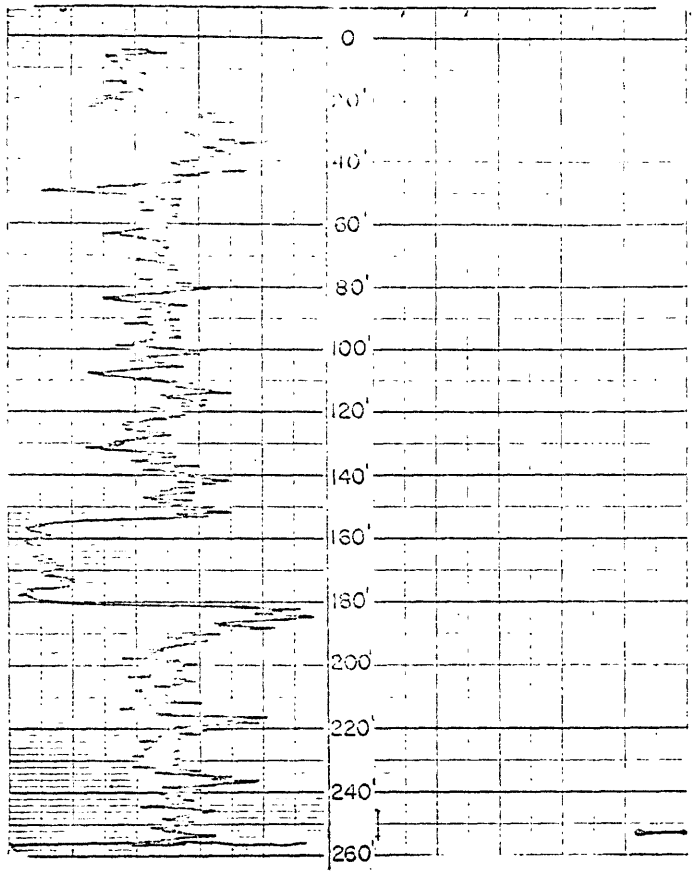
Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. [illegible] Date [illegible] Recorded by [illegible]
State [illegible] County [illegible] Map [illegible] Photo no. [illegible]
T. [illegible] S R. [illegible] W Sec. [illegible], Tract [illegible], Measured [illegible]
Elevation (ground) [illegible] Log measured from [illegible]
Drilled depth [illegible] Logged depth [illegible] Fluid type [illegible]
Recording speed [illegible] ft/min. (dn) down Hole dia. [illegible]
Sens. setting [illegible] Time const. [illegible] Logger no. [illegible]
Run [illegible] of [illegible] Tool type [illegible]
Remarks [illegible]



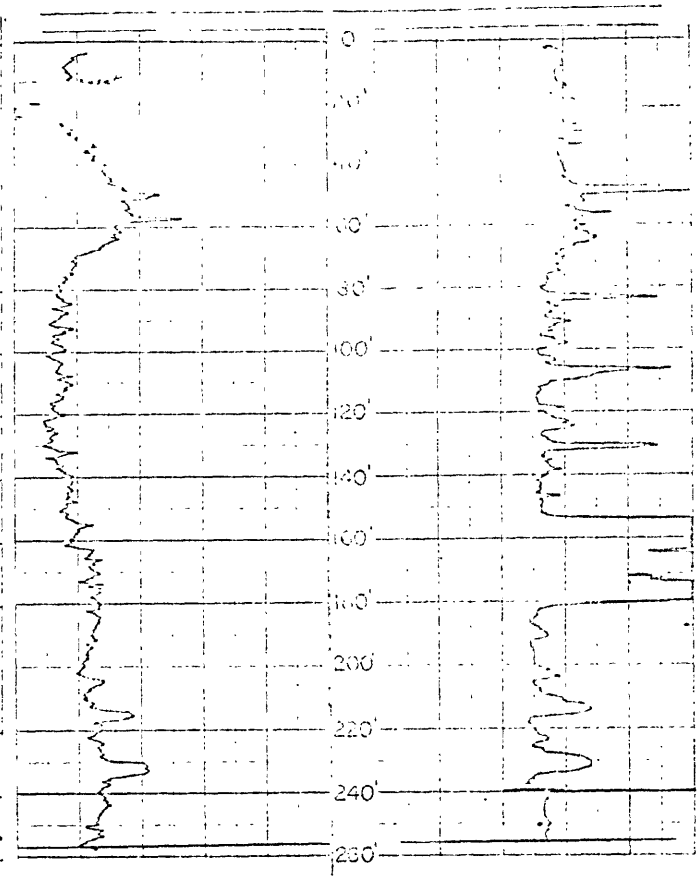
Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. [illegible] Date [illegible] Recorded by [illegible]
State [illegible] County [illegible] Map [illegible] Photo no. [illegible]
T. [illegible] S. R. [illegible] E. Sec. [illegible], Tract [illegible], Measured [illegible]
Elevation (ground) [illegible] Log measured from [illegible]
Drilled depth [illegible] Logged depth [illegible] Fluid type [illegible]
Recording speed [illegible] ft/min. (Up) down Hole dia. [illegible]
Sens. setting [illegible] Time const. [illegible] Logger no. [illegible]
Run [illegible] of [illegible] Tool type [illegible]
Remarks [illegible]



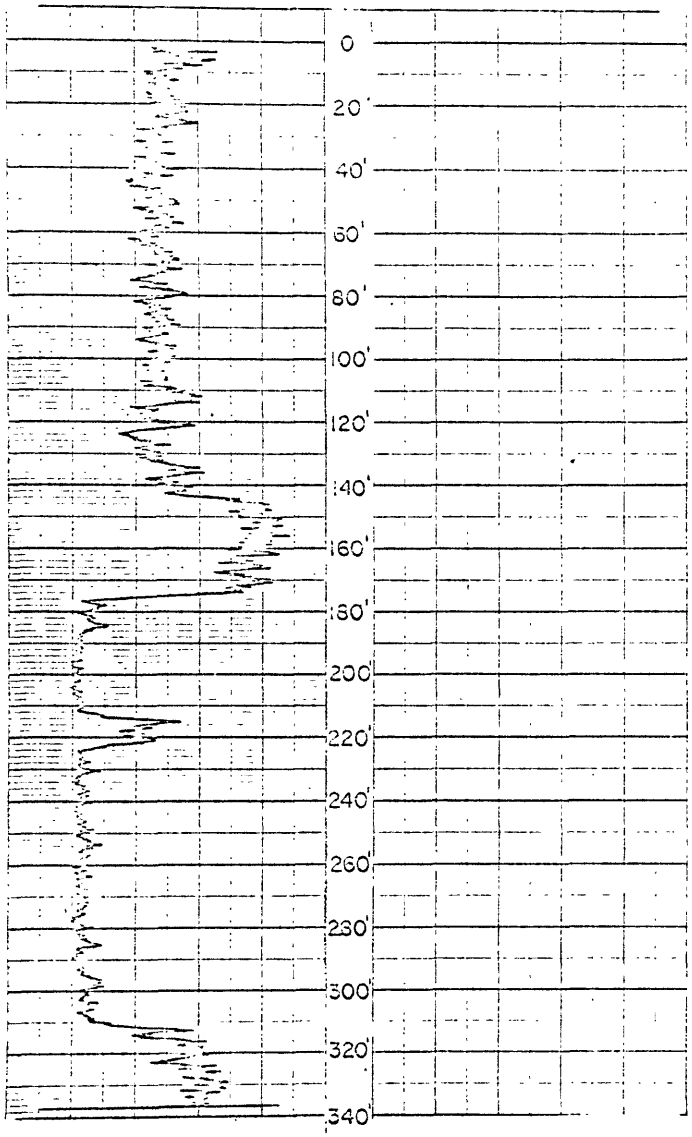
Montana Tech Foundation
Montana Bureau of Mines and Geology
Electric Log

Hole no. [illegible] Date [illegible] Recorded by [illegible]
State [illegible] County [illegible] Map [illegible] Photo no. [illegible]
T. [illegible] S. R. [illegible] E. Sec. [illegible], Tract [illegible], Measured [illegible]
Elevation (ground) [illegible] Log measured from [illegible]
Drilled depth [illegible] Logged depth [illegible] Fluid type [illegible]
Recording speed [illegible] ft/min. (Up) down Logger no. [illegible]
(S.P.) or S.N. Res. (Single point) or L.N. Res.
Sens. setting [illegible] Zero pos. [illegible] Sens. setting [illegible] Zero pos. [illegible]
Run [illegible] of [illegible] Hole dia. [illegible] Tool type [illegible]
Remarks [illegible]



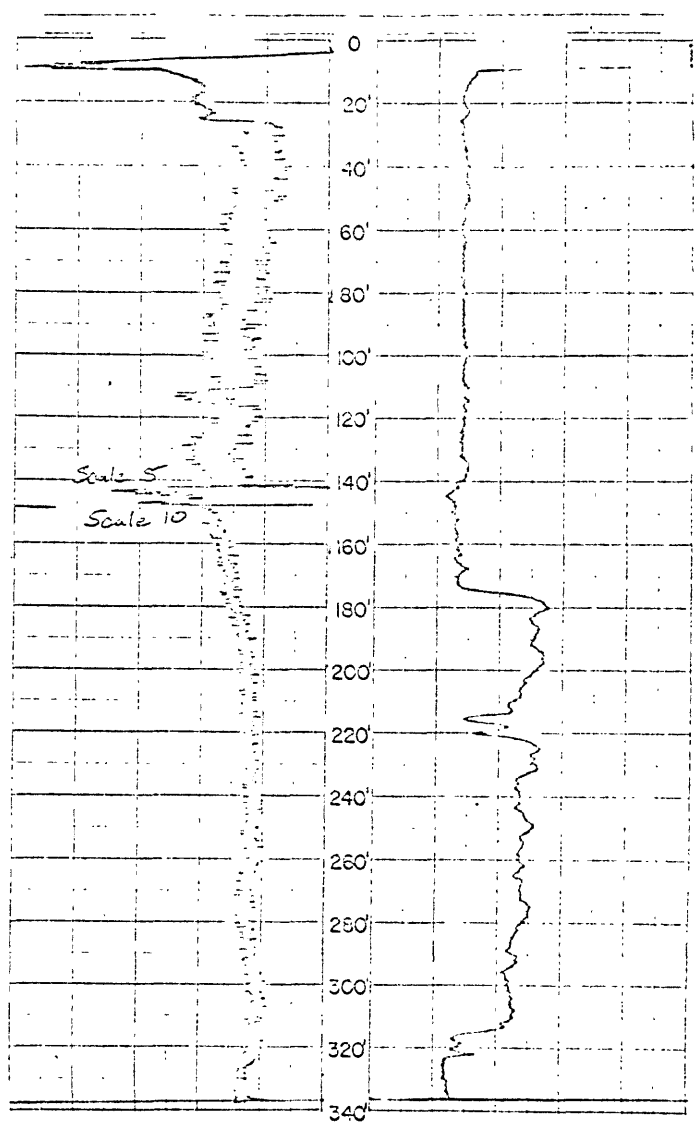
Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. ___ Date ___ Recorded by ___
State ___ County ___ Map ___ Photo no. ___
T. ___ R. ___ Sec. ___, Tract ___, Measured ___
Elevation (ground) ___ Log measured from ___
Drilled depth ___ Logged depth ___ Fluid type ___
Recording speed ___ ft/min. up down Hole dia. ___
Sens. setting ___ Time const. ___ Logger no. ___
Run ___ of ___ Tool type ___
Remarks ___



Montana Tech Foundation
Montana Bureau of Mines and Geology
Electric Log

Hole no. ___ Date ___ Recorded by ___
State ___ County ___ Map ___ Photo no. ___
T. ___ R. ___ Sec. ___, Tract ___, Measured ___
Elevation (ground) ___ Log measured from ___
Drilled depth ___ Logged depth ___ Fluid type ___
Recording speed ___ ft/min. up down Logger no. ___
(S.P.) or S.N. Res. (Single point) or L.N. Res.
Sens. setting ___ Zero pos. ___ Sens. setting ___ Zero pos. ___
Run 2 of ___ Hole dia. ___ Tool type ___
Remarks ___

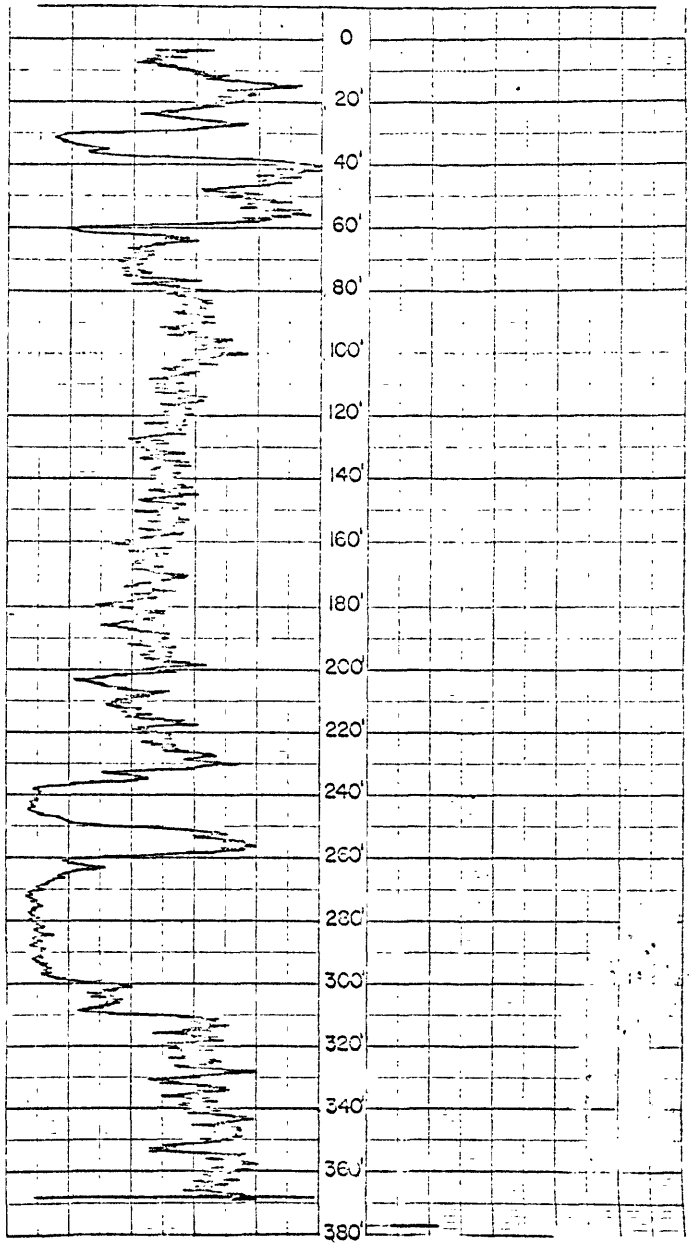


US-7350

No Geophysical Logs Available

Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

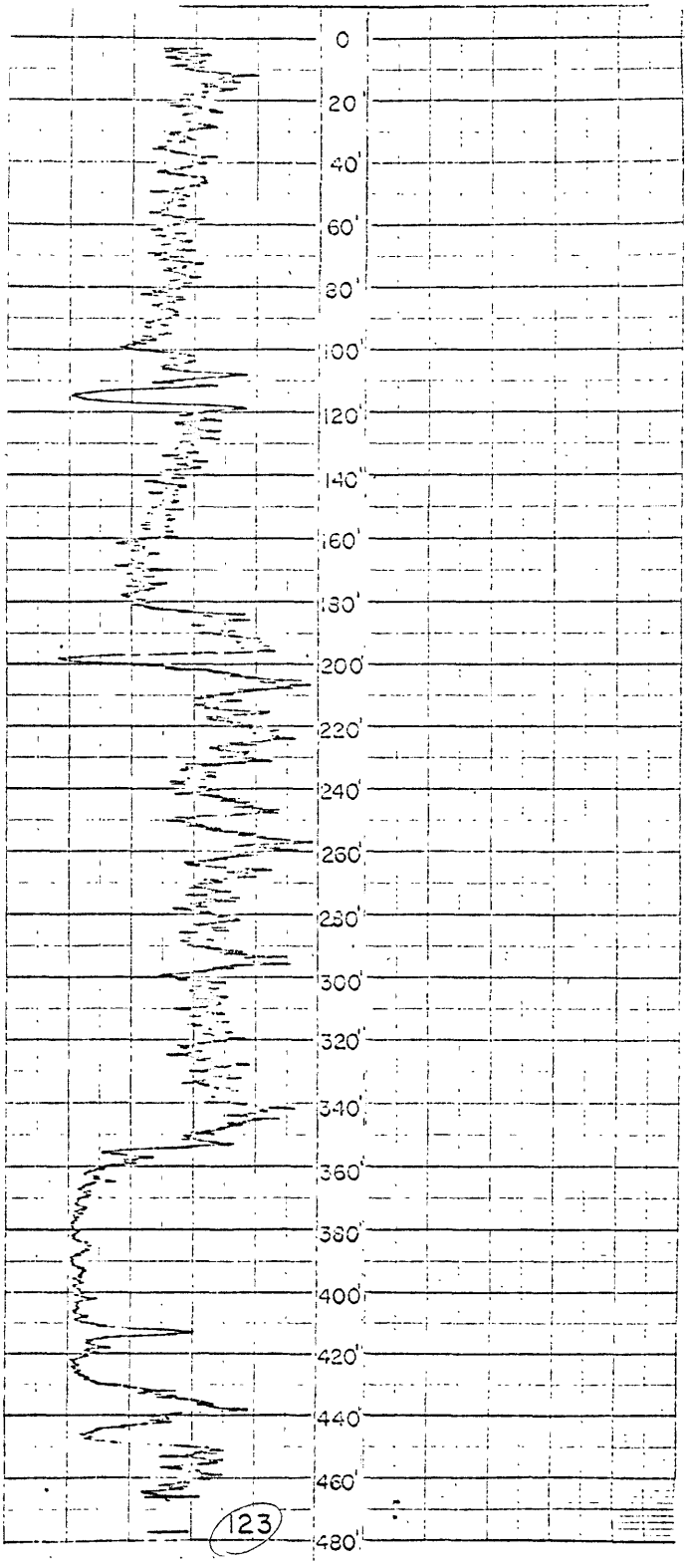
Hole no. [illegible] Date [illegible] Recorded by [illegible]
State Wyoming County [illegible] Map [illegible] Photo no. [illegible]
T. 52 N S R. 73 E W Sec. 11, Tract [illegible], Measured [illegible]
Elevation (ground) [illegible] Log measured from ground
Drilled depth 379' Logged depth 375' Fluid type Mud
Recording speed 30 ft/min. (up) down Hole dia. 5"
Sens. setting [illegible] Time const. [illegible] Logger no. 1
Run 1 of 1 Tool type [illegible]
Remarks



US-7352

Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

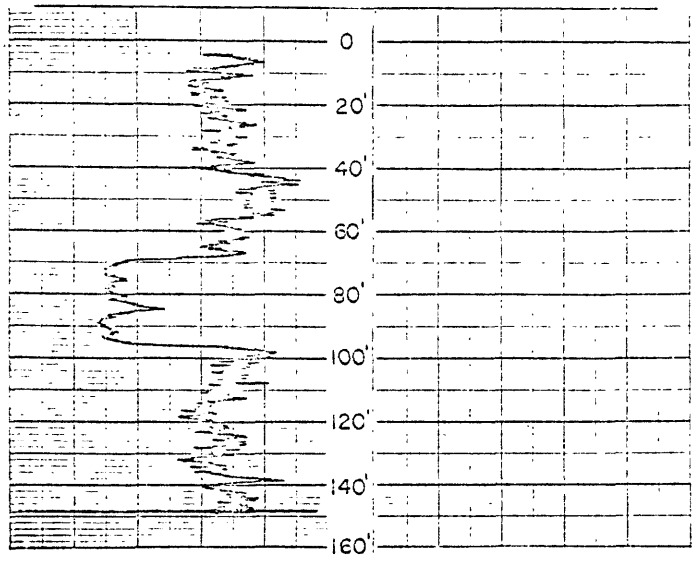
Hole no. [illegible] Date [illegible] Recorded by [illegible]
State [illegible] County [illegible] Map [illegible] Photo no. [illegible]
T. [illegible] R. [illegible] Sec. [illegible], Tract [illegible], Measured 640 FSL 640 FEL
Elevation (ground) [illegible] Log measured from [illegible]
Drilled depth [illegible] Logged depth [illegible] Fluid type [illegible]
Recording speed [illegible] ft/min. Hole dia. [illegible]
Sens. setting [illegible] Time const. [illegible] Logger no. [illegible]
Run [illegible] of [illegible] Tool type [illegible]
Remarks [illegible]



123

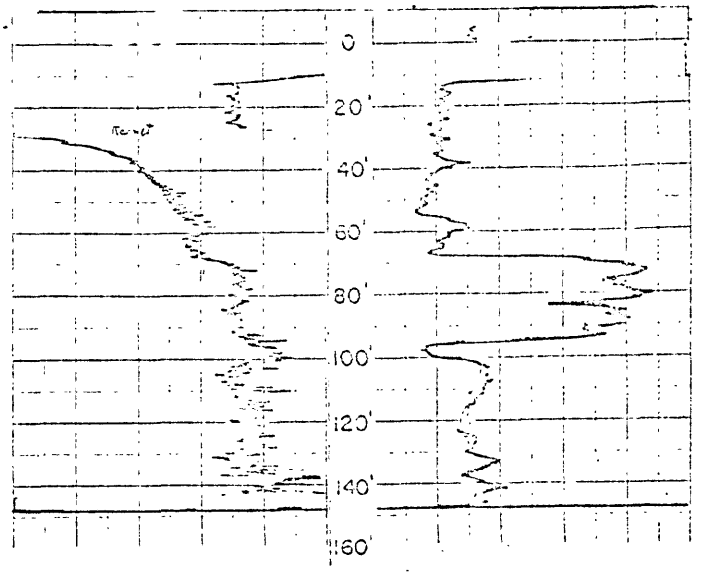
Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. [illegible] Date [illegible] Recorded by [illegible]
State [illegible] County [illegible] Map [illegible] Photo no. [illegible]
T. [illegible] S. R. [illegible] E. Sec. [illegible], Tract [illegible], Measured [illegible]
Elevation (ground) [illegible] Log measured from [illegible]
Drilled depth [illegible] Logged depth [illegible] Fluid type [illegible]
Recording speed [illegible] ft/min. (up) down Hole dia. [illegible]
Sens. setting [illegible] Time const. [illegible] Logger no. [illegible]
Run [illegible] of [illegible] Tool type [illegible]
Remarks [illegible]



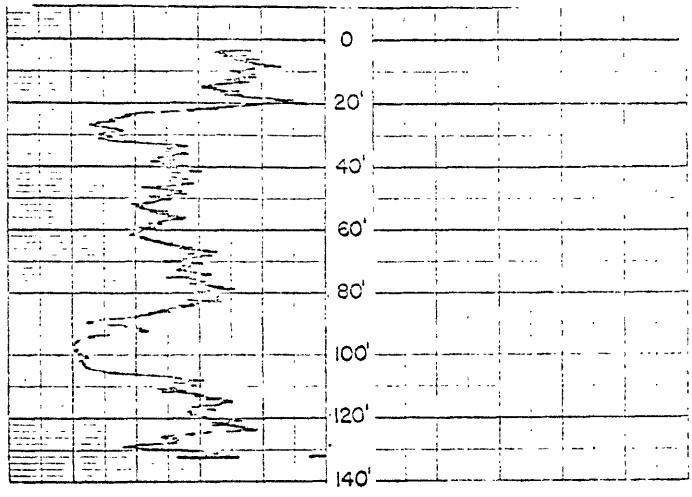
Montana Tech Foundation
Montana Bureau of Mines and Geology
Electric Log

Hole no. [illegible] Date [illegible] Recorded by [illegible]
State [illegible] County [illegible] Map [illegible] Photo no. [illegible]
T. [illegible] S. R. [illegible] E. Sec. [illegible], Tract [illegible], Measured [illegible]
Elevation (ground) [illegible] Log measured from [illegible]
Drilled depth [illegible] Logged depth [illegible] Fluid type [illegible]
Recording speed [illegible] ft/min. (up) down Logger no. [illegible]
(S.P.) or S.N. Res. (Single point) or L.N. Res.
Sens. setting [illegible] Zero pos. [illegible] Sens. setting [illegible] Zero pos. [illegible]
Run [illegible] of [illegible] Hole dia. [illegible] Tool type [illegible]
Remarks [illegible]



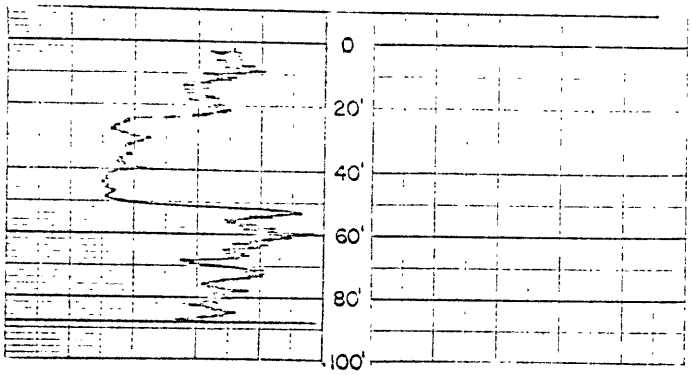
Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. US-7354 Date [illegible], 1973 Recorded by [illegible]
State [illegible] County [illegible] Map [illegible] Photo no. ____
T. 38 S R. 21 E Sec. 15, Tract [illegible], Measured [illegible]
Elevation (ground) [illegible] Log measured from [illegible]
Drilled depth 140' Logged depth 130' Fluid type [illegible]
Recording speed 20 ft/min. (UP) down Hole dia. 6"
Sens. setting 100 Time const. 1 Logger no. 1
Run 1 of 1 Tool type [illegible]
Remarks _____



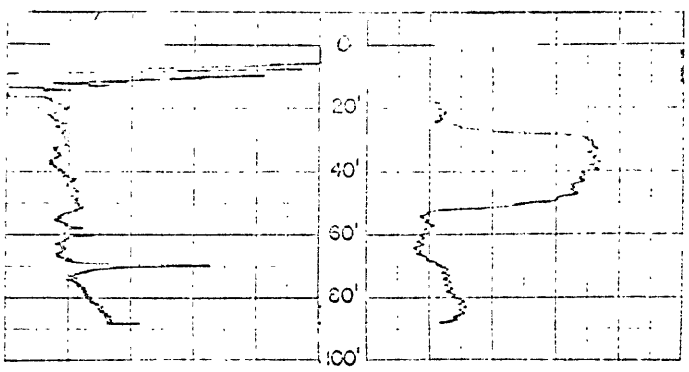
Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. [illegible] Date [illegible] Recorded by [illegible]
State [illegible] County [illegible] Map [illegible] Photo no. [illegible]
T. [illegible] S. R. [illegible] E. Sec. [illegible], Tract [illegible], Measured [illegible]
Elevation (ground) [illegible] Log measured from [illegible]
Drilled depth [illegible] Logged depth [illegible] Fluid type [illegible]
Recording speed [illegible] ft/min. (up) down Hole dia. [illegible]
Sens. setting [illegible] Time const. [illegible] Logger no. [illegible]
Run [illegible] of [illegible] Tool type [illegible]
Remarks [illegible]



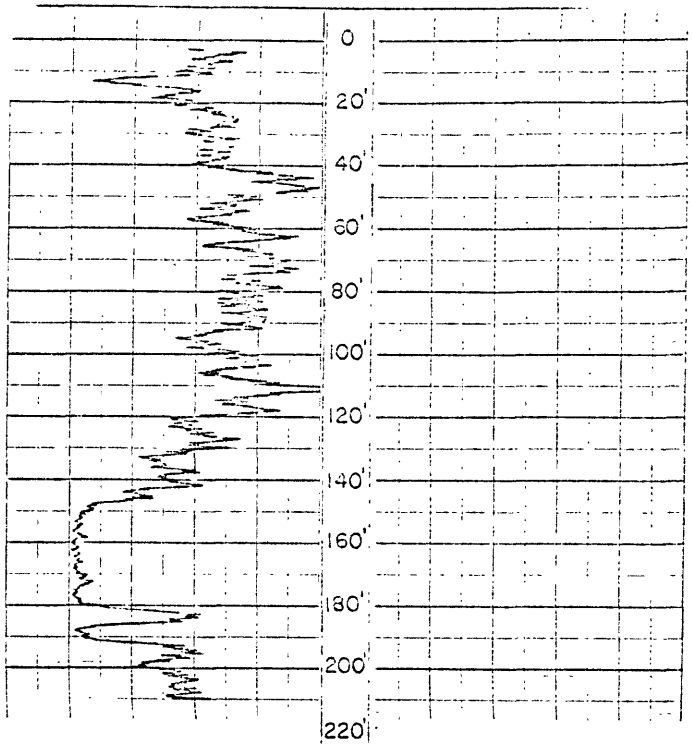
Montana Tech Foundation
Montana Bureau of Mines and Geology
Electric Log

Hole no. [illegible] Date [illegible] Recorded by [illegible]
State [illegible] County [illegible] Map [illegible] Photo no. [illegible]
T. [illegible] S. R. [illegible] E. Sec. [illegible], Tract [illegible], Measured [illegible]
Elevation (ground) [illegible] Log measured from [illegible]
Drilled depth [illegible] Logged depth [illegible] Fluid type [illegible]
Recording speed [illegible] ft/min. (up) down Logger no. [illegible]
(S.P.) or S.N. Res. (Single point) or L.N. Res.
Sens. setting [illegible] Zero pos. [illegible] Sens. setting [illegible] Zero pos. [illegible]
Run [illegible] of [illegible] Hole dia. [illegible] Tool type [illegible]
Remarks [illegible]



Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

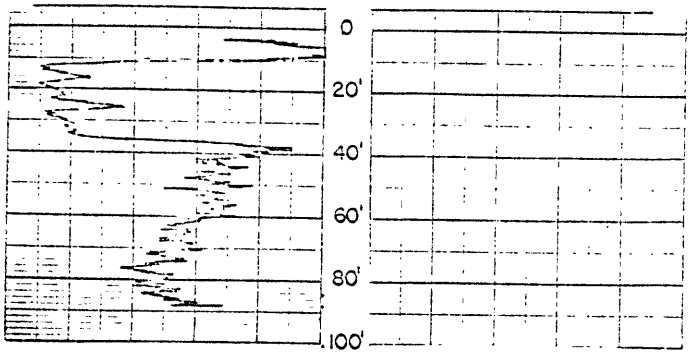
Hole no. [illegible] Date [illegible] Recorded by [illegible]
State [illegible] County [illegible] Map [illegible] Photo no. [illegible]
T. [illegible] R. [illegible] Sec. [illegible], Tract [illegible], Measured [illegible]
Elevation (ground) [illegible] Log measured from [illegible]
Drilled depth [illegible] Logged depth [illegible] Fluid type [illegible]
Recording speed [illegible] ft/min. (MP) down Hole dia. [illegible]
Sens. setting [illegible] Time const. [illegible] Logger no. [illegible]
Run [illegible] of [illegible] Tool type [illegible]
Remarks [illegible]



US-7357

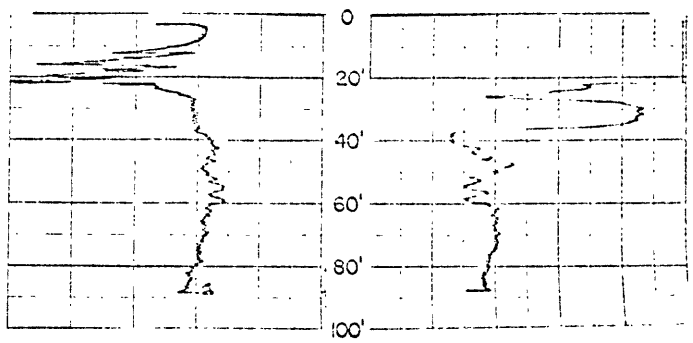
Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. [illegible] Date [illegible] Recorded by [illegible]
State [illegible] County [illegible] Map [illegible] Photo no. [illegible]
T. [illegible] N. R. 72 E. Sec. 21, Tract [illegible], Measured [illegible]
Elevation (ground) [illegible] Log measured from [illegible]
Drilled depth [illegible] Logged depth [illegible] Fluid type [illegible]
Recording speed [illegible] ft/min. (up) down Hole dia. [illegible]
Sens. setting [illegible] Time const. [illegible] Logger no. [illegible]
Run 1 of 2 Tool type [illegible]
Remarks [illegible]



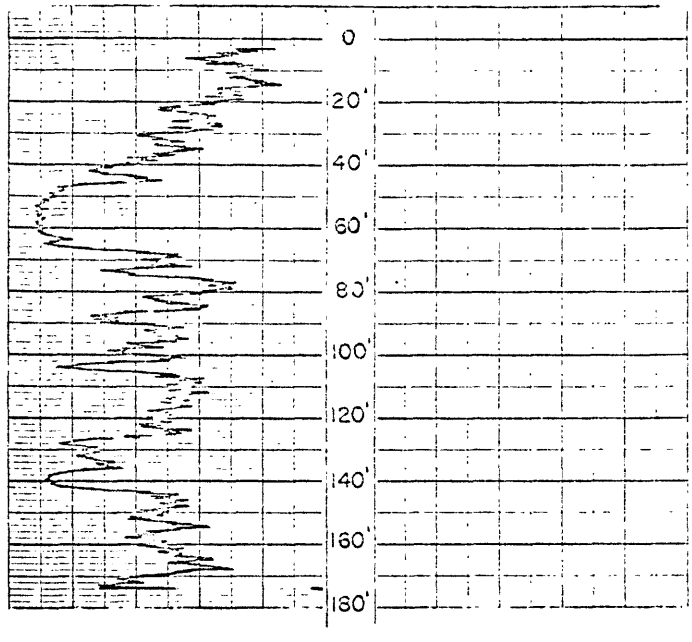
Montana Tech Foundation
Montana Bureau of Mines and Geology
Electric Log

Hole no. [illegible] Date [illegible] Recorded by [illegible]
State [illegible] County [illegible] Map [illegible] Photo no. [illegible]
T. [illegible] N. R. [illegible] E. Sec. [illegible], Tract [illegible], Measured [illegible]
Elevation (ground) [illegible] Log measured from [illegible]
Drilled depth [illegible] Logged depth [illegible] Fluid type [illegible]
Recording speed [illegible] ft/min. (up) down Logger no. [illegible]
(S.P.) or S.N. Res. (Single point) or L.N. Res.
Sens. setting [illegible] Zero pos. [illegible] Sens. setting [illegible] Zero pos. [illegible]
Run 2 of 2 Hole dia. [illegible] Tool type [illegible]
Remarks [illegible]



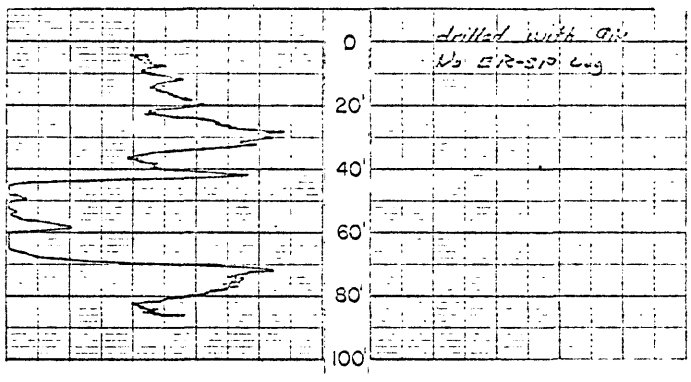
Mo[illegible] Tech Foundation
Montana B[illegible]u of Mines and Geol
Gamma Log

Hole no. [illegible] Date [illegible] Recorded by [illegible]
State [illegible] County [illegible] Map [illegible] Photo no. [illegible]
T. [illegible] S. R. [illegible] E. Sec. [illegible], Tract [illegible], Measured [illegible]
Elevation (ground) [illegible] Log measured from [illegible]
Drilled depth [illegible] Logged depth [illegible] Fluid type [illegible]
Recording speed [illegible] ft/min. Up down Hole dia. [illegible]
Sens. setting [illegible] Time const. [illegible] Logger no. [illegible]
Run [illegible] of [illegible] Tool type [illegible]
Remarks [illegible]



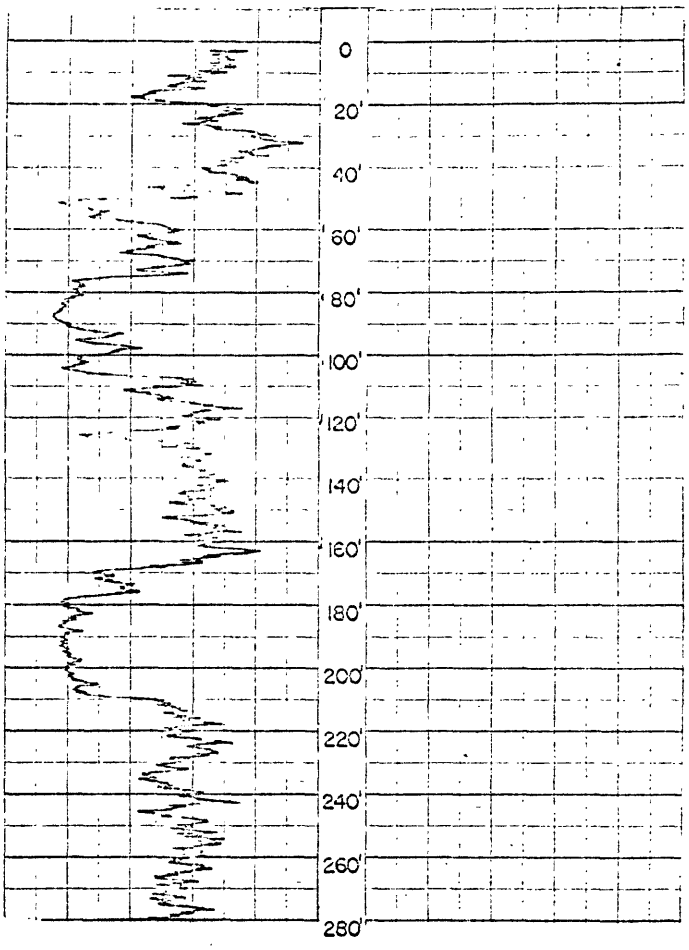
Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. [illegible] Date [illegible] Recorded by [illegible]
State [illegible] County [illegible] Map [illegible] Photo no. [illegible]
T. [illegible] R. [illegible] Sec. [illegible], Tract [illegible], Measured [illegible]
Elevation (ground) [illegible] Log measured from [illegible]
Drilled depth [illegible] Logged depth [illegible] Fluid type [illegible]
Recording speed [illegible] ft/min. down Hole dia. [illegible]
Sens. setting [illegible] Time const. [illegible] Logger no. [illegible]
Run [illegible] of [illegible] Tool type [illegible]
Remarks [illegible]



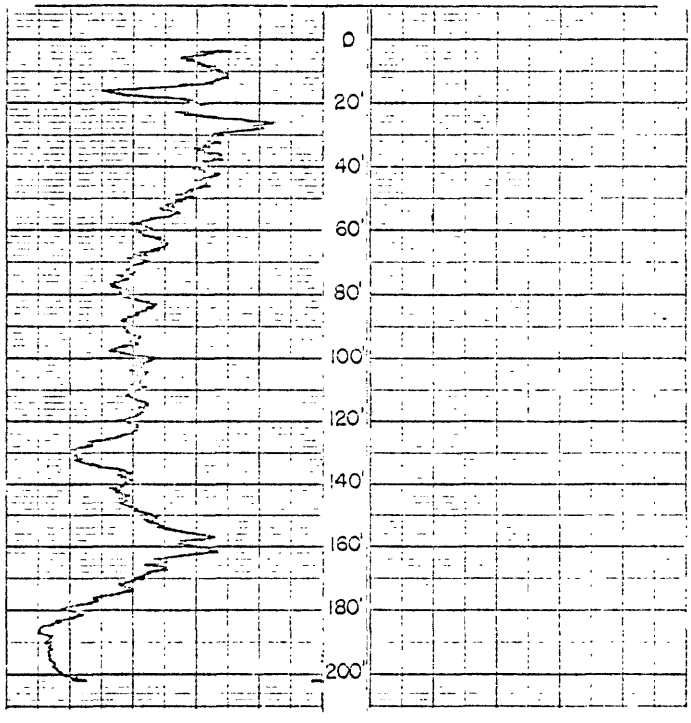
Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. [illegible] Date [illegible] Recorded by [illegible]
State [illegible] County [illegible] Map [illegible] Photo no. [illegible]
T. [illegible] R. [illegible] Sec. [illegible], Tract [illegible], Measured [illegible]
Elevation (ground) [illegible] Log measured from [illegible]
Drilled depth [illegible] Logged depth [illegible] Fluid type [illegible]
Recording speed [illegible] ft/min. (up) down Hole dia. [illegible]
Sens. setting [illegible] Time const. [illegible] Logger no. [illegible]
Run [illegible] of [illegible] Tool type [illegible]
Remarks [illegible]



Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. US-7361 Date Sept.23, 1975 Recorded by [illegible]
State Montana County Silver Map [illegible] Photo no. ____
T. 48 N S R. 21 E W Sec. 4, Tract SWSE, Measured [illegible]
Elevation (ground) 3572' Log measured from [illegible]
Drilled depth 205 Logged depth [illegible] Fluid type Air
Recording speed 25 ft/min. (up) down Hole dia. [illegible]
Sens. setting 100 Time const. [illegible] Logger no. 1
Run 1 of 1 Tool type Mt.Tech. SR
Remarks _____

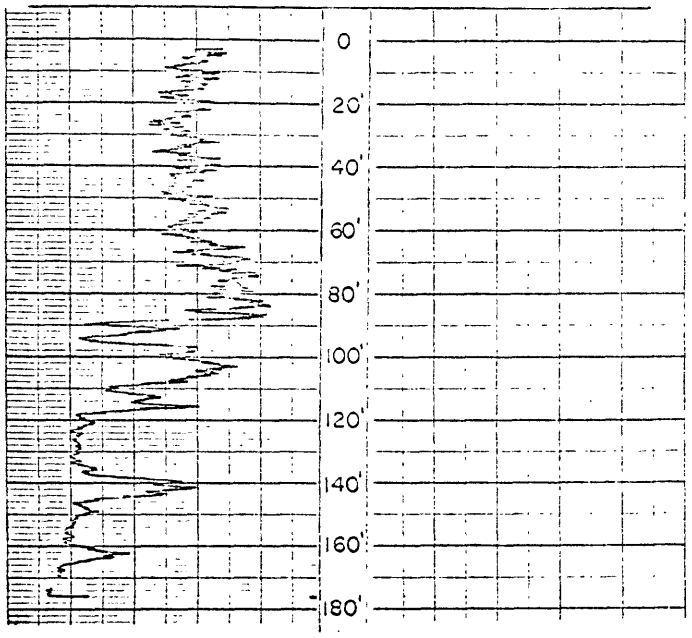


US-7362

No Geophysical Logs Available

Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. US-7363 Date Apr. 8 1979 Recorded by [illegible]
State Wyoming County Campbell Map [illegible] Photo no. ____
T. 50 N/S R. 71 E/W Sec. 23, Tract AAA, Measured [illegible]
Elevation (ground) [illegible] Log measured from [illegible]
Drilled depth 200' Logged depth 170' Fluid type [illegible]
Recording speed 30 ft/min. up/down Hole dia. [illegible]
Sens. setting 100 Time const. 2 Logger no. [illegible]
Run 1 of 1 Tool type [illegible]
Remarks ____



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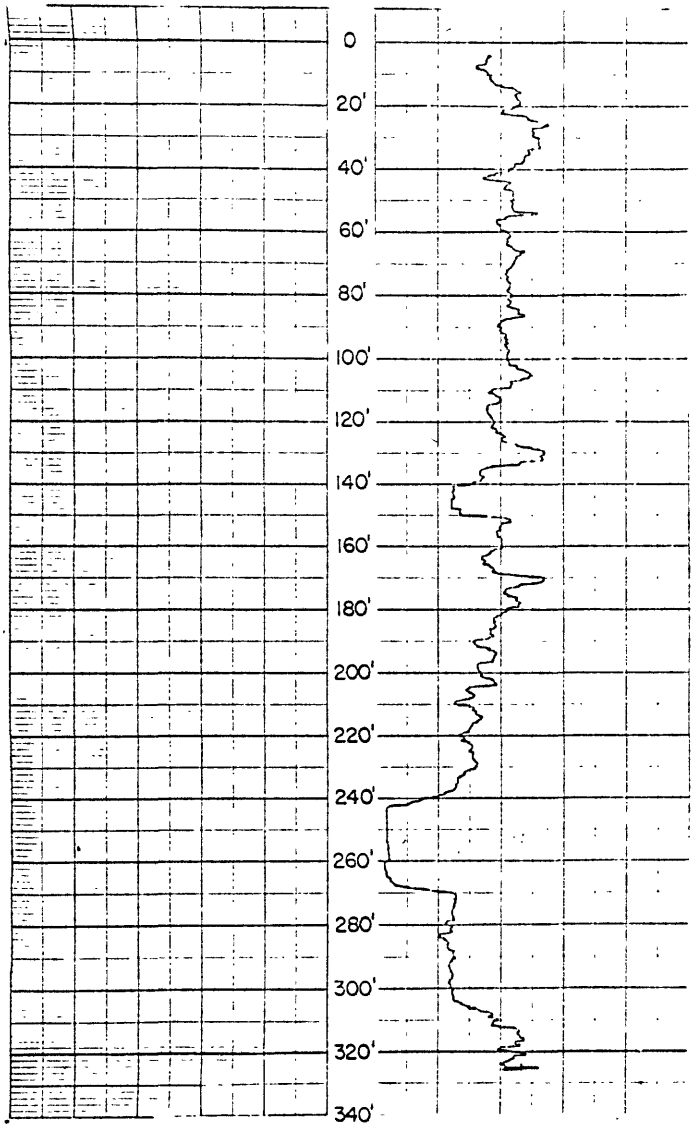
Montana Tech Foundation
Montana Bureau of Mines and Geology
Gamma Log

Hole no. _____ Date _____ Recorded by _____
State _____ County _____ Map _____ Photo no. _____
T. _____ R. _____ Sec. _____, Tract DACA, Measured 1725' FSL 750' FEL
Elevation (ground) _____ Log measured from _____
Drilled depth _____ Logged depth _____ Fluid type _____
Recording speed _____ ft/min. (up) down Hole dia. _____
Sens. setting _____ Time const. _____ Logger no. _____
Run _____ of _____ Tool type _____
Remarks _____



MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 51N RANGE 72W SECTION 17 TRACT DADD

BED NAME- DEPTH TO TOP 100 BOTTOM 144

SAMPLE NUMBER US-734 SAMPLE OF CORE 101- 115

COLLAR ELEVATION- 4305

RUN FOR PROJECT USGS DATE - 25JUN73

LAB. NUMBER - 483 AIR DRIED LOSS = 21.7019

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	9.482	29.126		
VOLATILE MATTER	41.548	32.532	45.901	50.549
FIXED CARBON	40.646	31.825	44.905	49.451
ASH	8.322	6.516	9.194	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	1.180	.924	1.304	1.436
ASH				
BRITISH THERMAL UNITS	10430	8167	11523	12689
SULFUR FORMS				
SULFATE	.040	.031	.044	.049
PYRITIC	.260	.204	.287	.316
ORGANIC	.880	.689	.972	1.071

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 52N RANGE 72W SECTION 6 TRACT CACA

BED NAME- DEPTH TO TOP 43 BOTTOM 80

SAMPLE NUMBER US-737C SAMPLE OF CORE 43- 50

COLLAR ELEVATION- 4190

RUN FOR PROJECT USGS DATE - 2JUL73

LAB. NUMBER - 485 AIR DRIED LOSS = 20.9120

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	9.998	28.820		
VOLATILE MATTER	38.828	30.709	43.143	47.513
FIXED CARBON	42.894	33.924	47.660	52.487
ASH	8.277	6.547	9.198	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	1.430	1.131	1.589	1.750
ASH				
BRITISH THERMAL UNITS	10688	8453	11876	13078
SULFUR FORMS				
SULFATE	.020	.016	.022	.024
PYRITIC	.420	.332	.467	.514
ORGANIC	.990	.783	1.100	1.211

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 52N RANGE 72W SECTION 6 TRACT CACB

BED NAME- DEPTH TO TOP 49 BOTTOM 84

SAMPLE NUMBER US-738 SAMPLE OF CORE 64- 74

COLLAR ELEVATION- 4192

RUN FOR PROJECT USGS DATE - 9JUL73

LAB. NUMBER - 487 AIR DRIED LOSS = 23.0681

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	11.012	31.540		
VOLATILE MATTER	37.866	29.131	42.552	45.579
FIXED CARBON	45.212	34.783	50.807	54.421
ASH	5.909	4.546	6.640	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.325	.250	.365	.391
ASH				
BRITISH THERMAL UNITS	10100	7770	11350	12157
SULFUR FORMS				
SULFATE	.020	.015	.022	.024
PYRITIC	.030	.023	.034	.036
ORGANIC	.275	.212	.309	.331

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 51N RANGE 72W SECTION 17 TRACT DBBA

BED NAME- DEPTH TO TOP 122 BOTTOM 165

SAMPLE NUMBER US-739 SAMPLE OF CORE 128- 133

COLLAR ELEVATION- 4306

RUN FOR PROJECT USGS DATE - 11JUL73

LAB. NUMBER - 489 AIR DRIED LOSS = 16.4278

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	10.161	24.920		
VOLATILE MATTER	41.253	34.477	45.920	51.028
FIXED CARBON	39.592	33.088	44.071	48.972
ASH	8.992	7.515	10.009	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	1.280	1.070	1.425	1.583
ASH				
BRITISH THERMAL UNITS	10455	8737	11637	12931
SULFUR FORMS				
SULFATE	.010	.008	.011	.012
PYRITIC	.380	.318	.423	.470
ORGANIC	.890	.744	.991	1.101

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 51N RANGE 72W SECTION 17 TRACT DBBA

BED NAME- DEPTH TO TOP 122 BOTTOM 165

SAMPLE NUMBER US-739C SAMPLE OF CORE 126- 131

COLLAR ELEVATION- 4306

RUN FOR PROJECT USGS DATE - 12JUL73

LAB. NUMBER - 490 AIR DRIED LOSS = 19.2368

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	9.612	27.000		
VOLATILE MATTER	39.429	31.845	43.623	49.555
FIXED CARBON	40.137	32.417	44.406	50.445
ASH	10.819	8.739	11.971	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	1.180	.953	1.305	1.483
ASH				
BRITISH THERMAL UNITS	10137	8187	11216	12741
SULFUR FORMS				
SULFATE	.020	.016	.022	.025
PYRITIC	.260	.210	.288	.327
ORGANIC	.900	.727	.996	1.131

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 51N RANGE 72W SECTION 17 TRACT DBBA

BED NAME- DEPTH TO TOP 122 BOTTOM 165

SAMPLE NUMBER US-739C SAMPLE OF CORE 135- 144

COLLAR ELEVATION- 4306

RUN FOR PROJECT USGS DATE - 13JUL73

LAB. NUMBER - 491 AIR DRIED LOSS = 19.7709

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	10.730	28.380		
VOLATILE MATTER	39.435	31.639	44.176	49.548
FIXED CARBON	40.155	32.217	44.983	50.452
ASH	9.677	7.764	10.841	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.610	.489	.683	.766
ASH				
BRITISH THERMAL UNITS	10169	8159	11391	12776
SULFUR FORMS				
SULFATE	.010	.008	.011	.013
PYRITIC	.030	.024	.034	.038
ORGANIC	.570	.457	.639	.716

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 51N RANGE 72W SECTION 17 TRACT DBBA

BED NAME- DEPTH TO TOP 122 BOTTOM 165

SAMPLE NUMBER US-739C SAMPLE OF CORE 144- 154

COLLAR ELEVATION- 4306

RUN FOR PROJECT USGS DATE - 13JUL73

LAB. NUMBER - 492 AIR DRIED LOSS = 22.0968

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	7.590	28.010		
VOLATILE MATTER	41.112	32.028	44.489	47.493
FIXED CARBON	45.451	35.408	49.185	52.507
ASH	5.845	4.554	6.326	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.490	.382	.530	.566
ASH				
BRITISH THERMAL UNITS	10604	8261	11475	12250
SULFUR FORMS				
SULFATE	.010	.008	.011	.012
PYRITIC	.040	.031	.043	.046
ORGANIC	.440	.343	.476	.508

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 51N RANGE 72W SECTION 17 TRACT DBBA

BED NAME- DEPTH TO TOP 122 BOTTOM 165

SAMPLE NUMBER US-739C SAMPLE OF CORE 154- 163

COLLAR ELEVATION- 4306

RUN FOR PROJECT USGS DATE - 13JUL73

LAB. NUMBER - 493 AIR DRIED LOSS = 23.4060

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	7.982	29.520		
VOLATILE MATTER	40.650	31.136	44.177	46.569
FIXED CARBON	46.639	35.723	50.686	53.431
ASH	4.727	3.621	5.137	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.530	.406	.576	.607
ASH				
BRITISH THERMAL UNITS	10645	8154	11569	12195
SULFUR FORMS				
SULFATE	.010	.008	.011	.011
PYRITIC	.010	.008	.011	.011
ORGANIC	.510	.391	.554	.584

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 51N RANGE 72W SECTION 17 TRACT DBBA

BED NAME- DEPTH TO TOP 122 BOTTOM 165

SAMPLE NUMBER US-739C SAMPLE OF CORE 163- 165

COLLAR ELEVATION- 4306

RUN FOR PROJECT USGS DATE - 13JUL73

LAB. NUMBER - 494 AIR DRIED LOSS = 24.5379

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	7.768	30.400		
VOLATILE MATTER	40.141	30.292	43.523	46.027
FIXED CARBON	47.071	35.521	51.036	53.973
ASH	5.018	3.787	5.441	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.580	.438	.629	.665
ASH				
BRITISH THERMAL UNITS	10596	7996	11488	12149
SULFUR FORMS				
SULFATE	0.000	0.000	0.000	0.000
PYRITIC	0.000	0.000	0.000	0.000
ORGANIC	.580	.438	.629	.665

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 47N RANGE 70W SECTION 32 TRACT DDCA

BED NAME- DEPTH TO TOP 85 BOTTOM 120

SAMPLE NUMBER US-7310 SAMPLE OF CORE 85- 89

COLLAR ELEVATION- 4664

RUN FOR PROJECT USGS DATE - 14JUL73

LAB. NUMBER - 495 AIR DRIED LOSS = 23.1439

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	7.046	28.560		
VOLATILE MATTER	40.715	31.292	43.802	47.476
FIXED CARBON	45.043	34.619	48.459	52.524
ASH	7.194	5.529	7.740	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.500	.384	.538	.583
ASH				
BRITISH THERMAL UNITS	10650	8185	11457	12418
SULFUR FORMS				
SULFATE	.030	.023	.032	.035
PYRITIC	.170	.131	.183	.198
ORGANIC	.300	.231	.323	.350

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 47N RANGE 70W SECTION 32 TRACT DDCA

BED NAME- DEPTH TO TOP 85 BOTTOM 120

SAMPLE NUMBER US-7310 SAMPLE OF CORE 89- 98

COLLAR ELEVATION- 4664

RUN FOR PROJECT USGS DATE - 14JUL73

LAB. NUMBER - 496 AIR DRIED LOSS = 23.7285

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	7.310	29.304		
VOLATILE MATTER	40.099	30.584	43.262	46.371
FIXED CARBON	46.375	35.371	50.033	53.629
ASH	6.215	4.740	6.705	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.500	.381	.539	.578
ASH				
BRITISH THERMAL UNITS	10836	8265	11691	12531
SULFUR FORMS				
SULFATE	.020	.015	.022	.023
PYRITIC	.140	.107	.151	.162
ORGANIC	.340	.259	.367	.393

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 47N RANGE 70W SECTION 32 TRACT DDCA

BED NAME- DEPTH TO TOP 85 BOTTOM 120

SAMPLE NUMBER US-7310 SAMPLE OF CORE 98- 108

COLLAR ELEVATION- 4664

RUN FOR PROJECT USGS DATE - 14JUL73

LAB. NUMBER - 497 AIR DRIED LOSS = 23.8018

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	6.874	29.040		
VOLATILE MATTER	41.474	31.603	44.536	49.396
FIXED CARBON	42.488	32.376	45.625	50.604
ASH	9.162	6.982	9.839	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.660	.503	.709	.786
ASH				
BRITISH THERMAL UNITS	10609	8084	11392	12635
SULFUR FORMS				
SULFATE	.020	.015	.021	.024
PYRITIC	.110	.084	.118	.131
ORGANIC	.530	.404	.569	.631

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 47N RANGE 71W SECTION 28 TRACT BCDB

BED NAME- DEPTH TO TOP 22 BOTTOM 26

SAMPLE NUMBER US-7311 SAMPLE OF CORE 24- 26

COLLAR ELEVATION- 4746

RUN FOR PROJECT USGS DATE - 15JUL73

LAB. NUMBER - 499 AIR DRIED LOSS = 22.9009

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	7.145	28.410		
VOLATILE MATTER	39.221	30.239	42.239	50.193
FIXED CARBON	38.919	30.006	41.914	49.807
ASH	14.714	11.344	15.846	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	5.390	4.156	5.805	6.898
ASH				
BRITISH THERMAL UNITS	9921	7649	10684	12696
SULFUR FORMS				
SULFATE	.040	.031	.043	.051
PYRITIC	3.310	2.552	3.565	4.236
ORGANIC	2.040	1.573	2.197	2.611

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 47N RANGE 72W SECTION 14 TRACT BCCD

BED NAME- DEPTH TO TOP 61 BOTTOM 63

SAMPLE NUMBER US-7312C SAMPLE OF CORE 61- 63

COLLAR ELEVATION- 4667

RUN FOR PROJECT USGS DATE - 16JUL73

LAB. NUMBER - 500 AIR DRIED LOSS = 14.5590

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	8.112	21.490		
VOLATILE MATTER	24.725	21.125	26.908	56.819
FIXED CARBON	18.790	16.055	20.449	43.181
ASH	48.372	41.330	52.643	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	3.050	2.606	3.319	7.009
ASH				
BRITISH THERMAL UNITS	4845	4139	5272	11133
SULFUR FORMS				
SULFATE	.120	.103	.131	.276
PYRITIC	1.970	1.683	2.144	4.527
ORGANIC	.960	.820	1.045	2.206

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 47N RANGE 72W SECTION 14 TRACT BCCD

BED NAME- DEPTH TO TOP 160 BOTTOM 167

SAMPLE NUMBER US-7312C SAMPLE OF CORE 160- 166

COLLAR ELEVATION- 4667

RUN FOR PROJECT USGS DATE - 17JUL73

LAB. NUMBER - 501 AIR DRIED LOSS = 20.5561

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	7.481	26.500		
VOLATILE MATTER	37.208	29.560	40.218	47.847
FIXED CARBON	40.557	32.221	43.838	52.153
ASH	14.751	11.719	15.945	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	4.520	3.591	4.886	5.812
ASH				
BRITISH THERMAL UNITS	9671	7683	10453	12436
SULFUR FORMS				
SULFATE	.100	.079	.108	.129
PYRITIC	2.900	2.304	3.135	3.729
ORGANIC	1.520	1.208	1.643	1.955

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 47N RANGE 72W SECTION 14 TRACT BCCD

BED NAME- DEPTH TO TOP 169 BOTTOM 173

SAMPLE NUMBER US-7312C SAMPLE OF CORE 169- 173

COLLAR ELEVATION- 4667

RUN FOR PROJECT USGS DATE - 17JUL73

LAB. NUMBER - 502 AIR DRIED LOSS = 18.5283

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	6.335	23.690		
VOLATILE MATTER	33.039	26.918	35.274	50.713
FIXED CARBON	32.110	26.161	34.282	49.287
ASH	28.514	23.231	30.444	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	1.360	1.108	1.452	2.088
ASH				
BRITISH THERMAL UNITS	8171	6657	8724	12542
SULFUR FORMS				
SULFATE	.020	.016	.021	.031
PYRITIC	.440	.358	.470	.675
ORGANIC	.900	.733	.961	1.381

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 47N RANGE 72W SECTION 14 TRACT BCCD

BED NAME- DEPTH TO TOP 233 BOTTOM 240

SAMPLE NUMBER US-7312C SAMPLE OF CORE 233- 240

COLLAR ELEVATION- 4667

RUN FOR PROJECT USGS DATE - 17JUL73

LAB. NUMBER - 503 AIR DRIED LOSS = 22.0183

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	9.735	29.610		
VOLATILE MATTER	39.603	30.883	43.874	48.087
FIXED CARBON	42.753	33.340	47.364	51.913
ASH	7.908	6.167	8.761	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	1.370	1.068	1.518	1.663
ASH				
BRITISH THERMAL UNITS	10535	8215	11671	12792
SULFUR FORMS				
SULFATE	.020	.016	.022	.024
PYRITIC	.440	.343	.487	.534
ORGANIC	.910	.710	1.008	1.105

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 47N RANGE 72W SECTION 6 TRACT BBCA

BED NAME- DEPTH TO TOP 44 BOTTOM 66

SAMPLE NUMBER US-7314C SAMPLE OF CORE 44- 52

COLLAR ELEVATION- 4672

RUN FOR PROJECT USGS DATE - 17JUL73

LAB. NUMBER - 504 AIR DRIED LOSS = 23.5822

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	8.267	29.900		
VOLATILE MATTER	41.806	31.947	45.574	51.137
FIXED CARBON	39.947	30.527	43.547	48.863
ASH	9.979	7.626	10.878	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	1.160	.886	1.265	1.419
ASH				
BRITISH THERMAL UNITS	10214	7806	11135	12494
SULFUR FORMS				
SULFATE	.020	.015	.022	.024
PYRITIC	.390	.298	.425	.477
ORGANIC	.750	.573	.818	.917

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 47N RANGE 72W SECTION 6 TRACT BBCA

BED NAME- DEPTH TO TOP 44 BOTTOM 66

SAMPLE NUMBER US-7314C SAMPLE OF CORE 52- 62

COLLAR ELEVATION- 4672

RUN FOR PROJECT USGS DATE - 17JUL73

LAB. NUMBER - 505 AIR DRIED LOSS = 22.3507

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	7.777	28.390		
VOLATILE MATTER	40.972	31.815	44.427	48.542
FIXED CARBON	43.432	33.725	47.095	51.458
ASH	7.817	6.070	8.477	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.490	.380	.531	.581
ASH				
BRITISH THERMAL UNITS	10618	8244	11513	12579
SULFUR FORMS				
SULFATE	.010	.008	.011	.012
PYRITIC	.160	.124	.173	.190
ORGANIC	.320	.248	.347	.379

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 47N RANGE 72W SECTION 6 TRACT BBCA

BED NAME- DEPTH TO TOP 44 BOTTOM 66

SAMPLE NUMBER US-7314C SAMPLE OF CORE 62- 66

COLLAR ELEVATION- 4672

RUN FOR PROJECT USGS DATE - 17JUL73

LAB. NUMBER - 506 AIR DRIED LOSS = 22.0608

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	8.017	28.310		
VOLATILE MATTER	39.850	31.059	43.325	47.280
FIXED CARBON	44.435	34.633	48.309	52.720
ASH	7.695	5.998	8.366	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.710	.553	.772	.842
ASH				
BRITISH THERMAL UNITS	10517	8197	11434	12477
SULFUR FORMS				
SULFATE	.010	.008	.011	.012
PYRITIC	.320	.249	.348	.380
ORGANIC	.380	.296	.413	.451

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 47N RANGE 73W SECTION 2 TRACT DODA

BED NAME- DEPTH TO TOP 100 BOTTOM 108

SAMPLE NUMBER US-7315 SAMPLE OF CORE 104- 108

COLLAR ELEVATION- 4760

RUN FOR PROJECT USGS DATE - 16JAN74

LAB. NUMBER - 507 AIR DRIED LOSS = 23.2480

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	7.963	29.360		
VOLATILE MATTER	40.592	31.155	44.105	49.153
FIXED CARBON	41.991	32.229	45.625	50.847
ASH	9.452	7.255	10.271	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.980	.752	1.065	1.187
ASH				
BRITISH THERMAL UNITS	10358	7950	11254	12542
SULFUR FORMS				
SULFATE	.030	.023	.033	.036
PYRITIC	.250	.192	.272	.303
ORGANIC	.700	.537	.761	.848

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 47N RANGE 73W SECTION 2 TRACT DDDA

BED NAME- DEPTH TO TOP 183 BOTTOM 208

SAMPLE NUMBER US-7315 SAMPLE OF CORE 185- 195

COLLAR ELEVATION- 4760

RUN FOR PROJECT USGS DATE - 16JAN74

LAB. NUMBER - 508 AIR DRIED LOSS = 20.1263

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	10.245	28.310		
VOLATILE MATTER	38.730	30.936	43.152	48.022
FIXED CARBON	41.921	33.484	46.707	51.978
ASH	9.102	7.270	10.141	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.810	.647	.902	1.004
ASH				
BRITISH THERMAL UNITS	10105	8071	11258	12529
SULFUR FORMS				
SULFATE	.020	.016	.022	.025
PYRITIC	.280	.224	.312	.347
ORGANIC	.510	.407	.568	.632

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 47N RANGE 73W SECTION 2 TRACT DDDA

BED NAME- DEPTH TO TOP 183 BOTTOM 208

SAMPLE NUMBER US-7315 SAMPLE OF CORE 195- 204

COLLAR ELEVATION- 4760

RUN FOR PROJECT USGS DATE - 16JAN74

LAB. NUMBER - 509 AIR DRIED LOSS = 20.7270

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	9.855	28.540		
VOLATILE MATTER	39.387	31.223	43.694	48.089
FIXED CARBON	42.517	33.705	47.166	51.911
ASH	8.239	6.532	9.140	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.480	.381	.532	.586
ASH				
BRITISH THERMAL UNITS	10281	8150	11405	12553
SULFUR FORMS				
SULFATE	.010	.008	.011	.012
PYRITIC	.180	.143	.200	.220
ORGANIC	.290	.230	.322	.354

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 47N RANGE 73W SECTION 2 TRACT DDDA

BED NAME- DEPTH TO TOP 183 BOTTOM 208

SAMPLE NUMBER US-7315 SAMPLE OF CORE 204- 208

COLLAR ELEVATION- 4760

RUN FOR PROJECT USGS DATE - 22JAN74

LAB. NUMBER - 510 AIR DRIED LOSS = 23.4586

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	7.853	29.470		
VOLATILE MATTER	45.095	34.517	48.939	53.066
FIXED CARBON	39.884	30.528	43.284	46.934
ASH	7.166	5.485	7.777	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.620	.475	.673	.730
ASH				
BRITISH THERMAL UNITS	10665	8163	11574	12550
SULFUR FORMS				
SULFATE	0.000	0.000	0.000	0.000
PYRITIC	.240	.184	.260	.282
ORGANIC	.380	.291	.412	.447

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 47N RANGE 72W SECTION 17 TRACT DACB

BED NAME- DEPTH TO TOP 48 BOTTOM 56

SAMPLE NUMBER US-7316 SAMPLE OF CORE 48- 56

COLLAR ELEVATION- 4764

RUN FOR PROJECT USGS DATE - 22JAN74

LAB. NUMBER - 511 AIR DRIED LOSS = 23.3692

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	9.814	30.890		
VOLATILE MATTER	40.464	31.008	44.868	49.679
FIXED CARBON	40.987	31.409	45.447	50.321
ASH	8.734	6.693	9.684	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.910	.697	1.009	1.117
ASH				
BRITISH THERMAL UNITS	10171	7794	11278	12488
SULFUR FORMS				
SULFATE	.020	.015	.022	.025
PYRITIC	.280	.215	.310	.344
ORGANIC	.610	.467	.676	.749

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 47N RANGE 72W SECTION 17 TRACT DACB

BED NAME- DEPTH TO TOP 65 BOTTOM 72

SAMPLE NUMBER US-7316 SAMPLE OF CORE 65- 72

COLLAR ELEVATION- 4764

RUN FOR PROJECT USGS DATE - 22JAN74

LAB. NUMBER - 512 AIR DRIED LOSS = 21.8873

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	9.412	29.240		
VOLATILE MATTER	39.531	30.879	43.639	50.027
FIXED CARBON	39.488	30.846	43.592	49.973
ASH	11.566	9.035	12.769	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.760	.594	.839	.962
ASH				
BRITISH THERMAL UNITS	9789	7646	10806	12387
SULFUR FORMS				
SULFATE	.010	.008	.011	.013
PYRITIC	.240	.187	.265	.304
ORGANIC	.510	.398	.563	.645

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 47N RANGE 72W SECTION 17 TRACT DACB

BED NAME- DEPTH TO TOP 75 BOTTOM 88

SAMPLE NUMBER US-7316 SAMPLE OF COAL 79- 88

COLLAR ELEVATION- 4764

RUN FOR PROJECT USGS DATE - 22JAN74

LAB. NUMBER - 513 AIR DRIED LOSS = 24.4888

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	7.377	30.060		
VOLATILE MATTER	40.847	30.844	44.101	49.571
FIXED CARBON	41.554	31.378	44.864	50.429
ASH	10.220	7.718	11.035	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.420	.317	.453	.510
ASH				
BRITISH THERMAL UNITS	10293	7772	11112	12491
SULFUR FORMS				
SULFATE	.010	.008	.011	.012
PYRITIC	.070	.053	.076	.085
ORGANIC	.340	.257	.367	.413

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 48N RANGE 73W SECTION 14 TRACT CDCD

BED NAME- DEPTH TO TOP 133 BOTTOM 149

SAMPLE NUMBER US-7320 SAMPLE OF CORE 136- 145

COLLAR ELEVATION- 4708

RUN FOR PROJECT USGS DATE - 22JAN74

LAB. NUMBER - 514 AIR DRIED LOSS = 26.5339

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	7.113	31.760		
VOLATILE MATTER	41.095	30.191	44.243	48.665
FIXED CARBON	43.349	31.847	46.669	51.335
ASH	8.441	6.202	9.088	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.820	.602	.883	.971
ASH				
BRITISH THERMAL UNITS	10580	7773	11391	12529
SULFUR FORMS				
SULFATE	.010	.007	.011	.012
PYRITIC	.230	.169	.248	.272
ORGANIC	.580	.426	.624	.687

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 48N RANGE 73W SECTION 14 TRACT CDCD

BED NAME- DEPTH TO TOP 133 BOTTOM 149

SAMPLE NUMBER US-7320 SAMPLE OF CORE 145- 147

COLLAR ELEVATION- 4708

RUN FOR PROJECT USGS DATE - 22JAN74

LAB. NUMBER - 515 AIR DRIED LOSS = 24.0523

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	7.370	29.650		
VOLATILE MATTER	41.232	31.315	44.513	48.202
FIXED CARBON	44.309	33.652	47.835	51.798
ASH	7.087	5.383	7.652	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	1.120	.851	1.209	1.309
ASH				
BRITISH THERMAL UNITS	10404	7902	11232	12163
SULFUR FORMS				
SULFATE	.010	.008	.011	.012
PYRITIC	.310	.235	.335	.362
ORGANIC	.800	.608	.864	.935

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 48N RANGE 73W SECTION 14 TRACT CDCD

BED NAME- DEPTH TO TOP 152 BOTTOM 164

SAMPLE NUMBER US-7320 SAMPLE OF CORE 151- 160

COLLAR ELEVATION- 4708

RUN FOR PROJECT USGS DATE - 22JAN74

LAB. NUMBER - 516 AIR DRIED LOSS = 22.4274

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	6.564	27.520		
VOLATILE MATTER	40.900	31.727	43.774	49.783
FIXED CARBON	41.257	32.004	44.156	50.217
ASH	11.277	8.748	12.070	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.590	.458	.631	.718
ASH				
BRITISH THERMAL UNITS	10250	7951	10970	12476
SULFUR FORMS				
SULFATE	0.000	0.000	0.000	0.000
PYRITIC	.080	.062	.086	.097
ORGANIC	.510	.396	.546	.621

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 48N RANGE 73W SECTION 14 TRACT CDCD

BED NAME- DEPTH TO TOP 152 BOTTOM 164

SAMPLE NUMBER US-7320 SAMPLE OF CORE 160- 164

COLLAR ELEVATION- 4708

RUN FOR PROJECT USGS DATE - 22JAN74

LAB. NUMBER - 517 AIR DRIED LOSS = 24.1484

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	7.279	29.670		
VOLATILE MATTER	40.961	31.070	44.178	49.284
FIXED CARBON	42.152	31.973	45.462	50.716
ASH	9.606	7.286	10.360	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	1.610	1.221	1.736	1.937
ASH				
BRITISH THERMAL UNITS	10806	8197	11655	13002
SULFUR FORMS				
SULFATE	.010	.008	.011	.012
PYRITIC	.890	.675	.960	1.071
ORGANIC	.710	.539	.766	.854

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 48N RANGE 73W SECTION 1 TRACT BABD

BED NAME- DEPTH TO TOP 86 BOTTOM 113

SAMPLE NUMBER US-7321 SAMPLE OF CORE 86- 95

COLLAR ELEVATION- 4690

RUN FOR PROJECT USGS DATE - 22JAN74

LAB. NUMBER - 518 AIR DRIED LOSS = 22.8401

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	6.700	28.010		
VOLATILE MATTER	41.112	31.722	44.065	50.284
FIXED CARBON	40.648	31.364	43.567	49.716
ASH	11.539	8.904	12.368	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	1.800	1.389	1.929	2.202
ASH				
BRITISH THERMAL UNITS	10377	8007	11123	12692
SULFUR FORMS				
SULFATE	.030	.023	.032	.037
PYRITIC	.830	.640	.890	1.015
ORGANIC	.940	.725	1.008	1.150

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 48N RANGE 73W SECTION 1 TRACT BABD

BED NAME- DEPTH TO TOP 86 BOTTOM 113

SAMPLE NUMBER US-7321 SAMPLE OF CORE 95- 104

COLLAR ELEVATION- 4690

RUN FOR PROJECT USGS DATE - 22JAN74

LAB. NUMBER - 519 AIR DRIED LOSS = 27.2971

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	5.684	31.430		
VOLATILE MATTER	40.361	29.344	42.794	50.860
FIXED CARBON	38.995	28.351	41.346	49.140
ASH	14.957	10.875	15.859	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	2.000	1.454	2.121	2.520
ASH				
BRITISH THERMAL UNITS	9998	7269	10601	12599
SULFUR FORMS				
SULFATE	.010	.007	.011	.013
PYRITIC	1.170	.851	1.241	1.474
ORGANIC	.820	.596	.869	1.033

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 48N RANGE 73W SECTION 1 TRACT BABD

BED NAME- DEPTH TO TOP 86 BOTTOM 113

SAMPLE NUMBER US-7321 SAMPLE OF CORE 104- 113

COLLAR ELEVATION- 4690

RUN FOR PROJECT USGS DATE - 22JAN74

LAB. NUMBER - 520 AIR DRIED LOSS = 24.3659

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	5.875	28.810		
VOLATILE MATTER	42.106	31.846	44.734	48.710
FIXED CARBON	44.335	33.533	47.103	51.290
ASH	7.682	5.811	8.162	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.770	.582	.818	.891
ASH				
BRITISH THERMAL UNITS	10870	8221	11549	12575
SULFUR FORMS				
SULFATE	.010	.008	.011	.012
PYRITIC	.330	.250	.351	.382
ORGANIC	.430	.325	.457	.497

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 49N RANGE 73W SECTION 35 TRACT DCBA

BED NAME- DEPTH TO TOP 134 BOTTOM 162

SAMPLE NUMBER US-7322 SAMPLE OF CORE 136- 146

COLLAR ELEVATION- 4715

RUN FOR PROJECT USGS DATE - 22JAN74

LAB. NUMBER - 521 AIR DRIED LOSS = 15.9777

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	5.370	20.490		
VOLATILE MATTER	42.018	35.305	44.403	53.502
FIXED CARBON	36.517	30.683	38.590	46.498
ASH	16.093	13.522	17.007	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	2.020	1.697	2.135	2.572
ASH				
BRITISH THERMAL UNITS	9991	8395	10558	12722
SULFUR FORMS				
SULFATE	.030	.025	.032	.038
PYRITIC	.770	.647	.814	.980
ORGANIC	1.220	1.025	1.289	1.553

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 49N RANGE 73W SECTION 35 TRACT DCBA

BED NAME- DEPTH TO TOP 134 BOTTOM 162

SAMPLE NUMBER US-7322 SAMPLE OF CORE 146- 155

COLLAR ELEVATION- 4715

RUN FOR PROJECT USGS DATE - 22JAN74

LAB. NUMBER - 522 AIR DRIED LOSS = 24.3970

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	6.167	29.060		
VOLATILE MATTER	42.318	31.994	45.100	50.658
FIXED CARBON	41.219	31.163	43.928	49.342
ASH	10.295	7.783	10.972	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.990	.748	1.055	1.185
ASH				
BRITISH THERMAL UNITS	10516	7951	11208	12589
SULFUR FORMS				
SULFATE	.020	.015	.021	.024
PYRITIC	.180	.136	.192	.215
ORGANIC	.790	.597	.842	.946

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 49N RANGE 73W SECTION 35 TRACT DCBA

BED NAME- DEPTH TO TOP 134 BOTTOM 162

SAMPLE NUMBER US-7322 SAMPLE OF CORE 155- 162

COLLAR ELEVATION- 4715

RUN FOR PROJECT USGS DATE - 22JAN74

LAB. NUMBER - 523 AIR DRIED LOSS = 25.2778

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	5.998	29.760		
VOLATILE MATTER	42.042	31.415	44.725	48.948
FIXED CARBON	43.849	32.765	46.647	51.052
ASH	8.109	6.060	8.627	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.810	.605	.862	.943
ASH				
BRITISH THERMAL UNITS	10881	8130	11575	12668
SULFUR FORMS				
SULFATE	0.000	0.000	0.000	0.000
PYRITIC	.250	.187	.266	.291
ORGANIC	.560	.418	.596	.652

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 47N RANGE 74W SECTION 10 TRACT DACD

BED NAME- DEPTH TO TOP 177 BOTTOM 180

SAMPLE NUMBER US-7323 SAMPLE OF CORE 179- 180

COLLAR ELEVATION- 5167

RUN FOR PROJECT USGS DATE - 23JAN74

LAB. NUMBER - 526 AIR DRIED LOSS = 19.3243

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	7.072	25.030		
VOLATILE MATTER	37.352	30.134	40.195	50.909
FIXED CARBON	36.018	29.058	38.759	49.091
ASH	19.557	15.778	21.046	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	2.660	2.146	2.862	3.625
ASH				
BRITISH THERMAL UNITS	8976	7241	9659	12233
SULFUR FORMS				
SULFATE	.040	.032	.043	.055
PYRITIC	1.600	1.291	1.722	2.181
ORGANIC	1.020	.823	1.098	1.390

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 47N RANGE 73W SECTION 17 TRACT ABDA

BED NAME- DEPTH TO TOP 261 BOTTOM 270

SAMPLE NUMBER US-7324 SAMPLE OF CORE 265- 270

COLLAR ELEVATION- 4871

RUN FOR PROJECT USGS DATE - 23JAN74

LAB. NUMBER - 527 AIR DRIED LOSS = 24.3959

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	7.134	29.790		
VOLATILE MATTER	39.082	29.548	42.085	49.866
FIXED CARBON	39.292	29.706	42.311	50.134
ASH	14.491	10.956	15.605	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	1.430	1.081	1.540	1.825
ASH				
BRITISH THERMAL UNITS	9883	7472	10643	12610
SULFUR FORMS				
SULFATE	.020	.015	.022	.026
PYRITIC	.620	.469	.668	.791
ORGANIC	.790	.597	.851	1.008

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 47N RANGE 73W SECTION 17 TRACT ABDA

BED NAME- DEPTH TO TOP 324 BOTTOM 346

SAMPLE NUMBER US-7324 SAMPLE OF CORE 327- 337

COLLAR ELEVATION- 4871

RUN FOR PROJECT USGS DATE - 23JAN74

LAB. NUMBER - 528 AIR DRIED LOSS = 24.3993

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	7.170	29.820		
VOLATILE MATTER	40.790	30.833	43.941	47.739
FIXED CARBON	44.654	33.759	48.103	52.261
ASH	7.385	5.584	7.956	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.830	.627	.894	.971
ASH				
BRITISH THERMAL UNITS	10700	8089	11526	12522
SULFUR FORMS				
SULFATE	.010	.008	.011	.012
PYRITIC	.250	.189	.269	.293
ORGANIC	.570	.431	.614	.667

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 47N RANGE 73W SECTION 17 TRACT ABDA

BED NAME- DEPTH TO TOP 324 BOTTOM 348

SAMPLE NUMBER US-7324 SAMPLE OF CORE 337- 347

COLLAR ELEVATION- 4871

RUN FOR PROJECT USGS DATE - 23JAN74

LAB. NUMBER - 529 AIR DRIED LOSS = 11.8897

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	6.719	17.810		
VOLATILE MATTER	41.291	36.382	44.266	48.017
FIXED CARBON	44.701	39.387	47.922	51.983
ASH	7.287	6.421	7.813	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.460	.405	.493	.535
ASH				
BRITISH THERMAL UNITS	10822	9535	11601	12584
SULFUR FORMS				
SULFATE	0.000	0.000	0.000	0.000
PYRITIC	.110	.097	.118	.128
ORGANIC	.350	.308	.375	.407

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 47N RANGE 74W SECTION 35 TRACT BCBC

BED NAME- DEPTH TO TOP 112 BOTTOM 114

SAMPLE NUMBER US-7325 SAMPLE OF CORE 112- 114

COLLAR ELEVATION- 5114

RUN FOR PROJECT USGS DATE - 23JAN74

LAB. NUMBER - 530 AIR DRIED LOSS = 24.3143

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	7.574	30.047		
VOLATILE MATTER	40.800	30.880	44.144	52.884
FIXED CARBON	36.351	27.513	39.330	47.116
ASH	15.274	11.560	16.526	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	2.940	2.225	3.181	3.811
ASH				
BRITISH THERMAL UNITS	9679	7325	10472	12545
SULFUR FORMS				
SULFATE	.100	.076	.108	.130
PYRITIC	1.330	1.007	1.439	1.724
ORGANIC	1.510	1.143	1.634	1.957

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 48N RANGE 74W SECTION 24 TRACT BCDA

BED NAME- DEPTH TO TOP 441 BOTTOM 471

SAMPLE NUMBER US-7326 SAMPLE OF CORE 450- 458

COLLAR ELEVATION- 4902

RUN FOR PROJECT USGS DATE - 23JAN74

LAB. NUMBER - 531 AIR DRIED LOSS = 20.7872

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	6.356	25.822		
VOLATILE MATTER	40.955	32.442	43.735	49.383
FIXED CARBON	41.978	33.252	44.828	50.617
ASH	10.710	8.484	11.437	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.940	.745	1.004	1.133
ASH				
BRITISH THERMAL UNITS	10509	8324	11222	12671
SULFUR FORMS				
SULFATE	0.000	0.000	0.000	0.000
PYRITIC	.940	.745	1.004	1.133
ORGANIC	0.000	0.000	0.000	0.000

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 48N RANGE 74W SECTION 23 TRACT CDBC

BED NAME- DEPTH TO TOP 142 BOTTOM 153

SAMPLE NUMBER US-7327 SAMPLE OF CORE 144- 150

COLLAR ELEVATION- 5092

RUN FOR PROJECT USGS DATE - 23JAN74

LAB. NUMBER - 532 AIR DRIED LOSS = 24.5178

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	6.918	29.740		
VOLATILE MATTER	42.138	31.807	45.271	50.769
FIXED CARBON	40.862	30.844	43.900	49.231
ASH	10.080	7.609	10.830	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	1.650	1.245	1.773	1.988
ASH				
BRITISH THERMAL UNITS	10467	7901	11245	12610
SULFUR FORMS				
SULFATE	.020	.015	.021	.024
PYRITIC	.800	.604	.859	.964
ORGANIC	.830	.627	.892	1.000

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 48N RANGE 74W SECTION 23 TRACT CDBC

BED NAME- DEPTH TO TOP 142 BOTTOM 153

SAMPLE NUMBER US-7327 SAMPLE OF CORE 150- 154

COLLAR ELEVATION- 5092

RUN FOR PROJECT USGS DATE - 23JAN74

LAB. NUMBER - 533 AIR DRIED LOSS = 23.6085

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	6.965	28.930		
VOLATILE MATTER	41.354	31.591	44.451	48.777
FIXED CARBON	43.427	33.175	46.680	51.223
ASH	8.251	6.303	8.869	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	1.270	.970	1.365	1.498
ASH				
BRITISH THERMAL UNITS	10510	8029	11297	12397
SULFUR FORMS				
SULFATE	.010	.008	.011	.012
PYRITIC	.220	.168	.236	.259
ORGANIC	1.040	.794	1.118	1.227

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 48N RANGE 74W SECTION 23 TRACT CDBC

BED NAME- DEPTH TO TOP 216 BOTTOM 222

SAMPLE NUMBER US-7327 SAMPLE OF CORE 215- 221

COLLAR ELEVATION- 5092

RUN FOR PROJECT USGS DATE - 23JAN74

LAB. NUMBER - 534 AIR DRIED LOSS = 27.2870

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	6.811	32.240		
VOLATILE MATTER	40.889	29.732	43.879	49.907
FIXED CARBON	41.042	29.843	44.042	50.093
ASH	11.256	8.185	12.079	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	1.200	.873	1.288	1.465
ASH				
BRITISH THERMAL UNITS	10211	7425	10958	12463
SULFUR FORMS				
SULFATE	.010	.007	.011	.012
PYRITIC	.340	.247	.365	.415
ORGANIC	.850	.618	.912	1.037

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 48N RANGE 74W SECTION 15 TRACT DBAD

BED NAME- DEPTH TO TOP 45 BOTTOM 58

SAMPLE NUMBER US-7329 SAMPLE OF CORE 46- 55

COLLAR ELEVATION- 4993

RUN FOR PROJECT USGS DATE - 23JAN74

LAB. NUMBER - 535 AIR DRIED LOSS = 25.7389

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	6.155	30.310		
VOLATILE MATTER	42.876	31.841	45.689	51.600
FIXED CARBON	40.216	29.866	42.855	48.400
ASH	10.750	7.984	11.456	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	2.000	1.485	2.131	2.407
ASH				
BRITISH THERMAL UNITS	10241	7605	10913	12325
SULFUR FORMS				
SULFATE	.040	.030	.043	.048
PYRITIC	.990	.735	1.055	1.191
ORGANIC	.970	.720	1.034	1.167

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 48N RANGE 74W SECTION 15 TRACT DRAD

BED NAME- DEPTH TO TOP 45 BOTTOM 58

SAMPLE NUMBER US-7329 SAMPLE OF CORE 55- 58

COLLAR ELEVATION- 4993

RUN FOR PROJECT USGS DATE - 24JAN74

LAB. NUMBER - 536 AIR DRIED LOSS = 24.8668

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	6.938	30.080		
VOLATILE MATTER	42.834	32.183	46.028	53.661
FIXED CARBON	36.989	27.792	39.748	46.339
ASH	13.236	9.945	14.224	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	3.820	2.870	4.105	4.785
ASH				
BRITISH THERMAL UNITS	10035	7540	10784	12572
SULFUR FORMS				
SULFATE	.060	.045	.064	.075
PYRITIC	2.530	1.901	2.719	3.169
ORGANIC	1.230	.924	1.322	1.541

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 47N RANGE 74W SECTION 35 TRACT DDAD

BED NAME- DEPTH TO TOP 59 BOTTOM 74

SAMPLE NUMBER US-7331 SAMPLE OF CORE 61- 71

COLLAR ELEVATION- 4984

RUN FOR PROJECT USGS DATE - 28JAN74

LAB. NUMBER - 537 AIR DRIED LOSS = 26.2539

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	7.642	31.890		
VOLATILE MATTER	40.881	30.149	44.265	49.577
FIXED CARBON	41.579	30.663	45.020	50.423
ASH	9.896	7.298	10.715	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	1.540	1.136	1.667	1.868
ASH				
BRITISH THERMAL UNITS	10345	7629	11201	12545
SULFUR FORMS				
SULFATE	.030	.022	.032	.036
PYRITIC	.650	.479	.704	.788
ORGANIC	.860	.634	.931	1.043

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 47N RANGE 74W SECTION 35 TRACT DDAD

BED NAME- DEPTH TO TOP 59 BOTTOM 74

SAMPLE NUMBER US-7331 SAMPLE OF CORE 71- 74

COLLAR ELEVATION- 4984

RUN FOR PROJECT USGS DATE - 28JAN74

LAB. NUMBER - 538 AIR DRIED LOSS = 26.2082

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	7.049	31.410		
VOLATILE MATTER	39.398	29.073	42.387	50.083
FIXED CARBON	39.268	28.977	42.247	49.917
ASH	14.283	10.540	15.366	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	4.720	3.483	5.078	6.000
ASH				
BRITISH THERMAL UNITS	9841	7262	10587	12509
SULFUR FORMS				
SULFATE	.050	.037	.054	.064
PYRITIC	3.890	2.870	4.185	4.945
ORGANIC	.780	.576	.839	.992

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 47N RANGE 74W SECTION 35 TRACT DDAD

BED NAME- DEPTH TO TOP 123 BOTTOM 127

SAMPLE NUMBER US-7331 SAMPLE OF CORE 123- 127

COLLAR ELEVATION- 4984

RUN FOR PROJECT USGS DATE - 28JAN74

LAB. NUMBER - 539 AIR DRIED LOSS = 26.9145

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	6.342	31.550		
VOLATILE MATTER	38.321	28.008	40.917	52.327
FIXED CARBON	34.913	25.517	37.278	47.673
ASH	20.422	14.926	21.805	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	3.460	2.529	3.694	4.724
ASH				
BRITISH THERMAL UNITS	8688	6350	9277	11864
SULFUR FORMS				
SULFATE	.080	.058	.085	.109
PYRITIC	2.440	1.783	2.605	3.332
ORGANIC	.940	.687	1.004	1.284

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 49N RANGE 72W SECTION 7 TRACT ADDC

BED NAME- DEPTH TO TOP 26 BOTTOM 40

SAMPLE NUMBER US-7330 SAMPLE OF CORE 26- 36

COLLAR ELEVATION- 4655

RUN FOR PROJECT USGS DATE - 16JAN74

LAB. NUMBER - 540 AIR DRIED LOSS = 20.4075

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	6.347	25.460		
VOLATILE MATTER	41.466	33.004	44.277	51.227
FIXED CARBON	39.479	31.423	42.156	48.773
ASH	12.705	10.113	13.567	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	2.450	1.950	2.616	3.027
ASH				
BRITISH THERMAL UNITS	10297	8196	10995	12721
SULFUR FORMS				
SULFATE	.070	.056	.075	.086
PYRITIC	1.150	.915	1.228	1.421
ORGANIC	1.230	.979	1.313	1.520

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 49N RANGE 72W SECTION 7 TRACT ADDC

BED NAME- DEPTH TO TOP 26 BOTTOM 40

SAMPLE NUMBER US-7330 SAMPLE OF CORE 36- 40

COLLAR ELEVATION- 4655

RUN FOR PROJECT USGS DATE - 16JAN74

LAB. NUMBER - 541 AIR DRIED LOSS = 19.6870

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	6.167	24.640		
VOLATILE MATTER	38.650	31.041	41.190	51.306
FIXED CARBON	36.681	29.460	39.093	48.694
ASH	18.501	14.859	19.717	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	1.780	1.430	1.897	2.363
ASH				
BRITISH THERMAL UNITS	8940	7180	9528	11868
SULFUR FORMS				
SULFATE	.060	.048	.064	.080
PYRITIC	.670	.538	.714	.889
ORGANIC	1.050	.843	1.119	1.394

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 49N RANGE 72W SECTION 7 TRACT ADDC

BED NAME- DEPTH TO TOP 50 BOTTOM 58

SAMPLE NUMBER US-7330 SAMPLE OF CORE 51- 58

COLLAR ELEVATION- 4655

RUN FOR PROJECT USGS DATE - 16JAN74

LAB. NUMBER - 542 AIR DRIED LOSS = 24.5147

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	6.842	29.680		
VOLATILE MATTER	42.173	31.835	45.271	49.097
FIXED CARBON	43.724	33.006	46.936	50.903
ASH	7.259	5.480	7.793	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.570	.430	.612	.664
ASH				
BRITISH THERMAL UNITS	10861	8199	11659	12644
SULFUR FORMS				
SULFATE	.020	.015	.021	.023
PYRITIC	.080	.060	.086	.093
ORGANIC	.470	.355	.505	.547

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 49N RANGE 73W SECTION 2 TRACT CDAD

BED NAME- DEPTH TO TOP 160 BOTTOM 176

SAMPLE NUMBER US-7333 SAMPLE OF CORE 162- 172

COLLAR ELEVATION- 4690

RUN FOR PROJECT USGS DATE - 16JAN74

LAB. NUMBER - 543 AIR DRIED LOSS = 23.7015

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	5.908	28.210		
VOLATILE MATTER	41.344	31.546	43.941	49.777
FIXED CARBON	41.716	31.829	44.336	50.223
ASH	11.030	8.416	11.723	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	1.920	1.465	2.041	2.312
ASH				
BRITISH THERMAL UNITS	10544	8045	11206	12694
SULFUR FORMS				
SULFATE	.020	.015	.021	.024
PYRITIC	.800	.610	.850	.963
ORGANIC	1.100	.839	1.169	1.324

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 49N RANGE 73W SECTION 2 TRACT CDAD

BED NAME- DEPTH TO TOP 160 BOTTOM 176

SAMPLE NUMBER US-7333 SAMPLE OF CORE 172- 176

COLLAR ELEVATION- 4690

RUN FOR PROJECT USGS DATE - 16JAN74

LAB. NUMBER - 544 AIR DRIED LOSS = 21.4340

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	6.257	26.350		
VOLATILE MATTER	39.756	31.235	42.410	49.874
FIXED CARBON	39.958	31.393	42.625	50.126
ASH	14.028	11.021	14.965	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	1.680	1.320	1.792	2.108
ASH				
BRITISH THERMAL UNITS	9519	7479	10154	11941
SULFUR FORMS				
SULFATE	.020	.016	.021	.025
PYRITIC	.290	.228	.309	.364
ORGANIC	1.370	1.076	1.461	1.719

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 49N RANGE 73W SECTION 2 TRACT CDAD

BED NAME- DEPTH TO TOP 182 BOTTOM 192

SAMPLE NUMBER US-7333 SAMPLE OF CORE 183- 192

COLLAR ELEVATION- 4690

RUN FOR PROJECT USGS DATE - 28JAN74

LAB. NUMBER - A-545 AIR DRIED LOSS = 22.2864

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	6.425	27.280		
VOLATILE MATTER	42.517	33.042	45.437	49.592
FIXED CARBON	43.217	33.586	46.185	50.408
ASH	7.839	6.092	8.378	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.810	.629	.866	.945
ASH				
BRITISH THERMAL UNITS	10742	8348	11480	12530
SULFUR FORMS				
SULFATE	.010	.008	.011	.012
PYRITIC	.140	.109	.150	.163
ORGANIC	.660	.513	.705	.770

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 49N RANGE 72W SECTION 6 TRACT BADA

BED NAME- DEPTH TO TOP 40 BOTTOM 55

SAMPLE NUMBER US-7332 SAMPLE OF CORE 43- 53

COLLAR ELEVATION- 4613

RUN FOR PROJECT USGS DATE - 21AUG73

LAB. NUMBER - B-545 AIR DRIED LOSS = 20.7329

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	6.001	25.490		
VOLATILE MATTER	39.048	30.953	41.542	51.055
FIXED CARBON	37.434	29.673	39.825	48.945
ASH	17.515	13.884	18.633	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	2.060	1.633	2.192	2.693
ASH				
BRITISH THERMAL UNITS	9529	7554	10138	12459
SULFUR FORMS				
SULFATE	.020	.016	.021	.026
PYRITIC	.820	.650	.872	1.072
ORGANIC	1.220	.967	1.298	1.595

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 49N RANGE 72W SECTION 6 TRACT BADA

BED NAME- DEPTH TO TOP 40 BOTTOM 55

SAMPLE NUMBER US-7332 SAMPLE OF CORE 53- 58

COLLAR ELEVATION- 4613

RUN FOR PROJECT USGS DATE - 21AUG73

LAB. NUMBER - 546 AIR DRIED LOSS = 21.5348

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	6.977	27.010		
VOLATILE MATTER	39.260	30.806	42.205	50.964
FIXED CARBON	37.775	29.640	40.609	49.036
ASH	15.986	12.544	17.186	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	1.470	1.153	1.580	1.908
ASH				
BRITISH THERMAL UNITS	9546	7490	10262	12391
SULFUR FORMS				
SULFATE	.020	.016	.022	.026
PYRITIC	.520	.408	.559	.675
ORGANIC	.930	.730	1.000	1.207

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 49N RANGE 72W SECTION 6 TRACT BADA

BED NAME- DEPTH TO TOP 60 BOTTOM 68

SAMPLE NUMBER US-7332 SAMPLE OF CORE 58- 67

COLLAR ELEVATION- 4613

RUN FOR PROJECT USGS DATE - 21AUG73

LAB. NUMBER - 547 AIR DRIED LOSS = 22.7936

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	7.378	28.490		
VOLATILE MATTER	41.731	32.219	45.055	50.385
FIXED CARBON	41.092	31.726	44.366	49.615
ASH	9.798	7.565	10.579	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	1.700	1.313	1.835	2.053
ASH				
BRITISH THERMAL UNITS	10523	8125	11361	12706
SULFUR FORMS				
SULFATE	.020	.015	.022	.024
PYRITIC	.770	.594	.831	.930
ORGANIC	.910	.703	.982	1.099

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 49N RANGE 74W SECTION 3 TRACT AAAA

BED NAME- DEPTH TO TOP 230 BOTTOM 254

SAMPLE NUMBER US-7335 SAMPLE OF CORE 234- 242

COLLAR ELEVATION- 4544

RUN FOR PROJECT USGS DATE - 22AUG73

LAB. NUMBER - 548 AIR DRIED LOSS = 20.4407

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	7.301	26.250		
VOLATILE MATTER	41.436	32.966	44.700	48.710
FIXED CARBON	43.631	34.713	47.069	51.290
ASH	7.630	6.071	8.231	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.860	.684	.928	1.011
ASH				
BRITISH THERMAL UNITS	10859	8639	11714	12765
SULFUR FORMS				
SULFATE	.010	.008	.011	.012
PYRITIC	.390	.310	.421	.458
ORGANIC	.460	.365	.496	.541

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 49N RANGE 74W SECTION 3 TRACT AAAA

BED NAME- DEPTH TO TOP 230 BOTTOM 254

SAMPLE NUMBER US-7335 SAMPLE OF CORE 242- 250

COLLAR ELEVATION- 4544

RUN FOR PROJECT USGS DATE - 22AUG73

LAB. NUMBER - 549 AIR DRIED LOSS = 20.8383

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	6.684	26.130		
VOLATILE MATTER	40.966	32.430	43.901	49.847
FIXED CARBON	41.217	32.629	44.170	50.153
ASH	11.131	8.811	11.928	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	1.200	.950	1.286	1.460
ASH				
BRITISH THERMAL UNITS	10649	8430	11411	12957
SULFUR FORMS				
SULFATE	.020	.016	.021	.024
PYRITIC	.290	.230	.311	.353
ORGANIC	.890	.705	.954	1.083

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 49N RANGE 74W SECTION 3 TRACT AAAA

BED NAME- DEPTH TO TOP 230 BOTTOM 254

SAMPLE NUMBER US-7335 SAMPLE OF CORE 250- 253

COLLAR ELEVATION- 4544

RUN FOR PROJECT USGS DATE - 22AUG73

LAB. NUMBER - 550 AIR DRIED LOSS = 20.5400

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	6.883	26.010		
VOLATILE MATTER	40.924	32.519	43.950	48.602
FIXED CARBON	43.279	34.390	46.479	51.398
ASH	8.912	7.082	9.571	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.870	.691	.934	1.033
ASH				
BRITISH THERMAL UNITS	10765	8554	11561	12784
SULFUR FORMS				
SULFATE	.020	.016	.021	.024
PYRITIC	.140	.111	.150	.166
ORGANIC	.710	.564	.762	.843

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 50N RANGE 74W SECTION 22 TRACT DAAA

BED NAME- DEPTH TO TOP 165 BOTTOM 191

SAMPLE NUMBER US-7337 SAMPLE OF CORE 167- 175

COLLAR ELEVATION- 4489

RUN FOR PROJECT USGS DATE - 22AUG73

LAB. NUMBER - 551 AIR DRIED LOSS = 23.2638

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	6.641	28.360		
VOLATILE MATTER	41.420	31.784	44.367	48.407
FIXED CARBON	44.146	33.876	47.286	51.593
ASH	7.792	5.980	8.347	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.700	.537	.750	.818
ASH				
BRITISH THERMAL UNITS	10884	8352	11658	12719
SULFUR FORMS				
SULFATE	.010	.008	.011	.012
PYRITIC	.060	.046	.064	.070
ORGANIC	.630	.483	.675	.736

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 50N RANGE 74W SECTION 22 TRACT DAAA

BED NAME- DEPTH TO TOP 165 BOTTOM 191

SAMPLE NUMBER US-7337 SAMPLE OF COAL 175- 183

COLLAR ELEVATION- 4489

RUN FOR PROJECT USGS DATE - 22AUG73

LAB. NUMBER - 552 AIR DRIED LOSS = 20.6749

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	6.359	25.720		
VOLATILE MATTER	40.223	31.907	42.955	48.557
FIXED CARBON	42.613	33.803	45.508	51.443
ASH	10.803	8.570	11.537	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	1.150	.912	1.228	1.388
ASH				
BRITISH THERMAL UNITS	10438	8280	11147	12601
SULFUR FORMS				
SULFATE	.010	.008	.011	.012
PYRITIC	.060	.048	.064	.072
ORGANIC	1.080	.857	1.153	1.304

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 50N RANGE 74W SECTION 22 TRACT DAAA

BED NAME- DEPTH TO TOP 165 BOTTOM 191

SAMPLE NUMBER US-7337 SAMPLE OF CORE 183- 188

COLLAR ELEVATION- 4489

RUN FOR PROJECT USGS DATE - 22AUG73

LAB. NUMBER - 553 AIR DRIED LOSS = 21.6285

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	6.190	26.480		
VOLATILE MATTER	40.751	31.933	43.441	50.040
FIXED CARBON	40.686	31.887	43.371	49.960
ASH	12.371	9.696	13.188	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	1.630	1.277	1.738	2.002
ASH				
BRITISH THERMAL UNITS	10313	8083	10994	12664
SULFUR FORMS				
SULFATE	.020	.016	.021	.025
PYRITIC	.470	.368	.501	.577
ORGANIC	1.140	.893	1.215	1.400

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 50N RANGE 73W SECTION 28 TRACT ADDC

BED NAME- DEPTH TO TOP 62 BOTTOM 64

SAMPLE NUMBER US-7339 SAMPLE OF CORE 62- 64

COLLAR ELEVATION- 4765

RUN FOR PROJECT USGS DATE - 27AUG73

LAB. NUMBER - 554 AIR DRIED LOSS = 22.2902

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	6.935	27.680		
VOLATILE MATTER	39.466	30.669	42.408	48.710
FIXED CARBON	41.556	32.294	44.654	51.290
ASH	12.041	9.357	12.939	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	1.510	1.173	1.623	1.864
ASH				
BRITISH THERMAL UNITS	10039	7801	10787	12390
SULFUR FORMS				
SULFATE	.030	.023	.032	.037
PYRITIC	.540	.420	.580	.666
ORGANIC	.940	.730	1.010	1.160

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 51N RANGE 73W SECTION 1 TRACT ACBA

BED NAME- DEPTH TO TOP 19 BOTTOM 26

SAMPLE NUMBER US-7334 SAMPLE OF CORE 21- 24

COLLAR ELEVATION- 4207

RUN FOR PROJECT USGS DATE - 30AUG73

LAB. NUMBER - 555 AIR DRIED LOSS = 24.0262

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	6.888	29.260		
VOLATILE MATTER	39.878	30.297	42.829	47.120
FIXED CARBON	44.753	34.001	48.065	52.880
ASH	8.478	6.442	9.106	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.930	.707	.999	1.099
ASH				
BRITISH THERMAL UNITS	10185	7738	10939	12034
SULFUR FORMS				
SULFATE	.300	.228	.322	.354
PYRITIC	.100	.076	.107	.118
ORGANIC	.530	.403	.569	.626

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 51N RANGE 73W SECTION 1 TRACT ACBA

BED NAME- DEPTH TO TOP 106 BOTTOM 147

SAMPLE NUMBER US-7334 SAMPLE OF CORE 111- 121

COLLAR ELEVATION- 4207

RUN FOR PROJECT USGS DATE - 30AUG73

LAB. NUMBER - 556 AIR DRIED LOSS = 23.0041

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	6.540	28.040		
VOLATILE MATTER	40.970	31.545	43.837	47.613
FIXED CARBON	45.078	34.709	48.233	52.387
ASH	7.410	5.706	7.929	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.650	.500	.695	.755
ASH				
BRITISH THERMAL UNITS	10759	8284	11512	12503
SULFUR FORMS				
SULFATE	0.000	0.000	0.000	0.000
PYRITIC	.010	.008	.011	.012
ORGANIC	.640	.493	.685	.744

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 51N RANGE 73W SECTION 1 TRACT ACBA

BED NAME- DEPTH TO TOP 106 BOTTOM 147

SAMPLE NUMBER US-7334 SAMPLE OF CORE 121- 131

COLLAR ELEVATION- 4207

RUN FOR PROJECT USGS DATE - 30AUG73

LAB. NUMBER - 557 AIR DRIED LOSS = 24.8026

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	6.113	29.400		
VOLATILE MATTER	40.700	30.605	43.350	46.129
FIXED CARBON	47.530	35.742	50.626	53.871
ASH	5.655	4.253	6.024	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.330	.248	.351	.374
ASH				
BRITISH THERMAL UNITS	10815	8133	11519	12258
SULFUR FORMS				
SULFATE	0.000	0.000	0.000	0.000
PYRITIC	.010	.008	.011	.011
ORGANIC	.320	.241	.341	.363

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 51N RANGE 73W SECTION 1 TRACT ACBA

BED NAME- DEPTH TO TOP 106 BOTTOM 147

SAMPLE NUMBER US-7334 SAMPLE OF CORE 131- 141

COLLAR ELEVATION- 4207

RUN FOR PROJECT USGS DATE - 30AUG73

LAB. NUMBER - 558 AIR DRIED LOSS = 24.8796

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	6.057	29.430		
VOLATILE MATTER	40.565	30.473	43.181	45.921
FIXED CARBON	47.771	35.886	50.852	54.079
ASH	5.605	4.211	5.967	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.550	.413	.585	.623
ASH				
BRITISH THERMAL UNITS	10563	7935	11244	11958
SULFUR FORMS				
SULFATE	.010	.008	.011	.011
PYRITIC	.090	.068	.096	.102
ORGANIC	.450	.338	.479	.509

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 51N RANGE 73W SECTION 1 TRACT ACBA

BED NAME- DEPTH TO TOP 106 BOTTOM 147

SAMPLE NUMBER US-7334 SAMPLE OF CORE 141- 147

COLLAR ELEVATION- 4207

RUN FOR PROJECT USGS DATE - 30AUG73

LAB. NUMBER - 559 AIR DRIED LOSS = 25.4924

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	6.264	30.160		
VOLATILE MATTER	40.834	30.425	43.564	49.635
FIXED CARBON	41.435	30.873	44.205	50.365
ASH	11.464	8.542	12.231	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	1.030	.767	1.099	1.252
ASH				
BRITISH THERMAL UNITS	10413	7758	11109	12657
SULFUR FORMS				
SULFATE	.010	.007	.011	.012
PYRITIC	.280	.209	.299	.340
ORGANIC	.740	.551	.789	.899

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 51N RANGE 73W SECTION 1 TRACT ACBA

BED NAME- DEPTH TO TOP 332 BOTTOM 410

SAMPLE NUMBER US-7334 SAMPLE OF CORE 340- 350

COLLAR ELEVATION- 4207

RUN FOR PROJECT USGS DATE - 30AUG73

LAB. NUMBER - 560 AIR DRIED LOSS = 22.2970

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	7.326	27.990		
VOLATILE MATTER	41.892	32.552	45.204	49.992
FIXED CARBON	41.906	32.563	45.220	50.008
ASH	8.874	6.896	9.576	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.610	.474	.658	.728
ASH				
BRITISH THERMAL UNITS	10794	8387	11647	12881
SULFUR FORMS				
SULFATE	.010	.008	.011	.012
PYRITIC	.110	.085	.119	.131
ORGANIC	.490	.381	.529	.585

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 51N RANGE 73W SECTION 1 TRACT ACBA

BED NAME- DEPTH TO TOP 332 BOTTOM 410

SAMPLE NUMBER US-7334 SAMPLE OF CORE 350- 360

COLLAR ELEVATION- 4207

RUN FOR PROJECT USGS DATE - 30AUG73

LAB. NUMBER - 561 AIR DRIED LOSS = 22.2759

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	7.686	28.250		
VOLATILE MATTER	38.169	29.667	41.347	43.613
FIXED CARBON	49.349	38.356	53.458	56.387
ASH	4.795	3.727	5.194	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.300	.233	.325	.343
ASH				
BRITISH THERMAL UNITS	10952	8513	11864	12514
SULFUR FORMS				
SULFATE	.010	.008	.011	.011
PYRITIC	.020	.016	.022	.023
ORGANIC	.270	.210	.292	.309

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 51N RANGE 73W SECTION 1 TRACT ACBA

BED NAME- DEPTH TO TOP 332 BOTTOM 410

SAMPLE NUMBER US-7334 SAMPLE OF CORE 360- 368

COLLAR ELEVATION- 4207

RUN FOR PROJECT USGS DATE - 30AUG73

LAB. NUMBER - 562 AIR DRIED LOSS = 25.8977

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	7.290	31.300		
VOLATILE MATTER	38.870	28.804	41.928	44.633
FIXED CARBON	48.218	35.731	52.011	55.367
ASH	5.619	4.165	6.062	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.300	.222	.324	.344
ASH				
BRITISH THERMAL UNITS	10172	7537	10971	11679
SULFUR FORMS				
SULFATE	.010	.007	.011	.011
PYRITIC	.010	.007	.011	.011
ORGANIC	.280	.207	.302	.322

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 51N RANGE 73W SECTION 1 TRACT ACBA

BED NAME- DEPTH TO TOP 332 BOTTOM 410

SAMPLE NUMBER US-7334 SAMPLE OF CORE 368- 370

COLLAR ELEVATION- 4207

RUN FOR PROJECT USGS DATE - 30AUG73

LAB. NUMBER - 563 AIR DRIED LOSS = 25.6858

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	7.796	31.480		
VOLATILE MATTER	40.747	30.281	44.193	46.729
FIXED CARBON	46.452	34.521	50.381	53.271
ASH	5.002	3.718	5.426	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.260	.193	.282	.298
ASH				
BRITISH THERMAL UNITS	11104	8252	12043	12734
SULFUR FORMS				
SULFATE	.010	.007	.011	.011
PYRITIC	0.000	0.000	0.000	0.000
ORGANIC	.250	.186	.271	.287

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 51N RANGE 73W SECTION 1 TRACT ACBA

BED NAME- DEPTH TO TOP 332 BOTTOM 410

SAMPLE NUMBER US-7334 SAMPLE OF CORE 370- 380

COLLAR ELEVATION- 4207

RUN FOR PROJECT USGS DATE - 30AUG73

LAB. NUMBER - 564 AIR DRIED LOSS = 25.9585

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	7.079	31.200		
VOLATILE MATTER	40.742	30.166	43.846	45.896
FIXED CARBON	48.028	35.561	51.687	54.104
ASH	4.150	3.073	4.467	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.190	.141	.204	.214
ASH				
BRITISH THERMAL UNITS	11288	8358	12148	12716
SULFUR FORMS				
SULFATE	.010	.007	.011	.011
PYRITIC	0.000	0.000	0.000	0.000
ORGANIC	.180	.133	.194	.203

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 51N RANGE 73W SECTION 1 TRACT ACBA

BED NAME- DEPTH TO TOP 332 BOTTOM 410

SAMPLE NUMBER US-7334 SAMPLE OF CORE 380- 390

COLLAR ELEVATION- 4207

RUN FOR PROJECT USGS DATE - 30AUG73

LAB. NUMBER - 565 AIR DRIED LOSS = 25.0380

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	5.872	29.440		
VOLATILE MATTER	40.066	30.034	42.566	46.672
FIXED CARBON	45.780	34.318	48.637	53.328
ASH	8.280	6.207	8.797	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.520	.390	.552	.606
ASH				
BRITISH THERMAL UNITS	11368	8522	12078	13243
SULFUR FORMS				
SULFATE	.010	.007	.011	.012
PYRITIC	.360	.270	.382	.419
ORGANIC	.150	.112	.159	.175

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 51N RANGE 73W SECTION 1 TRACT ACBA

BED NAME- DEPTH TO TOP 332 BOTTOM 410

SAMPLE NUMBER US-7334 SAMPLE OF CORE 390- 400

COLLAR ELEVATION- 4207

RUN FOR PROJECT USGS DATE - 30AUG73

LAB. NUMBER - 566 AIR DRIED LOSS = 25.5918

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	7.752	31.360		
VOLATILE MATTER	38.586	28.711	41.829	44.602
FIXED CARBON	47.926	35.661	51.954	55.398
ASH	5.735	4.268	6.217	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.270	.201	.293	.312
ASH				
BRITISH THERMAL UNITS	11064	8233	11994	12789
SULFUR FORMS				
SULFATE	.010	.007	.011	.012
PYRITIC	.050	.037	.054	.058
ORGANIC	.210	.156	.228	.243

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 51N RANGE 73W SECTION 1 TRACT ACBA

BED NAME- DEPTH TO TOP 332 BOTTOM 410

SAMPLE NUMBER US-7334 SAMPLE OF CORE 400- 410

COLLAR ELEVATION- 4207

RUN FOR PROJECT USGS DATE - 30AUG73

LAB. NUMBER - 567 AIR DRIED LOSS = 22.2888

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	5.457	26.530		
VOLATILE MATTER	42.876	33.320	45.352	50.445
FIXED CARBON	42.119	32.732	44.551	49.555
ASH	9.546	7.418	10.097	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.410	.319	.434	.482
ASH				
BRITISH THERMAL UNITS	11079	8609	11718	13034
SULFUR FORMS				
SULFATE	.010	.008	.011	.012
PYRITIC	.010	.008	.011	.012
ORGANIC	.390	.303	.413	.459

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 49N RANGE 73W SECTION 4 TRACT CDDD

BED NAME- DEPTH TO TOP 84 BOTTOM 86

SAMPLE NUMBER US-7341 SAMPLE OF CORE 84- 86

COLLAR ELEVATION- 4785

RUN FOR PROJECT USGS DATE - 30AUG73

LAB. NUMBER - 568 AIR DRIED LOSS = 25.2218

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	5.841	29.590		
VOLATILE MATTER	36.020	26.936	38.256	51.511
FIXED CARBON	33.907	25.355	36.011	48.489
ASH	24.230	18.119	25.733	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	2.760	2.064	2.931	3.947
ASH				
BRITISH THERMAL UNITS	8694	6501	9234	12433
SULFUR FORMS				
SULFATE	.120	.090	.127	.172
PYRITIC	1.540	1.152	1.636	2.202
ORGANIC	1.100	.823	1.168	1.573

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 52N RANGE 73W SECTION 35 TRACT DDAB

BED NAME- DEPTH TO TOP 150 BOTTOM 162

SAMPLE NUMBER US-7336 SAMPLE OF CORE 150- 160

COLLAR ELEVATION- 4295

RUN FOR PROJECT USGS DATE - 30AUG73

LAB. NUMBER - 569 AIR DRIED LOSS = 28.5975

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	7.118	33.680		
VOLATILE MATTER	39.211	27.998	42.216	45.650
FIXED CARBON	46.685	33.334	50.263	54.350
ASH	6.985	4.988	7.521	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	1.420	1.014	1.529	1.653
ASH				
BRITISH THERMAL UNITS	10802	7713	11630	12576
SULFUR FORMS				
SULFATE	.010	.007	.011	.012
PYRITIC	.630	.450	.678	.733
ORGANIC	.780	.557	.840	.908

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 52N RANGE 73W SECTION 35 TRACT DDAB

BED NAME- DEPTH TO TOP 150 BOTTOM 162

SAMPLE NUMBER US-7336 SAMPLE OF CORE 160- 162

COLLAR ELEVATION- 4295

RUN FOR PROJECT USGS DATE - 30AUG73

LAB. NUMBER - 570 AIR DRIED LOSS = 25.5105

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	7.436	31.050		
VOLATILE MATTER	39.283	29.262	42.439	46.785
FIXED CARBON	44.681	33.283	48.271	53.215
ASH	8.599	6.405	9.290	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	1.240	.924	1.340	1.477
ASH				
BRITISH THERMAL UNITS	10350	7709	11181	12326
SULFUR FORMS				
SULFATE	.010	.007	.011	.012
PYRITIC	.010	.007	.011	.012
ORGANIC	1.220	.909	1.318	1.453

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 52N RANGE 73W SECTION 35 TRACT DDAB

BED NAME- DEPTH TO TOP 224 BOTTOM 266

SAMPLE NUMBER US-7336 SAMPLE OF CORE 228- 238

COLLAR ELEVATION- 4295

RUN FOR PROJECT USGS DATE - 30AUG73

LAB. NUMBER - 571 AIR DRIED LOSS = 24.4695

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	6.236	29.180		
VOLATILE MATTER	40.132	30.313	42.802	47.941
FIXED CARBON	43.579	32.916	46.478	52.059
ASH	10.050	7.592	10.720	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.660	.499	.704	.788
ASH				
BRITISH THERMAL UNITS	10212	7713	10892	12199
SULFUR FORMS				
SULFATE	.010	.008	.011	.012
PYRITIC	.030	.023	.032	.036
ORGANIC	.620	.468	.661	.741

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 52N RANGE 73W SECTION 35 TRACT DDAB

BED NAME- DEPTH TO TOP 224 BOTTOM 266

SAMPLE NUMBER US-7336 SAMPLE OF CORE 238- 248

COLLAR ELEVATION- 4295

RUN FOR PROJECT USGS DATE - 30AUG73

LAB. NUMBER - 572 AIR DRIED LOSS = 24.6054

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	8.574	31.070		
VOLATILE MATTER	38.850	29.291	42.494	45.310
FIXED CARBON	46.893	35.355	51.291	54.690
ASH	5.682	4.284	6.215	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.440	.332	.481	.513
ASH				
BRITISH THERMAL UNITS	10805	8146	11818	12601
SULFUR FORMS				
SULFATE	.010	.008	.011	.012
PYRITIC	.010	.008	.011	.012
ORGANIC	.420	.317	.459	.490

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 52N RANGE 73W SECTION 35 TRACT DDAB

BED NAME- DEPTH TO TOP 224 BOTTOM 266

SAMPLE NUMBER US-7336 SAMPLE OF CORE 248- 258

COLLAR ELEVATION- 4295

RUN FOR PROJECT USGS DATE - 30AUG73

LAB. NUMBER - 573 AIR DRIED LOSS = 25.8791

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	5.060	29.630		
VOLATILE MATTER	43.231	32.044	45.536	48.255
FIXED CARBON	46.358	34.361	48.830	51.745
ASH	5.349	3.965	5.634	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.340	.252	.358	.380
ASH				
BRITISH THERMAL UNITS	11043	8185	11631	12326
SULFUR FORMS				
SULFATE	.010	.007	.011	.011
PYRITIC	0.000	0.000	0.000	0.000
ORGANIC	.330	.245	.348	.368

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 52N RANGE 73W SECTION 35 TRACT DDAB

BED NAME- DEPTH TO TOP 224 BOTTOM 266

SAMPLE NUMBER US-7336 SAMPLE OF CORE 258- 266

COLLAR ELEVATION- 4295

RUN FOR PROJECT USGS DATE - 30AUG73

LAB. NUMBER - 574 AIR DRIED LOSS = 26.4271

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	4.516	29.750		
VOLATILE MATTER	40.672	29.924	42.596	49.981
FIXED CARBON	40.703	29.947	42.629	50.019
ASH	14.107	10.380	14.775	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.790	.581	.827	.971
ASH				
BRITISH THERMAL UNITS	9884	7272	10351	12146
SULFUR FORMS				
SULFATE	.020	.015	.021	.025
PYRITIC	.070	.052	.073	.086
ORGANIC	.700	.515	.733	.860

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 51N RANGE 74W SECTION 25 TRACT DACD

BED NAME- DEPTH TO TOP 176 BOTTOM 203

SAMPLE NUMBER US-7343 SAMPLE OF CORE 180- 190

COLLAR ELEVATION- 4496

RUN FOR PROJECT USGS DATE - 30AUG73

LAB. NUMBER - 575 AIR DRIED LOSS = 20.0952

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	7.902	26.410		
VOLATILE MATTER	40.952	32.723	44.467	48.337
FIXED CARBON	43.770	34.975	47.527	51.663
ASH	7.373	5.892	8.006	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.600	.479	.651	.708
ASH				
BRITISH THERMAL UNITS	10795	8626	11721	12741
SULFUR FORMS				
SULFATE	.010	.008	.011	.012
PYRITIC	.020	.016	.022	.024
ORGANIC	.570	.455	.619	.673

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 51N RANGE 74W SECTION 25 TRACT DACD

BED NAME- DEPTH TO TOP 176 BOTTOM 203

SAMPLE NUMBER US-7343 SAMPLE OF CORE 190- 192

COLLAR ELEVATION- 4496

RUN FOR PROJECT USGS DATE - 30AUG73

LAB. NUMBER - 576 AIR DRIED LOSS = 27.6039

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	5.257	31.410		
VOLATILE MATTER	42.463	30.742	44.820	47.990
FIXED CARBON	46.019	33.317	48.574	52.010
ASH	6.259	4.532	6.607	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.660	.478	.697	.746
ASH				
BRITISH THERMAL UNITS	10769	7797	11367	12171
SULFUR FORMS				
SULFATE	0.000	0.000	0.000	0.000
PYRITIC	.050	.036	.053	.057
ORGANIC	.610	.442	.644	.689

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 51N RANGE 73W SECTION 11 TRACT CBDD

BED NAME- DEPTH TO TOP 178 BOTTOM 192

SAMPLE NUMBER US-7338 SAMPLE OF CORE 178- 188

COLLAR ELEVATION- 4268

RUN FOR PROJECT USGS DATE - 25JAN74

LAB. NUMBER - 577 AIR DRIED LOSS = 27.9943

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	4.743	31.410		
VOLATILE MATTER	40.196	28.943	42.198	46.059
FIXED CARBON	47.073	33.896	49.418	53.941
ASH	7.986	5.751	8.384	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.830	.598	.871	.951
ASH				
BRITISH THERMAL UNITS	10587	7623	11114	12131
SULFUR FORMS				
SULFATE	.010	.007	.010	.011
PYRITIC	.370	.266	.388	.424
ORGANIC	.450	.324	.472	.516

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 51N RANGE 73W SECTION 11 TRACT CBDD

BED NAME- DEPTH TO TOP 178 BOTTOM 192

SAMPLE NUMBER US-7338 SAMPLE OF CORE 188- 192

COLLAR ELEVATION- 4268

RUN FOR PROJECT USGS DATE - 30AUG73

LAB. NUMBER - 578 AIR DRIED LOSS = 25.3457

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	7.332	30.820		
VOLATILE MATTER	38.755	28.933	41.822	45.518
FIXED CARBON	46.388	34.631	50.059	54.482
ASH	7.523	5.617	8.119	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	1.110	.829	1.198	1.304
ASH				
BRITISH THERMAL UNITS	10737	8016	11586	12610
SULFUR FORMS				
SULFATE	.010	.007	.011	.012
PYRITIC	.320	.239	.345	.376
ORGANIC	.780	.582	.842	.916

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 51N RANGE 73W SECTION 11 TRACT CBDD

BED NAME- DEPTH TO TOP 230 BOTTOM 264

SAMPLE NUMBER US-7338 SAMPLE OF CORE 240- 250

COLLAR ELEVATION- 4268

RUN FOR PROJECT USGS DATE - 25JAN74

LAB. NUMBER - 579 AIR DRIED LOSS = 23.0520

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	6.703	28.210		
VOLATILE MATTER	36.667	28.215	39.302	47.004
FIXED CARBON	41.342	31.812	44.313	52.996
ASH	15.286	11.763	16.385	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.740	.569	.793	.949
ASH				
BRITISH THERMAL UNITS	9660	7433	10354	12383
SULFUR FORMS				
SULFATE	.020	.015	.021	.026
PYRITIC	.180	.139	.193	.231
ORGANIC	.540	.416	.579	.692

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 51N RANGE 74W SECTION 11 TRACT BBBC

BED NAME- DEPTH TO TOP 214 BOTTOM 236

SAMPLE NUMBER US-7345 SAMPLE OF CORE 215- 220

COLLAR ELEVATION- 4542

RUN FOR PROJECT USGS DATE - 12SEP73

LAB. NUMBER - 580 AIR DRIED LOSS = 24.8707

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	7.199	30.280		
VOLATILE MATTER	40.351	30.316	43.482	47.004
FIXED CARBON	45.496	34.181	49.026	52.996
ASH	6.952	5.223	7.492	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.450	.338	.485	.524
ASH				
BRITISH THERMAL UNITS	10795	8111	11633	12575
SULFUR FORMS				
SULFATE	0.000	0.000	0.000	0.000
PYRITIC	.030	.023	.032	.035
ORGANIC	.420	.316	.453	.489

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 52N RANGE 74W SECTION 13 TRACT CDDD

BED NAME- DEPTH TO TOP 291 BOTTOM 307

SAMPLE NUMBER US-7340 SAMPLE OF CORE 299- 307

COLLAR ELEVATION- 4285

RUN FOR PROJECT USGS DATE - 13SEP73

LAB. NUMBER - 581 AIR DRIED LOSS = 24.7048

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	7.005	29.980		
VOLATILE MATTER	37.822	28.478	40.672	42.815
FIXED CARBON	50.516	38.036	54.322	57.185
ASH	4.655	3.505	5.006	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.410	.309	.441	.464
ASH				
BRITISH THERMAL UNITS	11117	8371	11955	12585
SULFUR FORMS				
SULFATE	.130	.098	.140	.147
PYRITIC	.170	.128	.183	.192
ORGANIC	.110	.083	.118	.125

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 48N RANGE 72W SECTION 9 TRACT DADD

BED NAME- DEPTH TO TOP 69 BOTTOM 96

SAMPLE NUMBER US-7353 SAMPLE OF CORE 70- 80

COLLAR ELEVATION- 4752

RUN FOR PROJECT USGS DATE - 14SEP73

LAB. NUMBER - 584 AIR DRIED LOSS = 22.7772

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	8.187	29.100		
VOLATILE MATTER	39.802	30.736	43.352	49.539
FIXED CARBON	40.543	31.309	44.159	50.461
ASH	11.466	8.855	12.489	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	1.260	.973	1.372	1.568
ASH				
BRITISH THERMAL UNITS	10283	7940	11200	12798
SULFUR FORMS				
SULFATE	.010	.008	.011	.012
PYRITIC	.440	.340	.479	.548
ORGANIC	.810	.626	.882	1.008

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 48N RANGE 72W SECTION 9 TRACT DADD

BED NAME- DEPTH TO TOP 69 BOTTOM 96

SAMPLE NUMBER US-7353 SAMPLE OF CORE 80- 90

COLLAR ELEVATION- 4752

RUN FOR PROJECT USGS DATE - 14SEP73

LAB. NUMBER - 585 AIR DRIED LOSS = 23.1672

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	6.446	28.120		
VOLATILE MATTER	38.666	29.708	41.330	49.097
FIXED CARBON	40.088	30.801	42.850	50.903
ASH	14.799	11.371	15.819	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.850	.653	.909	1.079
ASH				
BRITISH THERMAL UNITS	9875	7587	10555	12539
SULFUR FORMS				
SULFATE	.030	.023	.032	.038
PYRITIC	.250	.192	.267	.317
ORGANIC	.570	.438	.609	.724

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 48N RANGE 72W SECTION 9 TRACT DADD

BED NAME- DEPTH TO TOP 69 BOTTOM 96

SAMPLE NUMBER US-7353 SAMPLE OF CORE 90- 96

COLLAR ELEVATION- 4752

RUN FOR PROJECT USGS DATE - 14SEP73

LAB. NUMBER - 586 AIR DRIED LOSS = 25.5929

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	6.930	30.750		
VOLATILE MATTER	41.556	30.921	44.652	48.766
FIXED CARBON	43.659	32.486	46.911	51.234
ASH	7.852	5.843	8.437	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.810	.603	.870	.951
ASH				
BRITISH THERMAL UNITS	10989	8176	11807	12895
SULFUR FORMS				
SULFATE	.010	.007	.011	.012
PYRITIC	.180	.134	.193	.211
ORGANIC	.620	.461	.666	.728

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 48N RANGE 72W SECTION 7 TRACT ACDB

BED NAME- DEPTH TO TOP 24 BOTTOM 51

SAMPLE NUMBER US-7355 SAMPLE OF CORE 26- 36

COLLAR ELEVATION- 4646

RUN FOR PROJECT USGS DATE - 25JAN74

LAB. NUMBER - 587 AIR DRIED LOSS = 23.2942

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	7.086	28.730		
VOLATILE MATTER	40.772	31.275	43.883	49.084
FIXED CARBON	42.294	32.442	45.520	50.916
ASH	9.846	7.553	10.597	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	1.130	.867	1.216	1.360
ASH				
BRITISH THERMAL UNITS	10539	8084	11343	12687
SULFUR FORMS				
SULFATE	.030	.023	.032	.036
PYRITIC	.180	.138	.194	.217
ORGANIC	.920	.705	.990	1.108

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 48N RANGE 72W SECTION 7 TRACT ACDB

BED NAME- DEPTH TO TOP 24 BOTTOM 51

SAMPLE NUMBER US-7355 SAMPLE OF CORE 36- 46

COLLAR ELEVATION- 4646

RUN FOR PROJECT USGS DATE - 25JAN74

LAB. NUMBER - 588 AIR DRIED LOSS = 23.9411

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	6.559	28.930		
VOLATILE MATTER	42.074	32.001	45.028	50.645
FIXED CARBON	41.002	31.186	43.881	49.355
ASH	10.363	7.882	11.091	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	1.270	.966	1.359	1.529
ASH				
BRITISH THERMAL UNITS	10668	8114	11416	12841
SULFUR FORMS				
SULFATE	.020	.015	.021	.024
PYRITIC	.500	.380	.535	.602
ORGANIC	.750	.570	.803	.903

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 48N RANGE 72W SECTION 7 TRACT ACDB

BED NAME- DEPTH TO TOP 24 BOTTOM 51

SAMPLE NUMBER US-7355 SAMPLE OF CORE 46- 51

COLLAR ELEVATION- 4646

RUN FOR PROJECT USGS DATE - 25JAN74

LAB. NUMBER - 589 AIR DRIED LOSS = 25.7030

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	6.792	30.750		
VOLATILE MATTER	41.340	30.715	44.354	48.525
FIXED CARBON	43.853	32.582	47.050	51.475
ASH	8.012	5.953	8.597	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.980	.728	1.051	1.150
ASH				
BRITISH THERMAL UNITS	10893	8093	11687	12786
SULFUR FORMS				
SULFATE	.020	.015	.021	.023
PYRITIC	.510	.379	.547	.599
ORGANIC	.450	.334	.483	.528

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 49N RANGE 72W SECTION 21 TRACT AABC

BED NAME- DEPTH TO TOP 11 BOTTOM 36

SAMPLE NUMBER US-7357 SAMPLE OF CORE 26- 36

COLLAR ELEVATION- 4684

RUN FOR PROJECT USGS DATE - 25JAN74

LAB. NUMBER - 590 AIR DRIED LOSS = 24.8226

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	7.285	30.300		
VOLATILE MATTER	41.634	31.299	44.906	48.850
FIXED CARBON	43.593	32.773	47.020	51.150
ASH	7.486	5.628	8.074	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.820	.616	.884	.962
ASH				
BRITISH THERMAL UNITS	10849	8156	11702	12730
SULFUR FORMS				
SULFATE	.020	.015	.022	.023
PYRITIC	.180	.135	.194	.211
ORGANIC	.620	.466	.669	.727

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 49N RANGE 72W SECTION 26 TRACT DDDA

BED NAME- DEPTH TO TOP 43 BOTTOM 70

SAMPLE NUMBER US-7359 SAMPLE OF CORE 45- 55

COLLAR ELEVATION- 4773

RUN FOR PROJECT USGS DATE - 25JAN74

LAB. NUMBER - 591 AIR DRIED LOSS = 25.8714

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	6.945	31.020		
VOLATILE MATTER	39.789	29.495	42.759	50.419
FIXED CARBON	39.127	29.005	42.048	49.581
ASH	14.137	10.480	15.193	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	1.920	1.423	2.063	2.433
ASH				
BRITISH THERMAL UNITS	10136	7514	10893	12844
SULFUR FORMS				
SULFATE	.040	.030	.043	.051
PYRITIC	.860	.638	.924	1.090
ORGANIC	1.020	.756	1.096	1.293

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 49N RANGE 72W SECTION 26 TRACT DDDA

BED NAME- DEPTH TO TOP 43 BOTTOM 70

SAMPLE NUMBER US-7359 SAMPLE OF CORE 55- 65

COLLAR ELEVATION- 4773

RUN FOR PROJECT USGS DATE - 25JAN74

LAB. NUMBER - 592 AIR DRIED LOSS = 26.2089

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	7.278	31.580		
VOLATILE MATTER	39.982	29.503	43.121	49.718
FIXED CARBON	40.435	29.838	43.610	50.282
ASH	12.303	9.079	13.270	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.870	.642	.938	1.082
ASH				
BRITISH THERMAL UNITS	10044	7412	10832	12490
SULFUR FORMS				
SULFATE	.030	.022	.032	.037
PYRITIC	.230	.170	.248	.286
ORGANIC	.610	.450	.658	.759

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPBELL

LOCATION- TOWNSHIP 49N RANGE 72W SECTION 26 TRACT DDDA

BED NAME- DEPTH TO TOP 43 BOTTOM 70

SAMPLE NUMBER US-7359 SAMPLE OF CORE 65- 70

COLLAR ELEVATION- 4773

RUN FOR PROJECT USGS DATE - 25JAN74

LAB. NUMBER - 593 AIR DRIED LOSS = 28.4650

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	7.387	33.750		
VOLATILE MATTER	41.698	29.829	45.025	49.500
FIXED CARBON	42.541	30.432	45.935	50.500
ASH	8.372	5.989	9.040	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.900	.644	.972	1.068
ASH				
BRITISH THERMAL UNITS	10777	7709	11636	12793
SULFUR FORMS				
SULFATE	.030	.021	.032	.036
PYRITIC	.410	.293	.443	.487
ORGANIC	.460	.329	.497	.546

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

MONTANA BUREAU OF MINES AND GEOLOGY

COAL ANALYSIS REPORT

STATE- WYOMING COUNTY- CAMPB

LOCATION- TOWNSHIP 50N RANGE 71W SECTION TRA

BED NAME- DEPTH TO TOP 109 BOTTOM 180

SAMPLE NUMBER US-[illegible] SAMPLE OF CORE [illegible]

COLLAR ELEVATION- 4654

RUN FOR PROJECT USGS DATE - 80CT73

LAB. NUMBER - 595 AIR DRIED LOSS = 26.7766

	COAL 1	COAL 2	COAL 3	COAL 4
PROXIMATE ANALYSIS				
MOISTURE	6.737	31.710		
VOLATILE MATTER	42.179	30.885	45.227	50.253
FIXED CARBON	41.754	30.574	44.771	49.747
ASH	9.328	6.830	10.002	
ULTIMATE ANALYSIS				
HYDROGEN				
CARBON				
NITROGEN				
OXYGEN				
SULFUR	.890	.652	.954	1.060
ASH				
BRITISH THERMAL UNITS	10661	7807	11431	12702
SULFUR FORMS				
SULFATE	.010	.007	.011	.012
PYRITIC	.240	.176	.257	.286
ORGANIC	.640	.469	.686	.762

NOTE - ALL DECIMAL NUMBERS ARE PERCENTAGES.

COAL 1 - AIR DRIED
NOTE - 0 ENTERED WHERE PERCENTAGES LESS THAN 0.01

COAL 2 - AS RECEIVED
COAL 3 - MOISTURE FREE
COAL 4 - MOISTURE FREE AND ASH FREE

References Cited

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U.S. Bureau of Mines, 1967, Methods of analyzing and testing coal and coke: U.S. Bur. Mines Bull. 638, 85 p.

U.S. Geological Survey and Montana Bureau of Mines and Geology, 1973, Preliminary report of coal drill-hole data and chemical analyses of coal beds in Sheridan and Campbell Counties, Wyo., and Big Horn County, Mont.: U.S. Geol. Survey open-file rept., 57 p.

Table 1.--Percent ash, and major oxide composition of ash (in percent), of drill-core samples, Powder River Basin. (Blank space indicates analysis not completed at time of report preparation.)

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Field-Lab. Sample Nos.	Ash	SiO_2	Al_2O_3	Na_2O	K_2O	CaO	MgO	P_2O_5	Fe_2O_3
483-D164604	8.85	22.	11.	1.17	0.40	18.	3.90	0.74	7.6
484-D164605	6.44	29.	29.	.21	.28	7.7	1.33	1.7	8.2
485-D164606	8.58	19.	12.	.37	.26	21.	3.95	1.1	6.9
486-D164607	7.26	18.	8.0	.56	.15	22.	4.50	< .05	9.2
487-D164608	6.04	24.	10.	.79	.32	28.	6.05	.92	4.9
488-D164609	5.79	16.	11.	.85	.50	28.	5.95	.62	5.9
489-D164610	9.19	27.	11.	.94	.22	18.	3.80	.78	7.7
490-D164611	11.6	41.	9.9	.82	.34	13.	3.00	.70	5.4
491-D164612	6.74	22.	13.	1.67	.16	25.	5.75	.82	4.4
492-D165086	6.58	31.	11.	1.76	< .10	27.	6.00	1.3	4.2
493-D165087	5.52	17.	10.	2.09	< .10	32.	7.00	.95	5.3
494-D165088	5.40	12.	13.	2.11	.12	29.	6.35	3.0	6.6
495-D165089	8.56	23.	13.	.49	.28	24.	4.00	3.3	7.2
496-D165090	6.52	33.	11.	.41	< .10	26.	4.60	2.0	5.4
497-D165091	9.84	32.	20.	.40	.42	16.	3.25	1.2	4.0
498-D165879	10.0	47.	15.	.81	1.3	14.	2.75	.51	4.1
499-D165092	12.8	13.	5.8	.12	.12	18.	2.25	.72	27.
500-D164613	50.6	50.	23.	.17	1.7	2.8	1.80	.05	9.6
501-D165093	14.4	17.	6.	.97	< .10	13.	2.25	1.6	27.
502-D165094	29.7	61.	12.	.46	.79	5.8	1.25	.46	4.6
503-D165095	8.78	19.	7.9	1.39	.25	21.	3.85	.18	10.
504-D165096	9.67	20.	13.	1.06	.25	22.	3.50	2.4	19.
505-D165097	8.26	26.	14.	1.18	< .10	26.	4.05	.50	5.1
506-D165098	7.96	20.	11.	1.44	.20	28.	4.60	.06	7.0
507-D165099	9.78	25.	11.	1.16	.78	23.	3.10	< .050	9.4
508-D165100	10.6	25.	15.	1.49	.23	19.	2.50	1.1	9.7
509-D165101	9.14	25.	16.	1.71	< .10	24.	3.10	1.0	6.2
510-D165102	7.76	19.	12.	1.86	< .10	27.	3.55	.34	8.6
511-D165103	9.94	28.	11.	.46	.76	24.	2.95	.76	7.5
512-D165104	12.8	39.	20.	.71	.25	18.	2.20	.19	4.2
513-D165105	12.5	41.	16.	1.00	.36	23.	2.20	.15	3.8
514-D165106	9.84	33.	12.	1.69	.40	22.	2.75	.20	8.4
515-D165107	7.68	11.	13.	2.28	.22	26.	3.25	.36	8.9
516-D165108	11.5	44.	18.	1.35	< .10	19.	2.40	.83	2.3
517-D165109	11.1	14.	6.8	1.31	< .10	19.	2.45	.40	23.
518-D165110	11.8	29.	13.	.54	.23	18.	2.40	.32	8.3
519-D165111	15.6	33.	17.	.35	.10	13.	1.85	.86	12.
520-D165112	8.52	17.	11.	.94	< .10	26.	3.60	.74	8.4
521-D165113	18.3	40.	16.	.80	.49	11.	1.40	.44	9.3
522-D165114	10.7	28.	18.	1.45	< .10	21.	2.40	1.9	3.4
523-D165115	8.94	19.	12.	1.75	< .10	25.	3.05	.78	7.4
524									
525									
526-D165116	20.5	38.	15.	.24	1.5	12.	1.75	.08	12.
527-D165117	17.7	38.	13.	.75	1.4	12.	2.25	.49	11.
528-D165118	7.72	17.	12.	1.60	< .10	27.	3.10	1.2	8.5
529-D165435	7.98	24.	12.	1.53	.30	26.	3.05	.28	8.4
530-D165119	15.6	16.	5.8	.24	.35	20.	2.20	.16	20.
531-D165436	11.0	30.	17.	1.05	.81	21.	2.05	.05	3.9
532-D165437	10.3	15.	6.3	.93	.18	26.	2.00	.54	12.
533-D165438	9.00	20.	7.6	1.13	.33	27.	2.15	.06	6.4
534-D165439	12.1	30.	13.	1.08	.89	20.	1.80	.89	7.9
535-D165440	12.0	16.	5.9	1.30	.18	23.	2.15	.54	16.
536-D165441	15.2	16.	5.0	.93	.29	15.	1.65	.16	33.
537-D165442	9.78	18.	7.2	.73	.18	31.	2.30	.66	7.8
538-D165443	15.9	8.3	3.8	.43	< .10	15.	1.25	.24	41.
539-D165444	20.9	31.	16.	.63	.67	13.	1.45	.16	15.
540-D165880	12.8	22.	12.	.15	.39	15.	2.30	.74	17.
541-D165881	18.2	42.	23.	.18	.83	11.	1.88	.43	6.1
542-D165882	7.40	21.	12.	.31	.18	32.	4.67	.12	2.6
543-D165883	10.1	18.	11.	1.50	.27	21.	2.70	.51	14.
544-D165884	13.2	35.	19.	.98	.51	15.	2.00	.71	6.9
545A-D165885	7.50	26.	13.	1.80	.13	30.	4.20	.07	2.6
545B-D165886	17.1	36.	21.	.63	.76	11.	1.83	.65	9.8
546-D165887	17.8	38.	21.	.59	.84	12.	2.22	< .05	8.4
547-D165888	9.80	16.	7.8	.87	< .10	22.	3.35	< .05	12.
548-D165889	7.28	13.	7.8	2.10	< .10	29.	3.40	< .05	9.6
549-D165890	11.0	29.	19.	1.50	.15	19.	2.16	.08	5.4
550-D165891	9.10	21.	15.	2.00	< .10	23.	2.53	1.6	5.9
551-D165892	7.46	23.	12.	2.00	.29	28.	3.34	.27	2.8
552-D165893	10.7	31.	16.	1.50	.44	20.	2.57	.05	5.0
553-D165894	12.2	29.	17.	.98	.16	14.	1.80	1.8	8.1
554-D165895	19.8	40.	11.	.70	1.4	12.	2.33	.10	12.
555-D165896	8.36	25.	11.	3.00	.43	19.	6.70	.83	7.6
556-D165897	6.82	25.	11.	2.00	.16	24.	4.65	.25	5.4
557-D165898	5.81	22.	13.	2.30	.21	26.	5.33	.40	5.3
558-D165899	8.68	33.	15.	1.50	.44	19.	3.87	2.0	4.8
559-D165900	11.2	33.	18.	1.30	.24	13.	2.95	1.5	6.9
560-D165901	8.56	41.	14.	.96	< .10	18.	4.20	1.0	2.8
561-D165902	5.03	22.	13.	2.00	< .10	26.	6.67	.77	2.5
562-D165903	5.83	32.	17.	1.60	< .10	22.	5.83	.92	2.7
563-D165904	5.74	33.	15.	1.70	.26	21.	5.50	.40	3.1
564-D165905	4.57	30.	11.	2.30	< .10	25.	6.40	.09	3.4
565-D165906	7.32	31.	12.	1.30	.20	18.	4.68	2.8	8.9
566-D165907	6.98	32.	11.	1.30	.31	20.	4.80	1.2	6.5
567-D165908	9.24	48.	16.	.81	< .10	13.	3.30	.92	3.2
568-D165909	23.9	51.	10.	.39	1.8	6.9	1.66	.06	14.
569-D165910	7.16	11.	5.1	1.70	< .10	21.	4.05	.94	17.
570-D165911	9.44	31.	12.	1.50	.37	17.	3.45	.65	3.5
571-D165912	10.6	38.	12.	1.20	.72	18.	2.87	.06	4.5
572-D165913	5.96	22.	12.	2.20	.13	27.	5.16	.37	5.5
573-D165914	5.43	16.	11.	2.30	<0.10	29.	5.85	<0.05	5.6
574-D165915	12.8	38.	22.	.65	.82	12.	2.69	1.7	4.0
575-D165916	7.48	19.	11.	1.60	.23	31.	3.06	.46	4.6
576-D165917	6.30	11.	9.9	2.00	< .10	32.	3.79	.12	5.2
577-D165918	8.34	15.	8.3	1.70	< .10	23.	3.82	2.5	13.
578-D165919	7.80	22.	6.6	1.85	.20	20.	3.75	< .05	12.
579-D165920	14.0	40.	20.	.96	1.1	9.8	2.90	.64	6.7
580-D165921	6.96	18.	9.9	2.02	< .10	32.	3.74	.84	5.8
581-D165922	4.93	8.0	9.0	2.75	< .10	34.	4.93	1.3	7.2
584-D165925	10.8	28.	13.	1.38	.12	20.	2.03	.25	6.5
585-D165926	14.9	30.	20.	.84	< .10	15.	1.55	.40	3.8
586-D165927	9.64	17.	10.	.75	< .10	26.	2.50	.08	7.9
587-D165928	10.1	25.	15.	1.16	.29	22.	2.56	.80	2.6
590-D165929	8.54	19.	23.	.59	< .10	28.	3.80	< .05	2.9
591-D165930	13.8	30.	16.	.69	.37	16.	2.00	.92	9.5
592-165931	12.4	29.	17.	.66	< .10	21.	2.14	.34	4.0
593-165932	8.84	17.	9.6	.58	< .10	26.	3.34	< .05	8.6
594-165933	11.7	23.	13.	.93	< .10	13.	2.27	1.4	16.
595-165934	9.26	33.	10.	1.30	< .10	7.3	3.07	1.1	7.9
596-165935	7.34	23.	15.	1.64	.26	26.	4.02	1.0	7.4
597-165936	16.6	36.	24.	.69	1.1	17.	2.06	0.2	5.9
598-165937	5.74	20.	14.	2.26	< .10	21.	5.05	1.1	5.7

Table 2.--Quantitative analyses (in ppm) for 12 trace elements in drill-core samples, Powder River Basin.

[Blank space indicates analysis not completed at time of report preparation.]

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Field-Lab Sample Nos.	ppm, coal							ppm, ash					Ash
	As	F	Hg	Sb	Se	Th	U	Cd	Cu	Li	Pb	Zn	(percent)
483-D164604	12	40	0.13	0.6	1.2	<2.0	0.8	<1.	232	53	160	230	8.85
484-D164605	3	75	.05	.3	.27	3.4	1.4	<1.	86	40	50	430	6.44
485-D164606	8	40	.09	.4	.84	<2.0	1.1	<1.	120	35	60	50	8.58
486-D164607	3	40	.30	.3	1.1	<2.0	<0.2	<1.	146	23	100	50	7.26
487-D164608	2	60	.09	.4	.59	<2.0	.4	<1.	228	23	190	144	6.04
488-D164609	2	80	.10	.2	.36	2.8	.3	1.	244	17	90	168	5.79
489-D164610	20	45	.21	.4	2.1	3.3	.9	<1.	162	45	30	164	9.19
490-D164611	12	40	.18	.8	2.9	4.6	1.0	<1.	220	42	160	72	11.6
491-D164612	5	45	.10	.4	.64	<2.0	.4	<1.	238	66	200	200	6.74
492-D165086	8	20	.12	.2	.9	2.5	.2	<1.	256	26	100	90	6.58
493-D165087	2	<20	.11	.2	.7	<2.0	<0.1	<1.	132	12	115	194	5.52
494-D165088	3	20	.08	.2	.6	2.2	<0.1	<1.	82	10	90	665	5.40
495-D165089	3	40	.12	.2	.9	<2.0	<0.1	<1.	436	50	680	136	8.56
496-D165090	1	95	.10	.2	.5	3.5	0.3	<1.	496	38	330	132	6.52
497-D165091	2	70	.12	.5	1.1	4.4	1.9	1.	354	40	150	168	9.84
498-D165879	3	105	.11	.3	.8	3.1	.6	<1.	84	28	85	192	10.0
499-D165092	10	50	.18	1.8	2.7	7.0	6.4	<1.	218	14	140	44	12.8
500-D164613	20	340	.38	2.3	3.4	13.1	7.5	1.	140	63	80	252	50.6
501-D165093	20	75	.19	.8	1.6	3.0	.8	<1.	132	16	70	80	14.4
502-D165094	30	80	.16	1.0	1.7	8.7	4.2	<1.	78	44	40	58	29.7
503-D165095	8	<20	.18	.4	.7	<2.0	.8	<1.	88	14	105	278	8.78
504-D165096	3	70	.05	.2	1.5	2.8	.5	<1.	136	36	110	90	9.67
505-D165097	2	30	.08	.1	1.3	<2.0	<0.1	<1.	126	66	60	66	8.26
506-D165098	4	<20	.09	.6	1.8	<2.0	.5	<1.	160	32	110	196	7.96
507-D165099	4	20	.05	.8	2.6	2.8	1.0	<1.	76	18	60	90	9.78
508-D165100	8	<20	.15	.4	.6	3.0	.7	<1.	146	50	100	184	10.6
509-D165101	2	<20	.07	.3	1.5	2.0	.5	<1.	172	74	110	100	9.14
510-D165102	3	20	.07	.5	.9	<2.0	<0.1	<1.	138	38	70	400	7.76
511-D165103	2	25	.06	.2	1.1	<2.0	.6	<1.	96	20	70	212	9.94
512-D165104	5	40	.08	.3	1.2	3.8	.8	<1.	256	72	100	102	12.8
513-D165105	2	30	.09	.1	1.4	<2.0	.4	<1.	116	40	80	152	12.5
514-D165106	5	<20	.11	.2	1.1	3.4	.5	<1.	218	36	180	130	9.84
515-D165107	4	<20	.08	.2	1.6	<2.0	.7	1.	160	36	90	94	7.68
516-D165108	3	20	.06	.2	2.6	4.1	1.1	<1.	160	68	80	68	11.5
517-D165109	10	20	.07	.2	1.2	<2.0	.3	<1.	164	22	70	68	11.1
518-D165110	15	30	.11	.2	2.3	<2.0	.9	1.	130	48	60	130	11.8
519-D165111	15	30	.25	.3	3.8	5.9	1.0	1.	170	72	100	152	15.6
520-D165112	3	<20	.07	.2	1.3	<2.0	.4	<1.	180	44	80	52	8.52
521-D165113	8	20	.10	.4	2.3	4.6	1.7	3.	172	64	90	148	18.3
522-D165114	5	<20	.07	.4	2.4	4.7	1.1	3.	208	78	90	174	10.7
523-D165115	5	<20	.12	.2	1.7	<2.0	.4	3.	158	72	70	230	8.94
524-													
525-													
526-D165116	8	80	.09	1.4	1.2	4.3	3.0	<1.	80	48	50	104	20.5
527-D165117	8	60	.10	.6	2.1	4.7	2.2	1.	94	32	25	232	17.7
528-D165118	5	<20	.10	.3	2.0	2.8	<.1	1.	164	34	100	158	7.72
529-D165435	5	<20	.08	.2	.6	<2.0	.3	2.	108	33	40	120	7.98
530-D165119	10	20	.14	1.1	1.2	<2.0	3.7	<1.	208	14	30	124	15.6
531-D165436	3	20	.16	2.4	1.7	<2.0	.4	1.	118	33	30	248	11.0
532-D165437	8	20	.10	.2	1.1	<2.0	<.1	<1.	84	15	30	52	10.3
533-D165438	5	<20	.06	.4	.4	<2.0	.8	<1.	84	15	50	108	9.0
534-D165439	5	<20	.09	.4	.5	3.4	1.0	<1.	98	43	40	56	12.1
535-D165440	15	<20	.10	.4	1.1	<2.0	.3	<1.	84	22	50	66	12.0
536-D165441	15	<20	.23	.6	1.8	3.8	.6	<1.	68	15	50	34	15.2
537-D165442	3	<20	.06	.2	.6	<2.0	<.1	<1.	88	20	30	52	9.78
538-D165443	20	<20	.33	.4	2.6	<2.0	.4	<1.	84	12	60	44	15.9
539-D165444	10	<20	.10	.4	1.3	4.4	1.5	<1.	90	77	40	76	20.9
540-D165880	8	50	.07	.4	2.2	3.3	.7	<1.	136	46	35	150	12.8
541-D165881	5	125	.06	.6	1.9	8.1	1.2	<1.	150	72	40	170	18.2
542-D165882	1	40	.02	.2	.8	<2.0	<.1	<1.	162	48	60	88	7.4
543-D165883	12	50	.09	.3	1.2	<2.0	.5	<1.		34	35	104	10.1
544-D165884	8	75	.06	.4	2.2	4.8	1.1	<1.	160	66	40	256	13.2
545A-D165885	2	20	.03	.1	1.0	<2.0	<.1	<1.	140	40	40	54	7.50
545B-D165886	10	110	.14	.7	2.4	6.0	1.2	<1.	142	66	30	186	17.1
546-D165887	10	100	.53	1.7	1.9	4.3	1.3	3.	166	70	45	980	17.8
547-D165888	4	35	.09	.7	1.5	<2.0	<.1	<1.	108	30	35	40	9.80
548-D165889	3	40	.07	.3	.9	<2.0	.4	<1.	96	20	45	35	7.28
549-D165890	5	40	.08	.5	2.6	4.4	.9	<1.	138	86	35	116	11.0
550-D165891	8	55	.21	.4	4.3	2.9	.7	<1.	122	96	55	128	9.10
551-D165892	1	35	.03	.4	1.1	<2.0	<.1	<1.	106	40	70	105	7.46
552-D165893	8	65	.05	.3	1.6	<2.0	1.0	<1.	138	46	50	58	10.7
553-D165894	12	60	.09	.3	2.6	4.3	1.0	<1.	146	92	35	158	12.2
554-D165895	8	90	.12	1.5	1.0	4.5	2.3	<1.	178	34	50	108	19.8
555-D165896	2	45	.04	.3	.5	<2.0	.6	1.	74	24	40	168	8.36
556-D165897	1	55	.11	.3	.9	<2.0	.4	1.	162	22	50	126	6.82
557-D165898	<1	60	.06	.2	.4	<2.0	<.1	<1.	124	26	45	103	5.81
558-D165899	1	45	.12	.2	.9	<2.0	.5	1.	136	50	50	78	8.68
559-D165900	3	40	.27	.5	1.6	6.7	1.4	<1.	338	48	50	176	11.2
560-D165901	1	<20	.18	.2	1.2	4.5	.4	<1.	334	58	35	165	8.56
561-D165902	<1	20	.06	.1	.7	4.2	<.1	<1.	158	42	45	114	5.03
562-D165903	2	25	.12	.1	1.4	<2.0	.6	1.	220	68	55	80	5.83
563-D165904	<1	20	.07	.1	.7	<2.0	.4	1.	142	54	40	122	5.74
564-D165905	<1	<20	.05	.1	.4	<2.0	<.1	<1.	160	26	50	120	4.57
565-D165906	1	20	.06	.2	.5	<2.0	.4	1.	70	38	40	155	7.32
566-D165907	2	30	.05	.2	.5	<2.0	<.1	<1.	88	42	45	172	6.98
567-D165908	2	25	.09	.4	1.1	6.8	1.6	<1.	142	108	50	58	9.24
568-D165909	12	70	.09	.8	1.2	7.2	1.8	<1.	84	24	<25	96	23.9
569-D165910	2	<20	.09	.2	.7	<2.0	<.1	<1.	84	8	30	58	7.16
570-D165911	3	30	.03	.6	.6	7.1	.9	1.	84	24	35	56	9.44
571-D165912	2	35	.24	.3	1.4	<2.0	.5	1.	110	30	40	47	10.6
572-D165913	1	<20	.07	.1	.6	<2.0	<.1	1.	136	28	40	184	5.96
573-D165914	<1	20	.06	.1	.5	<2.0	<.1	<1.	158	22	45	94	5.43
574-D165915	2	55	.14	.5	1.5	<2.0	1.3	<1.	158	96	45	83	12.8
575-D165916	1	<20	.04	.2	.9	<2.0	.4	<1.	98	30	45	50	7.48
576-D165917	1	20	.03	.2	.7	<2.0	<.1	<1.	96	56	55	56	6.30
577-D165918	3	<20	.13	.5	.7	<2.0	<.1	<1.	60	18	410	67	8.34
578-D165919	3	30	.13	.5	.7	<2.0	<.1	1.	96	18	120	136	7.80
579-D165920	2	90	.14	.5	1.2	3.2	.7	1.	100	38	65	472	14.0
580-D165921	1	<20	.03	.3	.9	<2.0	.4	<1.	102	34	150	84	6.96
581-D165922	1	20	.03	.3	.3	2.5	<.1	<1.	130	14	110	416	4.93
584-D165925	5	<20	.10	.6	1.8	<2.0	1.0	<1.	122	42	65	98	10.8
585-D165926	12	35	.66	.4	9.7	5.1	1.5	4.	162	96	70	188	14.9
586-D165927	3	20	.11	.2	1.2	<2.0	.3	<1.	114	34	55	74	9.64
587-D165928	3	25	.07	.3	1.9	<2.0	.7	<1.	110	74	65	136	10.1
590-D165929	2	20	.06	.3	1.2	<2.0	.6	1	130	38	75	92	8.54
591-D165930	5	40	.09	.5	2.1	<2.0	1.3	<1.	130	72	40	180	13.8
592-D165931	5	35	.21	.4	2.9	3.5	1.5	2.	156	96	65	410	12.4
593-D165932	4	<20	.13	.1	1.4	<2.0	<.1	<1.	94	34	65	42	8.84
594-D165933	8	50	.42	.5	3.8	4.6	1.1	3.	178	24	55	548	11.7
595-D165934	3	40	.24	.3	1.4	<2.0	.5	<1.	128	24	35	312	9.26
596-D165935	1	40	.06	.3	.4	<2.0	.5	1.	118	20	65	350	7.34
597-D165936	3	115	.15	1.0	1.5	<2.0	1.7	1.	172	34	120	380	16.6
598-D165937	1	40	.09	.1	.4	<2.0	.3	1.	184	20	45	370	5.74

Table 3--Semiquantitative 6-step spectrographic analyses (in ppm) of drill core samples, Powder River Basin.

[Dashes indicate element not detected. Blank space indicates analysis not completed at time of report preparation.]

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Field Lab. Sample Nos.	B	Ba	Be	Co	Cr	Cu	Ce	La	Mn	Mo	Nb	Ni	Sc	Sn	Sr	Ti	V	Y	Yb
483-D164604	700	3000	3	30	70	20	--	150	300	20	--	70	20	20	3000	2000	150	70	7
484-D164605	700	2000	20	50	500	15	--	150	500	100	--	100	20	--	2000	2000	150	100	10
485-D164606	500	2000	7	15	70	30	--	70	1500	15	--	70	15	--	3000	2000	150	70	7
486-D164607	700	2000	--	15	30	15	--	--	1000	10	--	30	10	--	3000	3000	150	30	3
487-D164608	700	7000	--	15	50	20	--	70	1000	15	--	50	20	--	7000	5000	150	30	5
488-D164609	700	5000	3	30	70	20	--	70	700	30	--	70	20	--	5000	3000	150	70	5
489-D164610	700	3000	3	20	70	20	--	100	300	15	--	70	20	--	3000	3000	150	70	7
490-D164611	500	3000	3	30	50	20	--	70	300	20	20	70	20	30	2000	5000	150	50	5
491-D164612	1000	7000	3	20	50	20	--	100	500	50	--	70	30	--	5000	5000	200	70	7
492-D165086	1500	7000	--	15	70	20	--	--	200	15	--	50	15	--	7000	3000	150	30	3
493-D165087	1500	7000	--	20	50	20	--	--	500	20	--	50	15	--	7000	1500	150	30	3
494-D165088	1500	7000	3	30	70	15	--	150	200	15	--	70	20	<20	7000	1500	150	70	7
495-D165089	500	7000	--	15	70	30	--	--	300	70	20	30	20	30	7000	7000	300	30	3
496-D165090	700	5000	--	10	70	15	--	70	150	100	--	20	15	30	5000	3000	100	30	3
497-D165091	500	3000	15	30	150	70	<20	150	100	30	30	30	100	--	3000	7000	500	150	15
498-D165879	300	3000	3	30	70	20	--	100	70	10	20	100	20	--	2000	3000	150	30	3
499-D165092	300	1500	3	10	50	30	--	70	1500	70	--	30	15	--	2000	1000	150	30	--
500-D164613	50	700	7	20	70	30	--	100	500	15	20	70	15	--	500	3000	300	70	5
501-D165093	300	3000	5	15	30	20	--	--	500	30	--	30	15	--	3000	3000	150	30	--
502-D165094	200	1500	7	10	70	30	--	70	300	15	30	20	15	--	1000	5000	150	30	5
503-D165095	700	3000	7	15	70	20	--	70	700	30	--	30	20	--	2000	2000	150	50	5
504-D165096	700	5000	5	30	70	20	--	150	3000	20	--	30	20	--	7000	1500	150	70	7
505-D165097	700	5000	--	15	70	20	--	70	2000	15	20	50	20	--	5000	3000	150	30	3
506-D165098	700	5000	20	150	50	20	30	70	3000	70	--	100	20	--	5000	3000	150	100	7
507-D165099	700	5000	20	20	70	20	20	70	700	15	--	70	20	--	5000	2000	150	70	7
508-D165100	700	3000	3	20	70	30	--	100	1000	15	20	70	20	--	5000	3000	150	70	7
509-D165101	700	5000	3	15	50	30	--	70	1000	10	20	50	30	--	5000	3000	150	30	3
510-D165102	700	1500	15	150	50	30	--	70	1500	30	--	150	30	--	5000	3000	200	70	5
511-D165103	700	2000	7	20	70	20	--	70	1000	10	--	50	15	--	3000	2000	150	50	3
512-D165104	700	1500	5	15	70	30	--	70	1000	10	20	50	20	<20	2000	3000	150	30	3
513-D165105	500	1000	--	15	70	20	--	70	2000	15	20	50	15	--	2000	3000	100	20	3
514-D165106	700	1500	--	15	70	20	--	--	1500	50	--	30	15	<20	3000	3000	100	30	3
515-D165107	1000	2000	--	70	150	20	--	--	2000	15	--	100	30	--	5000	2000	300	30	5
516-D165108	500	2000	3	15	100	30	--	100	1500	7	20	70	30	--	3000	5000	300	70	7
517-D165109	300	1500	3	30	30	15	20	--	1500	20	--	70	15	--	3000	2000	70	30	--
518-D165110	500	3000	--	30	70	20	--	--	1000	7	--	100	15	--	3000	2000	150	30	3
519-D165111	500	1500	3	15	50	30	--	--	1000	10	--	30	15	--	2000	2000	100	30	3
520-D165112	700	7000	5	50	50	20	--	--	2000	15	--	70	15	--	7000	3000	150	30	3
521-D165113	300	2000	5	20	70	30	--	--	1000	20	--	70	15	--	1500	3000	150	50	5
522-D165114	700	7000	5	30	100	30	--	150	2000	20	--	100	30	--	5000	3000	200	100	7
523-D165115	700	5000	--	30	30	20	--	--	3000	15	--	70	15	--	3000	5000	100	30	3
524-																			
525-																			
526-D165116	300	700	7	--	100	30	<20	--	700	200	20	20	15	--	2000	3000	200	70	5
527-D165117	500	3000	5	20	100	20	<20	70	500	20	--	70	15	--	3000	3000	150	50	5
528-D165118	700	7000	--	50	70	15	--	100	1000	30	--	150	15	--	7000	2000	100	50	5
529-D165435	1000	5000	5	70	50	20	<20	70	2000	20	--	70	15	--	5000	3000	150	30	3
530-D165119	300	10,000	15	20	70	70	20	70	3000	150	--	100	20	--	2000	1000	150	70	7
531-D165436	700	2000	3	50	70	20	--	70	1500	7	--	70	15	--	3000	3000	150	70	5
532-D165437	700	2000	--	--	20	15	<20	--	1500	7	--	20	10	--	3000	2000	70	20	--
533-D165438	700	500	5	15	50	30	20	70	1500	30	--	50	15	--	3000	2000	150	50	3
534-D165439	500	3000	5	15	50	30	<20	--	1500	20	--	30	15	--	3000	2000	100	30	3
535-D165440	500	2000	3	15	30	15	--	--	1000	15	--	30	10	--	3000	2000	70	20	--
536-D165441	500	2000	5	50	30	15	<20	--	500	20	--	50	15	--	2000	1500	70	30	--
537-D165442	1000	1500	--	15	30	15	--	--	1500	15	--	30	15	--	5000	2000	100	20	3
538-D165443	300	700	3	30	15	15	<20	--	700	70	--	50	10	--	3000	700	70	20	--
539-D165444	300	5000	5	30	30	30	30	--	1000	50	--	30	10	--	2000	2000	100	30	--
540-D165880	500	3000	--	20	50	20	--	70	700	10	--	50	15	--	2000	1500	150	30	5
541-D165881	300	1500	3	20	100	30	--	70	500	7	20	50	20	--	1000	3000	200	30	3
542-D165882	700	1000	5	70	50	20	--	70	2000	30	--	100	15	--	5000	3000	150	30	3
543-D165883	500	5000	3	30	70	20	--	70	700	15	--	70	15	--	3000	2000	150	30	5
544-D165884	500	3000	5	30	100	30	--	70	700	7	--	100	20	--	2000	3000	200	50	7
545A-D165885	700	5000	3	50	50	20	--	70	3000	20	--	100	15	--	5000	3000	150	30	3
545B-D165886	500	3000	3	30	150	30	<20	100	500	10	--	150	30	--	2000	5000	300	50	5
546-D165887	300	1500	10	70	100	30	<20	70	1000	10	--	150	30	--	2000	3000	300	100	15
547-D165888	500	2000	3	30	30	15	--	70	2000	150	--	70	15	--	3000	2000	70	20	2
548-D165889	500	3000	--	10	30	15	--	70	2000	10	--	30	15	<20	7000	1500	70	30	3
549-D165890	500	3000	5	30	100	20	--	150	2000	10	20	100	30	--	5000	3000	300	70	7
550-D165891	700	5000	3	30	70	20	--	100	2000	10	--	150	20	--	7000	2000	150	50	7
551-D165892	700	3000	3	30	70	15	--	70	3000	15	--	70	20	--	7000	2000	150	50	5
552-D165893	500	2000	5	20	100	20	--	70	2000	7	20	30	30	--	3000	2000	200	50	5
553-D165894	500	3000	3	30	70	20	--	70	2000	7	--	100	20	--	3000	2000	200	50	5
554-D165885	700	1000	10	10	70	20	30	70	1000	50	20	50	15	--	2000	2000	150	50	5
555-D165896	1000	5000	5	10	50	15	--	70	700	15	20	20	15	--	5000	2000	150	50	5
556-D165897	500	7000	--	30	70	20	--	100	500	10	20	70	30	--	7000	5000	300	70	5
557-D165898	700	7000	--	20	100	20	--	70	500	7	20	70	30	--	7000	3000	200	50	5
558-D165899	500	5000	--	20	100	30	--	70	300	--	20	50	20	--	5000	3000	200	30	3
559-D165900	300	5000	5	30	100	30	--	150	200	10	20	100	30	--	3000	10,000	300	70	7
560-D165901	300	3000	--	10	50	20	--	70	500	--	20	10	20	--	2000	7000	200	20	3
561-D165902	700	7000	3	10	50	15	--	70	500	7	20	15	20	--	5000	5000	150	30	3
562-D165903	500	7000	3	15	70	30	--	100	500	7	30	30	30	--	5000	10,000	200	50	5
563-D165904	500	7000	3	10	50	20	--	100	500	7	30	20	20	--	5000	5000	200	30	3
564-D165905	700	7000	--	10	50	15	--	70	300	7	30	15	15	--	5000	5000	150	20	5
565-D165906	300	7000	--	10	50	20	<20	70	500	7	20	20	15	--	7000	3000	100	20	3
566-D165907	500	7000	--	10	30	15	--	70	300	10	20	30	15	--	3000	3000	70	30	2
567-D165908	300	5000	3	10	70	30	--	100	100	10	30	30	30	--	3000	5000	150	50	5
568-D165909	300	1000	10	15	50	20	20	70	500	30	--	50	15	--	1000	2000	100	50	5
569-D165910	1000	5000	--	10	20	--	<20	--	1000	15	--	20	10	--	5000	1500	70	20	3
570-D165911	700	3000	15	15	70	20	--	70	300	15	--	20	15	--	3000	2000	150	30	3
571-D165912	500	3000	--	15	100	20	--	70	700	10	20	50	20	--	3000	3000	200	50	5
572-D165913	1000	5000	3	30	70	20	--	100	700	7	20	70	30	--	7000	5000	200	70	7
573-D165914	700	5000	--	20	50	20	--	70	700	15	--	50	20	--	7000	3000	200	50	3
574-D165915	150	3000	--	15	150	50	--	70	500	10	20	50	30	--	3000	7000	500	30	5
575-D165916	700	5000	3	15	50	15	--	70	5000	10	--	30	20	--	5000	2000	150	50	5
576-D165917	1000	5000	--	15	50	15	--	70	2000	15	--	20	15	--	7000	1000	200	30	3
577-D165918	1000	5000	--	--	15	10	--	--	700	7	--	10	10	--	5000	1500	70	20	--
578-D165919	700	3000	10	15	50	20	20	70	700	20	--	30	15	--	3000	3000	150	70	5
579-D165920	200	2000	--	30	100	30	--	70	200	15	--	70	20	--	2000	3000	300	30	3
580-D165921	500	5000	--	10	30	20	--	70	1500	20	--	30	15	--	5000	2000	100	30	2
581-D165922	1000	7000	--	10	20	15	--	--	1500	30	--	15	10	--	7000	1500	70	20	2
584-D165925	500	1500	--	15	50	15	--	70	1000	7	--	50	15	--	2000	2000	150	30	3
585-D165926	500	3000	5	30	70	30	--	100	1000	15	20	200	30	--	2000	3000	200	70	7
586-D165927	500	1000	3	50	30	20	<20	70	3000	10	--	100	10	--	2000	5000	100	30	3
587-D165928	700	3000	3	20	200	20	--	70	2000	7	--	70	20	--	2000	2000	150	50	3
590-D165929	700	2000	10	70	50	20	<20	70	2000	15	--	100	15	--	3000	3000	100	70	5
591-D165930	500	5000	5	20	70	20	--	70	700	15	--	70	20	--	2000	3000	200	50	5
592-D165931	500	3000	5	30	70	30	--	70	2000	7	--	100	30	--	1500	2000	300	70	7
593-D165932	700	2000	--	50	30	15	--	--	2000	7	--	100	15	--	3000	3000	100	30	3
594-D165933	300	3000	5	70	70	30	--	100	200	10	--	200	30	--	2000	2000	300	70	7
595-D165934	300	3000	--	10	50	10	--	70	300	7	--	70	15	--	2000	3000	100	50	5
596-D165935	500	5000	3	30	100	20	--	100	300	10	20	100	20	--	5000	2000	200	70	7
597-D165936	200	2000	5	30	150	30	--	70	150	15	20	70	30	--	1000	3000	500	50	5
598-D165937	700	7000	--	20	50	20	--	70	300	10	20	70	20	--	5000	3000	200	30	3