UNITED STATES DEPARTMENT OF THE INTERIOR GEOLOGICAL SURVEY

COAL DRILLING DURING 1979 IN WILLIAMS COUNTY, NORTH DAKOTA,

AND IN BEAVERHEAD, BIG HORN, DAWSON, FALLON, GARFIELD, McCONE,

MUSSELSHELL, POWDER RIVER, PRAIRIE, ROOSEVELT, ROSEBUD,

AND WIBAUX COUNTIES, MONTANA

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Open-File Report 81- 314

1981

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

Introduction and acknowledgments

The Montana Bureau of Mines and Geology (MBMG), Montana College of Mineral Science and Technology, drilled 235 coal exploration holes in 1979 under Grant No. 14-08-0001-27839 from the U.S. Geological Survey (USGS). Drilling was done between April 10 and December 14, 1979, in Williams County, North Dakota, and Beaverhead, Big Horn, Dawson, Fallon, Garfield, McCone, Musselshell, Powder River, Prairie, Roosevelt, Rosebud, and Wibaux Counties, Montana (figs. 1-8). The purpose of the drilling was to evaluate and classify mineral lands in the public domain. Data were collected from the drilling program to determine the extent, correlation, recoverability of coal beds, and the petrographic characteristics of associated rocks of the Tertiary Fort Union and Wasatch Formations.

This report presents lithologic logs using a 10-foot sample interval (corrected in depth intervals to match the geophysical logs, where available) and geophysical logs of density, gamma, spontaneous potential and resistivity. All holes were logged from the bottom to the top of the drill hole. The holes were rotary drilled and, where practical, water or air was used as the drilling fluid. Core holes are identified by a "c" following the drill-hole number and the analyses from these samples are presented at the end of this report. The proximate, ultimate, Btu/lb values, and trace-element analyses were completed by the Analytical Division of the MBMG.

The location of a drill hole within a section is identified by a letter-designated tract and by distance from section lines. Each section is subdivided into four quadrants, with the northeast quadrant designated as A, and continuing counterclockwise to D. Each quadrant is then subdivided into four equal parts with a similar letter designation. This is repeated until a section is divided 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 SELSWANWANEL of the section.

Fieldwork was carried out by the following Montana Bureau of Mines and Geology personnel: Robert E. Matson, Chief, Energy Division; Miller Hansen, geologist; and Russell Patterson, Jon Hangas, William Jackson, Kenneth Williams and Robert J. Pederson, technicians. Coordinators and technical guidance were provided by Robert E. Matson, MBMG, and Elmer M. Schell and Marvin L. Millgate, U.S. Geological Survey.

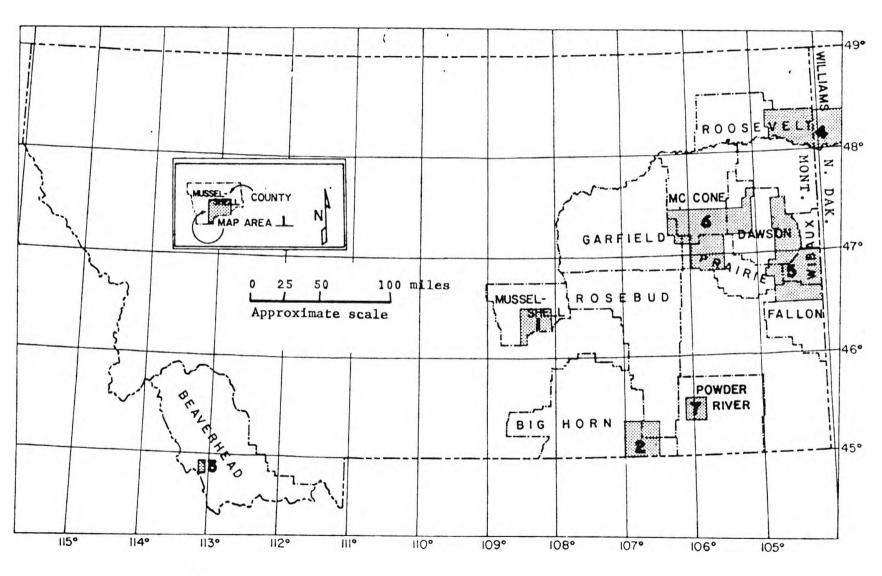


Figure 1.--Index map showing 1979 drilling areas, Montana and North Dakota.

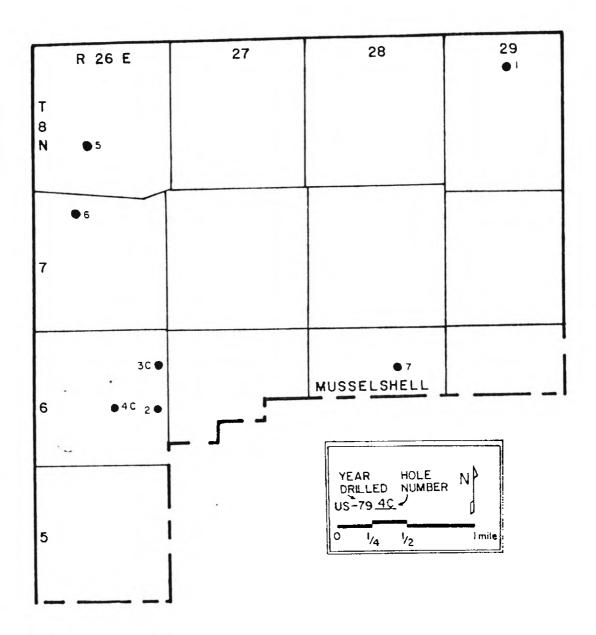


Figure 2.—Area 1, location of holes drilled in 1979, Musselshell County, Montana.

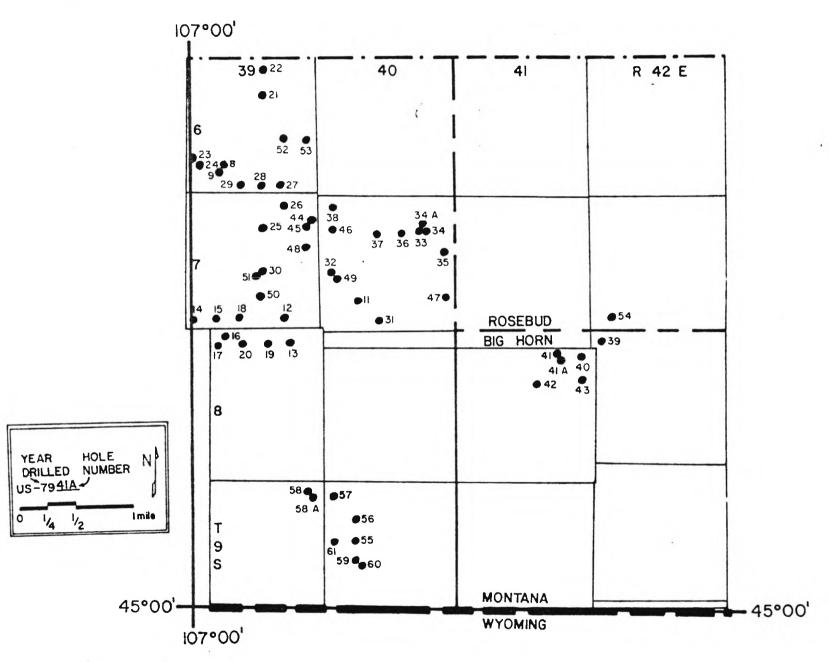


Figure 3.--Area 2, location of holes drilled in 1979, Big Horn and Rosebud Counties, Montana.

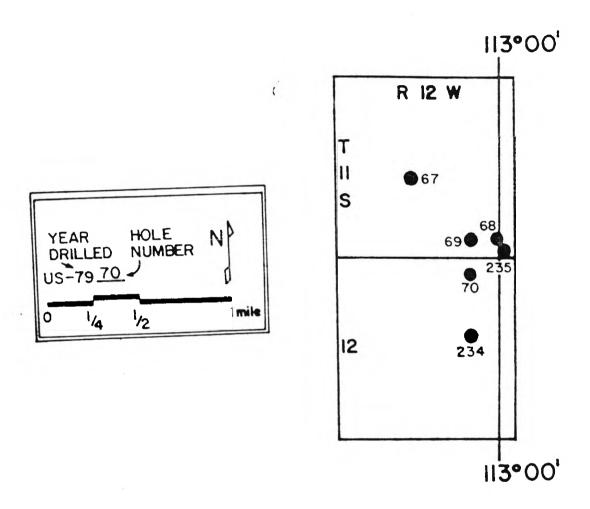


Figure 4. -- Area 3, location of holes drilled in 1979, Beaverhead County, Montana.

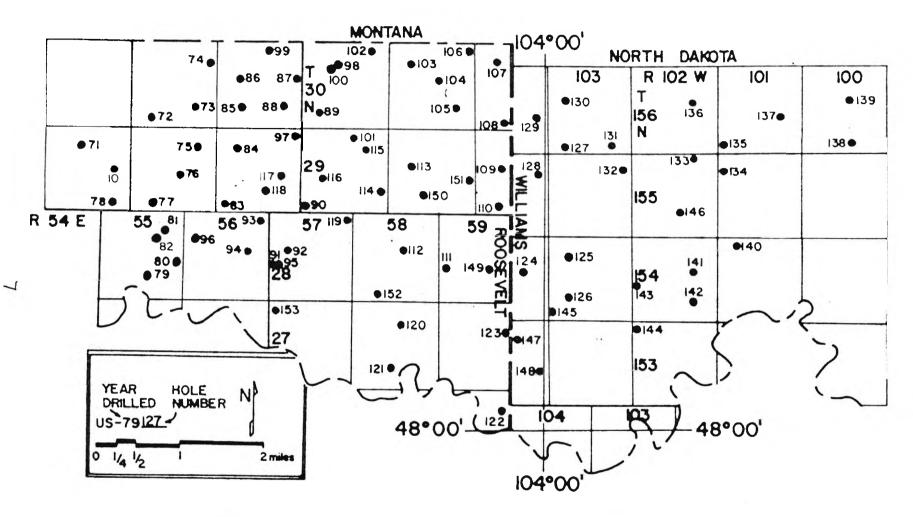


Figure 5.--Area 4, location of holes drilled in 1979, Roosevelt County, Montana, and Williams County, North Dakota.

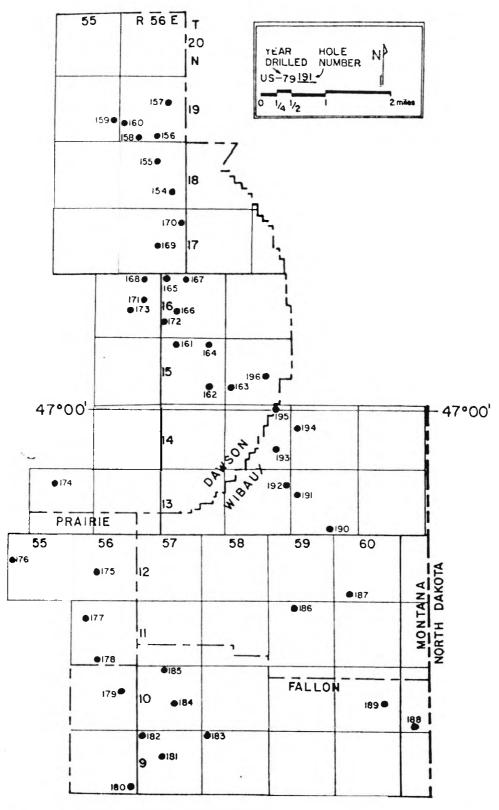
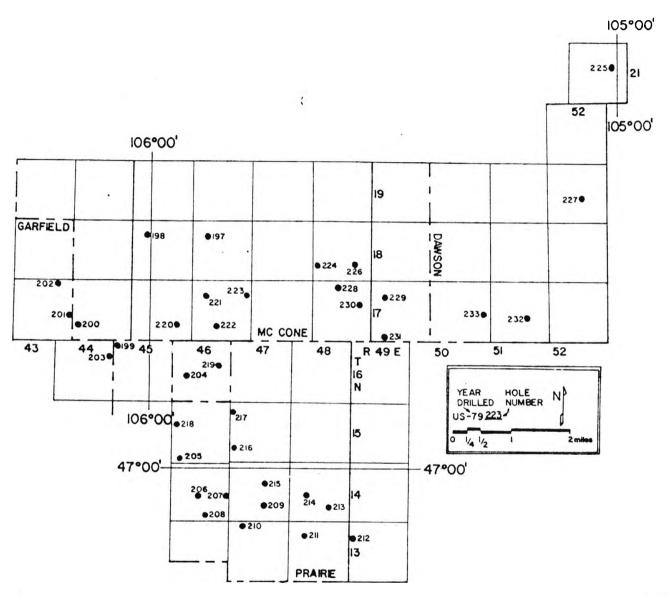
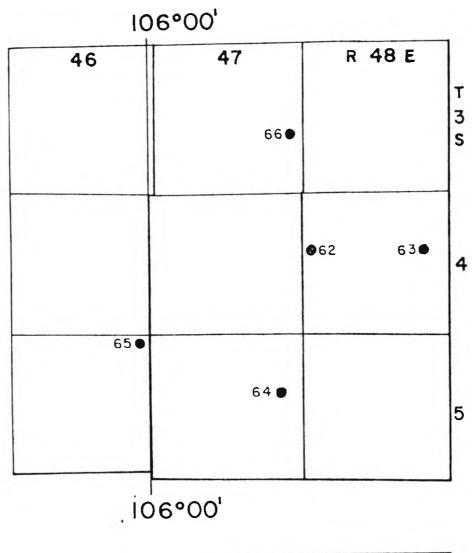


Figure 6.--Area 5, location of holes drilled in 1979, Dawson, Wibaux, Prairie, and Fallon Counties, Montana.



9

Figure 7.--Area 6, location of holes drilled in 1979, Dawson, McCone, Garfield, and Prairie Counties, Montana.



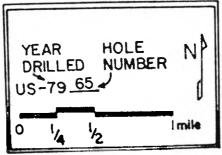


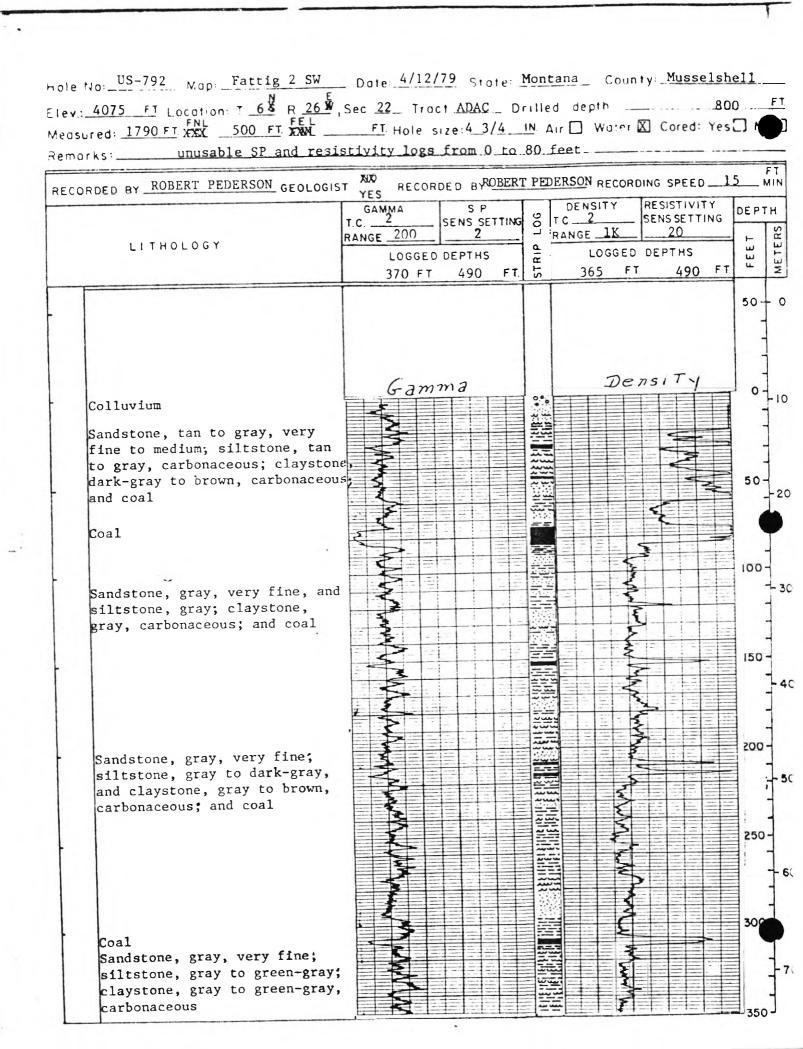
Figure 8. -- Area 7, location of holes drilled in 1979, Powder River County, Montana.

hale No: US-791 Map Fattig 1 NE Date: 4/10/79 State: Montana County: Musselshell Elev: 3112 FT Location: T 8 8 R 29 8, Sec 4 Tract DDCD Drilled depth 305 FT Measured: 380 FT FSL 690 FT. WOX FT. Hole size: 4 3/4 IN. Air Word X Cored: Yes No X RECORDED BY ROBERT PEDERSON CORDING SPEED 15 RECORDED BY ROBERT PEDERSON YES RESISTIVITY DENSITY SP GAMMA T.C. ___2 SENS SETTING SENS SETTING TC_ RANGE 2K RANGE 100 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS ā 304 FT 304 FT. 304 FT 50+ 0 Colluvium Sandstone, tan to gray, very fine to fine; siltstone, gray to green-gray; trace coal 50 and claystone, gray to darkbrown, carbonaceous; trace coal 100-Siltstone, green-gray; claystone, green-gray; sandstone, gray to green-gray, very fine to fine; siltstone, gray to green-gray; and 150 claystone, gray to green-gray, carbonaceous 200-250 Coa1 Sandstone, gray, medium to very fine; siltstone, gray; 300 and claystone, gray to browngray, carbonaceous

us-_____791

LITHOLOGY	GAMMA	\$. P.	STRIP	DENSITY	RESISTIVITY	FEET	
					A	350-	-
							7
						-	+
						400-	+
						_	1
						-	1
						450-	7
						_	1
						-	1.
						500 -	-1
						-	1
						_	
						550-	+
						-	1
						_	
N.J.					· ·	600-	-
						-	
			11		1/1	-	
						650 -	L.
						6507	
						1	
						-	
				14		700 -	1
4							
						7	
						750 -	ŀı
						-	
						1	
						800-	

hole No: US-792 Map: Fattig 2 SW Date: 4/12/79 State: Montana County: Musselshell Elev: 4075 FT Location: T 6 R 26 R 26 R 36 R 20 Tract ADAC Drilled depth _______800 Measured: 1790 FT XXX 500 FT XXX FT. Hole size: 4 3/4 IN Air Water X Cored: Yes unusable SP and resistivity logs from 0 to 80 feet RECORDED BY ROBERT PEDERSON RECORDING SPEED 15 RECORDED BY ROBERT PEDERSON GEOLOGIST YES DENSITY RESISTIVITY SP DEPTH GAMMA SENS SETTING SENS SETTING TC __2 T.C. _ RANGE 200 20 RANGE 1K LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS ME 365 FT. FT. 370 FT. 490 50+0 Dens Gamma Colluvium Sandstone, tan to gray, very fine to medium; siltstone, tan to gray, carbonaceous; claystone, dark-gray to brown, carbonaceous and coal Coal 100-Sandstone, gray, very fine, and siltstone, gray; claystone, gray, carbonaceous; and coal 150 -200-Sandstone, gray, very fine; siltstone, gray to dark-gray, · 50 and claystone, gray to brown, carbonaceous; and coal 250 300 Sandstone, gray, very fine; siltstone, gray to green-gray; claystone, gray to green-gray, carbonaceous



hole No: US-792 Map: Fattig 2 SW Dote: 4/12/79 State: Montana County: Musselshell Elev: 4075 FT Location: T 6xx R 26xx, Sec 22 Tract ADAC Drilled depth 800 .FT Measured: 1790 FT XXX 500 FT XXX FT. Hole size: 4 3/4 IN Air Water & Cored: Yes! No X Remarks: unusable SP and resistivity logs from 0 to 80 feet XX RECORDED BY ROBERT PEDERSON GEOLOGIST RECORDED BROBERT PEDERSON ECORDING SPEED YES DENSITY RESISTIVITY SP GAMMA DEPTH SENS SETTING SENS SETTING T.C. __ RANGE __200 RANGE _ IK__ 20 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 490 FT 370 FT 490 FT. 365 FT 50+ 0 50-S. P. Res. 100 150 -200 250 -300 -

v: 4075 FT Location: T 6xx Dsured: 1790 FT XXX 500 FT. morks: unusable SP an	MXC	ty logs II	Om O LO de	V TEEL	ORDING SPEED
LITHOLOGY	T.C RANG	MMA	S P ENS SETTING 2	DENSITY TC2 RANGEIK LOGGE	RESISTIVITY SENS SETTING 20 ED DEPTHS
		v			50
		S.P.		R	50
					150
					20
					25

Hole No: US-793C Map: Fattig 2 SW Dote: 4/16/79 State: Montana County: Musselshell Elev: 4030 FT Location: T 6 K R 26 W, Sec 12 Tract DDDD Drilled depth 400 Measured: 150 FT FSL 175 FT BAKK FT Hole Size: 4 3/4 IN Air Word X Cored: Yes X Remorks: Cored interval 220 feet to 237 feet. RECORDED BY ROBERT PEDERSONECORDING SPEED 15 RECORDED BY ROBERT PEDERSON GEOLOGIST YES RESISTIVITY SP DENSITY GAMMA DEPT SENS SETTING T.C. __ SENS SETTING RANGE _100 RANGE _2K_ LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS æ 410 FT 410 FT. 410 FT 423 FT 50-Colluvium Sandstone, tan to yellow, very fine to fine, ferruginous; 50siltstone, tan to yellow, ferruginous; and claystone, tan, gray and black, carbonaceous 100-Coa1 Sandstone, gray, very fine; 150 siltstone, gray, and claystone, gray to brown-gray, carbonaceous; and coal 200 -Coa1 Sandstone, gray, very fine; 250 siltstone, gray; and claystone, 27,200 gray to dark-brown, carbonaceous 300

hate No: US-793C Map: Fattig 2 SW Date: 4/16/79 State: Montana County: Musselshell Elev: 4030 FT Location: T 6 K R 26 K, Sec 12 Tract DDDD Drilled depth 400 F Measured: 150 FT FSL 175 FT BULK FT. Hole size: 4 3/4 IN Air Water & Cored: Yes Remarks: Cored interval 220 feet to 237 feet. RECORDED BY ROBERT PEDERSON ECORDING SPEED 15 RECORDED BY ROBERT PEDERSON GEOLOGIST YES RESISTIVITY DENSITY GAMMA SP DEPTH SENS SETTING SENS SETTING RANGE 100 RANGE 2K 20 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 410 FT 410 FT 423 FT 410 FT. 5 50-Colluvium Sandstone, tan to yellow, very fine to fine, ferruginous; siltstone, tan to yellow, ferruginous; and claystone, tan, gray and black, carbonaceous Coal Sandstone, gray, very fine; siltstone, gray, and claystone, gray to brown-gray, carbonaceous; and coal Coal Sandstone, gray, very fine; siltstone, gray; and claystone, TIW. gray to dark-brown, carbonaceous

RDED BY ROBERT PEDERSON GEOLOGIST	YES RECOR	DED BY ROBE	ERT	PEDERSQUECOR	ING SPEED	<u> </u>
LITHOLOGY RA	GAMMA .c2 ANGE _200 LOGGED 305 FT		RIP L	DENSITY TC 2 RANGE 2K LOGGED 304 FT		FEET ABO
Sandstone, brown, very fine to medium; siltstone, brown, ferruginous; and claystone, tan, ferruginous Coal Sandstone, gray, very fine to fine; siltstone, gray; and claystone, gray Coal Sandstone, gray, very fine to fine; siltstone, gray; and claystone, gray, carbonaceous						50
						200
Coal Siltstone, green-gray to brown-gray, carbonaceous; and claystone, gray to brown,		7 3				300

us- 794C

	LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
-							350-	
							-	- 80
1							400 -	
							450-	- 90
							-	
-				-			500-	-100
								-110
+							550-	
	\						600-	- 120
							-	
-							650-	-130
							-	
-					*		700 -	-140
		·					750 -	-150
							-	-150
							800	

nole No: US-795 Map: Fattig 2 NW Date: 4/26/79 State: Montana County: Musselshell Elev: 3430 FT Location: T 8 x R 26 x Sec 28 Tract DACA Drilled depth ____ 260 FT Medsured: 1800FT KNX 620 FT KXX FT Hole size: 4 3/4 IN Air William Cored: Yes No € Remarks: Cored interval 60 feet to 69 feet. RECORDED BY ROBERT PEDERSON GEOLOGIST RECORDED BYROBERT PEDERSONECORDING SPEED. MIN YES GAMMA SP DENSITY RESISTIVITY DEPTH TC. T.C. _ SENS SETTING SENS SETTING RANGE 200 RANGE _ 2K LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS œ 263 FT 262 263 262 50+0 1-10 Regolith Sandstone, tan, very fine to medium; siltstone, tan, ferruginous; and claystone, gray to brown, carbonaceous 50-Coa1 -20 100-Sandstone, gray, very fine to medium; siltstone, gray to dark-150 green-gray; and claystone, gray to light-brown. carbonaceous 200 - 50 250 -300

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
					16	350-	
					1	-	
					113]	- 80
						_	
						400-	
						_	-90
						-	-90
						450-	
						-	
						1	-100
						500-	1.
	9-1						1
						-	1
							-110
						550-	
						.	
						-	+
							- 120
-						600-	
							+
						650	-130
						650] "
							-
							+
						700	1
						700	-14
							+
							+
						750	1
						130	-15
							+
							+
						800	1

ORDED BY ROBERT PEDERSON GEOLOGIST	T YES RECO		RT PI	EDERSONRECORDING SPEED	
	GAMMA T.C. 2 RANGE 100	S P SENS SETTING	007	DENSITY RESISTIVITY TC SENS SETTING RANGE	1112
LITHOLOGY		D DEPTHS FT.	STRIP	LOGGED DEPTHS	FT.
					50
Colluvium Sandstone, tan, very fine to					
fine; siltstone, tan to yellow- brown, ferruginous					50
Sandstone, gray, very fine to fine; siltstone, gray to dark-gray, carbonaceous; and					
claystone, gray to dark-gray, carbonaceous					10
Coal .					
Sandstone, gray, very fine to fine; siltstone, gray to green-gray; and claystone, gray					15
Coal, with gray claystone				5 5	20
gandatana aray wary fina ta					25
sandstone, gray, very fine to fine; siltstone, gray to dark+ green-gray; and claystone, gray to green-gray				2 2 2 2 2	
gray to green gray			-		30

LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
						350-	
	===					-	
	3					-	
							- 80
			===			400 -	
a l	3					400	
Sandstone, gray, very fine to fine; siltstone, gray to							
dark-gray; and claystone,			===			_	
gray to green-gray						_	- 90
						450-	
						-	
			~~~			-	
	-		-			-	
						-	-100
	-					500-	
	1					-	
	-2						
	13					1	-110
			===			550-	
Sandstone, gray, very fine to			====			_	
fine; siltstone, gray to						_	
brown-gray, carbonaceous; and claystone, gray to brown-						-	
gray, carbonaceous						600-	-120
gray, carbonacture						-	1
			-			-	1
	3					-	1
Sandstone, gray, very fine to	3					-	
medium; siltstone, gray to green-gray; and claystone,	1					650-	130
gray to green-gray			====			-	1
						1	1
	3					700 -	
						-	-140
						-	1
-			===	1		-	1
			====			-	1
	135		===	1		750 -	- -
						-	-150
				}		-	+
						-	1
						-	1
						J 800 -	4

	LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET
	4						800
		5					+
silt	Istone, gray, very fine; sstone, gray to green-gray;	2					1
and	claystone, gray to brown,						850
		3					1
		1		1			-
		1 2					900
				1			-
							1
							4
							950
	÷			11			4
							1
							1000
				1-1			1
						10	-
	~						1050
							-
							1
							_
							1100-
							-
							1150 -
							_
							-
							1200 -
							-
							_
1							-

mole No: US-797 Map: Fattig 1 SW Date: 5/10/79 State: Montana County: Musselshell Elev: 4079 FT Location: T 6 R R 28 R, Sec 10 Tract BBBA Drilled depth 260 FT Measured: 140 FT KNX 375 FT FWE FT Hole size: 4 3/4 IN Air Winn & Cored Yes No YES RECORDED BYROBERT PEDERSON RECORDING SPEED 15 RECORDED BY ROBERT PEDERSON GEOLOGIST MIN DENSITY RESISTIVITY GAMMA SP DEPTH SENS SETTING T.C. 2 SENS SETTING RANGE _ 2K RANGE 200 LITHOLOGY ۵ LOGGED DEPTHS LOGGED DEPTHS ā 282 FT 283 FT. 282 FT. 282 50+0 Sandstone, tan to yellow, very fine to fine, ferruginous siltstone, gray to yellow, ferruginous; and claystone, gray to tan, and coal 50 -20 Sandstone, gray to green-gray, very fine to fine; siltstone, gray to green-gray; and claystone, gray to green-gray 100-Sandstone, gray, very fine to fine; siltstone, gray; and. claystone, gray 150 Sandstone, gray, very fine to fine; siltstone, gray; and claystone, gray to brown, 200 carbonaceous - 5C 250 -300 - 7C us-_____

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
					*	350-	
						400 -	80
						450	-90
						500-	-100
						-	-110
						550-	
	b	*				600-	-120
						650-	-130
						700 -	-140
						750 -	-150

	ST NE RECORDED BY ROTERT PEDERSON RECORDING SPEED 15	
LITHOLOGY	RANGE 100   SENS SETTING   RANGE   SENS SETTING	DE -
	LOGGED DEPTHS 2 LOGGED DEPTHS 548 FT. FT. FT.	F
		50
Sandstone, tan to yellow-		C
brown, very fine to fine, ferruginous; siltstone, tan to yellow-brown, ferruginous;		
and claystone, gray to brown, carbonaceous		50
Sandstone, gray, very fine to fine; siltstone, gray to yellow, ferruginous; and		100
claystone, gray to yellow, ferruginous		150
Coal		200
Sandstone, gray to green-gray, very fine; siltstone, gray to		250
dark-gray, carbonaceous		1

J& .

LITHOLOGY	GAMMA	<b>\$</b> . P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Coal, with siltstone parting Sandstone, gray very fine; siltstone, gray to dark-gray, carbonaceous Coal  Sandstone, gray to green-gray very fine to fine; and siltstone, gray to green-gray  Coal Siltstone, gray to green-gray and claystone, green-gray						450-	-120
							-

Hole No: US-799 Map: Kirby Date: 5/16/79 State: Montana County: Big Horn Elev: 4342 FT Location: T 65 R 39 , Sec 28 Tract ADAA Drilled depth _____ 510 FT Measured: 1500 FT KN 50 FT FT Hole Size: 4 3/4 IN Air Water & Cored: Yes No RECORDED BY ROBERT PEDERSON GEOLOGIST RECORDED BYROBERT PEDERSONRECORDING SPEED 15 YES RESISTIVITY GAMMA SP DENSITY 200 T.C. ____2 SENS SETTING SENS SETTING TC_ METERS RANGE ___ LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 529 FT 527 FT. 5 FT. FT. 50+0 0+10 Sandstone, gray, very fine; siltstone, tan to yellow, ferruginous; and claystone, yellow-brown to tan, ferruginous 50-- 20 Coal 100--30 150 -Sandstone, gray to dark-gray, very fine to fine; siltstone, 200gray to brown, carbonaceous; and claystone, gray to brown, - 50 carbonaceous 250 -- 60 300 - 70 Coa1

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Sandstone, gray, very fine to medium; siltstone, gray to brown, carbonaceous; and claystone, gray to brown, carbonaceous						450-	-80 -90
`~						600-	- 120
						650	130
						750	140

	LOGIST TOOK RECORD	DED BYK. WILLIAM		
LITHOLOGY	GAMMA T.C2 RANGE200 LOGGED	SENS SETTING S T		FEET
till siltstone, brown, ferruging and claystone, gray to lightown coal siltstone, gray, carbonace and claystone, gray, carbonaceous  coal siltstone, light-gray to carbonaceous; and claystone gray, carbonaceous; and claystone gray, carbonaceous; and limestone	brown,			50

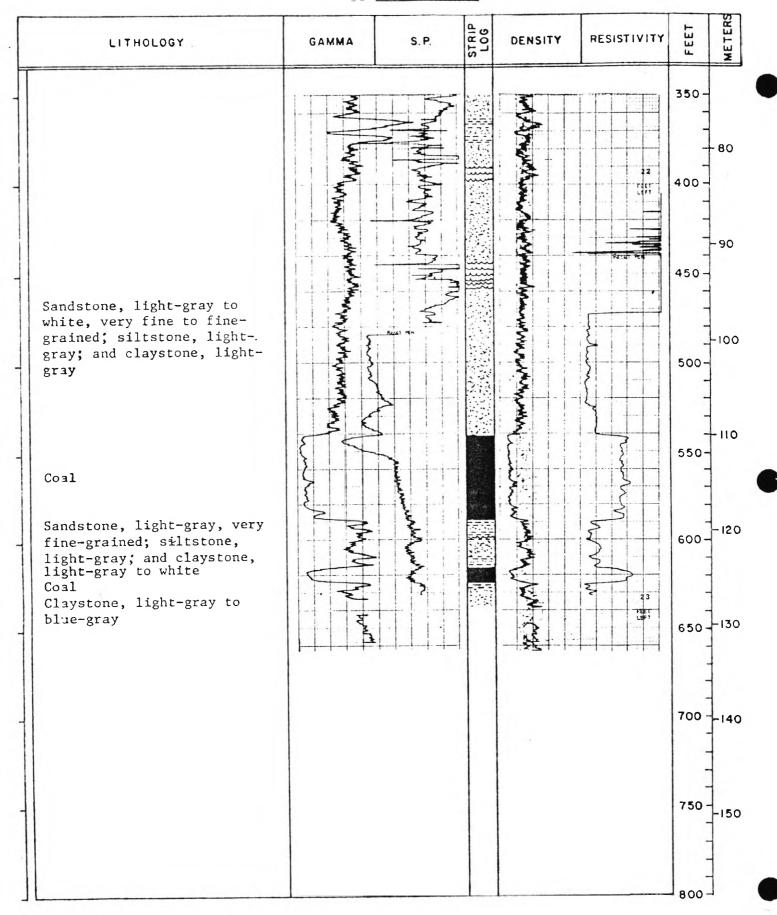
LITHOLOGY	GAMMA	\$. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
siltstone, gray to blue-gray; and claystone, gray, carbonaceous; and limestone		the standard of the standard o		an produced by the second		350 -	- 80
						450-	-90
						550-	-110
\						600-	-120
				Y			-140
						750	-150
						800	1

v.: 4022 FT Location: T 7 S R 40 K, asured: 1540 FT FSC 360 FT FWL morks: Lost circulation at 580 to	FT. Hole size: 5	IN Air Wathi X Cored: Yes X
CORDED BY KENNETH WILLIAMS GEOLOGIST	NO RECORDED BYENNE	TH WILLIAMSRECORDING SPEED20
	GAMMA SP T.C. 2 SENS SETTIME  LOGGED DEPTHS 612 FT FT	DENSITY RESISTIVITY DE SENS SETTING LOGGED DEPTHS
Sandstone, tan to brown, very fine to fine-grained, ferruginous; siltstone, gray; and claystone, gray  Coal, with claystone, partings		5
Sandstone, light-gray, very fine grained siltstone clay-stone, light-gray		20
Coal		25
Sandstone, light-gray, very fine to fine-grained; silt-stone, gray, carbonaceous; and claystone, gray, carbonaceous		30

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Coal				Marking in the state of the sta	\$6 -417	350 - - - - 400 -	- <b>8</b> 0
Sandstone, light-gray, very fine to fine-grained; siltstone, light-gray, carbonaceous; claystone, light to dark-gray, carbonaceous; and coal				Monthson Jahren Construction of the Williams		450	-100
Coal						550-	-120
					1 1 1 17	700	
						750 -	-150

CORDED BY KENNETH WILLIAMS GEOLOGIS		ETH WILLIAMSCORDING SPEED 20 DENSITY RESISTIVITY DE
LITHOLOGY	T.C. 2 SENS SETTING RANGE 200 250  LOGGED DEPTHS 634 FT 631 FT.	TC 2 SENS SETTING DE RANGE 50 250 LOGGED DEPTHS
		17/1/2 <b>3</b>
Clinker		5 5 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7
Sandstone, gray, very fine-		15 15
grained; siltstone, light- gray, carbonaceous; and claystone, light-gray, carbonaceous	Marine Ma	20
Coal		2:
Sandstone, light-gray, very fine-grained; siltstone, gray and claystone, dark-gray, carbonaceous	/;	30

01.



ECORDED BY KENNETH WILLIAMS		NO RECOF	RDED BY			
LITHOLOGY	T.C	GAMMA IGE	S P SENS SETTING DEPTHS	- P	DENSITY RESISTIVITE SENS SETT LOGGED DEPTHS	
		FT	FT.	STR	FT.	FT "
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Clinker						5
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						20
						25

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us-_____7913

L17	THOLOGY	GAMMA	\$. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
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RDED BY KENNETH WILLIAMS GEO	I I DCCICTIVITY
LITHOLOGY	T.C. 2  RANGE 200 250  LOGGED DEPTHS  TC 2  RANGE 2K 250  LOGGED DEPTHS
	833 FT. 831 FT. 5 838 FT 831 FT.
Sandstone, light-gray to t very fine-grained, ferrugi siltstone, light-gray; and claystone, light-gray Coal	nous;
Coal Sandstone, light-gray, verifine-grained; siltstone, gray; and claystone, gray dark-gray, carbonaceous Coal	ight-
Sandstone, light-gray, ve fine; and claystone, ligh gray Coal	
Sandstone, light-gray, ve fine-grained; siltstone, gray; and claystone, gray dark-gray, carbonaceous	light-

Hc :

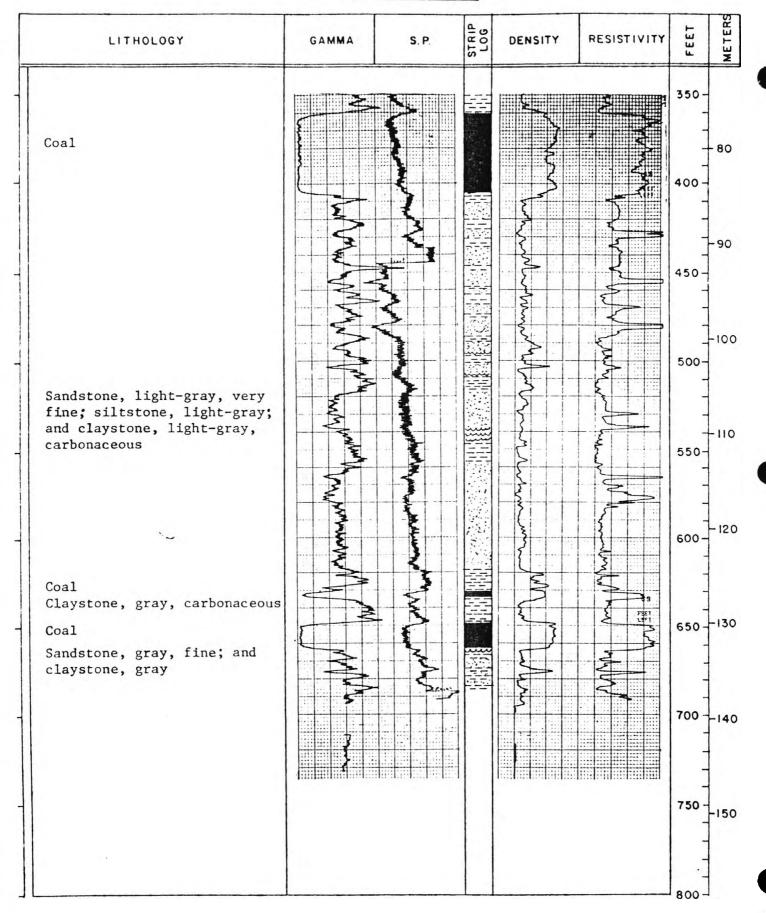
LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Coal, with claystone parting						350 -	- 80
Sandstone, light-gray, fine; and claystone, light-gray	M. Mary	of Warmer of the first of the second of the		Jamanaman		450-	- 90
				or work		500-	-100
Coal		NATIONAL		M		550- -	-110
	VAN MANA			John John		600-	- 120
Sandstone light-gray, very fine to fine-grained; siltstone, light-gray to white; and claystone, light-gray to white, carbonaceous	And the same of th	Area Maria		WWW.W.W.	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	650-	-130
	المردوا المرادات المر	يهمرامرمرسيم		www. Davidon		700 -	-140
Coal	The state of the s		}	7~~~		750	-150

LITHOLOGY	GAMMA.	<b>S</b> . P.	STRIP	DENSITY	RESISTIVITY	FEET
			जिल्ला इ.स.च्या	3		850
						900
						950
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	·					1100
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						1250

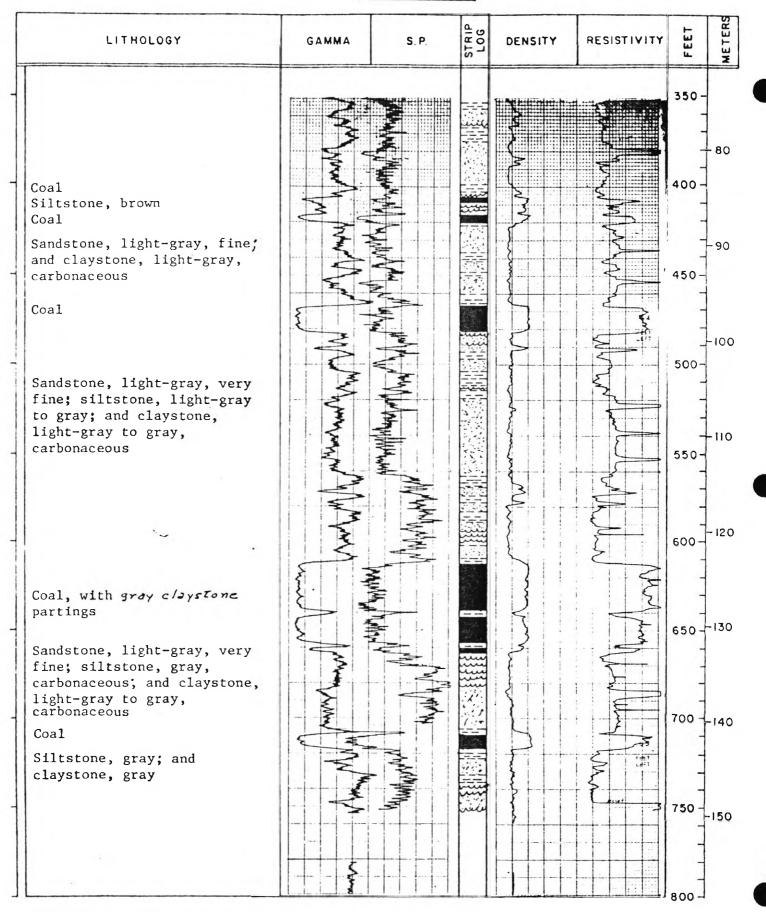
note No: US-7915 Map: Half Moon Hill Date: 4/18/79 State: Montana County: Big Horn Elev: 4528 FT Location: T 7 S R 39 T Sec 32 Tract DCDD Drilled depth 800 FT FT. Hole size: 5 IN Air Warr & Cored: Yes No X Measured: 216 FT FSL 1360 FT KMX Remarks: Lost circulation, no return after 720 feet; logged through pipe. (no source on density) RECORDED BYKENNETH WILLIAMS CORDING SPEED __ RECORDED BY KENNETH WILLIAMS GEOLOGIST MIN RESISTIVITY DENSITY SP GAMMA DEPTH SENS SETTING T.C. 2 TC_2 SENS SETTING RANGE _50 RANGE __ 100 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS æ 796 FT. 791 FT 50 + C Sanistone, light-gray to white, very fine; siltstone, tan to brown, ferruginous, local zones of calcareous; and claystone, gray, carbonaceous 50 Coal 100 200 Sandstone, light-gray, very fine and fine-grained; siltstone, light-gray; and claystone, gray, carbonaceous 250 300 Coal Sandstone, light-gray, very fine to fine-grained; siltstone light-gray; and claystone, gray carbonaceous

LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET
						350-
Coal, with claystone parting						450-
Siltstone, light-gray; and claystone, light-gray				A CONTRACTOR OF THE CONTRACTOR		500
Coal				Min		550-
~~		<b>3</b>	第 2 2 3 3 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	S. S		600-120
Sandstone, light-gray, very	3			D. Made Marine		650 130
fine to fine-grained; siltstone, gray, carbonaceou claystone, gray to white, carbonaceous; and coal	S			MAN		700140
			· 医医疗 医医疗 医医疗 医医疗 医皮肤			750 -150

hole No: US-7916 Map: Half Moon Hill Date: 4/26/79 State: Montana County: Big Horn Elev: 4337 FT Location: T 8 S R 39 , Sec 5 Tract Irreg. Drilled depth _____ 720 FI FT. Hole size: 5 IN Air Water X Cored: Yes No Measured: 2150 FT. KXX 2175 FT. FWL Remorks: Cored interval 228 feet to 263 feet. RECORDED BY KENNETH WILLIAMS ORDING SPEED RECORDED BY KENNETH WILLIAMS GEOLOGIST RESISTIVITY DENSITY SP DEPTH SENS SETTING T.C _ SENS. SETTING T.C. -RANGE _5K RANGE __ 200_ LITHOLOGY O. LOGGED DEPTHS LOGGED DEPTHS 699 FT FT. IS 694 FT. 50+0 Sandstone, tan to brown, very fine to fine, ferruginous; siltstone, light-gray, ferruginous; and claystone, light-gray, ferruginous Coal 50-Sandstone, gray, very fine; siltstone, light-gray, 100carbonaceous; and claystone, light to dark-gray, carbonaceous 150 Coal Bandstone, light-gray, very fine; siltstone, light-gray; and claystone, light to dark-200 gray, carbonaceous coa1 250 Sandstone, gray, very fine, locally calcareous; and claystone, gray 300



hole No: US-7917 Map: Half Moon Hill Date: 4/28/79 State Montana County: Big Horn Elev: 4085 FT Location: T 8 S R 39 7, Sec 5 Tract Irreg. Drilled depth Measured: 4550 FT FSL 325 FT XXXX FT. Hole size: 5 IN Air Ward & Cored: Yes No E RECORDED BYNETH WILLIAMSCORDING SPEED_ RECORDED BY KENNETH WILLIAMS GEOLOGIST RESISTIVITY DENSITY SP GAMMA DEPTH SENS SETTING TC_ T.C. ____2 SENS SETTING 250 RANGE _5K_ RANGE _ 200 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 752 FT 759 FT 752 FT. 754 FT 50 -Colluvium, ferruginous; sandstone, tan to gray, very fine, ferruginous; siltstone, tan to brown, ferruginous; and claystone, gray Coal Sandstone, light-gray, very fine; siltstone, light-gray; and claystone, light-gray to gray Coal 250 Sandstone, light-gray, very fine; siltstone, light-gray; ani claystone, light- to dark-300 gray, carbonaceous



note No: US-7918 Map: Half Moon Hill Date: 4/30/79 State: Montana County Big Horn Elev: 4140 FT Location: T 7 & R 39 , Sec 33 Tract ACBA Drilled depth 660 FT Measured: 1350 FT RNL 2190 FT FXXX FT Hole size: 5 IN Air Warn X Cored: Yes No X Remarks: Lost circulation at 595 feet no returns after 590 feet - logged through pipe. NO RECORDED BY KENNETH WILLIAMS GEOLOGIST NO RECORDED BYKENNETH WILLIAMS CORDING SPEED RESISTIVITY GAMMA SP DENSITY DEPTH T.C _ SENS SETTING T.C. ____2_ SENS SETTING RANGE _50 RANGE __ 100_ LITHOLOGY ST RIP LOGGED DEPTHS LOGGED DEPTHS 650 FT 655 FT 50 + 0 Regolith Sandstone, tan, very fine 50grained; and claystone, tan -20 to red Clinker 150 200 Sandstone, light-gray, very fine grained; siltstone, gray to light-gray; and claystone, dark-gray to gray 250 Sandstone, light-gray to 300 white, very fine grained; claystone, gray to light-gray, very silty

LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Claystone, gray to dark-gray, silty; and sandstone, light-gray; and coal  Claystone, light-gray to gray; and siltstone, light-gray				MATA PRANTA AND AND AND AND AND AND AND AND AND AN		350 -	- 80
Coal				SAM SAM		450-	- 90
Claystone, light-gray to gray; siltstone, light-gray; and some hard zones				A SANDA MANANA	-35	500-	-100
	The state of the s			Assir Assir		550-	-110
Sandstone, light-gray, very fine; and claystone, gray		<b>X</b>		Service of the servic		600-	-120
Coal		-		Annua Annua		650	-130
		- Amy		13	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	700	140
	[L. 1 l	1.1 1 1 1		I polosto I		750	-150
						800	-

Hole No: US-7919 Map: Half Moon Hill Date: 5/1/79 State: Montana County: Big Horn Elev: 3996 FT Location: T 8 S R 39 Sec 3 Tract Irreg. Drilled depth ______ 110 FT Measured: 3220 FT KKK 1960 FT FWL FT. Hole size: 5 IN Air Water & Cored: Yes No & Remorks: Total circulation lost, hole abandoned, no logs. RECORDED BYKENNETH WILLIANSCORDING SPEED RECORDED BY KENNETH WILLIAMS GEOLOGIST RESISTIVITY SP DENSITY GAMMA DEPTH SENS SETTING T.C. .... SENS SETTING RANGE. RANGE _ LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS FT. 50+0 Regolith, brown Clinker 50-100 150 -200 50 250 300 - 7C us-_____7919

LITHOLOGY	GAMMA	<b>S</b> . P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
					A	350-	
						-	80
4						400 -	
						-	-90
						450-	
						- - 500-	-100
						-	
						550-	110
						-	
						600-	- 120
						650	-130
						700	140
				4.			
						750	-150
						800	1

note No: US-7920 Map: Half Moon Hill Date: 5/10/79 State: Montana County: Big Horn Flev: 4163 FT Location: T 8 S R 39 , Sec 4 Tract Irreg. Drilled depth Measured: 2950FT FSL 825 FT KWX FT Hole size: 5 IN Air Ward & Cored: Yes No & Remorks: Hit a void at 350 feet - total loss of circulation. RECORDED BYKENNETH WILLIAMSCORDING SPEED 20 ХX MIN RECORDED BY RUSS PATTERSON GEOLOGIST YES DENSITY RESISTIVITY SP GAMMA DEPTH SENS SETTING SENS SETTING T.C __ RANGE __5K LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 300 FT 295 FT FT. 50+0 Regolith Sandstone, light-brown and gray, fine-grained, carbonaceous; and claystone, 100 light-brown Sandstone, light-gray, fineto medium-grained; and claystone, gray Coal 200 Sandstone, light-brown, finegrained, altered by burn; siltstone, tan to brown; and 250 claystone, gray

US-_____7920

. 1	LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
							350-	
							-	
							-	- 80
							400 -	
							_	
							_	- 90
							450-	
							-	
								-100
							500-	
							-	1
							550-	110
							-	1
								1
	`~						600-	- 120
								1
								1
							650	-130
								1
							700	-140
								-
								1
-							750	-150
								-
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]							-J 800	1

Hole No: US-7921 Map: Kirby Date: 5/11/79 State: Montana County: Big Horn Elev: 4469 FT Location: T 65 R 39 W Sec 10 Tract DAAA Drilled depth 640 FT Measured: 2335 FT. FSL 240 FT. FEL FT. Hole size: 5 IN Air Water X Cored: Yes No X Remarks: Density probe ran without source. RECORDED BYKENNETH WILLIAMECORDING SPEED RECORDED BY RUSS PATTERSON GEOLOGIST YES DENSITY RESISTIVITY SP GAMMA SENS.SETTING SENS SETTING T.C. _ RANGE 50 RANGE 200 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS FT. 5 .633 FT 628 FT 50 + O Sandstone, light-gray, very fine; siltstone, gray; and claystone, gray 50--20 Coal Coal... 100-Sandstone, light-gray, very fine; siltstone, gray; and claystone, gray 150 -Coal 200 -Sandstone, gray, very fine; -- 50 and claystone, gray 250 300 Coa1

	LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
	Coal		+				350-	- 80
	Sandstone, gray, very fine; siltstone, gray; and claystone, gray				My Man My Man		400 -	-90
		Mary Man Jours May No			MA AND AND AND AND AND AND AND AND AND AN	CIF:	500-	-100
	Coal						550-	-110
	Coal						600-	-120
-							650	-130
1							700 -	-140
					,		750 -	-150

note No: US-7922 Map Kirby Dote: 5/13/79 State: Montana County Big Horn Elev: 4477 FT Location: T 6 S R 39 , Sec 3 Tract CBDA Drilled depth ____ 700 F Measured: 1490 FT FSL 1010 FT FWL FT. Hote size: 5 IN Air Water X Cored: Yes No. YES RECORDED BY PUSS PATTERSON RECORDING SPEED RECORDED BY RUSS PATTERSON GEOLOGIST SP DENSITY RESISTIVITY GAMMA T.C. _____2 DEPTH 100 SENS SETTING SENS SETTING TC _____2__ RANGE 2K 250 RANGE 200 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 700 FT 693 FT 693 FT. 5 695 FT. 50+ Regolith Sandstone, light-gray, calcareous; and claystone, 50light-brown and gray Coal 100-Coal 200 Claystone, light-gray to gray; and siltstone, light-250 gray 300 Coa1

LITHOLOGY	GAMMA	S. P.	STRIP LOG	DENSITY	RESISTIVITY	FEET	METERS
Coal						350-	146
Claystone, gray, and limestone, light-gray	***			Δ		134 -	-80
			薑	<b>\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\fin}}}}}}}}}{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac}{\frac{\frac{\frac{\frac{\frac{\frac{\frac}{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}</b>	7	400-	
	**************************************			M		*********	-90
	The state of the s				}	450 - - -	The second secon
				2	\{\}	500-	-100
Claystone, light-gray to gray; siltstone, gray; and sandstone, light-gray,	STA VIEW					A POLICE	
very fine				3 3		550-	-110
Limestone, light-gray; and claystone, light-gray to			崖			30	Total Section 1
gray		* *				600-	-120
Coal, with partings of  dark-gray carbonaceous  claysTone			三		ב ל ב ל ב ל ב	650-	-130
			量		- <u>-                                  </u>		
			1		escile, atgr	700	-140
				12.L 4.0.00	ig de tras di T		
						750	-150 -11
						800	

hole No: US-7923 Map: Spring Creek Ranchate: 5/14/79 State: Montana County: Big Horn Elev: 4420 FT Location: T 6 S R 39 K, Sec 30 Tract BBCA Drilled depth ____ 660 FT Measured: 950 FT KKK 510 FT FWL FT Hole size: 5 IN Air Warri 3 Cored: Yes No X RECORDED BYKENNETH WILLIAMSCORDING SPEED -MIN RECORDED BY KENNETH WILLIAMS GEOLOGIST XXX DENSITY 2 RESISTIVITY SP GAMMA DEPTH 100 SENS SETTING 250 SENS SETTING RANGE _2K 200 RANGE _ LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 653 FT. 660 FT 653 FT 655 FT 50+0 Sandstone, tan, very fine to fine Coal 50 Sandstone, gray, fine; -20 claystone, gray; and limestone, light-gray Coal 100 150 Claystone, light-gray to gray; siltstone, light-gray; and sandstone, light-gray, very fine 200 -51 250 Limestone, light-gray; siltstone, gray; and claystone, gray 300 Coal Sandstone, light-gray, very fine; and claystone, lightgray to gray

LITHOLOGY	GAMMA	\$. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Claystone, light-gray to gray, silty; and limestone, light-gray		Called Way All A Property				350 - - - - 400 -	- 80
Sandstone, gray, very fine; siltstone, gray to light-gray; and claystone, light-gray	The Month of the Control of the Cont	My January Man		\$\tag{\tag{\tag{\tag{\tag{\tag{\tag{		450-	- 90
Coal	The state of the s	May Lynny		2	2	500-	-100
Sandstone, light-gray, very fine to fine; and claystone, gray to tan		Maggar Provided Market		The same of the sa		550-	110
Coal		May May May				600-	-120
Coal Sandstone, light-gray, fine; and claystone, light- to dark- gray						650	-130
						700	-140
						750	-150
						800	_

RECORDED BY RUSS PATTERSON G	EOLOGIST	YES				PATT			ING SPE		T
LITHOLOGY		RANGE	2	SENS D DEPT	250	RIP L	ANGE _	2K	RESISTI SENS SE 25 DEPTH: 50	TTING Ω	FEET
											50-
Regolith			N.	NOW P	>						0 -
Claystone, light-gray to sandstone, light-brown an light-gray, very fine			Mary many many	MANNUMAN	מאלונות אינו אינו אינו אינו אינו אינו אינו אינו			Manus mande	Z	<b>X</b>	50-
Coal			× ×		A TANKA A				Jan Alak	) 	100-
Claystone, gray to dark-gand siltstone, light-gray	-		La Man Man Man	Apply of the state	W			James July	was a state of the		150 -
		-	May MA	Mynymy				Vary Some	No.	<b>-</b>	200
Sandstone, light-gray, ve fine grained; siltstone, light-gray to gray; and claystone, gray to dark-g			ment of the month of the	My Mary Contractor Mary Contraction				Minne	to the same	17 1751 1841	250
. gray to dark y	gray		Marine Marine	My Mariaber			-	A Lynna Man			300
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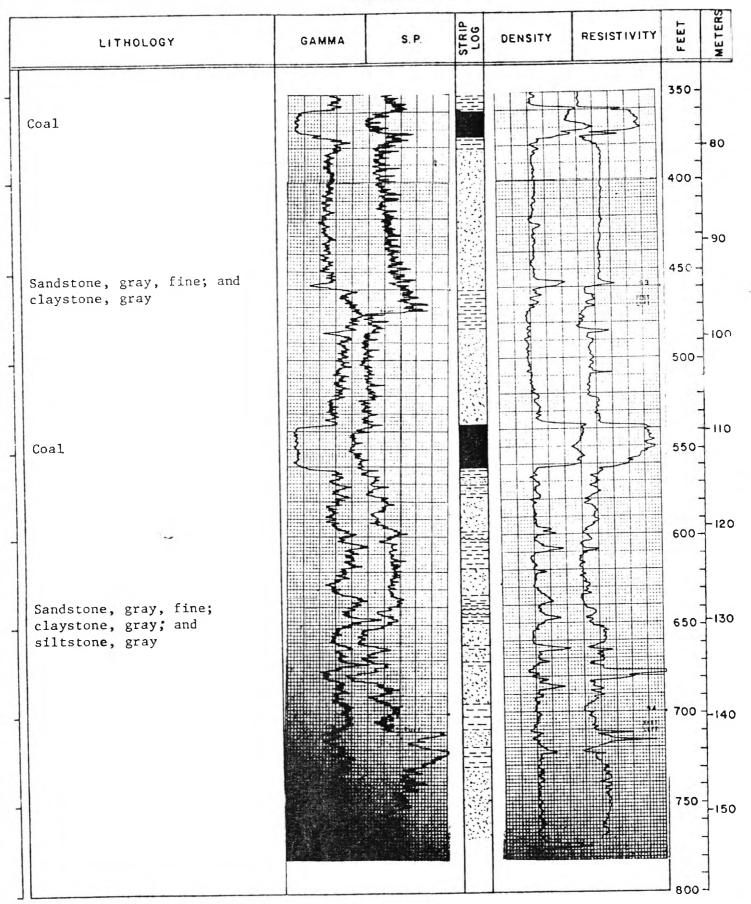
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LITHOLOGY	GAMMA	<b>S</b> . P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Claystone, light-gray to gray; and sandstone, dark-gray, . very fine	5	M. Marvelloway V.	蒙蒙二	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		350 -	- 80
Coal			霊			450 -	-90
Sandstone, light-gray, very fine; and claystone, gray to light-gray	A A	The bady		Jany Marin		500-	-100
						550- - -	110
`~						600-	
						650 -	
						750	
						800	

ORDED BY KOSS TA	TTERSON GEOL	OGIST YE	ES RECO	ORDED B	KENN	ETH V	VILLIANG	CORDING	SPEED_	20
LITHOLOGY		T.C.	3F 200	SENS	50	1-1	DENSIT	SEI	SISTIVITY NS.SETTING 250	
			LOGGE 599 F	т. 597	7 FT.	STR			597	
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Sandstone, 11 fine; and cla	ght-brown, ver ystone, light-		1	3		3.			3.	
brown			3		4 11			<b>\$</b>		
			1		441			2	2	5
Coal		<u> </u>	13	=	j	===		- Tal		J
		973	1	1		5.0				
			1	3					++	10
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Sandstone, 1	ight-gray, ver	у	3		2+-	5	1	+++	4	
fine; and cla	ystone, light			-	-		1	<b>&gt;</b>	Ę	
gray to gray			\$		*	5		<b>&gt;</b>		15
			3		A No.	益	\$		1811	
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			1		5			1		20
Coal		- 1		Au	الما			15	+	4
	1		1		3		1 8		17-1-1	
	1	<i>i</i>	-		13		1		EPH	
Sandstone, 1	ight-gray, ver	ry		-	3	=	1		2	2
	aystone, light	<u> </u>	1 3	\$	11		1	1	110	7
gray to gray carbonaceous			- 3	2			*	111	3	
	,	3.1.	2	- 1	1 4 4 5	11:30	1 8	1571	151-1	

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Sandstone, light-gray, very fine; and claystone, gray  Coal	The same of the sa	My My My John Mary			MAL	350 -	- 80
Sandstone, light-gray, fine; and claystone, light-gray	The Control of the Co	And My Mary May May May May May May May May May Ma		a market		450-	-90
to gray	A TANKA TANKA TANKA	accertally Myses		A Carrier		500-	-100
Coal		A Warman Mary Control			MANNAN WAY	550-	-110
						600-	-120
						50-	-130
				4		700	-140
						750	-150
						800	1

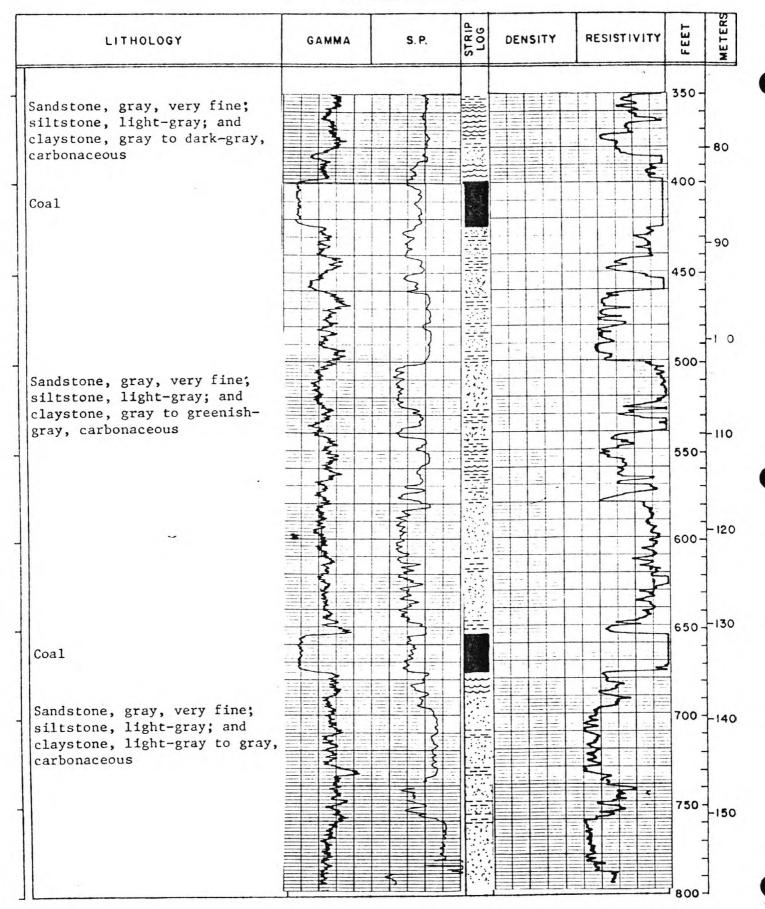
hale No: US-7926 Map: Kirby Date: 5/16/79 State Montana County Big Horn Elev: 4608 FT Location: T' 7 S R 39 N, Sec 2 Tract AAAD Drilled depth _____ 780 FT Measured: 400 FT FNL 150 FT RWX FT. Hole size: 5 IN Air Water X Cored: Yes No X NX YES RECORDED BY KENNETH WILLIAMSECORDING SPEED 20 RECORDED BY WILLIAM JACKSON GEOLOGIST RESISTIVITY SP DENSITY GAMMA SENS SETTING SENS SETTING T.C. ____2 TC_ RANGE __200 RANGE _ 2K LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 774 FT 772 FT. 779 FT 772 FT 50+0 Sandstone, brown, ferruginous; and siltstone, brown, ferruginous Sanistone, gray, very fine; siltstone, gray, carbonaceous; and claystone, gray, 150carbonaceous 200-250-300 Coal Sandstone, gray, fine, carbonaceous; and claystone, gray, carbonaceous



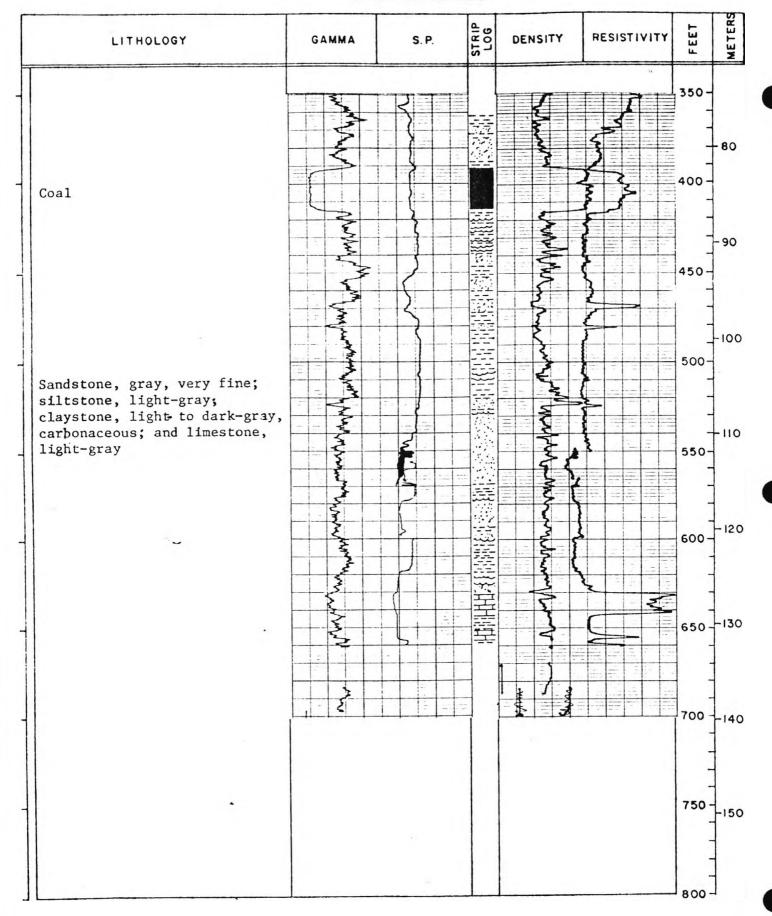
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		T.C. 2 SENS SETTING					1	T C	)E N:	5111		_ SENS SETTING			T	DEP	TH		
LITHOLOGY		RANC		GGE	D D	EPT			STRIP L						20 PTH 79	S	FT	FEET	
													ba					50	1
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			\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\						\$ \$										1-1-
			₹ 5	R															-
	Sandstone, gray, very fine; siltstone, light-gray to			\$														50	1
	brown; and claystone, light- gray to brown, carbonaceous		VV	>		-		- WAR						-		- 1			1
	gray	= 1	2	3				1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			-			-		+		100	1
			1	5	-	-		<b>2</b>	135							1			1
			3		-		MALIA	2		× -	-							150	_
			3			-	1	<u>A</u>				.61						150	1-1
	Coal, with gray siltstone	VV	3	-		-	7	7		~									1
	parting Sandstone, light-gray, fine;	23	5			-					-			1	-	1		200	, -
	and claystone, light-gray	1	*		=					74 		Ě	=		3				-
	Coal	1	1			-								1	4	E		250	- ) -
	Sandstone, gray, very fine;		*				}									$\triangleleft$			-
	ani claystone, light-gray to gray, carbonaceous		\$				7		, . , .					72 2					
			Š				1											300	) -
			3				}						==						-
	Coal		<	>		+	1	5					-	+	<		1	4	

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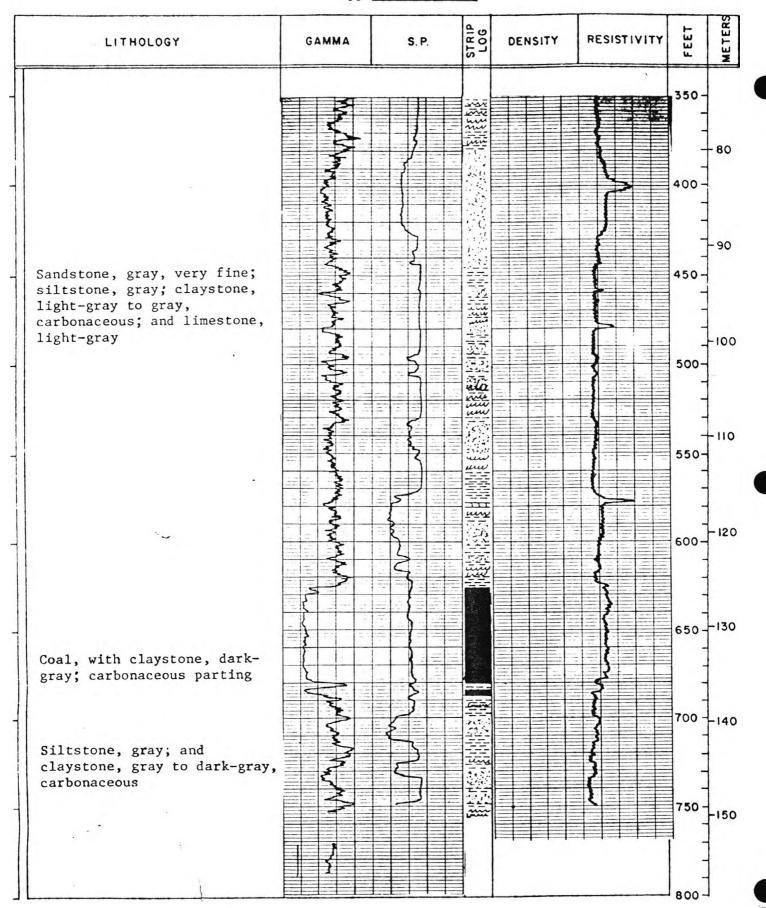
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Dote: 5/23/79 State Montana County Big Horn Elev: 4492 FT Location: T 6 S R 39 W, Sec 34 Tract BDDC Drilled depth ____ 650 FT Measured: 2298 FT XXX 2290 FT. FWL ____FT. Hole size: 5 IN Air Word & Cored: Yes No & YES RECORDED BY ALAN PETAJA RECORDING SPEED RECORDED BY RUSS PATTERSON GEOLOGIST DENSITY RESISTIVITY SP GAMMA TC ____2___ SENS SETTING T.C. 2 SENS SETTING 50 RANGE _ 2K__ RANGE _200_ LITHOLOGY ۵ LOGGED DEPTHS LOGGED DEPTHS 660 FT 660 FT 5 661 FT 657 FT 50 + € Siltstone, gray to light-brown; and claystone, gray to light-brown Coal, with light-brown siltstone parting Siltstone, light-gray to brown; and claystone, light-gray to gray, carbonaceous Coal 100 Sandstone, light-gray, very fine; and claystone, lightgray to gray Coal . Sandstone, light-gray, very fine; siltstone, light-gray; 250 claystone, light to darkgray, carbonaceous; and limestone, gray 300

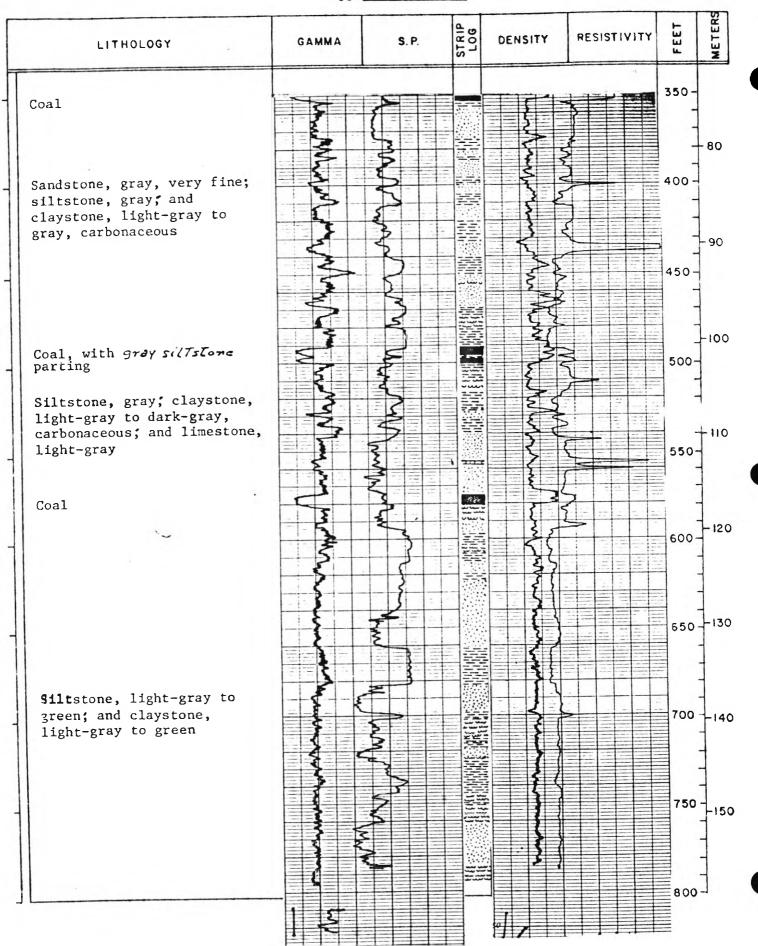


CORDED BY RUSS PATTESRON GEO	LOGIST NO RECO	RDED BY ALA	N P	ETAJA RE	CORE	ING SPEED	2	0
	GAMMA T.C. 2 RANGE 200	1 5 2	106	DENSIT TC 2 RANGE 2		RESISTIVIT SENS SETTI 50	Y NG	DEP
LITHOLOGY	LOGGE	D DEPTHS r 749 FT.	STRIP	1		749	FT	PEE PEE
Sandstone, gray, very fine siltstone, light-gray to brown; claystone, light-gr to brown. carbonaceous; an limestone, light-gray	ay E							500 1500 2500
Coal						3		

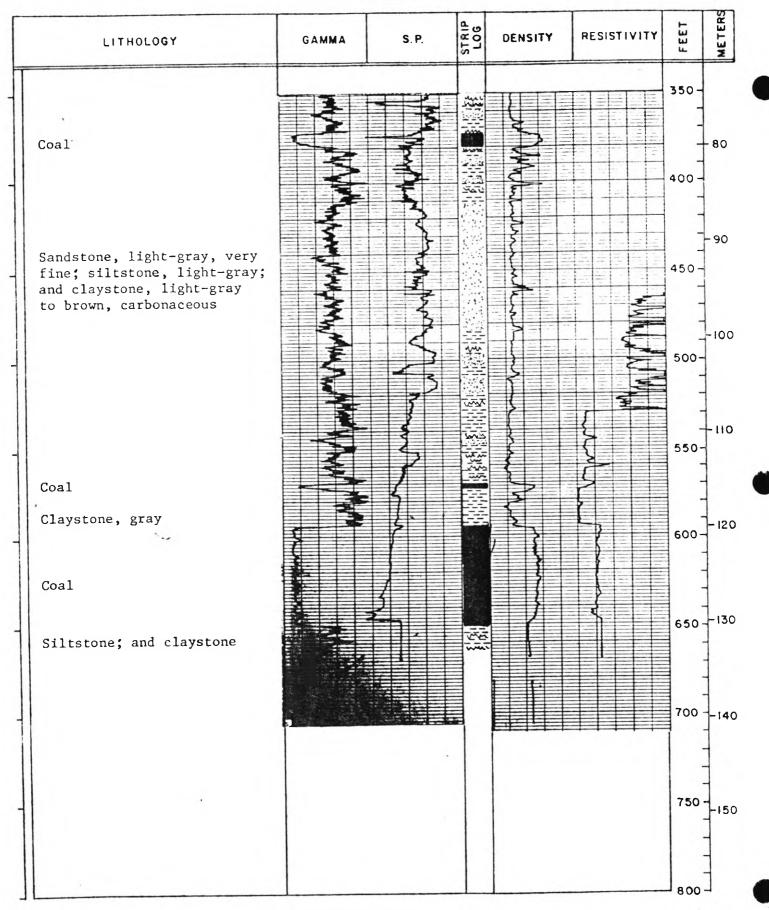


note to: US-7930 Map Half Moon Hill Date: 5/25/79 State: Montana County: Big Horn Eley: 4478 FT Location: T 75 R 39 X, Sec 22 Tract ABAD Drilled depth _____ 780 F Measured: 629 FT KXX 1476 FT KXX FT Hole size: 5 IN Air Wurar X Cored: Yes No NE RECORDED BY ALAN PETAJA RECORDING SPEED. RECORDED BY RUSS PATTERSON GEOLOGIST YES RESISTIVITY GAMMA 2 DENSITY SP DEPTH SENS SETTING SENS SETTING T.C. ___ TC_ RANGE __ 200 RANGE _2K 50 50 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 787 FT. 5 796 FT. 785 FT. 787 50+ Sandstone, light-brown, very fine grained; siltstone, gray; and claystone, gray Coal Siltstone, gray; and claystone, light-gray to gray, carbonaceous 150 Co 11 Siltstone, gray, and claystone, gray Coa1 200 Sandstone, light-gray, very fine grained; siltstone, light-gray; and claystone, 250 light-gray to gray 300 Coal. Claystone, gray to dark-gray

Coal



note No: US-7931 Map: Tongue River Dam Date 5/26/79 State Montana County Big Horn Elev: 3956 FT Location: T 7 S R 40 , Sec 33 Tract BDBB Drilled depth ____ Measured: 1398 FT KXK 1568 FT FWL ___ FT Hole Size: 5 IN Air _ Wurst X Cored: Yes _ No X Remorks: Inaccurate total depth due to worn shimwheel on logger. RECORDED BY ALAN PETAJA RECORDING SPEED RECORDED BY RUSS PATTERSON GEOLOGIST MIN YES RESISTIVITY GAMMA 2 DENSITY SP DEPTH SENS SETTING TC_ T.C. _ SENS SETTING 100 RANGE _5K RANGE __ 100 50 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 669 FT 669 FT 669 669 FT. 50 + C Siltstone, brown; and claystone, brown Coal Claystone, gray 50 Clinker 100 4141 Sandstone, light-gray, very fine; siltstone, light-gray; and claystone, light to darkgray, carbonaceous 200 250 Coal Sandstone, light-gray, very fine; siltstone, light-gray; and claystone, light-to darkgray, carbonaceous



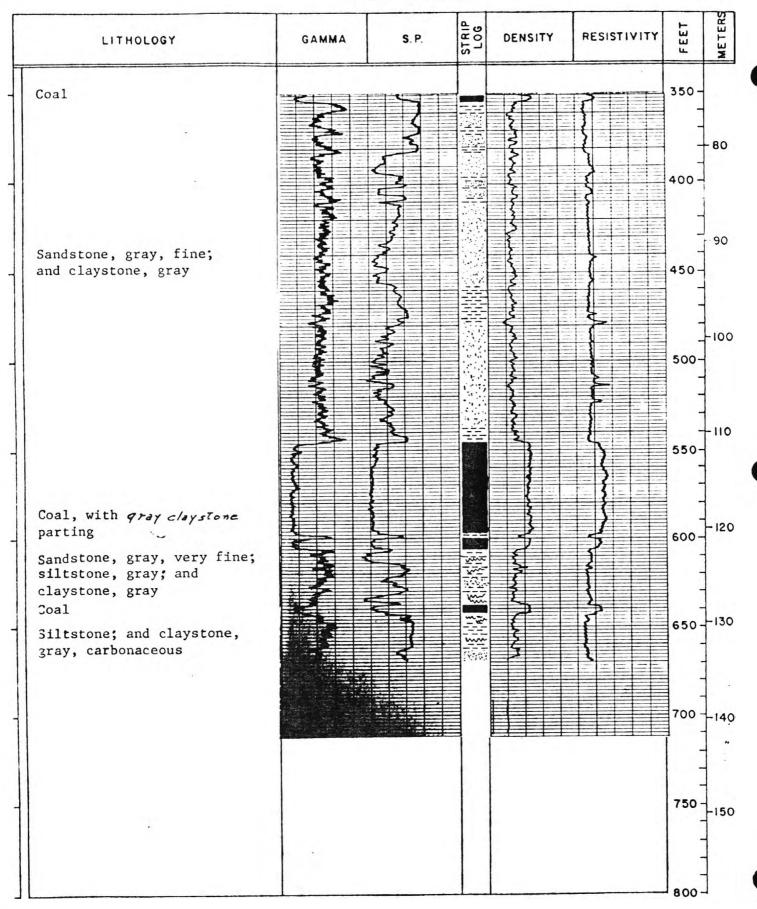
note No: US-7932 Map: Tongue River DamOate: 5/22/79 State: Montana County: Big Horn Elev: 4112 FT Location: T 7 S R 40 W, Sec 19 Tract DDAB Drilled depth _______60 FT Measured: 1069 FT FSL 632 FT. FXXX FT. Hole size: 5 IN Air Warer X Cored: Yes No X Remarks: Hole was caving as fast as pipe was put down, so cancelled hole. RECORDED BY RUSSELL PATTERS RECORDING SPEED 20 RECORDED BY RUSSELL PATTERSON EOLOGIST XXX YES DENSITY RESISTIVITY SP GAMMA DEPTH 106 SENS SETTING T.C. _ SENS SETTING RANGE RANGE _ LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS FIL FT. 50+0 Clinker 50 100 150 200-250 60 300

17:50

GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
				.,	350-	
					1	
					]	- 80
					-	
					400-	
					-	- 90
098					450	
					450-	
741					-	
						-100
						1
					-	
					-	-110
					550-	
				·	-	
					-	- 12
					600-	
					-	-
					-	1
					650-	-13
						-
						+
						1
					700	-14
1					1	1
						1
						-
					750	-15
						] [
						+
	GAMMA	GAMMA S.P.	GAMMA S.P. SIR	GAMMA S.P. S.P. DENSITY		350 - 400 - 450 - 500 - 550 - 550 - 700

ORDED BY RUSS PATT	TERSON_ GEOLOGI	165	D BY ALA		TAJA RECORD	DECICTIVITY	1000
LITHOLOGY		T.C. 2 RANGE 200 SE LOGGED DE	PTHS	RIP LOG		DEPTHS	FEET
							50-
							50-
Sandstone, gray			<b>3</b>				100
grained; siltst claystone, ligh gray, carbonace limestone, gray	t-to dark- ous; and						150
							200
Coal			\$   \frac{1}{2}	5 5 5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	<b>1 2 3 5 5 5 5 5 5 5 5 5 5</b>		250
				-			.1

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hole No: US-7934A Map: Tongue River Dam Date: 6/4/79 State: Montana County: Big Horn Elev: 4093 FT Location: T 7 R 40 x, Sec 11 Tract DBBA Drilled depth 100 FT Measured: 2462 FT FSL 2129 FT FEL FT. Hole size: 5 IN Air Warr X Cored: Yes No X Remarks: Lost circulation, no samples taken. RECORDED BY RUSS PATTERSON ECORDING SPEED 20 RECORDED BY RUSS PATTERSON GEOLOGIST YES RESISTIVITY DENSITY GAMMA SENS SETTING TC. SENS SETTING T.C. __ RS RANGE -RANGE -LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS FT FT. 50+0 50 100-150 -200-J- 50 250 300

LITHOLOG	Y	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
							350-	
							1	- 80
							400-	
							-	- 90
							450-	30
							500-	- 100
							-	
							550-	-110
							-	
	<u>.</u>						600-	- 12
							-	
							650-	-13/
							-	
							-	
							700 -	-14
							-	
							750 -	-15
							-	
							800	

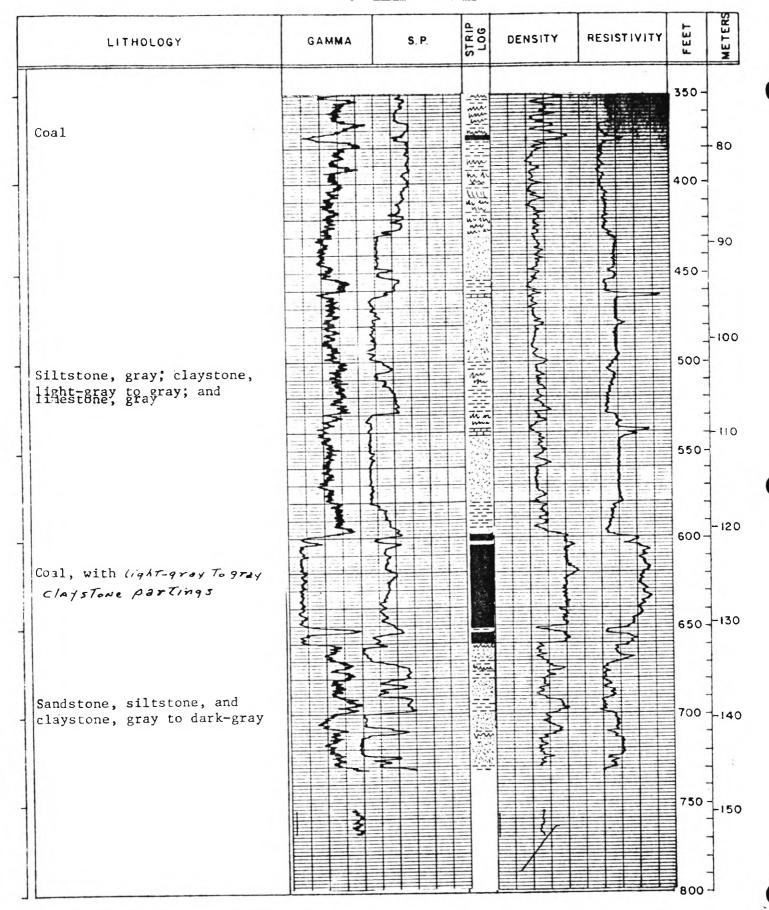
ECORDED BY RUSS PATTERSON G	SEOLOGIST XXV RE	CORDED BY RUSS	PA	TTERSOMECORDING		
LITHOLOGY	GAMMA T.C RANGE	S P SENS SETTING	P00		STIVITY SSETTING	DE P
CITACCOCT	LOG	GED DEPTHS FT FT.	STRIP	LOGGED DEP	THS FT	FEE
						50
						0
						50
						100
						150
						200
						250

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us-<u>7934</u>

LITH	OLOGY	GAMMA	\$. P.	STRIP LOG	DENSITY	RESISTIVITY	FEET	METERS
							350-	
	٠						1	- 80
							400 -	
							=	-90
							450-	- 30
							1	-100
							500~	
							-	11 .
							550-	
							-	
	•						600-	-120
							650-	-130
							700	1,40
								-140
								+
							750	-150
].							J 800	]

hale to: US-7935 Map. Tongue River Dambate: 6/6/79 State: Montana County: Big Horn Elev: 3932 FT Location: T 75 R 40 7, Sec 13 Tract CBAC Drilled depth _____ 720 FT Measured: 2296 FT FSL 752 FT FWL FT Hole size: 5 IN Air Water & Cored: Yes No W Remarks: Inaccurate total depth due to worn shimwheel on logger. RECORDED BY RUSS PATTERSON GEOLOGIST RECORDED BY ALAN PETAJA RECORDING SPEED YES DENSITY C____2 RESISTIVITY SP GAMMA SENS SETTING T.C. __2 TC_ SENS SETTING RANGE _ 200 RANGE _2K 50 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 732 FT. 730 FT 732 FT 732 FT 50 + O Sandstone, light-brown, very fine grained Coal -20 Sandstone, light-gray, very 150 fine grained; siltstone, light-brown to gray; claystone, light-gray to gray, carbonaceous; and limestone, gray 200 -250 -Coal, with claystone, gray to - 60 dark-gray; carbonaceous parting 300 Siltstone, gray; and claystone, gray to dark-gray, carbonaceous 70



note No: US-7936 Map: Tongue River Dam Date: 6/8/79 State: Montana County: Big Horn Elev: 4018 FT Location: T 7 S R 40 K, Sec 10 Tract ABDC Drilled depth ______640 FT Measured: 4109 FT. FSL 1926 FT. XXX _____FT Hole size: ___5 IN Air | Warn 🔀 Cored: Yes 🗌 No 🛛 Remarks: Lost circulation at 80 ft.; but was reestablished, then lost again at 575 ft. MM RECORDED BY ALAN PETAJA RECORDING SPEED RECORDED BY RUSS PATTERSON GEOLOGIST YES DENSITY RESISTIVITY SP GAMMA DEPTH T C _2 SENS SETTING SENS SETTING T.C. _ RANGE __ 100 RANGE _2K LITHOLOGY E LOGGED DEPTHS LOGGED DEPTHS 577 FT. 651 FT. FT. 50+ 0 0 Sandstone, light-gray, very fine; siltstone, lightbrown; and claystone, gray 50 to light-brown 100 150 40 in. Sandstone, light-gray, very fine; siltstone, light-gray, claystone, light to dark-gray, carbonaceous; and limestone, 200-*** gray 50 250 -7.7 60 Coal 300 Sandstone, light-gray, very سمي fine; siltstone, gray; clay-200 70 stone, light- to dark-gray, carbonaceous; and limestone, gray; and coal

LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
				7000		350-	- 80
		-				400-	
Coal				SA MA		450-	- 90
Sandstone, light-gray, very fine grained; siltstone, gray; claystone, light- to dark-gray,						500	-100
carbonaceous; and limestone, gray	Town Man					550-	- 110
Coal, with siltstone parting	}					600	12
Sandstone, very fine; and claystone, gray						650	-13
	2					700 -	-14
						750 -	-15
						800-	

pg. 89-90->
at. end of.
book 88

Sandstone, light-brown; and claystone, light-gray, very fine; siltstone, light-gray; and claystone, light-to dark-gray, carbonaceous  Coal	ORDED BY RUSS PATTERSON GEOLO			PETAJA RE	 <del>.</del>
Sandstone, light-brown, very fine; siltstone, light-brown; and claystone, light-gray, very fine; siltstone, light-gray; and claystone, light-gray; and claystone, light brown fine; siltstone,		T.C. 2	S P ENS. SETTING	8 T.C	TTING DE
Sandstone, light-brown, very fine; siltstone, light-brown; and claystone, light-gray, very fine; siltstone, light-gray; and claystone, light-gray; and claystone, light to dark-gray, carbonaceous	LITHOLOGY	LOGGED D		E LOG	1
Sandstone, light-brown, very fine: siltstone, light-brown; and claystone, light-gray, very fine; siltstone, light-gray; and claystone, light to dark-gray, carbonaceous					 50
fine: siltstone, light-brown; and claystone, light-gray, very fine; siltstone, light-gray; and claystone, light to dark-gray, carbonaceous  Coal					
Clinker  Sandstone, light-gray, very fine; siltstone, light-gray; and claystone, light to dark-gray, carbonaceous  Coal	Sandstone, light-brown, very fine siltstone, light-brown and claystone, light-brown	· <b>*</b>			50
Sandstone, light-gray, very fine; siltstone, light-gray; and claystone, light to dark-gray, carbonaceous  Coal	Clinker			2.\r 2.\r .\r	
Coal 20	fine; siltstone, light-gray; and claystone, light-to dark				100
20	gruy, cursonacoos			372	15
25	Coal			77.00 S	20
					25

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LITHOLOGY	GAMMA	S.P.	STRIP LOG	DENSITY	RESISTIVITY	FEET	METERS
Sandstone, light-gray, very fine; siltstone, light-gray; and claystone, light to dark-gray  Coal						400-	-80
Sandatana liaht-aray yaru			1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			450 -	-1
Sandstone, light-gray, very fine; siltstone, light-gray; and claystone, light- to dark-gray, carbonaceous	\$					500 - - - -	110
Coal, with claystone parting						550-	- 120
Claystone			茎			650-	-130
						700 -	-140
						750 -	-150
						800-	

Hole No: US-7938 Map: Taintor Desert Date: 6/9/79 State: Montana County: Big Horn Elev: 4250 FT Location: T 7 R 40 T, Sec 6 Tract ddab Drilled depth 880 FT Measured: 1040 FT FSL 447 FT KWK FT Hole size: 5 IN Air Water X Cored: Yes No X Remarks:_ NΩ RECORDED BY ALAN PETAJA RECORDING SPEED 20 RECORDED BY RUSS PATTERSON GEOLOGIST YES SP DENSITY RESISTIVITY GAMMA SENS SETTING T.C. _ SENS. SETTING T.C_ RANGE 200 RANGE _ 2K METERS LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 137 FT FT. 896 FT. 896 50+ Siltstone, and claystone, light-gray to light-brown Coal 50--20 Sanistone, light-gray, very fine; claystone, light-gray 100-Coal 150 -200-Sandstone, siltstone, and claystone, light to dark-50 gray, carbonaceous 250-Coal 60 300 Sandstone, siltstone, and claystone, light- to dark-gray; and limestone, gray

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
		3			<b>\</b>	350	
	Trachen American		1000			100	80
	VW VWW /W	J. Charles				150-	90
Coal Siltstone, and claystone, light-to dark-gray		}				500-	-100
Coal	Manager					550-	110
	A A A A A A A A A A A A A A A A A A A	3	~~~			500 <b>-</b>	-120
Sandstone; siltstone, light- gray; and claystone, light-		3			}	650-	-130
gray to gray		5	~~			700 -	-140
	Mary Commercial Commer					750 -	-150
Coal, with claystone parting.	*				- = =	800-	

	LITHOLOGY		GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET
Coal,	with gray claysto	one'					4	800
partin	g		,				3	850
fine;	one, light-gray, siltstone, light-graystone, light-gr	-gray;					Carmo	900
								950
			."					1000
		8						1050
								1100
	45							1150
								1200
				į.				

Hole No: US-7939 Map: Spring Gulch Date: 6/10/79 State: Montana County: Big Horn Eley: 3755 FT Location: T 8 S R 42 W, Sec 6 Tract ACDB Drilled depth 760 FT Measured: 3010 FT FSL 3540 FT FWL FT Hole size: 5 IN Air Water X Cored: Yes No X Remarks:_ GEOLOGIST YES RECORDED BY ALAN PETAJA RECORDING SPEED 17 RECORDED BY RUSS PATTERSON MIN. GAMMA T.C. 2 SP DENSITY RESISTIVITY DEPTH T.C ____2___ SENS SETTING SENS SETTING METERS RANGE __100 RANGE _2K LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS æ 756 FT. FT. 288 FT. 50+0 50-Sandstone, gray, very fine; -20 sandstone, light-gray; and claystone, light to dark-gray, carbonaceous; and clinker 100-- 30 Coal 150-200-Sandstone, gray, very fine grained; siltstone, light-gray; - 50 claystone, light-gray; and coa1 250 -- 60 300 - 70

-	LITHOLOGY	G A	MM	<b>A</b> A		<b>S</b> . I	<b>.</b>	-	STRIP	DENSITY	RESISTIVITY	FEET	METERS
The second secon	Coal Claystone, dark-gray, carbon- aceous Coal			Annual V								350    400	-80
The state of the s	Sandstone, light-gray, very fine; siltstone; claystone, light-gray to dark-gray, carbonaceous; and limestone, light-gray			Company of the second								450-	-90
	Coal			WWW WWW								500- - -	-100
		7		N. P.								550-	-110
	Siltstone; claystone, light- to dark-gray, carbonaceous; and limestone, light-gray			JAN K. W. W.	ALA CARLE							600-	-120
				W.W.	•							650-	-130
				THE THE WAY	A							700 -	-140
	Coal		>									-	
	Claystone			*	•							750 	-150
			*									800-	

Hole No: US-7940 Map: Spring Gulch Date: 6/11/79 State: Montana County: Big Horn Elev: 3864 FT Location: T 85 R 41 W, Sec 1 Tract DACA Drilled depth 850 FT.

Peasured: 1865 FT FSL 955 FT RWX FT. Hole size: 5 IN Air Water X Cored: Yes No X YES RECORDED BY ALAN PETAJA RECORDING SPEED RECORDED BY RUSS PATTERSON GEOLOGIST DENSITY RESISTIVITY SP DEPTH GAMMA SENS SETTING T.C ________ T.C. ____2 SENS SETTING RANGE _5K LITHOLOGY ۵ LOGGED DEPTHS LOGGED DEPTHS 850 FT FT. IS 223 FT 50 + 0 50--20 100-Sandstone, light-gray, very fine; siltstone, light-brown; claystone, light- to dark-gray, carbonaceous; and clinker 150 200-250 Coa1 Siltstone, light-gray; 300 claystone, light-gray; and sandstone, light-gray, very fine 70

LITHOLOGY	GAMMA	\$. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
		1 1 1 1 1 1 1 1				350-	
Coal						-	1
			藝			-	1
	1		a at 100			-	- 80
						-	-
Siltstone, light-gray;						400-	-
claystone, light to dark-gray	<b>\$</b>		~~			-	1
and sandstone, gray, very	-		2.4		[1]	-	
fine	1					-	-90
	3		1			-	
	3		1		1,5	450-	
	3					-	
	3		72.72		<u> </u>		
	7		==			-	-100
	<b>\{\}</b>		W M				100
	<b>\$</b>					500-	
			22			-	
Coal			100			-	
	٤						
	3		200				-110
Candatana lista	至		至			550-	
Sandstone, light-gray, very fine; siltstone, light-gray;	-		10.00				
and claystone, light-gray;	5						
and clayscone, light-gray	5						
	-		==			600-	-120
	1					600-	
	- 3						
	3		\$ 7 E				
	1		222				
	3					650-	-130
Coal	2						
	3		==				g T
	333						
	3					_	
	3		喜			700 -	-140
Siltstone, light-gray; and	3					4	140
claystone, light-gray	7					_	
	1					_	
	3					4	
					V = 6	750 -	
	3					1	-150
	7		===				
	3.		===				
* 8 * 4 * 4 * * * * * * * * * * * * * *			2-3			800	4.

19-10

LITHOLOGY	GAMMA	<b>S</b> . P.	STRIP	DENSITY	RESISTIVITY	FEET
						850
						950
						1000-
						1150 -
						1200

hole No: US-7941 Map: Spring Gulch Date: 6/13/79 State: Montana County: Big Horn Elev: 3848 FT Location: T 8 R 41 R, Sec 2 Tract Irreg. Drilled depth easured: 2105 FT FSL 2109 FT FALL FT Hole size: 5 IN Air Water X Cored: Yes No X Remarks: Circulation lost and not regained. NX RECORDED BY ALAN PETAJA RECORDING SPEED 17 RECORDED BY RUSS PATTERSON GEOLOGIST YES GAMMA 2 RESISTIVITY DENSITY SP DEPTH SENS SETTING TC_ SENS SETTING RANGE 50 RANGE 2K LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS α FT. 5 430 FT FT 464 FT 50 + O Siltstone, light-gray to lightbrown; and claystone, lightbrown Coal Sandstone, gray, very fine; 50 siltstone; and claystone, -20 light to dark-gray, carbonaceous 100-- 30 Coal 150 -Sandstone, light-gray, very fine; siltstone; and claystone, gray; and limestone, lightgray Coa1 200 -- 50 250 Coal 60 Sandstone, light-gray, very fine; siltstone, lightgray; claystone, gray; 300 limestone, light-gray, and coa1 70

CTO LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Coal						350 - - - - 400 -	80
Sandstone, light-gray. very fine grained						450-	-90
				ns-gray to		500-	-100
				y, very t claystone 2707.		550-	-110
	100 and 100 an					600-	- 120
	AND THE RESERVE AND THE RESERV		adio.	ht-gray, r : and clay sidne, 11g		650-	-130
					Transaction of the state of the	700 -	-140
				News-to		750	-150
			- Jagu	istone, 11	is one, lig line(_sil ) clayston	800-	

Hole No: US-7941A Map: Spring Gulch Date: 6/21/79 State: Montana County: Big Horn 560 FT. Elev: 3853 FT Location: T 8 5 R 41 W, Sec 2 Tract Irreg-Drilled depth Measured: 2175FT FSL 2100 FT RWX FT. Hole size: 5 IN. Air Water 🗵 Cored: Yes 🖾 No 🗌 Remarks: No samples first 400 feet due to the lack of circulation and close proximity to US-7941, Cored interval 10 to 20 feet and 124 to 146,5 feet. XXO. RECORDED BY ALAN PETAJA RECORDING SPEED RECORDED BY RUSS PATTERSON GEOLOGIST MIN. YES GAMMA 2 RESISTIVITY SP DENSITY DEPTH SENS SETTING T.C. _ SENS SETTING TERS RANGE _2K RANGE __200 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS ā ME 554 FT. 457 FT. 554 555 FT 50+0 Density -10 Siltstone Coal 50 -20 Siltstone; claystone; and sandstone, gray, fine-grained 100-- 30 Coal 150 -Coa1 200 Sandstone, siltstone, and claystone **- 50** Coal 250 60 Siltstone, and claystone 300 70 Coal

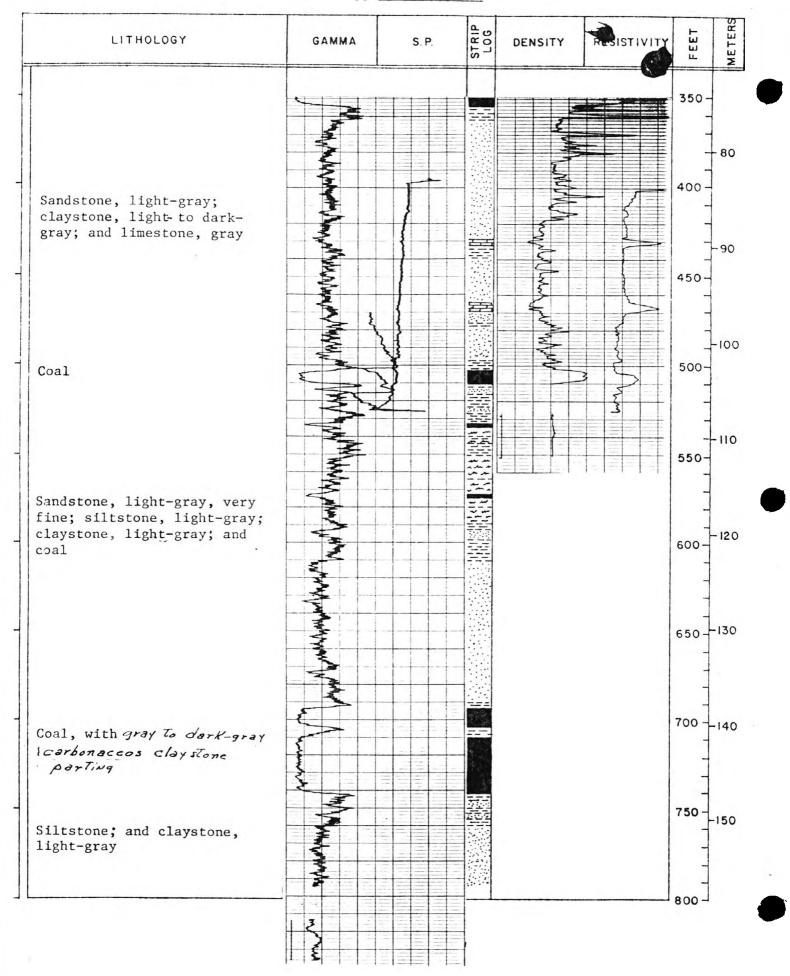
LITHOLOGY	GAMMA	<b>S</b> . P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Sandstone, gray, very fine; siltstone; and claystone, and limestone		r.t.	会は、			450-	- 80 90
						500-	-110
						650	-120 -130
						700 -	-140
						750 -	-150

Hole No: US-7941A Map: Spring Gulch Date: 6/21/79 State: Montana County: Big Horn Elev: 3853 FT Location: T 8 S R 41 W, Sec 2 Tract Irreg. Drilled depth 560 FT.

Measured: 2175FT FSL 2100 FT. FXX FT. Hole size: 5 IN. Air Water X Cored: Yes X No Remarks: No samples first 400 feet due to lack of circulation and close proximity of US=7941. YES RECORDED BY ALAN PETAJA RECORDING SPEED RECORDED BY RUSS PATTERSON GEOLOGIST MIN. DENSITY RESISTIVITY GAMMA 2 SP DEPTH SENS SETTING SENS SETTING TC_ T.C. _ RANGE 200 RANGE _2K 50 50 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS H 554 FT 555 FT. 554 FT. 457 FT. 50+0 5.P. Gamma Res. 0. -10 Siltstone Coal 50. Siltstone, claystone; and -20 sandstone, gray, fine-grained 100-- 30 Coal 150 --40 Coal 200-Sandstone, siltstone, and claystone - 50 Coal 250 -60 Siltstone, and claystone 300 70 Coal

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
						350 - - - - - 400 -	80
Sandstone, gray, very fine; siltstone; and claystone, and limestone	Market of Market					450-	90
	A Company	1	- 7.5 - 1.5 - 1.5			500-	-100
Coal, with claystone parting	3	}			<b>\{\)</b>	550-	110
***						600-	-120
						650 -	-130
						700	1-140
						750 -	-150
,						800	1

	PATTERSON GEOLOGIST YES RECORDED BY ALA  GAMMA S P  T.C. SENS SETTING			DENSITY T.C	RESISTIVITY	DEPT
	RANGE	DEPTHS & & & & & & & & & & & & & & & & & & &		RANGE	DEPTHS	FEET
						50-
			蠶			0-
Sandstone, gray, very fine; siltstone, light-brown; claystone, gray to dark-gray; and limestone, gray						50-
Coal				2		100-
Sandstone, gray, very fine; siltstone, gray; and claystone, gray to dark-gray, carbonaceous				W. W.		150
Coal Siltstone, gray; claystone, gray; and limestone, gray						<u>:</u> 000
Sandstone, gray, very fine; siltstone, light-gray;				\ \{\bar{\chi}{\chi}\}		250

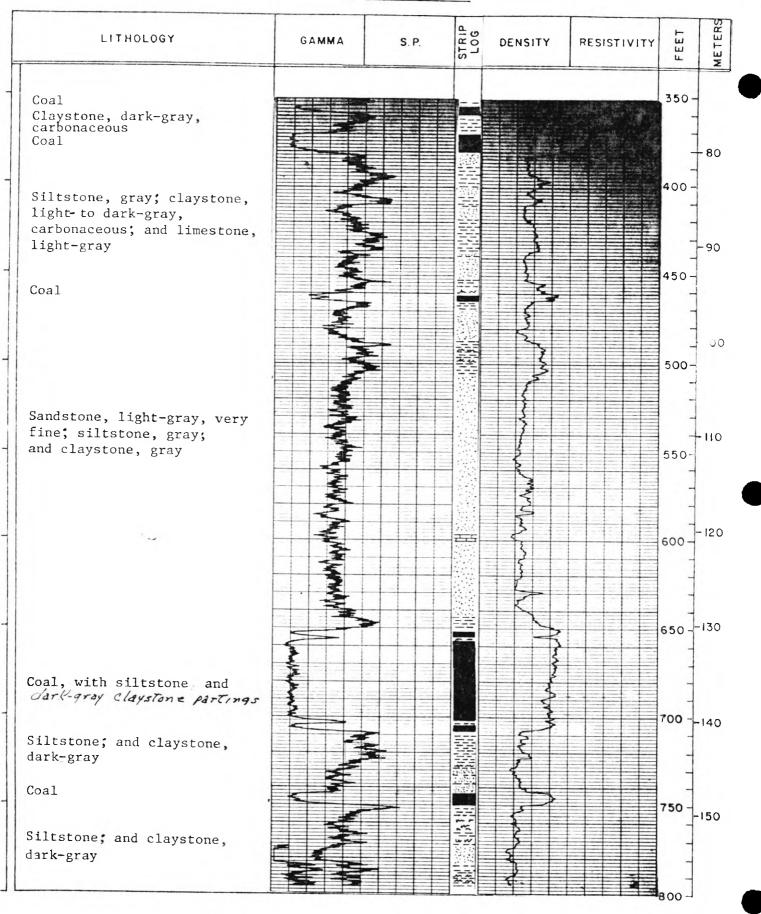


nole No: US-7943 Map: Spring Gulch Date: 6/22/79 State: Montana County: Big Horn Elev: 4064 FT Location: T 85 R 41 7, Sec 12 Tract Irreg. Drilled depth Measured: 1710 FT KKK 1450 FT WE FT Hole size: 5 IN Air Water & Cored: Yes No & Remarks:_ YES RECORDED BY ALAN PETAJA RECORDING SPEED 30 RECORDED BY RUSS PATTERSON GEOLOGIST DENSITY RESISTIVITY GAMMA SP DEPTH T.C. ____2 SENS SETTING SENS SETTING T C ___ RANGE 100 RANGE _2K_ RS 50 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 488 FT. 561 FT. 1033 FT. 561 FT. 50 + 0Siltstone, brown; and claystone, light- to darkgray, carbonaceous Coal 50 -20 Sandstone, gray, very fine; siltstone; and claystone, light to dark-gray, carbonaceous 100-Coal 150 Sandstone, gray, very fine; siltstone; claystone, lightgray; and limestone, lightgray - 50 250 -Coal 60 Sandstone, light-gray, very 300 fine; siltstone; claystone, light-gray; and limestone, light-gray; and coal 70

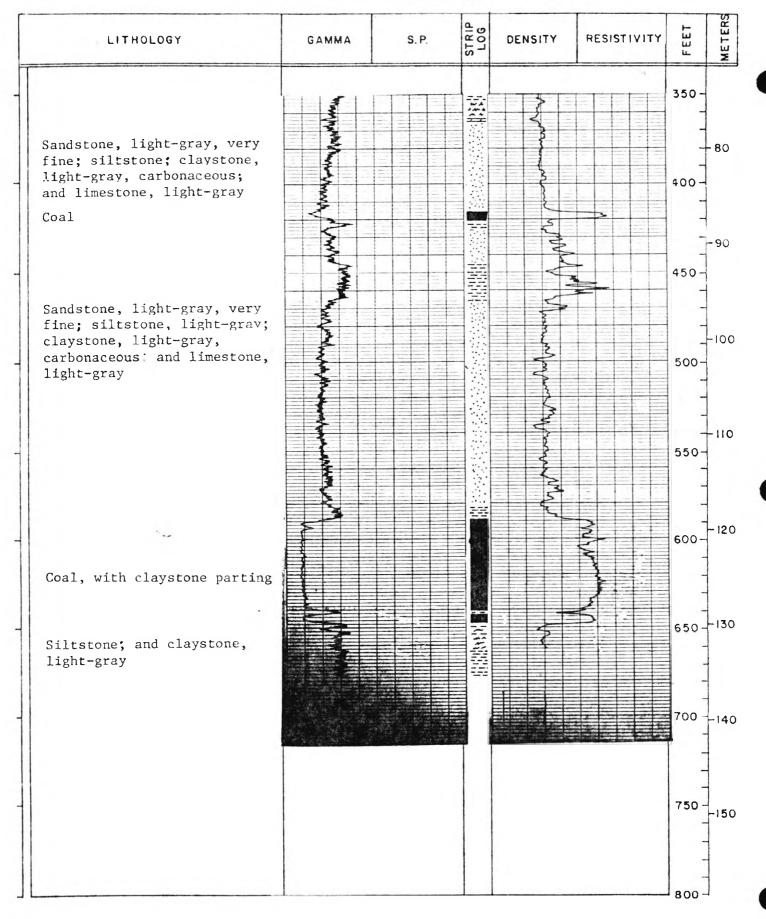
	LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
					A Maria		350 -	80
	one; and claystone, to dark-gray			墨溪溪溪	Character of the control of the cont		450-	-90
Coal							500-	-100
Siltst light-	one; and claystone, to dark-gray	A STATE OF THE STA	\$				550-	-110
		*					600-	-120
Coal		X LE					650	-130
Sandsto siltsto light-	one, gray, very fine; one; and claystone, to dark-gray	Mary Mary					700 -	-140
Coal		NAME OF THE PERSON OF THE PERS					750 -	-150
Siltsto light-g	one; and claystone, gray	3					800	

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET
Coal, with siltstone parting Siltstone, and claystone						900 950 1000
				) ear-		1150
						1200
•						

hole No: US-7944 Map: Half Moon Hill Date: 8/23/79 State: Montana County: Big Horn Elev: 4273 FT Location: T 7 8 R 39 W, Sec 12 Tract DBBB Drilled depth 800 FT Measured: 2430 FT KXXX 2520 FT KXXX FT. Hole size: 5 5/8 IN Air Warr X Cored: Yes No X Remarks:__ MM RECORDED BY ALAN PETAJA RECORDING SPEED RECORDED BY RUSS PATTERSON GEOLOGIST YES DENSITY 2 RESISTIVITY SP GAMMA DEPTH SENS SETTING T.C. __ SENS SETTING RANGE 100 RANGE _ LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 796 FT FT. 5 795 FT 50+0 0710 50-Sandstone, gray to light--20 brown, very fine; siltstone; and claystone, light-gray 100-- 30 Coal 150 -200 -Sandstone, gray, very fine; siltstone; claystone, lightto dark-gray; and limestone, light-gray 250 -- 60 300 70



hole No: US-7945 Map: Half Moon Hill Date: 8/26/79 State: Montana County: Big Horn Elev: 4219 FT Location: T 7 S R 39 W, Sec 12 Tract DAAA Drilled depth 680 FT Measured: 2480 FT FSL 30 FT XXXX FT Hole Size: 5 5/8 IN Air X Water Cored: Yes No X Remarks: Drilled with foam. RECORDED BY ALAN PETAJA RECORDING SPEED 20 RECORDED BY RUSS PATTERSON GEOLOGIST MIN YES RESISTIVITY SP DENSITY GAMMA DEPTH SENS SETTING SENS SETTING T.C. ___ RANGE 2K RANGE 200 50 50 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 666 FT. 5 677 FT. 662 FT 666 FT 50+0 Gamma DENSITY -10 Alluvium Siltstone, light-brown Coal 50. -20 100-- 30 150--40 Sandstone, light-gray, very fine; siltstone, light-gray; claystone, light-gray; and limestone, light-gray 200-- 50 250 -60 Coal Siltstone, gray; and 300 claystone, gray Coa1 70



RECORDED BY RUSS PATTERSON GEOLOG	IST YES RECORDED BY ALAN	N PETAJA RECORDING SPEED	20N
LITHOLOGY	GAMMA T.C. 2 SENS SETTING SO LOGGED DEPTHS 677 FT. 666 FT.	LOGGED DEPTHS	DE PT
	0// FT. 000 FT.	6 002 F1 000 F1	50-

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LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
		S 0				350-	80
		5. P.		/c'	es.	450-	- 90
		}				500-	
						550-	-110
						600-	- 12
						650-	-130
						700 -	-14
		3				750 - - -	-150
						800	

hale No: US-7946 Map: Half Moon Hill Date: 8/27/79 State: Montana County: Big Horn Elev: 4126 FT Location: T 7 S R 40 W, Sec 7 Tract DBBD Drilled depth 760 FT. Measured: 2246 FT. FSL 2983 FT. FWL FT. Hole size: 5 5/8 IN Air X Warri Cored: Yes No 1 Remarks: Drilled with foam YES RECORDED BY ALAN PETAJA RECORDING SPEED 20 RECORDED BY RUSS PATTERSON GEOLOGIST RESISTIVITY DENSITY SP GAMMA DEPTH T.C.___2 SENS SETTING SENS SETTING T.C. ____2_ RANGE 2K RANGE 100 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS œ 710 FT 750 FT FT. 5 50+0 Alluvium Claystone, light-gray to light-brown 50 -20 Coal 100-- 30 150 -40 200-Sandstone, light-gray, very fine; siltstone, light-gray; 250 claystone, light-gray; and limestone, gray; and coal - 60 300 --70

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	
	<b>2</b>	<b>E</b>	基			350-	
Coal		-				400-	+ 8
						450-	
Sandstone, light-gray, very fine grained; siltstone, light-gray; claystone,			44 44 44	John John John John John John John John		500-	-1
light-gray; and limestone, gra	TANAN TANAN					550-	
% <u>~</u>	No service of the ser			Jan Maria		600-	
						650-	-1
Coal, with claystone partings			* *		Array Marie Control of the Control o	700 -	-1
Sandstone, and claystone						750 -	-1
a	\$					-	

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ORDED BY RUSSELL PATTERSONGEOLOGI	YES		ELL PA		RESISTIVIT	~ T
	GAMMA T.C RANGE	S P SENS SETTIN	007	DENSITY TC 2 RANGE 2K	_ SENS SETTIN	
LITHOLOGY	LOGGED	DEPTHS	RIP	LOGGE	D DEPTHS	FEET
	618 FT.	F .	T. 5	618	F 1.	FT 50-
						50
			\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\			3
Clinker			\$\frac{1}{2}\$			
Clinker			15.V			
			25.5			50
		<b>*</b>	133			3
			Z\>			
1.2						100
					-	
Sandstone, light-gray, fine;			523			
claystone, light-gray; limestone, gray, and coal						150
	<b>*</b>			1 2		
				1 5		
			=			200
				= =		
Coal	<b>\[ \]</b>				1	
La Santana Maria		<b>&gt;</b>				250
Sandstone, gray, very fine; siltstone, gray; claystone,		3				
light-gray; and limestone,	<b>1</b>		- <del> </del>			
gray				1 8		300
	1					
		-				-

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LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Sandstone, gray, very fine;						350 - - -	80
siltstone, gray; claystone, light-gray; and limestone, gray				The state of the s		400	-90
				A Marca Marca		-	-100
Coal			盖	W.	TV WINTER	550-	-110
Sandstone, light-gray, very fine; siltstone; claystone, light-gray; and limestone, gray				}		600-	-12
	\$ \$					650-	-130
						700 -	-14
						750 - - - -	-150
						800-	

note No: US-7948 Map: Half Moon Hill Date: 9/18/79 State: Montana County: Big Horn Elev: 4436 FT Location: T 7 8 R 39 K, Sec 13 Tract CCAC Drilled depth FT. Hole size: 5 5/8 IN Air Water X Cored: Yes No Measured: 780 FT FST Remorks: Gamma would only go to 656', density was stuck at 720', but spring slackened and probe was retrieved. (Poor hole) RECORDED BY R. PATTERSON RECORDED BY R. PATTERSON RECORDING SPEED MIN GEOLOGIST YES RESISTIVITY DENSITY SP GAMMA DEPTH SENS SETTING SENS. SETTING T.C. RANGE 100 RANGE LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS FI FT. FT. 656 FT 50+0 Regolith, light-brown Sandstone, light-gray, very fine grained; siltstone, gray; and 50 -20 claystone, light-gray to gray 100-Sandstone, light-gray, very fine grained; siltstone, gray; and claystone, light-gray to gray 150 Coa1 200-Sandstone, light-gray, very fine grained; and claystone, 50 gray 250 60 Coal 300 Sandstone, light-gray, very fine grained; and claystone, gray

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	00314
Sandstone, light-gray, very fine grained; siltstone, gray; and claystone, gray						350 - - - 400 - - 450 - - - 500-	- 90
Coal, with claystone parting Sandstone, gray, very fine grained; and claystone, gray						550-	- 12
Coal Sandstone, gray, very fine grained; and claystone, gray						650 -	
,	<b>.</b>					750 - - - - - - 800 -	-15

Coal  Sanistone, light-gray, fine-grained; and claystone, dark-gray, carbonaceous  Coal	DRDED BY R. PATTERSON GEOL			ATT	ERSON RECO	RDING SPEED	.0 T
Coal Sanistone, light-gray, fine-grained; and claystone, dark-gray, carbonaceous  Coal  Co		TC 2	S P SENS SETTING	907	TC 2		DEF
Coal Sanistone, light-gray, fine-grained; and claystone, dark-gray, carbonaceous  Coal  Sanistone, light-gray, fine-grained; and claystone, dark-gray, carbonaceous  Coal  Coal  Coal  Coal  Sanistone, light-gray, fine-grained; and claystone, dark-gray, carbonaceous  Coal  Coal  Coal  Coal  Coal  Coal  Coal  Coal  Coal  Sanistone, light-gray, fine-grained; siltstone, gray; and claystone, gray; and claystone, gray	LITHOLOGY	LOGGE		RIP	LOGGE		E E
Coal  Sanistone, light-gray, fine-grained; and claystone, dark-gray, carbonaceous  Coal  Sanistone, light-gray, fine-grained; and claystone, dark-gray-carbonaceous  Coal  Coal  Coal  Coal  Sanistone, light-gray, fine-grained; siltstone, gray; and claystone, gray							50
gray, carbonaceous  Coal  Sanistone, light-gray, fine-grained; and claystone, dark-gray, carbonaceous  Coal  Coal  Coal  Coal  Sanistone, light-gray, fine-grained; siltstone, gray; and claystone, gray  and claystone, gray  Sanistone, gray  Sanistone, gray  Sanistone, gray							0
Sanistone, light-gray, fine-grained; and claystone, dark-gray, carbonaceous  Coal  Coal  Coal  Sanistone, light-gray, fine-grained; siltstone, gray; and claystone, gray  and claystone, gray  Coal		k-				\$	50
grained; and claystone, dark-gray, carbonaceous  Coal  Coal  Coal  Coal  Sandstone, light-gray, fine-grained; siltstone, gray; and claystone, gray  and claystone, gray  Coal	Coal						
Coal  Coal  Coal  Coal  Sanistone, light-gray, fine-grained; siltstone, gray; and claystone, gray	grained; and claystone,						100
Coal  Coal  Sandstone, light-gray, fine-grained; siltstone, gray; and claystone, gray	Coal			-			150
Coal  Sandstone, light-gray, fine-grained; siltstone, gray; and claystone, gray	Coal						
Sandstone, light-gray, fine-grained; siltstone, gray; and claystone, gray	Coal						<b>2</b> 00
Sandstone, light-gray, fine-grained; siltstone, gray; and claystone, gray	Coal					8	
	<pre>grained; siltstone, gray; and claystone, gray</pre>			2 X X			250

LITHOLOGY	GAMMA	\$. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Coal, with claystone parting						350-	80
Sandstone, gray, fine-graine siltstone, gray; and claystone, gray					All Many Come	450-	90
Coal						500-	100
Sandstone, gray, very fine grained; siltstone, gray; and claystone, gray						550-	110
						600-	120
						650-~	130
Coal						700	140
	\$		201 050 050			750	150
						800	

 RDED BY R. PATTERSON GEOLOGIS	TES		ATTI		DING SPEED2	0 1
LITHOLOGY	GAMMA T.C. 2 RANGE 100 LOGGED 639 FT	S P SENS. SETTING DEPTHS	RIP L	DENSITY TC 2  RANGE 2K  LOGGED 640 F	RESISTIVITY SENS SETTING DEPTHS T. FT.	FEET TA30
	039 (1)		5,	0.70		50-
Regolith, light-brown						50-
			111111111111111111111111111111111111111			100-
Clinker			\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\			150 -
	Application of the second		~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~			200-
			8.24 0.35 2.5 2.5 2.5 2.5 3.5 3.5 3.5 3.5 3.5 3.5 3.5 3.5 3.5 3	1		250

. LI	THOLOGY	GAMMA	\$. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
fine graine claystone, limestone,  Coal  Sandstone, fine graine light-gray	light-gray, very ed; siltstone, ; claystone, gray;				What was a second of the secon	3	350 - - - 400 - - - 450 -	80
and Limesto	one, light-gray						500-	-100
Coal					Market	3	550-	-110
Coal	~~					>	600-	- 120
		3		2 3 3 4 5 3 4 5 4 5 4 6 6 6 7 6 7 6 7 6 7 7 7 7 8 7 7 8 7 8 8 9 8 9 9 9 9 9 9 9 9 9 9 9 9	*		650-	-130
		1 \$					700 -	-140
1	•						750 -	-150

ORDED BY RUSS PATTERSON GEOLOGIST	CAMMA SP DENSITY RESISTIVITY DEPT
LITHOLOGY	T.C. 2  RANGE 100  LOGGED DEPTHS  FT FT. 5  TC 2  RANGE 2K  SENS SETTING  TC 2  RANGE 2K  LOGGED DEPTHS  FT FT. 5  FT FT.
	50-
Regolith, brown	
Clinker	
Coal	200
	250

LITHOLOGY	GAMMA	<b>S</b> . P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
						350-	
	<b></b>	<b>F</b>	22.72.45			]	
	-					]	
				2		7	
			1300	1		7	- 80
				1		-	
	-5		17.50			400-	
Coal			10 to 10			-	
	1		212.7	1 3 1		+	
			2			-	- 90
			100	1 1		-	31
	5		377			450-	
Sandstone, light-gray, very	3		J	1		1	
fined grained; siltstone,	Mark Villon						
gray; and claystone, gray				1 3			
			144	-3		7	-10
	1					- 1	
141	2					500-	
	3		14.			7	
			1993			+	
				1 2		+	
Coal	3-5-					+	-11
			2000			550-	
		× =   -	30.25 30.25			4	
	1		-	1 2		4	
	S		177.72E	5		1	
Coal					3		
`~				7		-000	- 12
	احتمد		2552 707.7			6007	
	2		24.4	रि		7	
Sandstone, light-gray, very	4			3	E 15 3 E	7	
fine grained; siltstone,				7		1	
light-gray; and claystone,	3			5		7	
gray	35		m. w.	1 3 -		650-	-13
	3		1	1 5		-	
			***	-   -		+	
	5		22.2	114		-	
	3		==	3		-	
					3	700 -	-14
	3					4	
Cont	-   -   -				3	4	
Coal			W 8				
				5   -	3	750	
	1		200			750 -	-15
				3		7	
						+	
						+	
	1000		1 =			4	

hale No: US-7952 Map: Kirby Date: 9/25/79 State: Montana County: Big Horn Elev: 4672 FT Location: T 6 S R 39 \$, Sec 24 Tract CBBB Drilled depth 680 FT. Medsured: 2260 FT. FSL 50 FT. FWL FT. Hole size: 5 5/8 IN Air 🛛 Water 🗌 Cored: Yes 🗌 No 🖾 Remarks:__ MX RECORDED BY RUSS PATTERSON GEOLOGIST RECORDED BYRUSS PATTERSON ECORDING SPEED _ 20 YES RESISTIVITY DENSITY SP GAMMA DEPTH SENS SETTING SENS SETTING T.C. __. Õ RANGE _ 2K RS RANGE 100 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS œ FT. 662 FT FT. S 664 FT 50+0 Sandstone, gray, very fine grained; and claystone, gray Coal 50-- 20 Sandstone, gray, very fine grained; and claystone, gray 100 Coal, with claystone parting 150 -40 Sandstone, light-gray, very fine grained; and claystone, light-gray -- 50 Coal 250 -Sandstone, light-gray, very fine grained; siltstone, gray; - 60 and claystone, gray 300 Coal, with claystone parting 70

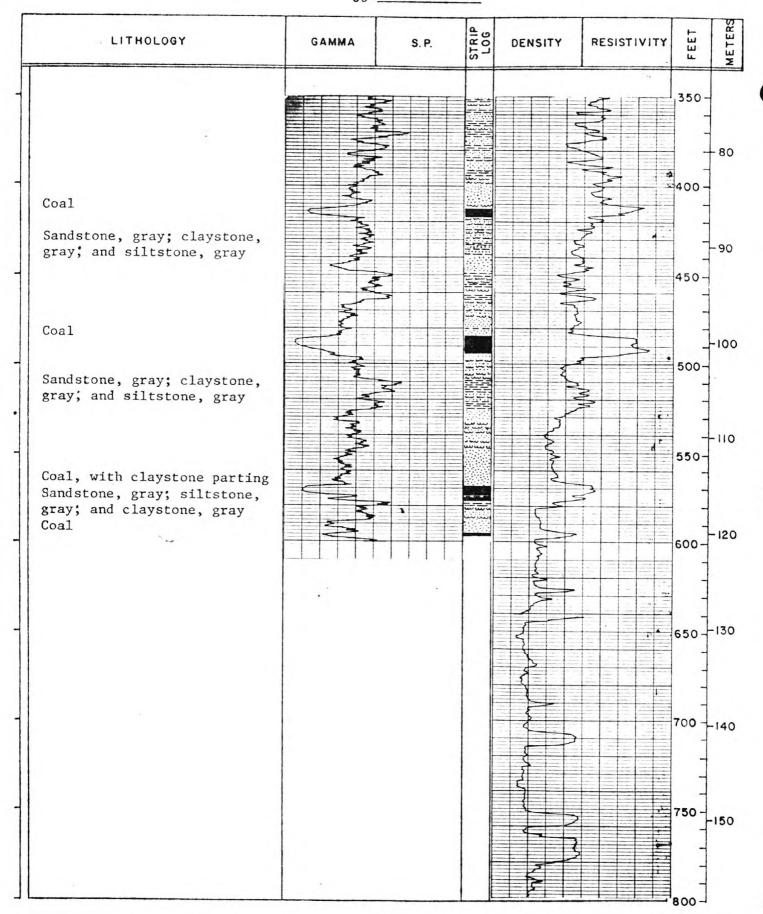
LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Coal						350 - - - - 400 -	-80
Sandstone, light-gray, fine grained; siltstone, gray; and claystone, gray	The boundary of the second			John J. Comment		450-	-100
				John War		550-	-110
Coal				- Long		600-	-120
			7725			650 - - - - 700 -	
•						750 -	-150
						800-	

Regolith, brown  Sandstone, gray, very fine grained; and claystone, gray  Coal  Sandstone, gray, very fine grained; and claystone, gray  Coal  C	RDED BY RUSS PATTERSON GEOLOGIS	ST YES RECORDED BYRUSS	PAT	TERSONRECORE	DING SPEED	)
Regolith, brown  Sandstone, gray, very fine grained; and claystone, gray  Coal, with claystone parting Sandstone, gray, very fine grained; and claystone, gray  Coal  Sandstone, gray, very fine grained; and claystone, gray  Coal  Coal  Coal  Coal  Coal  Coal		GAMMA SP		DENSITY TC _2	RESISTIVITY	DEF
Regolith, brown  Sandstone, gray, very fine grained; and claystone, gray  Coal, with claystone parting  Sandstone, gray, very fine grained; and claystone, gray  Coal  Sandstone, gray, very fine grained; and claystone, gray  Coal  Coal  Coal	LITHOLOGY	LOGGED DEPTHS	STRIP	LOGGED		FEET
Sandstone, gray, very fine grained; and claystone parting  Sandstone, gray, very fine grained; and claystone, gray  Coal  Sandstone, gray, very fine grained; and claystone, gray  Coal  Coal  Coal  Coal  Coal				· ·		50
Sandstone, gray, very fine grained; and claystone parting  Sandstone, gray, very fine grained; and claystone, gray  Coal  Sandstone, gray, very fine grained; and claystone, gray  Coal  Coal  Coal  Coal  Coal						
grained; and claystone, gray  Coal, with claystone parting  Sandstone, gray, very fine grained; and claystone, gray  Coal  Sandstone, gray, very fine grained; and claystone, gray  Coal  Coal  Coal	Regolith, brown					C
Coal, with claystone parting  Sandstone, gray, very fine grained; and claystone, gray  Coal  Sandstone, gray, very fine grained; and claystone, gray  Coal  Coal  Coal	grained; and claystone,		- 100 A			
Sandstone, gray, very fine grained; and claystone, gray  Coal  Sandstone, gray, very fine grained; and claystone, gray  Coal  Coal			767 767			50
Coal Sandstone, gray, very fine grained; and claystone, gray  Coal  Coal	Sandstone, gray, very fine	3				
Sandstone, gray, very fine grained; and claystone, gray  Coal  Coal	- Table		723			100
grained; and claystone, gray  Coal  Coal		3				
Coal Coal	grained; and claystone,					15
Coal Coal	Coal					20
	Sandstone, light-gray, very		<u>ح</u>			25
fine grained; siltstone, gray; and claystone, gray			11.8			

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LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET
				Two day	-11	350-
Sandstone, gray, very fine; claystone, gray		<b>E</b>		5		400-
Coal				The second sec	<b>N</b>	450-
andstone, gray, very fine; laystone, gray; and siltstone ray						500-
	5					550-
						600
	•					650-1
						700 -1
						750

	YES	7	ATTERSON CORDING	CICTIVITY	
LITHOLOGY	RANGE 100  LOGGED DEPTHS	STRIP LOG	TC 2 SEN	NS.SETTING	FEET
	600 FT F	1. S	1020		50-
Sand, brown; silt, brown; clay, brown, and alluvial				\$	0
		77 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7			50
Clinker		127 V V V V V V V V V V V V V V V V V V V			100
Sandstone, gray; claystone	,	21			150
gray; and siltstone, gray					200
Coal, with gray claystone					250



RDED BYRUSSELL PATTERSON GEOLOGIST	GAMMA	SP		DENSITY	RESISTIVITY	DEDT
LITHOLOGY	T.C. 2 SEN	IS SETTING	_	T.C2 RANGE_IK	_	= +
	LOGGED DEI 420 FT.	PTHS FT.	STRIP	LOGGET 420 F	D DEPTHS T. F	FEE
						50-
Top soil and alluvium	3		000			0 -
	MAN MAN					50-
Sandstone, light-gray, very	A A A A A A A A A A A A A A A A A A A					100
fine; siltstone; and claystone, light-gray					N C	150
						200
Coal, with siltstone parting	3		=			250
Sandstone, light-gray, very fine; siltstone; claystone, light-						300

	LITHOLOGY	GAMMA	<b>\$</b> . P.	STRIP	DENSITY	RESISTIVITY	FEET
	Coal				1 2		350-
1	Sandstone, light-gray, very fine; siltstone; and claystone, gray	W Land					400
							150-
		<u>-                                    </u>					500-
							550-
							600-120
	•						650 - 130
	•						700 140
							750
							800

Hole No: US-7956 Map: Decker Date: 10/5/79 State: Montana County: Big Horn Elev: 3617 FT Location: T 9 S R 40 W, Sec 8 Tract CDDB Drilled depth 380 FT Measured: 450 FT FSL 2086 FT FWL FT Hole size: 5 5/8 IN Air Water Cored: Yes No Remarks: Gas flowing into hole. NX RECORDED BYRLESELL PATTERSONECORDING SPEED ___ MIN. RECORDED BY RUSSELL PATTERSONGEOLOGIST YES SP DENSITY RESISTIVITY GAMMA DEPTH SENS SETTING TC_ SENS SETTING T.C. _ RANGE _ 2K METERS RANGE ___100 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS FE œ FT. S 380 FT. FT. 378 FT. 50 + 00-1-10 Top soil يتيتي 50-- 20 Sandstone, light-gray, very 100fine; siltstone; and claystone, - 30 light-gray 150 -Coal, with gray claystone parting 200 -- 50 Siltstone; and claystone, gray 250-Coal - 60 Sandstone, gray, very fine; NEW Y siltstone; claystone, lightgray to tan; and limestone, 300gray - 70 Coa1

	LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
	Coal Sandstone, light-gray, very fine; and claystone, gray	3				*   -   -   -   -   -   -   -   -   -	350-	
				A Cas:		= = =	400-	-80
							450-	-90
-							500-	-100
								-110
							550-	
-							600	- 120
-							650	-130
1		<i>&gt;</i>			- 0		700 -	-140
							750	-150
	,						800	

TXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	S P IS SETTING	DEN TC RANGE	ISITY RESISTING	TTING DE
LOGGED DEF	S SETTING	TC RANGE	SENS SET	TTING
LOGGED DEF	- 1	9		
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		in i		

LITHOLOGY	GAMMA	8. P.	DENSITY	RESISTIVITY	FEET	METERS
					350 - - -	
					400-	80
					450-	-90
					-	-10
					500-	
					550-	110
***					600-	- 12
					650-	-130
					-	
					700 -	-14
					750 -	-150
					800-	

RDED BY KUSSELL PATTERSON	GEOLOGIST	YES RECOR	DED BRUSSEI	LL P	ATTERSON	ING SPEED	0
		GAMMA T.C.	S P SENS SETTING	90	DENSITY T.C	RESISTIVITY SENS.SETTING	DE
LITHOLOGY		RANGE	l	-	RANGE		-
		LOGGED FT	DEPTHS FT.	TRIP	LOGGED FT.		FEE
				-			
							50
							0
							50
							30
							100
`~							
							150
			0.64				
						,	200
			1				
							250
	- 1						
				1			
							300 ·

LITHOLOGY	GAMMA	* <b>3</b> . P.	STRIP, LOG	DENSITY	RESISTIVITY	FEET	KFTFR
						350-	
						-	- 80
						- 400 -	1
		3-1				-	
						-	- 90
						450- -	
	0.0					-	-10
						500-	
						-	
						550-	+"
						-	
\$						600-	- 12
						-	1
						650-	13
						650-	
						-	
						700 -	-14
						-	1
						750 -	-15
						-	
						800	1

CORDED BY RUSSELL PATTERSON GEOLOGIS	YES	HAN	GAS RECORDING SPEED 2: DENSITY RESISTIVITY	
L!THOLOGY	T.C. 2 SENS SETTING RANGE 50 LOGGED DEPTHS		TC SENS SETTING RANGE LOGGED DEPTHS	DE P
	529 FT. FT.		FT. FT.	50
				30
Siltstone, tan  Siltstone, gray to brown, carbonaceous; and claystone, gray to brown, carbonaceous:				0
		323		
				50
		550		
				100
		المنابعة الم		
		200		
				150
			7.7	
		1635		200
	\$	To a		
Coal		4		250
Sand, light-gray to green;		200		
siltstone, gray; and claystone, gray				

, ,

-	LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET
	Sand, light-gray to green; siltstone, gray; and claystone, gray						350 - - - - 80 - 400 - - - - 90
1	Coal, with siltstone parting						450-
-	Sandstone, gray, very fine; and claystone, gray			THEN			550-
							600-
							650 130
							700 -140
							750 -150
							800

CC	DRDED BY RUSSELL PATTERSONGEOLOGIS	ST YES RECOF	RDED BYRUSSE	LL PA	TTERSONECOR DENSITY	RESISTIVITY	DEPT
	LITHOLOGY	T.C2 RANGE100	SENS SETTING	- A	TCRANGE	SENS SETTING	E F
	F	1	D DEPTHS FT.	STRI	F		
							50
							-
				-2-2-			0 -
	Claystone, light-brown						-
	Godi		5				50-
		<b>-</b>					
	Sandstone, light-gray, very fine; siltstone; and	5	*				
	claystone, light-gray	2	3	15116			100
		3					150
	Coal	=					
			<b>*</b>		*		
		1					200
	Sandstone, light-gray, very	· ·					
	fine; siltstone; and clayston light-gray; and limestone,	ne.		****	3332-		250
	gray	3			-1 -1 -1		
					) मुस्य		
			<b>\$</b>				300
					111111111111111111111111111111111111111		
			*	33	<b>A</b>		

LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	
Sandstone, light-gray, very fine; siltstone; claystone, light-gray; and limestone, gray	The state of the s					350 - 	
Coal, with claystone parting						500-	
Sandstone, light-gray, very fine; siltstone; and claystone, light-gray						600	0
Claystone, gray		<b>3</b>				700 -140	
		3				750 -150	Э

Hole No: US-7960 Map: Decker Date: 10/8/79 State: Montana County: Big Horn Elev.: 3647 FT Location: T 9 S R 40 X, Sec 20 Tract BDAC Drilled depth 520 FT Measured: 1845 FT KXX 2362 FT FWL FT Hole size: 5 5/8 IN Air Warn Cored: Yes No X Remarks:_ XXX RECORDED BAUSSELL PATTERSONECORDING SPEED 20 RECORDED BY RUSSELL PATTERSONGEOLOGIST YES RESISTIVITY DENSITY SP GAMMA DEPTH SENS SETTING SENS SETTING T.C. ___ METERS RANGE 100 RANGE _ LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS FT. 5 FT. FT 520 FT 50 + 0 0 -Top soil and alluvium 50-Sandstone, light-gray, very 100-- 30 150 --40 200-Siltstone; and claystone, light-gray to light-brown 250 - 60 300 Coal, with siltstone parting

	LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
	Sandstone, fine; and claystone, dark-gray Coal  Sandstone, light-gray, very fine; siltstone; and claystone, gray						350 - - 400 - - 450 -	- 80 - 90
4	Coal Siltstone and claystone						500-	-10 <b>0</b> -110
							650-	-120 -130
							750-	~140 -150

ECORDED BY JON HANG	AS GEOLOGIS						NG SPEED2 RESISTIVITY	1
LITHOLOGY			ED DEPTHS	ETTING	TC_ RANC	LOGGED I	SENS SETTING	FEET
		675	FT	FT.	ST	FT	F I.	50-
Siltstone, redd claystone, dark Coal								50-
Sandstone, gray gray; and clays				13.39 (31.1)3.111				100
Coal, with clay	stone parting			Natural Company				150
Sandstone, gray gray; claystone limestone, gray	, gray; and							200
			5					250

4.

LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Coal, with claystone parting  Sandstone, gray; siltstone, gray; and claystone, gray  Coal  Sandstone, gray; siltstone, gray; and shale, light-gray						450 - - 500 - - - - - - - - - - - - - - - - - - -	-80 -90 -100 -120

	SELL PATTERSON EOLOGI	YES	RDED BYRUSS	ELL PATT	ERSQNcordin	NG SPEED2.	5 F
LITHO	LOGY ·	GAMMA T.C. 2 RANGE 200 LOGGE 608 FT	500 D DEPTHS	S TC-RAN	s		FEET
							50-
Regolith, 1	orown	\[ \{ \}		50.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10			0-1
Siltstone, gray and da Coal	gray; and claystone ark-gray			2003 2013 2013 2013 2013 2013 2013 2013			50-
fine; silts	light-gray, very stone, light-gray; one, light-gray						100-
Coal							150 -
Sandstone, fine; silts and claysto	light-gray, very stone, light-gray; one, gray	AND AND	MAN WAY OF STREET			Fight Fight USFT	200-
Coal		**************************************					250-
							300-

LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Coal	TO MONTH OF THE PARTY OF THE PA					350   400	- 80
Sandstone, gray, very fine; siltstone, light-gray; and claystone, light-gray					90 Ast (11)	450-	-90
	Same of the same o			-		500-	-100
						550-	-110
Coal	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\					600-	-120
						650 -	-130
						700 -	-140
						750	-150
						800	

	DRDED BY RUSSELL PATTERSONGEOLOGI	165
	LITHOLOGY	GAMMA T.C. 2 SENS SETTING RANGE 200  LOGGED DEPTHS  SP TC 2 RANGE 5K  LOGGED DEPTHS  DENSITY TC 2 RANGE 5K  LOGGED DEPTHS
-		427 FT. FT. 5 431 FT. FT.
	Regolith  Sandstone, light-gray, very fine; siltstone, light-gray; and claystone, light-gray	
	Coal	
	Coal	
		I min in the trade of the first and the last of the first of the last of the l

	LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
	Coal Sandstone, light-gray,					67 6161 1061	350-	- 80
1	very fine; and claystone, gray						400-	
-							450-	-90
-							500-	-100
							550-	-110
	<b>*</b> ~						600-	-120
-							650-	-130
							700 -	-140
							750	150
							800	-

note No: US-7964 Map: Three_Mile_ButteDate: 10/20/79 State: Montana County: Powder River Elev: 4028 FT Location: T 5 S R 47%, Sec 14 Tract DCBA Drilled depth 1000 FT.

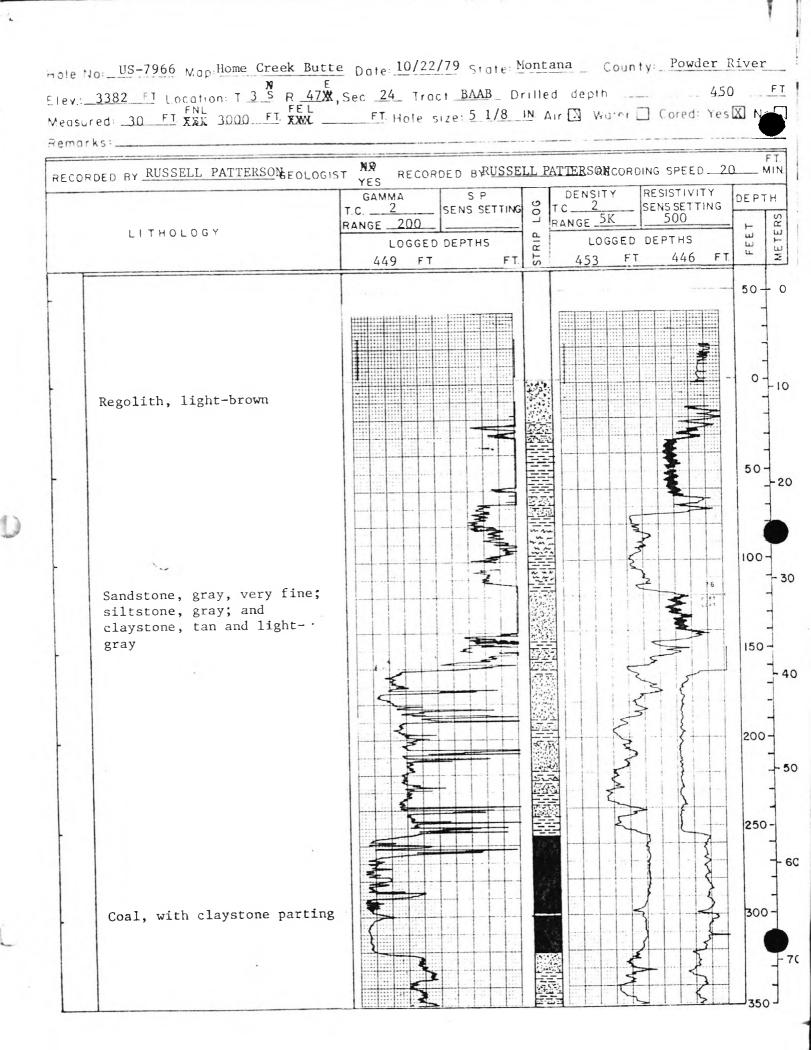
Measured: 1310 FT FSL 2080 FT. XXX FT. Hole size: 5 1/8 IN Air X Water Cored: Yes No X Remarks: XXX RECORDED BY RUSSELL PATTERSOMEOLOGIST RECORDED BYRUSSELL PATTERS & CORDING SPEED _ MIN YES DENSITY GAMMA SP RESISTIVITY DEPTH SENS SETTING 250 T.C. ___2 SENS SETTING RANGE 10K TERS RANGE _200 500 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 586 FT 861 FT 854 50+0 Regolith 50 100-- 30 150 Sandstone, light-gray, very 200 fine; siltstone, gray; and claystone, gray 250-60 300 70

LITHOLOGY	GAMMA	S.P.	STRIP LOG	DENSITY	RESISTIVITY	FEET	METERS
Sandstone, gray, very fine; siltstone, gray; and claystone, gray	The state of the s					850	
						900 -	
						950	
						1000	
						1050	
						1100	
						1150	
	J m					1200	-
						1250	

nole No: US-7965 Map: Yager Butte Date: 10/21/79 State: Montana County: Powder River Elev: 3438 FT Location: T 5 8 R 46 W, Sec 1 Tract BBAA Drilled depth 500 FT Measured: 380 FT KKK 1240 FT FWL FT. Hole size: 5 1/8 IN Air Water X Cored: Yes No X Remorks:_ XX RECORDED BRUSSELL PATTERS ONE CORDING SPEED __ RECORDED BY RUSSELL PATTERSONGEOLOGIST MIN. YES RESISTIVITY DENSITY GAMMA SP DEPTH SENS.SETTING SENS SETTING T.C. ___2 RANGE __ 200 RANGE _5K 250 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 500 494 FT 496 FT. 494 FT FT. 50 + 0Regolith, light-brown Coal 50 -20 100-- 30 Sandstone, light-gray, very fine; siltstone, gray; and 150 claystone, gray to dark-gray 200 Coal, with claystone parting 250 60 Sandstone, gray, fine; and claystone, gray 300 Coal, with claystone parting 70

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET
Coal	The state of the s				الملطيلسر	350-
	Thurst many			1	الماليم	400-
Sandstone, gray, fine; and claystone, gray					2 3 3 3 3 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4	
	1				3	500-
	13			j.		- - - 550-
						-120
						600-
						650 -130
						700 -140
						750150
						800

Hole No: US-7966 Map: Home Creek Butte Date: 10/22/79 State: Montana County: Powder River Elev: 3382 FT Location: T 3 S R 47XX, Sec 24 Tract BAAB Drilled depth 450 FT Measured: 30 FT XXX 3000 FT XXX FT. Hole size: 5 1/8 IN Air X Water Cored: Yes X No Remarks:_ RECORDED BRUSSELL PATTERSQNcording SPEED _ 20 NR RECORDED BY RUSSELL PATTERSON EOLOGIST YES RESISTIVITY DENSITY DEPTH GAMMA SP SENS SETTING T.C. ___2 SENS SETTING RANGE 5K 500 RANGE _200 FT. STRIP LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 446 FT. 449 50+0 Regolith, light-brown 50 100-- 30 Sandstone, gray, very fine; siltstone, gray; and claystone, tan and lightgray 150 -- 40 200-- 50 250 - 60 300 Coal, with claystone parting



	LITHOLOGY	GAMMA	<b>S</b> . P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
						***	350-	
							_	
							_	-80
							400-	
							_	
							-	-90
							450-	
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							500-	-100
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							-	
							-	
							650-	-130
							-	
							700 -	-14
								-
							-	1
							750 -	-15
							-	+
1							1800	1

note No: US-7967A Map: Medicine Lodge Peak Date: 10/31/79 State: Montana County: Beaverhead Elev: 6720 FT Location: T 115 R 12 W, Sec 21 Tract DAAC Drilled depth _____ 215 FT Measured: 2000 FT FSL 750 FT XXX FT Hole size: 5 5/8 IN Air X Warr C Cored: Yes No X Cored 195-215 feet. MM RECORDED BRUSSELL PATTERS ON CORDING SPEED 20 RECORDED BY RUSSELL PATTERSONGEOLOGIST YES RESISTIVITY GAMMA T.C. ___2 SP SENS SETTING SENS SETTING RANGE 200 METERS RANGE 2K LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS FT. FT. 50+0 Sandstone; gray; claystone, gray; and siltstone, gray 50 Claystone, gray; and 100 sandstone, gray Coa1 Coal 150 -Sandstone, gray; claystone, gray, and siltstone, gray 200 Coal 50 250 60 300 - 70

 LITHOLOGY		GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	2
						- 14	750	
							350-	
							-	1
							-	- 80
							-	1
							400 -	1
							-	1
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							-	90
							450-	
							430-	
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							-	
						N AS	-	
							-	
							800-	

hole No: US-7968 Map Medicine Lodge Peak Date: 11/1/79 State: Montana County: Beaverhead 2 N, Sec 36 Tract ADCD Drilled depth 1000 FT Elev: 6470 FT Location: T 115 R 1 Measured: 2550 FT XXX 1700 FT FWL FT. Hole size: 5 5/8 IN Air Water Cored: Yes No X Remorks: Hole blown out to approximately 1 foot diameter for approximately 10 feet from RECORDED BY JON HANGAS RECORDED BY JON HANGAS RECORDING SPEED GEOLOGIST YES RESISTIVITY GAMMA SP DENSITY DEPTH SENS SETTING SENS, SETTING RANGE 200 RANGE 2K 500 1K LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS œ 989 FT. 996 FIL 991 989 FT. 0 50-Siltstone, brown to gray; and sandstone, brown, medium 50 Coal 100 Siltstone, black to brown, medium 150 40 Siltstone, brown to gray, 200some sandy, carbonaceous; claystone, gray 250 300 Siltstone, brown to gray - 70

LITHOLOGY	GAMMA	<b>S</b> , P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Siltstone, gray to brown				A Mark Mark Mark		350 - - - 400 -	- 80 - 90
Coal		AND THE PROPERTY OF THE PROPER		A MAY CAN		450-	-100
Siltstone, gray; some sandstone, gray, fine	My Joseph Contraction Committee	ALMILA WILLIAM		John W. W.		550-	-110
Siltstone, gray to brown;	Jam Jandyka Jahran	Analytic Property		May by and which		600-	-120
minor carbonaceous shale, sandy	<b>1</b>	Mary Mark Mark Mark Mark Mark Mark Mark Mark		A MMV M		650-	-130
	Juny Mary Mary Mary Mary Mary Mary Mary Mar			Land Land Mand	my than I what was the	700 -	-140
	Wall Market	AND THE PROPERTY OF THE PARTY O				750 -	-150

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET
Siltstone, gray		other works of the second		John Manderson Mander	Markey Mark John Jakoban	800
Sandstone, gray, medium		THE THE STANDARD STAN		ans my filmed home	15 ·	900
			500 500 500 500 500 500 500 500 500 500			1000
•				<b>j</b>		1030
						1150
						120

				RECORDING		
LITH	OLOGY	GAMMA T.C2 SEN RANGE _200_ LOGGED DEF 608 FT	NS SETTING S TO		100PTHS	FEET
light-bro Sandstone gray; and Siltstone claystone sandstone Bentonite	, gray; siltstone, claystone, gray , brown, carbonaceous; gray; and	The state of the s				50-
	, gray; siltstone, claystone, gray			my of the party of the		<b>25</b> 0

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LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
						350-	
				Approximation		400-	80
	Am/www	<u></u>		Mana		450-	90
		**		air and the same of the same o		500-	-10
						550-	-=
	M M M more					600-	- 12
	· Value					650-	-13
						700 -	-14
						750 -	-18
						800 -	

ECORDED BY RUSSELL PATTERSONGEO	LOGIST XX RECORDED BY _	 RECORDI	NG SPEED2	Q N
LITHOLOGY	GAMMA T.C. 2  RANGE 200  LOGGED DEPTHS 489 FT	DENSITY F	RESISTIVITY SENS.SETTING	E E T
Regolith, brown  Sandstone, light-gray, medium to fine; siltstone gray, and claystone, gray		M Many Many Many Many Many Many Many Man		50-

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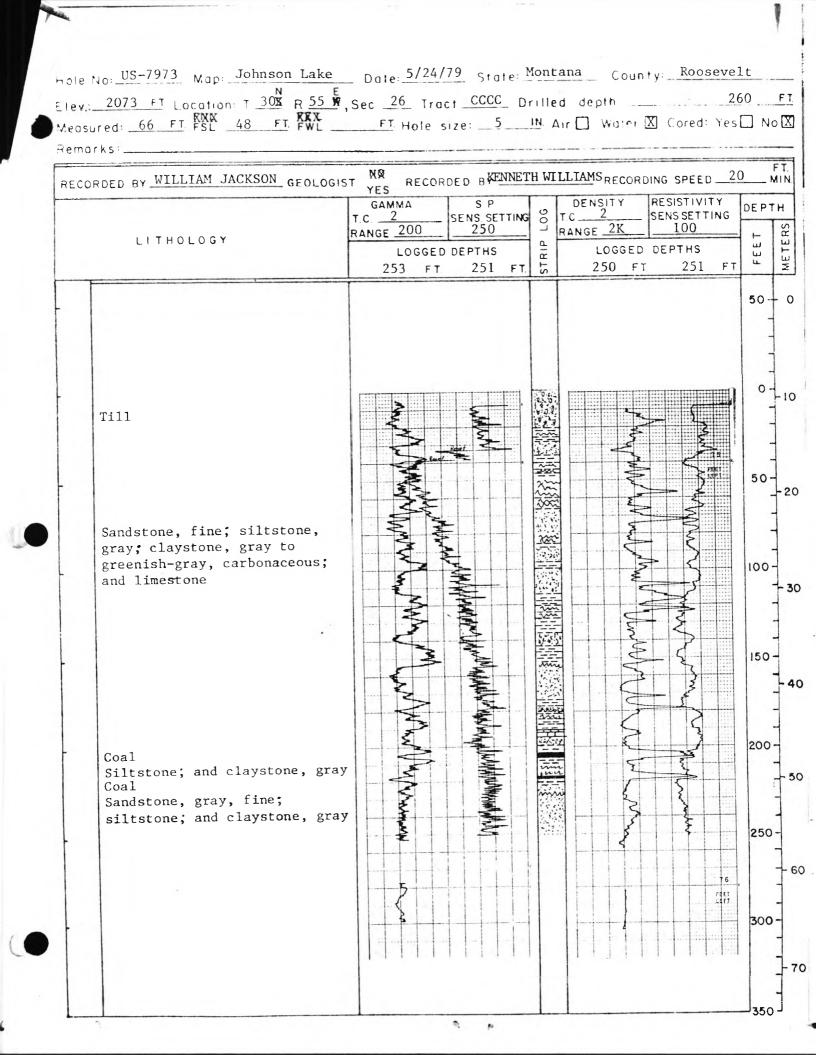
LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET
Sandstone, gray, very fine; siltstone, gray; and claystone, gray	W. M.		到一個別時的國際國際的		34 	350 - - - - - - - - - - - - - - - - - - -
		<u>7</u>		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		500- 110 550- 120
						650 130
 ·						750150

CO	RDED BYWILLIAM JACKSON GEOLOGIS	T YES RECORDED BYENNET	TH WI	LLIAMS _{RECORDING} SPEED	20
		T.C. 2 SENS. SETTING	90	DENSITY RESISTIVITY T.C _ 2 SENS.SETTING RANGE _ 2K 100	DEP
	LITHOLOGY	RANGE 200 250  LOGGED DEPTHS 424 FT. 472 FT.	1 &	LOGGED DEPTHS 479 FT. 472 F	FEET
1					50
				and the pareless	
			GS 6N		0
	Sand and gravel				
L					
		\$ <b>5</b>			50
				F S	100
	Sandstone; siltstone, gray to				1.00
	green; and claystone, gray to brown, carbonaceous				
		3	200	}	150
		\$ 5			
		And White			
	Coal Sandstone, gray, very fine;				200
	siltstone, gray to brown; and claystone, gray to brown,				
	carbonaceous Coal	\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	100		25
3					
	Sandstone, gray, very fine;		1		
	siltstone, greenish-gray; and claystone, gray to brown,	3 8	1 =	3 3 3	30

LITHOLO	GY FALLWOOD	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
	1. 1. 10		3	102AI		- J	350-	, Si maj
	4 2 192 7 his		Chy Valley and Valley and Valley	200	The state of the s		400-	- 80
Coal Siltstone; and o	claystone,	\ \frac{1}{2}	Joseph Jo				450-	-90
		3		,	,		500-	-10
		3					550-	
				#0	n 1920an Santana Santana	delicat att	13	- :
							650-	-1
				1 29 11 5 1 1 5 10	y, water i g to brown e to brown	in all the second of the secon	700	
				9-(5 1-) 1-) 1-)	* y *** ; y *:2-6::30 *:32-8:38	idatone. eta cakune. eta cakunela	750	- T

ORDED BY WILLIAM JACKSON GEOLG		ACKSON RECORDING SPEED 20	
LITHOLOGY	GAMMA T.C. 2 RANGE 200 250  LOGGED DEPTHS 233 FT 231 FT.	DENSITY RESISTIVITY SENS SETTING 100 LOGGED DEPTHS 238 FT 231 FT	FEET DEP
Coal Sandstone, light-gray, ver fine; siltstone, gray to green; claystone, gray; an limestone,  Coal Sandstone, gray, fine; and claystone, gray	THE STATE OF THE S		50

LITHOLOGY	GAMMA	S. P. STRIP	DENSITY	RESISTIVITY	FEET	VETER
					350-	
					400	-90
					45	-10
					-	- 11
					600-	- 12
					650-	-13
					700 - - - -	-14
					750 - -	-15



LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
					- 11	350-	
						-	80
						400-	
	•					-	- 90
						450-	
							-10
						500-	
							-110
						550- - -	
<b>√</b>					4	600-	- 12
						-	
						650 -	-13
					1		
						700 -	-14
						-	
						750 -	-150
						-	1
						800-	]

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nole No: US-7974 Map: Johnson Lake Date: 5/24/79 State: Montana County: Roosevelt Elev: 2012 FT Location: T 30x R 55 W, Sec 12 Tract CDCD Drilled depth easured: 150 FT FSL 1820 FT FWL FT. Hole Size: 4 3/4 IN Air Ward A Cored: Yes No X Remarks: No source on density - gravel hole. RECORDED BEENNETH WILLIAMS RECORDING SPEED 20 RECORDED BYKENNETH WILLIAMS GEOLOGIST XXX RESISTIVITY SP DENSITY GAMMA SENS SETTING SENS SETTING RANGE _50 100_ RANGE 200 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 250 FT 257 FT 250 FT. 252 FT 50+0 Till; sandstone, brown, medium to coarse; and gravel 100-Siltstone, gray, calcareous; and claystone, gray to greengray, carbonaceous Coal Siltstone; and claystone, gray Coal, with siltstone parting Sandstone, gray, very fine; 200 siltstone; and claystone, gray to dark-gray 250 -60 300-

LITHOLOGY	GAMMA	\$. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
					14.	350-	
						-	-80
						400-	
						-	-90
						450-	
						-	-100
						500-	
*							-110
						550-	
	•						
						600-	-120
						-	
	1."						
						650-	-130
						=	
						700 -	-140
						750 -	
					10	-	-150
						800	

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Hale No: US-7975 Map: Johnson Lake Date: 5/24/79 State: Montana County: Roosevelt Elev.: 2241 FT Location: T 29 x R 55 x, Sec 11 Tract CCCC Drilled depth 300 FT. FT. Hole size: 4 3/4 IN Air Water 🖫 Cored: Yes 🗌 No 🖫 Measured: 15 FT FSL 40 FT FWL Remarks: _ RECORDED BYKENNETH WILLIAMSRECORDING SPEED 20 NN MIN RECORDED BY WILLIAM JACKSON GEOLOGIST YES RESISTIVITY SP DENSITY DEPTH GAMMA SENS SETTING TC_ SENS SETTING T.C. __2 100 RANGE _2K_ RANGE 200 250 291 FT. 5 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 298 FT 291 FT 294 FT 50+ 0 -10 Sandstone, brown, fine; siltstone; and claystone, gray, carbonaceous Coal Siltstone; claystone, gray; 50. and limestone, gray -20 Coal 100-Siltstone; and claystone, gray, carbonaceous 150-Coa1 Sandstone; siltstone; and claystone, gray to greenish-200gray, carbonaceous - 50 250 -- 60 300

	LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	
						Ъ.	350 -	
							-	- 8
*							400-	
							-	- 9
							450-	
						18		-1
							500-	
							550-	-
							-	
	<u>_</u>						600-	-
							-	
							650-	-1
							-	
							700 -	
							-	
							750 -	-1
	o. 4-4-					_	-	
							800-	

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note No: US-7976 Map: Johnson Lake Date: 5/25/79 State: Montana County Roosevelt Elev: 2296 FT Location: T29 % R 55 %, Sec 22 Tract CBBB Drilled depth Measured: 2640 FT KXX 45 FT FWL FT Hole size: 4 3/4 IN Air Ward X Cored: Yes No X Remarks: -MX RECORDED BYENNETH WILLIAMSRECORDING SPEED 20 RECORDED BYWILLIAM JACKSON GEOLOGIST MIN YES DENSITY TC 2 RESISTIVITY GAMMA SP SENSSETTING T.C. ____2 SENS SETTING 250 RANGE 200 RANGE 2K 100 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 398 391 393 FT. 391 FT 5 50 + 050-Sandstone, brown, fine; siltstone; and claystone, gray to brown 100--30 Coal 150-Siltstone; and claystone, gray Coal 200-- 50 Sandstone, gray, fine; claystone, gray to green; and 250 limestone - 60 300-- 70

LITHOLOGY	GAMMA	<b>S</b> . P.	STRIP	DENSITY	RESISTIVITY	FEET	
						350  400   450	-8
						500-	-10
						550-	-1
	No.					600-	- 1
						650 - -	
						700 - - - - - 750 -	
						800-	

nole No. US-7977 Map: Culbertson Date: 5/25/79 State: Montana County: Roosevelt Elev: 2285 FT Location: T 29 X R 55 X, Sec 32 Tract BBBB Drilled depth Measured: 36 FT RAK 10 FT FWL _____FT. Hole size: 5 ____IN Air _ Water X Cored: Yes _ No X Remarks: Logged with pit over hole. RECORDED BY WILLIAM JACKSON GEOLOGIST NO RECORDED BY WINNETH WILLIAMS RECORDING SPEED 20 MIN RESISTIVITY DENSITY TC 2 SP GAMMA SENS SETTING SENS SETTING RANGE 2K 100. RANGE 200 250 LITHOLOGY ٩ LOGGED DEPTHS LOGGED DEPTHS œ 491 491 FT. 498 FT 493 FT 50 + 0 eus unu Siltstone; claystone, gray and brown, carbonaceous; and sandstone, gray, very fine 50-Coa1 100-Sandstone, greenish-gray, unus very fine; siltstone, green; claystone, gray to green; and limestone 150 -40 Coal 200 -- 50 Coal Sandstone, light-gray, very fine; siltstone, green; and 250 claystone, gray - 60 300 Coa1 Sandstone, light-gray, very fine; siltstone, green; claystone, gray to brown, carbonaceous; and limestone

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
	Anna Marine Comment	A property of the second second		organization of the state of th		350-	-80
	1 And 1			Mary May	- : - : - : - : - : - :	450 —	- 90
					<u> </u>	500-	-100
	2					550-	-110
		s ·				600-	-120
						650 -	
						750	
						800	

Hole No: US-7978 Map: Fort Kipp Date: 5/26/79 State: Montana County: Roosevelt Elev: 2109 FT Location: T 29 R S4W, Sec 35 Tract DDDD Drilled depth 360 FT. Measured: 20 FT FSL 35 FT XXX FT Hole size: 4 3/4 IN Air Water & Cored: Yes No Remarks: _ NR RECORDED BYWILLIAM JACKSON RECORDING SPEED ____ RECORDED BY WILLIAM JACKSON GEOLOGIST MIN YES SP DENSITY RESISTIVITY GAMMA SENS SETTING T.C ____2_ SENS.SETTING T.C. ____2_ RANGE 200 RANGE 2K 500 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 351 FT. 5 353 358 FT. 351 FT FT. 50+0 -10 Sandstone, brown, fine; siltstone; and claystone, brown 50--20 Coa1 100-- 30 Siltstone, gray to greenishgray; claystone, gray, carbonaceous; and limestone 200-Coal Siltstone, gray, carbonaceous; claystone, gray; and 250 sandstone, gray, fine Coal 60 Sandstone, fine; siltstone, gray to greenish-gray; and 300 claystone, gray -70

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET
			1900	1		350-
				· in the state of		
						+
						400-
						-
						1
						450-
						]
						-
						500-
						-
i e						
						+
						550-
						-
`~						600-
						]
						650-
						650-
						700 -
						750 -
						150-
						1 +
						800

note No: US-7979 Map Culbertson Date 5/27/79 State: Montana County: Roosevelt Elev: 2160 FT Location: T 28% R 55%, Sec 27 Tract AAAA Drilled depth Measured: 100 FT KS 150 FT KW FT. Hole Size: 4 3/4 IN Air William & Cored: Yes No X Remarks: Ma RECORDED BYWILLIAM JACKSON RECORDING SPEED RECORDED BY KENNETH WILLIAMS GEOLOGIST MIN YES RESISTIVITY DENSITY GAMMA SP DEPTH SENS SETTING SENS SETTING TC_ RANGE 200 RANGE _2K_ 500 100 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 271 FT. 5 278 FT 271 FT 273 FT 50 + 0 7-10 Till Siltstone, light-tan, ferruginous; and claystone, gray to light-tan, 50 carbonaceous -20 Coal Sandstone, gray, carbonaceous; and claystone, light-gray, carbonaceous Coal 100-- 30 Siltstone; and claystone, light-gray to brown 150 - 40 Coal, with gray to dank-gray, carbonaceous claystone partings 200 Sandstone, gray, very fine; - 50 siltstone; and claystone, gray to dark-gray, carbonaceous 250 300 70

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
					4	350-	
						_	- 80
						-	1
						400 -	
						_	
						-	- 90
						450-	
						_	
						_	-100
					0.73	500-	
					T _A la	-	
						_	-110
						550-	
						_	
					44	-	- 120
*						600-	120
						4	
						-	
						650-	-130
						4	
						-	
						700 -	-140
						]	
						_	
						-	
						750 -	-150
						-	
						-	

note No: US-7980 Map: Culbertson Date: 5/27/79 State: Montana County: Roosevelt Elev.: 2212 FT Location: T28 X R 55 W, Sec 24 Tract BAAD Drilled depth Measured: 460 FT KXX 2720 FT XXX FT Hole size: 4 3/4 IN Air Word & Cored: Yes No & Remarks: Density statistical staken at 478 feet. XX RECORDED BWILLIAM JACKSON RECORDING SPEED __ RECORDED BY KENNETH WILLIAMS GEOLOGIST YES RESISTIVITY DENSITY SP GAMMA SENS SETTING 5 TC 2 SENS SETTING RANGE 2K 100 RANGE _200 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 471 FT. 5 478 FT. 471 FT 473 FT. 50+0 Sandstone, brown, fine; siltstone; and claystone, brown to black, carbonaceous Coal -20 Sandstone, brown, fine; siltstone; and claystone, gray to blackish-brown, carbonaceous 100-- 30 Coal Sandstone, gray, fine; siltstone, gray to green; and 200 claystone, gray to brown, carbonaceous 250 -60 Coal 300-- 70

LITHOLOGY	GAMMA	<b>S</b> . P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Sandstone, gray fine; siltstone, gray; and claystone, brown to gray	Mary Mary	and the second second		mar what have what		350-	-80
		Annage Armaday and Armaday Arm				450-	-90 -100
	, <u> </u>					550-	-110
						600-	- 120
						650-	-130
						700 -	-140
						750 -	-150

hole No: US-7981 Map: Culbertson Date: 5/28/79 State: Montana County: Roosevelt 480 FT. Elev: 2240 FT Location: T 28 % R 55 % Sec 11 Tract DDCD Drilled depth Measured: 15 FT KXX 925 FT XXX FT. Hole size: 4 3/4 IN Air Water X Cored: Yes No X Remorks: Cored interval 51 feet to 61 feet. RECORDED BWILLIAM JACKSON RECORDING SPEED __ 20 RECORDED BY KENNETH WILLIAMS GEOLOGIST MIN. YES DENSITY RESISTIVITY GAMMA SP DEPTH SENS.SETTING T.C. _2 SENS. SETTING RANGE 2K 100 RANGE 200 250 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 474 FT 472 FT 479 FT 472 50+0 Sandstone, brown, fine; siltstone, green to brown; and claystone, gray to brown, carbonaceous 50 Coal Sandstone, green to brown, medium to fine; siltstone, green; claystone, gray, 100carbonaceous; and limestone, gray Coa1 150 Coal 200-Claystone, gray to green; - 50 and sandstone, brown, fine 250 -- 60 300 Coa1

	LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
		<b>1</b>			- Lewymy		350-	80
	Sandstone, light-gray, very fine; siltstone, gray; and claystone, gray		Mark Styles W Mark		And		400 -	
	and craystone, gray		The state of the s		Mayori		450-	90
		į			(	est Gal	500	100
-							550-	110
-	`~						600-	120
-							650	130
					÷		700 -	140
							750 -	150
							800	

CORDED BY KENNETH WILLIAMS GEOLOG	TES			0
LITHOLOGY	T.C. 2  RANGE 200 SENS SETTIME 250  LOGGED DEPTHS 494 FT 492 FT.	RANGE 2K	RESISTIVITY SENS SETTING 100 D DEPTHS T 492 FT	FEET
Sand and gravel; siltstone; and claystone, brown  Coal  Sandstone, gray, fine; claystone, gray to brown, carbonaceous; and limestone  Coal  Sandstone, fine; siltstone, gray; claystone, gray to				50-

LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Coal Siltstone; and claystone, gray, carbonaceous  Coal Sandstone, gray, very fine; siltstone; and claystone,	A VANAMA MA	My My March Straighton		J. W. W. J. W.		350-	-80
gray; and limestone  Coal		money Mandall		Market		450-	-90
	<b>T</b>		777 777 777 777 777		7.	500-	-100
						550-	-110
						650-	-120
						650	
						750 -	-150
						800-	

Hole No: US-7983 Map: Bainville 3 NW Date: 5/30/79 State: Montana County: Roosevelt Elev.: 2201 FT Location: T 29% R 56 X , Sec 31 Tract ABBB Drilled depth Measured: 72 FT KXX 2960 FT FWL FT Hole size: 5 IN Air Warn X Cored: Yes No X Remarks:_ MM RECORDED BWILLIAM JACKSON RECORDING SPEED -RECORDED BYKENNETH WILLIAMS GEOLOGIST YES DENSITY RESISTIVITY GAMMA SP SENS SETTING DEPTH T.C. ____ SENS SETTING RANGE 5K RANGE 200 500 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 291 FT. 5 398 FT 291 393 FT 50+0 Regolith, brown Coal Sandstone, brown and gray, very fine; siltstone, gray; 50and claystone, tan and gray -20 Coa1 100 Sandstone, brown and gray, very fine; siltstone, gray; and claystone, gray 150 -Coal 200 -50 250 -60 300 70

LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
			200 200 200 200 200 200 200 200 200 200	\(\lambda \lambda \lam	7. MW/	400-	- 80
*						500	-100
						550-	- 120
				·		700 -	
						750 -	-150

note No: US-7984 Map: Bainville 2 SW Dote: 5/30/79 State: Montana County: Roosevelt Elev: 2084 FT Location: T 29 x R 56 x, Sec 8 Tract ADDC Drilled depth 320 FT Measured: 2550FT KXX 350 FT KXX FT Hole size: 5 IN Air Water X Cored: Yes No X Remarks:_ MW RECORDED BY WILLIAM JACKSON GEOLOGIST RECORDED 8WILLIAM JACKSON RECORDING SPEED. YES DENSITY RESISTIVITY GAMMA SP DEPTH SENS SETTING _ SENS.SETTING T.C., _ RANGE 2K RANGE 200 500 LITHOLOGY <u>a</u> LOGGED DEPTHS LOGGED DEPTHS 311 FT 312 FT. 311 FT. 318 FT 50+0 Sandstone, brown, fine; siltstone, gray; and claystone, brown and gray 50--20 100-Coal -30 150-40 Sandstone, gray, very fine; siltstone, gray; and claystone, brown and gray 200-- 50 250 -300 - 7C

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
						350-	
						-	- 80
		- 1				400-	00
						-	
						=	- 90
						450-	
						1	
							-100
						500-	
							-110
						550-	
<b>_</b>						600-	-120
						650-	-130
						-	
						700 -	-140
						-	-140
						750	-150
						-	

nole No: US-7985 Map: Bainville 2 SW Date: 5/31/79 State: Montana County: Roosevelt Elev: 2102 FT Location: T 30 & R 56 X, Sec 29 Tract CDDD Drilled depth Measured: 15 FT FSL 2549 FT FWL FT Hole size: 4 3/4 IN Air Water & Cored: Yes No X Remarks: _ FT. RECORDED BY WILLIAM JACKSON GEOLOGIST YES RECORDED BWILLIAM JACKSON RECORDING SPEED SP DENSITY RESISTIVITY GAMMA DEPTH SENS. SETTING 500 TC __2_ SENS SETTING T.C. __2 RANGE 200 RANGE 2K 100 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 371 FT. 5 373 FT. 378 FT 371 FT. 50+0 Sandstone, gray, fine; siltstone, gray; and claystone, gray and brown 50 -20 Coal Sandstone, gray, fine; siltstone, gray; and 100claystone, gray - 30 Coal 150 -250 -300-Coa1

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	Na T T P
Coal Claystone, gray						350    400	80
						450-	-90
						550-	-110
						650	-130
	•					700 -	-140
						750 -	-150

note No: US-7986 Map: Bainville 2 SW Date: 5/31/79 State: Montana County: Roosevelt Elev: 2102 FT Location: T 30% R 56% Sec 17 Tract ADDD Drilled depth 380 FT Measured: 2560FT KXK 18 FT RWX FT Hole size: 4 3/4 IN Air Water & Cored: Yes No & Remarks:___ NK RECORDED BY WILLIAM JACKSON GEOLOGIST YES DENSITY RESISTIVITY SP GAMMA DEPTH SENS SETTING TC __2__ SENS SETTING RANGE 5K 100 500 RANGE __ LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 397 FT. 392 FT 380 FT 380 FT. 50+0 Sandstone, gray and red, very fine, ferruginous; and claystone, gray and 50brown -20 Coal Sandstone, gray, very fine; and claystone, gray 100-. +30 Coal 40 200 -Sandstone, gray, very fine; siltstone, gray; and 50 claystone, gray and green 250 -- 60 300 Coal 70 Coa1

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
						350-	
				, 7		400-	- 80
						450-	-90
						-	-100
						500-	
						550-	-110
						600-	-120
						_	-130
						650-	-130
						700 -	-140
						750 -	-150
						800-	

hale No: US-7987 Map: Bainville 2 SW Date: 6/1/79 State: Montana County: Roosevelt Elev: 2150 FT Location: T 30 x R 56 x, Sec 13 Tract BBBB Drilled depth 380 FT Measured: 60 FT KSK 15 FT FWL ___ FT Hole size: 4 3/4 IN Air Warri X Cored: Yes No X Remarks:_ XXX RECORDED BY WILLIAM JACKSON GEOLOGIST RECORDED BY WILLIAM JACKSON ECORDING SPEED YES GAMMA SP DENSITY RESISTIVITY DEPTH T.C. ____ SENS SETTING T.C.__2__ SENS SETTING RANGE 200 RANGE _2K_ METERS LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS œ 380 FT. 5 374 FT. 379 FT. 380 FT. 50 + 0Sandstone, gray, fine; siltstone, gray; and claystone, gray 50 -20 Coal, with claystone parting 100-Sandstone, gray, fine; siltstone, gray; and claystone, gray and green 150 -Coal 200 Sandstone, gray, very fine; siltstone, gray; and claystone, gray 250 60 Coal 300 Claystone, gray; sandstone, gray; and siltstone, gray 70 Coal

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Coal Sandstone, gray; and claystone, gray						350 - - - -	-80
						400 -	- 90
						450 - - - -	-100
						500-	-110
-						550-	-120
	A B					600-	
	4.					650-	
						700 -	
						750 -	-150

nole No: US-7988 Map: Bainville 2 SW Date: 6/1/79 State: Montana County: Roosevelt Elev: 2197 FT Location: T 30 X R 56XX, Sec 26 Tract BCCC Drilled depth Measured: 2680 FT FST 90 FT FWT FT Hole size: 4 3/4 IN Air Water & Cored: Yes No Remarks:_ NQ RECORDED BYWILLIAM JACKSONECORDING SPEED RECORDED BY WILLIAM JACKSON GEOLOGIST YES DENSITY RESISTIVITY SP GAMMA DEPTH T.C. ____2 SENS SETTING SENS SETTING RANGE 2K 500 LITHOLOGY 4 LOGGED DEPTHS LOGGED DEPTHS 393 391 FT. 398 FT 391 FT. 50 + O Sandstone, gray, very fine; and claystone, gray Coa1 50--20 Sandstone, gray, very fine; siltstone, gray; and claystone, gray 100-- 30 Coal Sandstone, gray, very fine; claystone, gray-green 200-- 5C Coal 250-Sandstone, gray, very fine; siltstone, gray; and - 6C claystone, gray 300 Coal

LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
			三 三 三 三 三 三 三 三 三 三 三 三 三 三 三 三 三 三 三			350 - -	
					À	400 -	-80
					i i i i i i i i i i i i i i i i i i i	450 - -	90
			=			500-	-100
						550-	110
						600-	-120
						650	-130
						700	-140
						750	-150
						800	1

hole No: US-7989 Map: Bainville 2 SE Date: 6/5/79 State: Montana County: Roosevelt Elev: 2357 FT Location: T 30 % R 57 %, Sec 29 Tract CCCC Drilled depth Measured: 18 FT FSL 56 FT FWL ___ FT Hole size: 4 3/4 IN Air _ Water & Cored: Yes _ No 1 Remarks: RECORDED BY WILLIAM JACKSON GEOLOGIST NØ RECORDED BWILLIAM JACKSON RECORDING SPEED _20 YES GAMMA 2 DENSITY SP RESISTIVITY SENS SETTING SENS SETTING 200 RANGE __ 500 RANGE _2K 100 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 513 FT. 511 FT. 518 511 50+0 50--20 Sandstone, brown and gray, very fine; and claystone, brown and gray 100-- 30 150 -200-- 50 Coal 250-Sandstone, gray, very fine; - 60 siltstone, gray; and claystone, gray 300 70 Coal

LITHOLOGY	GAMMA	S. P.	STRIP LOG	DENSITY	RESISTIVITY	FEET	METERS
Sandstone, gray, very fine; siltstone, gray; and claystone, gray	May Land Land	The free transfer with the first of the firs		The state of the s	John John James	350 - - - - - 400 -	- 80
Sandstone, gray, very fine; siltstone, green-gray; and claystone, gray		My Market			W.M.M	450-	-90
	1	٨٨				500-	-100
						550-	-110
`~						- - - - - - - -	-120
						650-	-130
						700 -	-140
						750 -	-150
	<u> </u>					800-	

CORDED BY WILLIAM JACKSON GEO	OGIST NE RECORDED BYWILLIAM JACKSON RECORDING SPE	ED
LITHOLOGY	GAMMA T.C. 2 SENS SETTING SOO LOGGED DEPTHS  SP TC 2 RANGE 2K SENS SE RANGE 2K LOGGED DEPTH	TTING DEF
	308 FT 306 FT. 5 313 FT 30	6 FT. L
Sandstone, brown, fine; siltstone, gray; and claystone, gray		50
Coal	ANDWAY WALL MANAGEMENT OF THE PARTY OF THE P	150
Siltstone, gray; and claystone, gray		≥ 15 200
Coal Siltstone, gray; and	The state of the s	250

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LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
						350-	
44						_	80
						400-	1
						-	
						-	-90
						450-	
						-	
						_	-100
						500-	
						-	
						550-	-110
						-	
						-	
\ <u></u>						600-	- 12
						-	
						650-	-130
						630-	
						-	
						700 -	-140
						-	
						_	
						750 - -	-150
						-	
						800-	

Hole No: US-7991 Map: Bainville 3 NW Date: 6/6/79 State: Montana County: Roosevelt Elev: 2110 FT Location: T 28 R R 57 W, Sec 19 Tract DDDD Drilled depth Measured: 590 FT FSL 12 FT TANK FT Hole size: 5 IN Air Wain X Cored: Yes No X Remorks: Lost circulation at 260 feet, returned at 320 feet, lost at 340 feet. NR RECORDED BY WILLIAM JACKSON GEOLOGIST RECORDED BWILLIAM JACKSONECORDING SPEED_ YES RESISTIVITY GAMMA SP DEPTH L06 SENS SETTING T.C. _ SENS SETTING TC_ RANGE 200 500 RANGE _ 2K 100 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 372 FT. 374 FT 379 372 FT. 50+ 0 Sandstone, brown and gray, fine; and claystone, brown and gray 50-Coal Sandstone, gray, very fine; and claystone, gray 100-Coal - 30 150 -Sandstone, gray, very fine; and claystone, gray and greenish-gray 200-- 50 Coal 250 -Sandstone, gray, very fine; and claystone, gray and green Coal 300 - 70 Coal

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET
		7. All			**************************************	350-
	}				70- Fatt 1411	400-
						450-
		1.	~			500-
						550-
`~						600-120
						650 -130
				i. Cu		700 -140
						750150
					*************	800

CORDED BY WILLIAM JACKSON GEO	DLOGIST YES RECORDED BWILLIAM JACKSON RECORDING SPEED 20
LITHOLOGY	GAMMA T.C. 2 RANGE 200 SENS SETTING 50 TO SENS SETTING 100 SENS SETTING 200 LOGGED DEPTHS 293 FT 300 FT. 50 298 FT 300 FT
Sandstone, brown and gray, fine; claystone, gray, some carbonaceous  Coal  Sandstone, gray, very fine and claystone, gray  Coal  Sandstone, gray, very fine claystone, gray	

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LITHOLOGY	GAMMA	\$. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
						350-	
						0-	
						-	
						_	- 80
						400 -	
						-	
						_	
					1.8		-90
					13	450~	
						_	
						-	
						-	-100
	. 1					500-	1
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						-	
						-	
							-110
						550-	
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						-	
M3						-	- 120
						600-	
						-	
						-	
					6	-	-130
	1.					650-	
						_	
						-	
					1.3	_	
						700 -	-140
					0.9	_	
						-	
						-	
						750 - -	-150
						_	
						_	
						800 -	1

Hole No: US-7993 Map: Bainville 3 NW Date: 6/6/79 State: Montana County: Roosevelt Elev: 2230 FT Location: T 28 R 56 X, Sec 1 Tract CDDD Drilled depth 440 FT Measured: 25 FT FSC 2530FT FWC ____ FT Hole size: 4 3/4 IN Air _ Wuth Cored: Yes No & Remarks:_ NX RECORDED BY WILLIAM JACKSON GEOLOGIST RECORDED BYWILLIAM JACKSONRECORDING SPEED 20 YES DENSITY 2 GAMMA RESISTIVITY DEPTH SENS SETTING RANGE 2K 200 500 RANGE _ LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 433 FT. 431 FT. 438 431 Regolith, brown Sandstone, gray; and 50. claystone, brown and gray Coal 100 - 30 Limestone, gray Sandstone, gray, very fine; and claystone, gray 150 Coal 200-50 Sandstone, gray, medium; siltstone, green; and 250 claystone, gray - 60 300 70

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
	MANA MANA MANA				Convergence of the second	350 - - -	- 80
Sandstone, gray, very fine; siltstone, gray; and claystone, greenish-gray	1 / N / N / N / N / N / N / N / N / N /				MAN AM	400 - - -	
	1					450 	-90
			9			500-	-100
						550-	-110
`~						600-	-120
	•					650-	-130
						700 -	-140
						750 -	-150
						800	

hale No: US-7994 Map: Bainville 3 NW Date: 6/7/79 State: Montana County: Roosevelt Elev: 2190 FT Location: T 28 R S6 K, Sec 14 Tract BBCA Drilled depth 320 FT Measured: 680 FT KXX 320 FT FWL FT Hole size: 4 3/4 IN Air Ward & Cored: Yes No X Remarks:_ NM RECORDED BY WILLIAM JACKSON GEOLOGIST RECORDED BYWILLIAM JACKSON RECORDING SPEED 20 YES RESISTIVITY SP DENSITY DEPTH SENS. SETTING SENS SETTING RANGE 200 RANGE _2K_ 500 100 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS STRI 313 FT 318 FT 311 FT. 311 FT 50 + O Sandstone, brown, fine; and claystone, gray Coal 50--20 Sandstone, gray, fine; and claystone, gray 100-Coal ~ 7-30 150 --40 Sandstone, gray, fine; siltstone, gray; and claystone, gray 200 -- 50 Coal 250 -300 -70

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	
						350-	
						_	8 +
						- 400 -	1
						-	1
						450-	- 9
						450-	-
						-	-10
						500-	1
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						-	1
	•					650-	] ]-1:
						-	
						-	-
						700 -	1-1-
						-	
						750 -	-1
						-	-
						800-	-

. .

hale No: US-7995 Map: Bainville 3 NW Date: 6/7/79 State: Montana County: Roosevelt Fley: 2131 FT Location: T 28% R 57 W, Sec 19 Tract BCBB Drilled depth Measured: 1345 FT FNL 745 FT. FWL ____ FT. Hole size: 4 3/4 IN Air _ Water X Cored: Yes _ No X Remarks:_ NX RECORDED BYWILLIAM JACKSON RECORDING SPEED 20 RECORDED BY WILLIAM JACKSON GEOLOGIST YES GAMMA RESISTIVITY SP DENSITY SENS SETTING RANGE 200 RANGE _ 500 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 371 FT 371 FT. 378 FT 373 FT 50+0 Regolith Sandstone, gray, fine; 50 and claystone, gray -20 Coal 100-Sandstone, gray, fine; 150 and claystone, gray 200-Coal 250 -Sandstone, gray, fine; siltstone, gray, and claystone, gray Coal 300 Coal -70

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
				, } 		350-	80
						450-	90
			-			500-	-100
						550-	110
						600-	-120
						650-	-130
						700 -	-140
						750 -	-150
						800	

note No: __ US-7996 Map: Culbertson Date 6/8/79 State Montana County: Roosevelt Elev: 2299 FT Location: T 28% R 56 W, Sec 7 Tract DDAC Drilled depth 400 FT Measured: 855 FT FSL 370 FT RWX FT Hole Size: 4 3/4 IN Air Wurch X Cored: Yes No X Remarks: _ NA RECORDED BYILLIAM JACKSON RECORDING SPEED _ RECORDED BYWILLIAM JACKSON GEOLOGIST YES DENSITY TC 2 RESISTIVITY SP GAMMA DEPTH SENS SETTING SENS.SETTING T.C. ___2 RANGE _200 500 RANGE 2K 100 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 391 FT. 5 393 FT. 398 FT 50+0 Sandstone, gray and brown, fine; and claystone, gray and brown 50-1-20 Coal 100-- 30 150 Coa1 Sandstone, gray, fine; siltstone, gray; and claystone, gray 200 - 50 250 Coal - 60 Sandstone, gray, fine; siltstone, gray; and 300 claystone, gray 70

-	LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
		S. Martiness	and the state of t		Mary Mary Mary Mary Mary Mary Mary Mary	\$3 Fract LGET	350 - - - - 400 -	80
							450	-90
_							500-	-100
							550-	-110
							600-	-120
							650 - - -	-130
						•	700  	-140
							750 - - - -	-150

note No: US-7997 Map: Bainville 2 SW Date: 6/8/79 State: Montana County: Roosevelt Eley: 2235 FT Location: T 29\$ R 56 X, Sec 1 Tract CCCC Drilled depth 440 FT Medsured: 24 FT FSL 185 FT FWL FT Hole size: 4 3/4 IN Air Water & Cored: Yes No W Remarks:_ NEO RECORDED BWILLIAM JACKSON RECORDING SPEED 20 RECORDED BY WILLIAM JACKSON GEOLOGIST MIN. YES DENSITY RESISTIVITY GAMMA DEPTH SENS SETTING SENS SETTING RANGE _ 2K 100 RANGE 200 500 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 429 429 FT. 436 50+0 Sandstone, brown and gray, 50 fine; and claystone, brown -20 and gray Coa1 100-Sandstone, gray, fine; and claystone, gray 150 Coal Sandstone, gray, fine; siltstone; and claystone, 200 -50 Coal 250 -- 60 300 -70

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	MF TER
	No.	Justin 1/1			19 19 19 19 19 19 19 19 19 19 19 19 19 1	350 -	
Sandstone, light-gray, very fine, siltstone, gray; and claystone, gray	Tony of the same	MANAGE STORMER				400-	80
	1			<b>\</b>		450-	90
						500-	-10
						550-	- - - -
						600-	- 12
						650-	-13
						700 -	-14
					×.	750	-15
						800	

Hole No: US-7998 Map: Bainville 2 SE Date: 6/9/79 State: Montana County: Roosevelt Elev: 2237 FT Location: T 30 % R 57 %, Sec 9 Tract CCCC Drilled depth 400 FT.

Measured: 54 FT FSt 297 FT FWL FT. Hole size: 4 3/4 IN Air Water & Cored: Yes No & Remarks: Logged over pit without source. RECORDED BWILLIAM JACKSON RECORDING SPEED MIN RECORDED BY WILLIAM JACKSON GEOLOGIST YES DENSITY TC 2 GAMMA SP RESISTIVITY DEPTH SENS.SETTING T.C. __2 SENS SETTING RANGE 200 RANGE _50 500 100 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 392 FT. 50+ 50--20 100--30 Sandstone, gray, fine; siltstone, gray; and 150 claystone, brownish-gray and gray 200 - 50 250 60 300 Coal 70

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Sandstone, gray, fine; and claystone, gray		Many rough		CATION AND SWEET LOVE VA	66	400-	- <b>8</b> 0 - <b>9</b> 0
				\$		500-	-110
						650	- I20 - I30
						750 -	-140 -150

Hole No: US-7999 Map Medicine Lake Dote: 6/9/79 State: Montana County: Roosevelt Elev: 2141 FT Location: T 30 X R 56 X, Sec 3 Tract BCCC Drilled depth Measured: 2530 FT KXX 125 FT. FWL FT. Hole size: 4 3/4 IN. Air Water X Cored: Yes No X Remorks: RECORDED BWILLIAM JACKSON RECORDING SPEED_ RECORDED BY WILLIAM JACKSON GEOLOGIST YES DENSITY RESISTIVITY GAMMA SP DEPTH SENS SETTING SENS SETTING 500 RANGE __200 500 RANGE _2K LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 572 FT. 574 FT 572 FT 579 FT 50 + 0 50--20 100-Sandstone, light-gray, very - 30 fine; and claystone, gray 150 -200-Coal Sandstone, light-gray, very 250 fine; and claystone, gray 60 Coal 300 - 70

LITHOLOGY	GAMMA	<b>S</b> . P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Sandstone, light-gray, very		HAM MARK MARKET WANTER AND THE				350 -	- 80
fine; and claystone, gray	Comment of the Market of the M	My Wind Many Many Many Many Many Many Many			2 EE	450-	-90
Sandstone, gray, very fine; and claystone, gray	W. Williams	1			Michael Michael	500-	-100
and Crayscone, gray		White took the same of the sam		Junit Junit		550-	110
						600-	120
						650	-
						750	-140
						800	-

	GEOLOGIS	YES	ORDED BYWI				7
LITHOLOGY		1	500 ED DEPTHS	ING ON TO	2 SIGE 2K S		FEET ABO
		393 F	391	FT. 5	398 FT	391 FT	50
Sandstone, red and grafine; and claystone, brown and gray	у,		The second of th		Markon Mary Mary Mary Mary Mary Mary Mary Mary	My W W W W W W W W W W W W W W W W W W W	100
Coal		Way James	Approximately by		Markey All Control		
Sandstone, light-gray, fine; and claystone, g		3	Variation 1		\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		250

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US- /91

LITHOLOGY	GAMMA	S. P.	STRIP LOG	DENSITY	RESISTIVITY	FEET	METERS
		Mary May May				350 -	- 80
	<b>(</b>				) 38 (111	450 -	- 90
						500-	-100
						550-	130
	·					650	
						700	-140
						750	-150
				<u> </u>		800	

Hole No: US-79101 Map: Bainville 2 SE Date: 6/10/79 State: Montana County: Roosevelt Elev: 2304 FT Location: T 29 R R 57 N, Sec 3 Tract AAAA Drilled depth 520 FT Measured: 190 FT FNL 220 FT FEL FT. Hole size: 5 IN Air Water & Cored: Yes No & Remarks: Logged in pit, no source, MM RECORDED BY WILLIAM JACKSON GEOLOGIST RECORDED BYWIILIAM JACKSON RECORDING SPEED YES DENSITY RESISTIVITY GAMMA SP DEPTH T.C. _ SENS. SETTING SENS SETTING 100 250 RANGE 50 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS à. 412 FT. 414 FT. 50+ 0 50 -20 Sandstone, brown and gray, fine to medium; and 100claystone, brown and gray 150 -200 -- 50 250-Coal 60 Sandstone, gray, fine; and claystone, gray 300 - 70 Coal

LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Coal  Sandstone, gray, fine; and claystone, gray	Month of the state	Application of the Mily fort		فالمحامد بدالما يعمل أعر بعديها ليرادمه العم	The first state of the state of	350-	- 80
	3					450-	-90
					96	500-	-100
						550-	-110
						600-	-120
						650 -	-130
	,					700 -	-140
						750 -	-150

Hole No: US-79102 Map Capeney's Lake Dote: 6/11/79 State: Montana County Roosevelt Elev: 2260 FT Location: T 30 R 57 , Sec 2 Tract ADDD Drilled depth 560 FT

Measured: 2480FT RXX 6 FT RXX FT. Hole size: 4 3/4 IN Air Water X Cored: Yes No X Remarks:___ YES RECORDED BY JOHN DANIEL RECORDING SPEED RECORDED BY JOHN DANIEL __ GEOLOGIST RESISTIVITY GAMMA SP DENSITY DEPTH SENS SETTING T.C. ___2_ SENS SETTING RANGE 200 RANGE 2K_ LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS œ 554 FT. 552 FT. 5 559 FT. 50+0 50-100-Sandstone, brownish-gray and gray, fine to coarse; and claystone, gray to dark-gray 150-200-- 50 Coal 250 -- 60 Sandstone, gray, fine to very fine; and claystone, gray 300-

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Sandstone, gray, very fine; and claystone, greenishgray and light-gray		March March Control of March M			W W W W W W W W W W W W W W W W W W W	400-	80
Coal		<b>Ž</b> _		, <u>(</u>		550-	-110
	Į					600-	-120
						650 -	-130
					•	700	-140

nole No: US-79103 Map: Bainville 1 SW Date: 6/11/79 State: Montana County: Roosevelt Elev: 2165 FT Location: T 30 X R 58 X, Sec 8 Tract ACCC Drilled depth 480 FT

Measured: 890 FT XXX 2620 FT XXX FT Hole size: 4 3/4 IN Air Water X Cored: Yes No X Remorks:_ NR RECORDED BY JOHN DANIEL RECORDING SPEED 20 RECORDED BY JOHN DANIEL _ GEOLOGIST YES RESISTIVITY DENSITY GAMMA DEPTH TC _____2 SENS.SETTING T.C. 2 SENS. SETTING RANGE _ 2K RANGE ____200__ 250 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 479 FT. 472 FT. 5 472 50+0 Sandstone, brown and brownish-yellow, fine to medium; and claystone, brown and gray 50 - 20 Coa1 100 - 30 150 -Sandstone, brownish-gray and gray, fine; and claystone! gray 200 - 50 Coal 250 Sandstone, light-gray, fine; - 60 and claystone, light-to dark-gray 300

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
	The state of the s	A Destroy of the best of the b		- Company	W may V V may V may	350 - - - - 400 -	-80
Coal Sandstone, light-gray, fine; and claystone, gray						450-	-90
				7	8 1 8 d	500-	- <b>10</b> 0
					v.	550-	-110
						600-	-120
						650	-130
						700 -	-140
			4.7			750 -	-150
						800-	

hole No: US-79104 Map Bainville 1 SW Date: 6/12/79 State: Montana County: Roosevelt Elev: 2210 FT Location: T 30% R 58%, Sec 15 Tract CDCD Drilled depth 480 FT Measured: 105 FT FSL 1880 FT FWL FT Hole size: 4 3/4 IN Air Water X Cored: Yes No X Remarks: Logged through pit, no source. RECORDED BY WILLIAM JACKSON GEOLOGIST YES GAMMA DENSITY RESISTIVITY SP DEPTH SENS SETTING SENS SETTING 200 RANGE 50 RANGE . LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 474 FT 472 FT. 479 472 FT 50+0 50 -20 Snaistone, light-gray, fine to very fine; siltstone, gray; and claystone, gray 100-Coal 150 200 Sandstone, gray, fine to 50 very fine; siltstone, gray; and claystone, gray 250 300 Coal 70

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Sandstone, light-gray, fine; siltstone, gray; and claystone, gray	The Man Control of the Control of th	Lampro M. M. M. Margaland		Stant Africa Stanton		350-	- 80
		J. W. Warden		Jan John John John John John John John Joh		450-	-90
	3			<u> </u>		500-	-110
						550-	120
							-130
						700	-140
						750	-150
						800	

hale No: US-79105 Map Bainville 1 SW Date: 6/13/79 State: Montana County Roosevelt Elev.: 2247 FT Location: T 30% R 58%, Sec 26 Tract DDDD Drilled depth

Measured: 77 FT FSL 66 FT RWX FT Hole size: 4 3/4 IN Air Water X Cored: FT. Hole size: 4 3/4 IN Air Warn X Cored: Yes No X Remarks: Logged in pit. XX RECORDED BY WILLIAM JACKSON GEOLOGIST RECORDED BYWILLIAM JACKSON RECORDING SPEED YES GAMMA RESISTIVITY SP DENSITY SENS SETTING SENS SETTING 200 RANGE _ 2K RANGE . LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 394 FT 392 FT. 392 FT 50-50 -20 Sandstone, brown and gray, fine; and claystone, gray to dark-gray 100 150 Coal 200 50 Sandstone, light-gray, very fine; siltstone, gray; and claystone, gray to dark-gray 250 60 300 -Coal

LITHOLOGY	GAMMA	<b>S</b> . P. `	STRIP	DENSITY	RESISTIVITY	FEET	METERS
						450-	-80 -90
						600-	-120
						700 -	
						750 -	

Tale No. US-79106 Map: Brush Date: 6/13/79 State: Montana County: Roosevelt Elev: 2240 FT Location: T 30 R R 58 , Sec 1 Tract DBBA Drilled depth 400 FT Measured: 2640 FT FSL 2040 FT RWX FT Hole size: 4 3/4 IN Air Water X Cored: Yes X No Remarks: Cored interval 25.6 feet to 36.85 feet. RECORDED BY JOHN DANIEL RECORDED BYWILLIAM JACKSONRECORDING SPEED_ _ GEOLOGIST RESISTIVITY **GAMMA** DENSITY SENS SETTING STC SENS SETTING RANGE __ 200_ 250 RANGE __ LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 391 FT. 398 FT 394 FT. 50 + 0Coal 50 Sandstone, light-gray, very fine Coal 100 Sandstone, light-gray, very fine to fine; siltstone, gray; and claystone, gray 150 40 Coal 200 - 50 250 Sandstone, light-gray, very fine to fine; siltstone, 300 gray; and claystone, gray 70

450- 450- 550- 700-	LITHOLOGY .	GAMMA	<b>S</b> . P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
450————————————————————————————————————	Coal	3	Total despondent or the state of the state o			76	-	- 80
550-							450-	-90
550- 600- 650-		[mate] strates						-100
650							1	-110
700 -							600-	-120
750							650 -	-130
750-					-		700 -	-140
			·				750 -	-150

RECO	RDED BY WILLIAM JACKSON GEOLOGIS	ST YES RECOR	DED BY WILLIA	M JACKSON	ECORDING SPEED	1
	LITHOLOGY	T.C. 2 RANGE 200	SENS SETTING 5	TC_2 RANGE_2	SENS.SETTING	FEET
	Sandstone, brownish-red, fine siltstone, gray; and claystone, gray  Coal  Coal	The state of the s			The state of the s	500
	Sandstone, gray, very fine; siltstone, gray; and claystone, gray				A Marine Marine Marine	25

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\				2	350-	
		M. M.		Š	\$	400-	-80
						450-	-90
	antiminini					500-	-100
14-1						550- 	-110
				776	Advisor, on Theseor, o Theseor, o	600 <del>-</del>	- 120
					1.6	650 - -	-130
						700 - 	-140
			-	STORY SEL	10.2	750 - 	-150
						800-	

note No: US-79108 Map: Bull Butte Date: 6/15/79 State: Montana County: Roosevelt Elev: 2381 FT Location: T 30 8 R 59 W, Sec 33 Tract BBBB Drilled depth 460 FT Measured: 170 FT FNL 110 FT FWL FT Hole size: 4 3/4 IN Air Warn X Cored: Yes No X Remarks:_ ĦΧ RECORDED BYWILLIAM JACKSON RECORDING SPEED RECORDED BY WILLIAM JACKSON GEOLOGIST YES DENSITY RESISTIVITY SP GAMMA DEPTH SENS SETTING SENS SETTING RANGE _2K RANGE __ 200 500 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 454 FT 458 FT 451 FT. 451 50+0 Sandstone, brown and gray, very fine; siltstone, gray; and clavstone, gray 50 -20 Coal Sandstone, gray, very fine to fine; siltstone, gray; 100and claystone, gray 150 Coa1 Sandstone, light-gray, very fine; siltstone, gray; and 200 claystone, gray 50 Coa1 250 60 Sandstone, light-gray, very fine; siltstone, gray; and claystone, gray 300

LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET
	y washing	100	13 13 13 13 13 13 13 13 13 13 13 13 13 1	Two wat	**************************************	350-
Coal Sandstone, light-gray, very		ALL CALLES AND		Ward OF		400-
fine; siltstone, gray; and claystone, gray	M	May My My May				
	3					500
	₹					+110
						550-
						600 - 120
						650 -130
						700140
						750150
		•				800

nole No: US-79109 Map: Bull Butte Date: 6/16/79 State: Montana County: Roosevelt Elev: 2458 FT Location: T 29 x R 59 x, Sec 17 Tract CCCD Drilled depth Measured: 55 FT RXXX 2190 FT FEL FT. Hole size: 4 3/4 IN Air Water X Cored: Yes No X Remarks: Lost circulation from 60-140 feet and 200-220 feet. NK RECORDED BYWILLIAM JACKSON RECORDING SPEED RECORDED BY WILLIAM JACKSON GEOLOGIST MIN YES GAMMA 2 DENSITY 2 RESISTIVITY SP SENS SETTING SENS SETTING T.C. __ RANGE 200 RANGE _ 2K 500 100 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 492 FT 494 FT 492 50+ 0 300 Regolith 50 -20 100-Sandstone, gray, fine to very fine; and claystone, brown and gray 150 Coal 200-Sandstone, gray, fine; siltstone, gray; and claystone, - 50 gray Coal 250 60 Sandstone, light-gray, fine to very fine; siltstone, gray; and claystone, gray 300

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
	A Company of the Comp	Manday John Mark			Let AM Charles	350-	-80
Sandstone, light-gray, very fine; and claystone, gray	TOWN AND AND AND AND AND AND AND AND AND AN	MANIMAN WALLAND WATER		Monday	A CONTRACTOR OF THE CONTRACTOR	450-	-90
	\$ \$	MIN/MIN		- VV		500-	-100
				<i>'</i>		550-	110
						600-	-120
*						650	-130
·						700	-140
						750	-150
						J 800	_

Hole No: US-79110 Map: Red Bank Creek Date: 6/17/79 State: Montana County: Roosevelt Elev: 2309 FT Location: T 29 R R 59 F, Sec 32 Tract DDCD Drilled depth 560 FT.

Measured: 30 FT FSL 1200 FT XXX FT. Hole size: 4 3/4 IN Air Water X Cored: Yes No X Remarks: Logged through pit. MM RECORDED BY WILLIAM JACKSON GEOLOGIST RECORDED BWILLIAM JACKSON RECORDING SPEED YES DENSITY RESISTIVITY **GAMMA** DEPTH SENS SETTING 100 SENS SETTING RANGE __ 200 RANGE _2K_ _500_ LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 552 FT 550 557 550 FT. FT. FI 50+ 0 Sandstone, brown and gray, fine; siltstone, gray; and claystone, gray 50 -20 Coal Sandstone, gray, very fine; 100 and claystone, gray - 30 Coal 150 Sandstone, light-gray, fine to fine; siltstone, gray; 200 and claystone, gray 50 250 60 Coa1 300 70

LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
		possession of the last of the second the second of the sec		Wally V' Wally		350 -	80
Sandstone, gray, very fine; siltstone, gray; and	Www.	Mary Man Magalit Mayora		May May	J. Mrs. M. J.	450-	-90
claystone, gray		Whater the				500-	-100
Coal Coal		3		7	\$7. FEET 1.051	550-	110
						600-	-120
	*					650 -	-130
						700 -	-140
	·					750 -	-150
						800-	

note No: US-79111 Map: Bainville 4 NW Date: 6/19/79 State: Montana County: Roosevelt Elev: 2199 FT Location: T 28% R 59 %, Sec 19 Tract DDDD Drilled depth _____ 560 FT.

Measured: 72 FT FSL 52 FT FEL FT. Hole size: 4 3/4 IN Air Warn X Cored: Yes No X Remorks:_ NI RECORDED BYWILLIAM JACKSONRECORDING SPEED RECORDED BY WILLIAM JACKSON GEOLOGIST YES DENSITY 2 RESISTIVITY SP GAMMA SENS SETTING SENSSETTING T.C. _ RANGE _ 200 RANGE 2K 500 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 552 FT 552 FT. 5 558 FT 554 FT. 50+0 Sandstone, gray, fine; siltstone, gray; and claystone, 50gray and brown -20 Coal 100-- 30 Sandstone, gray, very fine; siltstone, gray; and claystone, gray 200-- 50 250 -60 Coal Sandstone, gray, fine; and 300 claystone, gray Coal

LIŤHOLOGY	GAMMA	<b>S</b> . P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Sandstone, gray, very fine;	M.	Mary Market			2/	350-	
siltstone, light-gray; and claystone, gray and blue-gray		Yank Minner Law		hara hara		400 -	- 80
Coal		The production leading by the forest feet of the forest			. 5	-	- 90
	M _s	Why styrah (s)				450-	
Coal	1	John Warney				500-	-100
Sandstone, gray, very fine; siltstone, gray; and claystone, gray	Š					550-	-110
		7.			)	600-	- 120
	·					650-	-130
						700	
						700 - - - -	-140
					•	750 -	-150
						800-	

CORDED BY WILLIAM JACKSON GEOLOGIS	YES			T
LITHOLOGY	T.C. 2 SENS SETTING RANGE 200 500	RANGE _2K	SENS SETTING	DE P
	LOGGED DEPTHS 394 FT 391 FT	1 4 1	ED DEPTHS FT 391 FT	lu
Sandstone, gray, fine to very fine; and claystone, gray and brown  Coal  Sandstone, gray, fine to very fine; and claystone, light-gray to gray  Coal	Many Many Many Many Many Many Many Many			50
Sandstone, light-gray, very fine; and claystone, gray	A Complete Company			250

and claystone, gray Coal  400-  450-  500-  600-	METERS	FEET	RESISTIVITY	DENSITY	STRIP	\$. P.	GAMMA	LITHOLOGY
450- 450- 500- 600-		350-		3	27.57.2 	WWW.		and claystone, gray
500- 500- 600-	- 80	400-		}		<b>1</b>		
500- 550- 600-	-90	450 - -						
650-	-100	500-						
650	110	1						
700	-120	600-						
	-130	650 -						
	140	700						•
750	-150	750						

note No: US-79113 Map: Bainville 1 SW Date: 6/21/79 State: Montana County: Roosevelt Elev: 2403 FT Location: T 29% R 58 W, Sec 17 Tract DDAA Drilled depth 615 FT Measured: 1230FT FSL 95 FT FEL FT. Hole size: 4 3/4 IN Air Water & Cored: Yes No & Remarks: Logged with pit and without source. RECORDED BYWILLIAM JACKSON RECORDING SPEED 20 RECORDED BY WILLIAM JACKSON GEOLOGIST MIN YES RESISTIVITY DENSITY GAMMA 2 SP DEPTH SENS.SETTING SENS. SETTING RANGE 50 500 100 RANGE 200 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS œ 609 607 614 FT 607 FT. 50+ 0 50--20 Sandstone, gray, fine to very fine; siltstone, gray; and claystone, gray 100-150 -Coa1 Sandstone, gray, fine; siltstone, light-gray; and claystone, gray 200-- 50 Coal 250 -Sandstone, gray, fine to 60 very fine; and claystone, gray 300 70

LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
	\$	MA PANA			}	350-	
Sandstone, gray, fine to very fine; and claystone, gray	The state of the s	WANNE TO THE WANTER WANTER				400 -	- 80
Coal	Mando	And Marchard Com		A Consideration		450-	-90
Sandstone, gray, fine; siltstone, gray; and claystone, gray	Minima	the throntony		Land Andrew	}	-	-100
Coal		AM Let properties and why was a second		*		500- - -	
Sandstone, light-gray, fine; siltstone, gray; and claystone, gray		2		YAMA JAMA JAMA JAMA JAMA JAMA JAMA JAMA		550-	-110
Coal Sandstone, light-gray, very fine and claystone, gray		A Company of the state of the s		A A	100 A) W	600-	-120
						650 -	-130
						700 -	-140
						750 - -	-150
						800-	

note No: US-79114 Map: Bainville 3 NE Date: 6/21/79 State: Montana County: Roosevelt Elev: 2139 FT Location: T 29 R 57 R, Sec 25 Tract BBBB Drilled depth 280 FT Measured: 65 FT XXX 226 FT FWL FT. Hole size: 4 3/4 IN Air Water X Cored: Yes No X Remorks:_ MO RECORDED BY MARY ALICE SPENCE BEOLOGIST RECORDED BWILLIAM JACKSON RECORDING SPEED. YES DENSITY C 2 RESISTIVITY GAMMA SP DEPTH SENS SETTING SENS SETTING RANGE 200 100 500 RANGE _2K LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 274 279 272 272 50 -Sandstone, light-gray, very fine; siltstone, gray; and 50claystone, gray -20 100-Coal Sandstone, gray, very fine; siltstone, gray; and 150 claystone, gray Coal 200-Sandstone, gray, fine; and claystone, gray 250 60 300

LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
						350-	
						-	80
						400-	
						-	-90
						450-	
						500-	-100
						550-	110
\ <u></u>						600-	- 120
						650	-130
						700	-140
						750	-
							-150
						800	

ECORDED BYWILLIAM JACKSON GEOLOGI	ST YES RECORDED BWILLIAM JACKSON RECORDING SPEED 20
LITHOŁOGY	GAMMA SP T.C. 2 SENS SETTING TO SENS SETTING T
Alluvium  Sandstone, fine to coarse, white and brown  Claystone, gray; some carbonaceous	51
Sandstone, gray, fine; siltstone, gray; and claystone, gray	
Claystone, gray; some Coal  Claystone, gray; and siltstone, gray	25

note No: US-79114 Map: Bainville 3 NE Date: 6/21/79 State: Montana County: Roosevelt Elev: 2139 FT Location: T 29 R 57 N, Sec 25 Tract BBBB Drilled depth 280 FI Measured: 65 FT XXX 226 FT FWL FT. Hole size: 4 3/4 IN Air Wuser X Cored: Yes No X Remarks: NO RECORDED BY MARY ALICE SPENCE BEOLOGIST RECORDED BWILLIAM JACKSON RECORDING SPEED YES DENSITY C 2 RESISTIVITY SP SENS SETTING SENS SETTING RANGE __ 200 RANGE _2K 100 500 LITHOLOGY STRIP LOGGED DEPTHS LOGGED DEPTHS 274 272 279 272 FT. 50 -Sandstone, light-gray, very fine; siltstone, gray; and 50claystone, gray -20 100-Coal Sandstone, gray, very fine; siltstone, gray; and 150claystone, gray Coa1 200-Sandstone, gray, fine; and claystone, gray 250 60 300 70

LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
						350-	
						_	- 80
						400-	
						-	
						_	- 90
						450-	
						-	
						-	-10
						500-	
						-	1
							1,,,
						550-	
							+
				84			-1:
						600-	1 "
							+
							-
						650	-13
							+
							-
						700	-1.
							+
							-
						750	-1:
							+
							1
						1800	1

CORDED BYWILLIAM JACKSON GEOLOG	GIST YES RECOR	DED BWILLI	AM JACKSON	RECORDING S	SPEED 20	_
LITHOLOGY	GAMMA T.C2 RANGE 100	S P SENS SETTING 100	DEN TC_2 RANGE	SITY RESIS	SETTING SETTING	DE P
		DEPTHS 482 FT	1 4	LOGGED DEP		FE
Alluvium			**************************************			50
Sandstone, fine to coarse, white and brown		Rest T				50
Claystone, gray; some carbonaceous	3					100
Sandstone, gray, fine; siltstone, gray; and claystone gray	e,	ALWAND AND AND AND AND AND AND AND AND AND		N-V/M /m	W. James	150
Claystone, gray; some carbonaceous		MANAGORAL AND		No.	A JAMANIN.	200
Coal					57	250
Claystone, gray; and siltstone, gray		- W				

LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Sandstone, gray, very fine; and claystone, gray  Coal		South Marmon Comp ) south		Mymy	4 (S)	350 -	- 80
Sandstone, gray, very fine; and claystone, gray; some carbonaceous	View I I I I I I I I I I I I I I I I I I I	Mary Mary Mary				450-	-90
	***	\{\bar{\}_{\bar{\}}\}	224.24	3		500-	-100
	3				5 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	550-	-110
						600-	-120
						650	-130
						700	-140
						750	-150

Hole No: US-79115 Map: Bainville 2 SE Date: 7/28/79 State Montana County: Roosevelt Elev: 2187 FT Location: T 298 R 57 W, Sec 11 Tract DDDD Drilled depth 500 FT Measured: 90 FT FSL 85 FT XXX FT Hole size: 5 1/8 IN Air X Warn Cored: Yes No X Remorks:_ RECORDED BY WILLIAM JACKSON GEOLOGIST RECORDED BUILLIAM JACKSON RECORDING SPEED 20 YES DENSITY 2 GAMMA SP RESISTIVITY SENS SETTING ST.C. T.C. __2 SENS SETTING RANGE 2K LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 482 FT. 5 490FT 482 FT. 485 FT 50+0 Caliper 50 100-- 30 200-250 -60 300-

<del> </del>	LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
							350-	
							400-	- 80
							450-	-90
				~			500-	-100
							550-	-110
							, -	- 120
	3						600-	
							650	-130
							700	-140
							750 -	-150
							800	

hole No: US-79116 Map: Bainville 2 SE Date: 7/29/79 State: Montana County: Roosevelt Elev: 2239 FT Location: T 29 X R 57 X, Sec 20 Tract AAAA Drilled depth 440 FT Measured: 190 FT KXK 20 FT XXXX FT Hole size: 5 1/8 IN Air Walci X Cored: Yes No X Remarks:__ RECORDED BY WILLIAM JACKSON GEOLOGIST XX RECORDED BWILLIAM JACKSON RECORDING SPEED_ MIN. YES SP DENSITY RESISTIVITY GAMMA DEPTH SENS SETTING SENS SETTING T.C. _ T.C_ RANGE 2K RANGE 200 250 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 433 FT FT. 438 431 FT. 431 50+0 -10 Regolith, brown 50. -20 Sandstone, light-gray, very fine; claystone, gray; and 100siltstone, gray -30 Coal Sandstone, light-gray, very fine, and claystone, gray 200 50 Coal 250 Sandstone, light-gray, very fine; claystone, gray; some carbonaceous; and siltstone, gray 300 70

	LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
	Sandstone, light-gray, very fine; and claystone, gray, some carbonaceous	As Low My Source States	MAN THE WASHINGTON WHEN THE WASHINGTON				350   400	- 80
						3	450-	90
				-1			500-	-100
							550-	110
							600-	-120
-							650	130
-							700	-140
							750	-150
							800	-

hole No: US-79116 Map: Bainville 2 SE Date: 7/29/79 State: Montana County: Roosevelt Elev: 2239 FT Location: T 29 X R 57 X, Sec 20 Tract AAAA Drilled depth 440 FT FT. RWX -Measured: 190 FT RSK 20 FT. Hole size: 5 1/8 IN Air Water X Cored: Yes No X Remarks: RECORDED BYWILLIAM JACKSON XXX RECORDED BWILLIAM JACKSON RECORDING SPEED _ GEOLOGIST YES DENSITY C ___2 RESISTIVITY GAMMA SP DEPTH 007 T.C. ___2 SENS.SETTING RANGE _2K METERS RANGE __200 LITHOLOGY FEET ٩ LOGGED DEPTHS LOGGED DEPTHS F.T. 433 FT. 431 FT. 438 50+0 Caliper -10 50--20 100-- 30 150--40 200-- 50 FEET 250 -- 60 300 -70

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
		•		Maddon My Lings		350-	80
						450-	-90
						500-	-10
						550- -	-110
						600-	-12
						650 - - -	-13
						700 -	-14
						750 -	-150
						800-	

lev.: leasi emo	No: US-79117 Map: Bainville 2 SW  2170 FT Location: T 29\$ R 56\$  ured: 5 FT R&L 2570 FT RWX  urks:	,Sec 23 Tract BAAA (	Drilled depth	440 F
	LITHOLOGY	T.C. 2 RANGE 200 SENS SETTIN LOGGED DEPTHS 433 FT 431 FT	DENSITY RESISTIVITY SENS SETTING 100 LOGGED DEPTHS	FEET
	Alluvium, brown; and gravel  Sandstone, brown, medium  Siltstone, gray, very fine; and claystone, gray to gray-blue  Coal  Sandstone, gray, very fine; claystone, gray some carbonaceous			50-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1
	Coal			250-
	Sandstone, gray, very fine; and claystone, gray			300-

LITHOLOGY	GAMMA	\$. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Sandstone, gray, fine; and claystone, gray		Addy down or of the state of th				350 - - - - 400 -	80
				***		450-	-10
		i				550-	1 11
						600-	- 12
						650	
						750	1
						800	

19.18

LITHOLOGY	RANGE 200 LOGGED	S P SENS. SETTIM 250	T.C.		RESISTIVITY SENSISETTING 100	DEF
			1 1	LOGGED		F
	393 FT.		STRIP	398 FT.		7.
			٥٥٠٠١		37.	50
Regolith			8	\$		
Sandstone, gray, very fine and claystone, brown and g	The state of the s			www.wl.	\$ .	50
Coal Sandstone, brown, fine;					-   E	10
and claystone, blue-gray a gray	ind.			A Allem		150
Limestone, gray				V MANA MANA	- What	20
Claystone, gray to blue-gr	av:			NAMAN .		25

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
			三名が			350-	- 80
						450-	-90
						500-	-100
						550-	-110
<b>*</b> ~						600-	-120
						650-	-130
						700 -	-140
						750 -	150
						800	

CORDED BY WILLIAM JACKSON GEOL	GAMMA S P DENSITY RESISTIVITY	N
LITHOLOGY	RANGE   200   250   RANGE   2K   100	FEET
Sandstone, red and brownish- yellow, fine; and claystone brownish-yellow, and gray  Claystone, gray  Coal  Sandstone, gray, fine; and claystone, gray  Coal  Claystone, gray and blue-gray  siltstone, gray; and		50-
sandstone, gray, fine		250 -

LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Claystone, gray			<b>3</b>	1 3		350 - -	
		· · · · · · · · · · · · · · · · · · ·				-	80
				<i>j</i>		400-	
						-	-90
						450-	
		•				500-	-10
						-	
				•		550-	-111
						-	
<b>`~</b>						600-	-12
						-	
						650-	-13
						-	1
						700 -	-14
*						-	-
						750 -	-15
.5.						-	1

Hole No: US-79120 Map: Bainville SW Date: 7/31/79 State: Montana County: Roosevelt Elev: 2024 FT Location: T 27 X R 58 x, Sec 10 Tract ADCC Drilled depth 42- FT Measured: 2580 FT FNL 1316 FT FEL FT. Hole size: 5 1/8 IN. Air Water X Cored: Yes No X Remarks:_ RECORDED BY RUSSELL PATTERSON GEOLOGIST RECORDED BWILLIAM JACKSON RECORDING SPEED 20 YES DENSITY T.C __2 RESISTIVITY GAMMA SP DEPTH SENS SETTING SENS.SETTING 200 RANGE 50 RANGE _ LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 412 FT. 420 FT. 415 FT. 412 50+0 07-10 Regolith 50-Sandstone, gray, very fine; -20 and claystone, gray 100-- 30 Coal 150-Sandstone, gray, very fine; and claystone, gray 200-Coal - 50 Sandstone, gray, very fine; 250 and claystone, gray and blue-gray 60 300 Coal 70

	LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
	Sandstone, gray, very fine; and claystone, gray  Coal  Coal  Sandstone, gray, very fine; and claystone, gray				Market Ma		350-	-80
-		3					450 – 450 –	- 90
-							5( -	-100
		-					550- - -	-110
							600-	-120
							650-	-130
							700 -	
-			Ž-m				750 -	1

9121

TC. 2 SENS SETTING PANGE 200 DEPTHS SANS SETTING PANGE 2K SENS SETTING PANGE 2K SETT	easured: <u>45 FT FSL 730 FT xew</u>	S8 No. Sec 28 Tract DDCD Drilled depth 400  FT. Hole size: 5 1/8 IN. Air Water X Cored: Yes X I  LOGIST NO. RECORDED BY WILLIAM JACKSON RECORDING SPEED 20
Regolith  Sandstone, brown, fine, and claystone, gray, fine, and claystone, gray and blue-gray, some carbonaceous  Coal, with claystone parting  Sandstone, gray, fine; and claystone blue-gray, some carbonaceous		GAMMA T.C. 2 SENS SETTING PANGE 200 SENS SETTING PANGE 2K  LOGGED DEPTHS  SENS SETTING PANGE 2K  LOGGED DEPTHS  LOGGED DEPTHS  DENSITY TC 2 SENS SETTING PANGE 2K  LOGGED DEPTHS
Sandstone, brown fine; and claystone, gray, fine; and claystone, gray and blue-gray, some carbonaceous  Coal, with claystone parting  Sandstone, gray, fine; and claystone parting		50
Sandstone, gray, fine; and claystone, gray and blue-gray, some carbonaceous  Coal, with claystone parting  Sandstone, gray, fine; and claystone blue-gray	Sandstone, brown, fine, and	50
Coal, with claystone parting  Coal, with claystone parting  Sandstone, gray, fine; and claystone blue-gray	Coal	
Coal, with claystone parting  Sandstone, gray, fine; and claystone blue-gray	claystone, gray and blue-gr	
Sandstone, gray, fine; and	Coal, with claystone partin	ng 2000
clayetone blue-gray	Condatano aray fine' and	250
		300

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LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
		SAMPANA MARINA				350 -	80
						450-	90
						500-	-100
						550-	-110
						600-	- 120
						650 - -	-130
						700 -	-140
						750 - -	-150
						800-	

Hole No: US-79122 Map: Bainville SE Date: 8/1/79 State: Montana County: Roosevelt Elev.: 2020 FT Location: T 26 % R 59 W, Sec 11 Tract DDCC Drilled depth Measured: 1020 FT KXX 710 FT FEL FT Hole size: 5 1/8 IN Air Water X Cored: Yes No X Remarks:_ YES RECORDED BWILLIAM JACKSON RECORDING SPEED 20 RECORDED BY WILLIAM JACKSON GEOLOGIST RESISTIVITY DENSITY SP GAMMA DEPTH SENS SETTING SENS SETTING T.C ___2_ T.C. _ RANGE 200 RANGE ZK LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS FT. 5 575 FT. 50+0 0-10 Alluvium 50--- 20 100-- 30 Sandstone; and siltstone; 150 and claystone, gray to blue; and coal 200-- 50 250 - 60 300 Coal Sandstone, gray, fine; siltstone; and claystone, white to blue-gray

LITHOLOGY	GAMMA	<b>S</b> . P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
		3			N.	350-	
Coal Sandstone; and claystone, gray	Š			Mary W by and		400-	- 80
Sandstone; and claystone, gray to brown; and limestone		1			-	450-	-90
Coal					- ₹ ;; - ₹ ;;	500-	-100
Coal Sandstone; and claystone, gray		1 <b>4</b>				550-	110
						600-	-120
						650 - -	-130
				-		700 -	-140
						750 -	-150
						800-	

Hole No: US-79123 Map: Bainville SE Date: 8/2/79 State: Montana County: Roosevelt Eley: 2216 FT Location: T 27 % R 59 W, Sec 11 Tract CCCC Drilled depth 600 FT. Measured: 65 FT FSC 15 FT XXXX FT Hole size: 5 1/8 IN Air Water X Cored: Yes No X Remarks:___ SX(X) RECORDED BYWILLIAM JACKSON GEOLOGIST RECORDED BWILLIAM JACKSON RECORDING SPEED 20 MIN. YES DENSITY SP RESISTIVITY GAMMA DEPTH T.C. 2 SENS SETTING SENS. SETTING RANGE 2K RANGE _200_ 500 100 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS  $\alpha$ 593 FT. 600 FT. 593 FT 50 + 00410 Sandstone, brown, fine to very fine; and claystone, 50--20 gray and blue-gray Coal 100-- 30 150-Sandstone, gray, very fine; siltstone, gray; and -50 claystone, gray 250 -60 300-

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Sandstone, gray, fine to very fine; siltstone, gray; and claystone, gray	That more and the second	They was a grant with the state of the state		Wat have made the	AND THE WAY OF THE PARTY OF THE	350 - - - 400 - - - - 450 -	80
Coal				beromen hand		500-	-100
		\$				600-	- 120
	, (4) (4)				2	650	-130
				1		700 -	-140
						750 -	-150
						800	

CORDED BY WILLIAM JACKSON GE	OLOGIST YES RECORDED BWILLIAM JACKSON RECORDING SPEED  GAMMA SP DENSITY RESISTIVITY	
LITHOLOGY	T.C.   2     SENS SETTING   T.C.   2     SENS SETTING   RANGE   200   250     C   2	EET
Regolith  Sandstone, tan and gray, fine to very fine; and claystone, gray  Coal  Sandstone, gray, fine; and claystone, gray		500 500 2500 2500

LITHOLOGY	GAMMA	\$. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Coal						350-	-80
Sandstone, gray, fine; and claystone, gray				المحملة		450	-90
		<u>}</u> ,		<b>}</b>	7W * #	500-	-100
						550-	-110
* ~						600-	-120
						650 -	
						700 - - - - 750 -	
		•				800-	-150

Hole No: US-79125 Map: Trenton NW Date: 8/7/79 State North Dakota County: Williams Elev: 2247 FT Location: T154% R103 , Sec 8 Tract DDDD Drilled depth 500 FT Measured: 97 FT RNX 50 FT XXX FT. Hole size: 5 1/8 IN Air Water X Cored: Yes No X Remorks:_ ХK RECORDED BY WILLIAM JACKSON GEOLOGIST RECORDED BYWILLIAM JACKSONRECORDING SPEED __ 20 YES GAMMA SP DENSITY RESISTIVITY DEPTH SENS SETTING T.C. ___2 SENS.SETTING T.C ___ RANGE 200 RANGE _ 1K LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS  $\bar{\alpha}$ 492 FT. 5 495 FT 500 FT. 492 FT 50+ 0 04 -10 50-S.P. -20 Res. 100-150-200-- 50 250 -60 300 70

LITHOLOGY	GAMMA	<b>\$</b> . P.	STRIP	DENSITY	RESISTIVITY	FEET	00111
					- 14	350-	
						-	
							- 80
						-	00
					1	400-	
					- 13	-	- 90
						450	
					9.1	450	
						-	
						]	-100
						500-	
						+	
						]	
						1	-110
						550-	
						1	
						4	
							- 120
<b>(</b>						600-	
						4	
						-	
					-	650-	-130
						4	
						1	
						7	
						700 -	-140
						1	
						7	
						4	
						750 -	150
						-	
						-	
						t 008	

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note No: US-79125 Map: Trenton NW Date: 8/7/79 State North DakotaCounty: Williams Elev: 2247 FT Location: T154X R 103W, Sec 8 Tract DDDD Drilled depth 500 FT Measured: 97 FT. FSL 50 FT. KWX FT. Hole size: 5 1/8 IN Air Water X Cored: Yes No X Remarks:___ NX RECORDED BY WILLIAM JACKSON GEOLOGIST RECORDED BYWILLIAM JACKSON RECORDING SPEED YES GAMMA SP DENSITY C 2 RESISTIVITY DEPTH SENS SETTING T.C. _ SENS SETTING RANGE 200 RANGE 1K 100 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 495 FT. 492 FT. 500 FT. - 0 50 -20 Sand and sandstone, brown and gray; and claystone, gray 100 Coal Sandstone, gray; and claystone, gray 200 Coal 250 Sandstone, gray, very fine; siltstone, gray; and 60 claystone, gray 300

LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Sandstone, gray, very fine; and claystone, gray  Coal		Market Ma				350-	-80
Sandstone, gray, very fine; siltstone, gray; and claystone, gray				Thousand the second		450	-90
				1	€,	500-	-100
	Í			. 7		550-	-110
						600-	- 120
						650-	-130
				1		700 -	-140
				7		750 - - - -	-150

Hole No: US-79126 Map: Trenton NW Date: 8/8/79 StateNorth DakotaCounty: Williams Elev: 2369 FT Location: T154 R 103 , Sec 29 Tract AAAA Drilled depth Measured: 312 FT XXX 65 FT RWX FT. Hole size: 5 1/8 IN Air Water X Cored: Yes No X Remorks:__ N CX RECORDED BY CHRIS MURPHY RECORDED BYWILLIAM JACKSON RECORDING SPEED 20 GEOLOGIST YES RESISTIVITY GAMMA SP DENSITY DEPTH T.C_ SENS SETTING SENS.SETTING RANGE _200 RANGE 1K 500 LITHOLOGY STRIP LOGGED DEPTHS LOGGED DEPTHS 550 FT. 557 FT. 550 FT. 50+0 0-110 50--20 Sandstone, brown, fine; 100claystone, gray and brown; -30 and siltstone, gray 150 -- 40 Coal 200 -Coal - 50 250 -Coal, with clay parting - 60 Sandstone, gray, very fine; 300 and claystone, gray 70

LITHOLOGY	GAMMA	S. P.	STRIP LOG	DENSITY	RESISTIVITY	FEET	METERS
Sandstone, gray, very fine; siltstone, gray; and		Mary Mary Mary Mary Mary Mary Mary Mary	T ==		¥7	350-	
claystone, gray Limestone, gray	Ammy .			3	AM July 1	400-	80
Coal		The state of the s			\$ \frac{1}{2}	- - 450-	-90
Sandstone, gray, very fine;	3	Mary Mary Mary St.		h	745 WV	-	100
siltstone, blue-gray and gray; and claystone, blue-gray and gray		SELECTION OF THE SELECT			MV XX	500-	-100
	Ž	Š		ì		550-	-110
				1		600-	-120
			Manner			1	
						650	·130
						700	140
						750-	150
	*					1	

hole No: US-79127 Map: Bone Trail SW Date: 8/9/79 State North DakotaCounty: Williams Elev: 2426 FT Location: T156% R 103 , Sec 32 Tract CCCC Drilled depth Measured: 29 FT RXX 57 FT FWL FT. Hole size: 5 1/8 IN Air Water X Cored: Yes No X Remarks: XX RECORDED BY WILLIAM JACKSON GEOLOGIST RECORDED BYWILLIAM JACKSON RECORDING SPEED ___ YES RESISTIVITY DENSITY **GAMMA** SENS. SETTING SENS.SETTING 100 RANGE 1K 250 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 600 FT. 592 FT. 594 50+0 Regolith Sandstone, gray, medium; and claystone, brown 50 and gray 100-Coal 30 150 Sandstone, gray, very fine; siltstone, gray; and claystone, gray and bluegray 50 250 60 Coal Sandstone, gray, very fine; 300siltstone, gray; and claystone, gray 70

LITHOLOGY	GAMMA	S.P.	STRIP LOG	DENSITY	RESISTIVITY	FEET	METERS
Sandstone, gray, very fine; siltstone, gray; and claystone, gray and blue-gray  Coal				WINDS AND		350 - - - 400 - - - 450 -	-80 -90
Sandstone, gray, very fine; siltstone, gray; and claystone, blue-gray	WW/WW/WW			Aulthorness and an annual and an annual and an annual and an		550-	-110
		Ź		, <u>}</u>		600-	- 120
						650	-130
						700 -	-140 ;
						750 -	-150
						008	•

hole No: US-79128 Map: Bull Butte Date: 8/9/79 State North DakotaCounty: Williams Elev: 2379 FT Location: T155 R R104 , Sec 12 Tract BBBB Drilled depth 600 FT. Measured: 78 FT KXX 30 FT. FWL FT. Hole size: 5 1/8 IN Air Walni 🛈 Cored: Yes 🗌 No 🗓 Remarks: Denisty logged without source RECORDED BY CHRIS MURPHY RECORDING SPEED RECORDED BY CHRIS MURPHY GEOLOGIST XXX DENSITY RESISTIVITY SP GAMMA DEPTH SENS SETTING T.C. __ SENS SETTING RANGE __200 RANGE 50 100 LITHOLOGY ۵. LOGGED DEPTHS LOGGED DEPTHS à. 592 FT. 600 FT 595 FT 50 + 0Sandstone, brown, very fine; and claystone, gray 50. -20 Coal 100-Sandstone, gray, very fine; - 30 claystone, gray and bluegray . 150--40 Sandstone, gray, very fine; 200and claystone, dark-gray - 50 Coal 250 - 60 Siltstone, gray; and claystone, gray and bluegray 300 70

LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Sandstone, gray, very fine; siltstone, gray; and claystone, gray and blue-gray Coal						350 -	-80
Sandstone, gray, very fine; siltstone, gray; and claystone, gray and bluegray						450-	-90 -100
Coal Sandstone, gray, very fine; and claystone, blue-gray						550-	-120
							-130
						750	-150

Hole No: US-79129 Map: Bull Butte Date: 8/12/79 StateNorth DakotaCounty: Williams Elev: 2515 FT Location: T156 R 104 , Sec 24 Tract BBBB Drilled depth 720 FT. Measured: 23 FT FSL 80 FT FWL FT Hole size: 5 1/8 IN Air Water & Cored: Yes No X Remarks: Density logged without source. NN RECORDED BY WILLIAM JACKSON GEOLOGIST RECORDED BYWILLIAM JACKSONECORDING SPEED _20. YES GAMMA SP DENSITY RESISTIVITY SENS SETTING SENSSETTING T.C. _ T.C_ RANGE 50 RANGE _ 200 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 714 FT. 712 FT. 712 FT. 50+0 04-10 Claystone, gray to dark-gray 50--20 Coal 100-- 30 Coal Sandstone, gray, very fine; and claystone, dark-gray 150 --40 Coal 200-- 50 Sandstone, gray, very fine; 250 and claystone, gray - 60 Coal 300 Claystone, gray Coal 70 Bandstone, gray, very fine; and claystone, gray

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Sandstone, gray, very fine; and claystone, gray				المساهر المساعر المساهر المساهر المساهر المساهر المساهر المساهر المساهر المساعر المساهر المساهر المساهر المساهر المساهر المساهر المساهر المساعر المساهر المساهر المساهر المساهر المساهر المساهر المساهر المساع		350 - - - - - 400 -	-80
Coal	The state of the s	AND			Mary Warmen Warner	450 - - - - - 500 -	-90 -100
Sandstone, gray, very fine; and claystone, gray		And the state of t		المراجعة الم		550- - -	-110
	The American	And he had the state of the sta		man de la companya de		600-	-120
Coal Sandstone, gray, very fine; and claystone, gray					- Ard Land And The	700 -	-140
	<b>}</b>			<b>}</b>		750 - - - -	-150
	1					800-	]

Hole No: US-79130 Map: Bone Trail SW Date: 8/13/79 StateNorth Dakota County: Williams Elev: 2413 FT Location: T 1568 R 103W, Sec 17 Tract BAAA Drilled depth 600 FT. Measured: 150 FT. FNL 2350 FT FWL FT. Hole size: 5 1/8 IN. Air Water X Cored: Yes No X RECORDED BY CHRIS MURPHY __ GEOLOGIST RECORDED BY CHRIS MURPHY RECORDING SPEED 20 YES GAMMA RESISTIVITY SP DENSITY DEPTH T.C. ____2 SENS SETTING SENS SETTING RANGE __100 250 RANGE 2K LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS œ ME 597 FT. 593 FT. 600 FT 50-Regolith 50--20 100-- 30 150 -Sandstone, gray, very fine; claystone, brown and gray, with some clinker 200 -- 50 250 -- 60 Coal Coal 300 Claystone, gray and bluegray; and siltstone, gray

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Claystone, blue-gray; and siltstone, gray						350 - - - - 400 -	. 80
Coal Claystone, blue-gray Coal	The state of the s			17 Jan 19	N. W.	450-	-90
Sandstone, gray, very fine; and claystone, blue-gray	A. Warana			Market		500-	
Coal	A MANAGE AND A MAN			and the second	<b>₹</b>	550-	
	{				~	600-	-130
							-140
						750	-
						800	

Hole No: US=79131 Map: Bone Trail SW Date: 8/14/79 Stat North Dakota County: Williams Elev: 2401 FT Location: T156 R 103 , Sec 35 Tract BBBB Drilled depth Measured: 10 FT KXX 12 FT FWL FT Hole size: 5 1/8 IN Air Water X Cored: Yes No X Řemarks:_ FT. CVX. RECORDED BY CHRIS MURPHY GEOLOGIST RECORDED BY CHRIS MURPHY RECORDING SPEED _20 YES DENSITY GAMMA RESISTIVITY DEPTH SENS. SETTING SENS.SETTING METERS 500 RANGE _2K LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 593 FT. 600 FT. 50+ Sandstone, brown, very fine; and claystone, brown 50--20 Coal Coa1 Coal. 100-Sandstone, gray, very fine; - 30 siltstone, gray; and claystone, gray 150 Coal Sandstone, gray, very fine; and claystone, gray Coal 200 50 250 Coal 60 Claystone, blue-gray 300 Phosphatic lime 70 Claystone, blue-gray; and siltstone, gray Coa1

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LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Coal					The state of the s	350 -	- 80
Sandstone, gray, very fine; siltstone, gray; and claystone, blue-gray	Section of the second of the s	WATER AND			MANAJANA 68	450-	- 90
Coal				V. J.	) Arman	500-	-100
Coal						1	
Sandstone, gray, very fine; siltstone, gray; and claystone, gray					3	550-	-110
			<u> </u>			600-	-120
						650	-130
						700 -	-140
						750 -	-150
	L			-		800	

CORDED BY WILLIAM JACKSON GEOLG	DGIST YES RECORDED BY ALL	AN PE	ETAJA RECORDING SPEED_	
LITHOLOGY	T.C. 2 SENS SETTIN 500 LOGGED DEPTHS 596 FT 593 FT	RIP	DENSITY TC 2 SENS SETTIN RANGE 2K 100  LOGGED DEPTHS 600 FT 593	G F H
Regolith; some brown clay			\$1, <b>22.</b> The second se	50
Claystone, gray Coal Coal		0000		50-
Sandstone, gray; and claystone, gray Coai Coai Limestone				150
Claystone, gray  Coal  Claystone, gray; and sandstone, gray, fine			M. John M. Mary M. M. Mary M.	200
Coal				<b>2</b> 50

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Coal  Coal  Sandstone, gray, very fine, siltstone, gray; and claystone, gray  Coal		TOWNS THE WASTER STATE OF THE PARTY OF THE P		The man of the second of the s		350 - - - 400 - - - - - - - - - - - - - - - - - - -	-80 -90
Sandstone, gray, fine; and claystone, gray						550-	-120
			- NAME OF THE PERSON OF THE PE			700 -	
						750 -	-150

Hole No: US-79133 Map: Bone Trail SE Date: 8/15/79 State North Dakota County: Williams Elev: 2340 FT Location: T 155 R 102, Sec 2 Tract CCCC Drilled depth _____ 560 FT Measured: 10 FT FSL 12 FT FWL FT. Hole size: 5 1/8 IN Air Water X Cored: Yes No X Remorks:___ MOX RECORDED BY WILLIAM JACKSON GEOLOGIST RECORDED BY ALAN PETAJA RECORDING SPEED 20 YES SP DENSITY RESISTIVITY GAMMA DEPTH SENS SETTING T.C. __2 SENS.SETTING RANGE 200 RANGE _2K_ 500 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 560 FT 556 FT 553 FT. 50+0 Regolith 50-Siltstone, gray; and -20 claystone, brown and gray 100-Coa1 - 30 Coa1 150 -40 Sandstone, gray, very fine; claystone, gray 200 -- 50 Coa1 250 -- 60 Coal, with claystone parting 300 Siltstone, gray; and claystone, gray - 70 Coal

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Sandstone, blue-gray, very	Carbonary Monghamor of Law Propagation and Company	Service of the servic		My My many My		350  400  450	-80
fine; siltstone, gray; and claystone, gray	Man	MANAGE AND				500-	-100
						600-	-120 -130
						700 -	-140
						750 -	-150

hole No: US-79134 Map: Otter Tail CreekDate: 8/16/79 State: North Dakotaounty: Williams Elev: 2315 FT Location: T155x R 101x, Sec 7 Tract DDDD Drilled depth 600 FT Measured: 117 FT FSC 28 FT KWX FT Hole size: 5 1/8 IN Air Water X Cored: Yes No X Remorks:____ XXX RECORDED BYWILLIAM JACKSON GEOLOGIST RECORDED BWILLIAM JACKSON RECORDING SPEED 20 YES DENSITY C 2 RESISTIVITY GAMMA SP DEPTH SENS SETTING T.C. _ SENS. SETTING RANGE 200 500 RANGE 2K LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 593 FT. 600 FT 593 FT. 596 FT. 50+0 04-10 Regolith, brown 50--20 100-Sandstone, light-gray, very - 30 fine; siltstone, gray; and claystone, brown and gray 150 40 200 Coal, with claystone partings 50 Sandstone, gray, very fine; and claystone, gray 250 60 300 Coal 70

LITHOLOGY	GAMMA	S. P	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Coal			==			350-	80
Claystone, gray		nie pie produce		Marca Mrs.	contest of the second	400 -	
Coal ·	Mark Control					450-	-90
Sandstone, gray, very fine; and claystone, gray					T Frei Inti	500-	-100
		MANANA PANANA PATON AND PANANA PARANA PA			W My my Mar	550-	-110
	<b>?</b>	And A		\{\bar{\x}\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\	À	600-	- 120
	2					650	-130
				į.		700 -	-149
						750 -	-150
						800	

Hole No: US-79135 Map: Otter Tail CreekDate: 8/21/79 State: North Dakota County: Williams Elev.: 2292 FT Location: T 156% R 101, Sec 31 Tract CCCC Drilled depth 600 FT Measured: 54 FT RSK 172 FT. FWL FT. Hole size: 5 1/8 IN Air Water & Cored: Yes No X Remarks:_ XX RECORDED BWILLIAM JACKSON RECORDING SPEED 20 RECORDED BYWILLIAM JACKSON GEOLOGIST MIN. YES DENSITY 2 RESISTIVITY SP GAMMA DEPTH SENS SETTING SENS SETTING RANGE 2K RANGE __ 200 250 100 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS FT. FT. 601 FT. 594 594 50+0 Regolith, brown 50 -20 Sandstone, gray, very fine; siltstone, gray; and 100claystone, gray - 30 Coal, with clay parting 150 Coal Sandstone, gray, very fine; and claystone, gray 200-- 50 Coal Sandstone, gray, very fine; and claystone, gray 250 -60 Coa1 300 Sandstone, gray, very fine; siltstone, gray; and claystone, gray 70

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Coal	The same of the sa	MAN		John May Co		350 - - - - - 400 -	- 80
Sandstone, gray, very fine,	1,1/1				Mary	450-	-90
siltstone, gray; claystone, gray and light-gray; and limestone, gray	Anyway have					500-	-100
		ALL MANAGE AND		Am Alma	Tur Walund	550-	-110
		*	蓬	\$		600-	-120
						650-	-130
						700 -	-140
						750 -	-150

DRDED BY WILLIAM JACKSON GEOLOGIST	ST YES RECORDED BWILLIAM	M JA	CKSON RECOR	DING SPEED 2	0
	GAMMA SP	90	GAMMA T.C. 2 RANGE 50	RESISTIVITY SENS SETTING 100	DE P
LYTHOLOGY	LOGGED DEPTHS	STRIP		DEPTHS T 493 FT	FEET
Sandstone, gray and brown, very fine; and claystone, gray and brown  Coal, with claystone parting Sandstone, gray, medium to fine; and claystone, blue-gray  Coal  Coal			The state of the s	5	50-

	LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
	Coal Sandstone, gray, very fine; siltstone, gray; and clay- stone, gray and blue-gray	MAN POWER			Comp. Joseph Johnson		350 - - - - 400 -	-80
	Coal	MM		墨墨	MAY OF THE PARTY O	A When I was	- - 450-	-90
		who who			Survivo de de de la composição de la com	A MARINA.	500-	-100
							550- 	-110
-							600-	-120
							650 - - -	-130
							700 -	-140
							750 -	-150
							800-	

ORDED BY WILLIAM JACKSON GEO	LOGIST XX RECORDED BWILL	IAM JACKSON RECORDING SPEED 20
LITHOLOGY	GAMMA S P T.C. 2 SENS SETTIN RANGE 200 250  LOGGED DEPTHS 396 FT 394 F	VG S CAMMA RESISTIVITY SENS SETTING LOGGED DEPTHS
Sandstone, brown, fine; siltstone, gray; and claystone, gray fine; siltstone, gray; and claystone, gray  Coal  Coal, with claystone particular coal, with claystone particular coal, with claystone particular coal, gray; and claystone, gray; and claystone, gray; and claystone, gray		
Coal Sandstone, gray, very fine and claystone, gray		三 三 三 三

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
				*	\$	350-	80
				<b>. g</b>		400 - -	
						450-	-90
			_			500-	-100
						550-	-110
						600-	- 120
						650-	-130
						700 -	-140
						750 -	-150
						800-	

Measured: More to location: TIS6 R R100 W  Measured: Measured: Hole cave-in, no log take	,Sec <u>34</u> T	roct DCCC	Drille	ed death	35	0 F	
RECORDED BY CHRIS MURPHY GEOLOGIS	4	oppen awii	LITAMJ	ACKSON RECOR	OINC CREED	F	7
	GAMMA T.C.	S P SENS. SET	TING 8	DENSITY T.C	RESISTIVITY SENS.SETTING	DEPTH	200
LITHOLOGY	LOGG	ED DEPTHS	REP	LOGGED	DEPTHS		METER
						50-	
Sandstone, brown, fine to							0
coarse; and claystone,						50-	20
Coal						100-	30
Sandstone, gray, fine; and gravel			00000000000000000000000000000000000000			150-	March Control
Coal			7000 0 000 0 000 0 000			1.	40
Claystone, gray						200-	
Coal					A CONTRACTOR OF THE CONTRACTOR	]:	50
Claystone, gray Coal						250-	
Claystone, gray					A STATE OF THE STA	1 -	60
Coal							
Claystone, gray						500-	The second second
Claystone, gray							70

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
				N 460% A-	. 14	350-	
						-	- 80
						400-	
						-	
						-	- 90
						450-	1
						-	-100
			-			500-	1
						-	
						550-	110
						-	
				•		600-	120
	•					-	
						650-	-130
							1
						700	-14
						-	
						750	-
						:	13
						:	1

hole No: US-79139 Map: Marmon SE Date: 8/23/79 State: North Dakotaounty: Williams Elev: 2095 FT Location: T156% R100%, Sec 15 Tract CBBB Drilled depth 420 FT Measured: 750 FT FSC 20 FT FWL FT Hole size: 5 1/8 IN Air Water X Cored: Yes No X Remarks: Density logged without source: logged through pipe. RECORDED BY CHRIS MURPHY RECORDED BWILLIAM JACKSON RECORDING SPEED 20 GEOLOGIST YES SP RESISTIVITY GAMMA DENSITY DEPTH SENS SETTING SENS SETTING T.C_ RANGE _50 RANGE __ 200_ 1.00 50Ω LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 414 FT. 420 FT. 416 FT. 50 + 0 Sandstone, brown and gray, fine; and claystone, gray 50--20 Coal 100-- 30 Sandstone, gray, very fine; and claystone, gray 150 -Coal Sandstone, gray, very fine; and claystone, gray and 200 blue-gray Coal 250 -Coal Sandstone, gray, very fine; - 60 and claystone, gray and blue-gray 300-Coal - 70

LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Coal, with claystone parting Sandstone, light-gray, very fine; and claystone, blue- gray	A Marian Maria	Moragad Hill Buck No.		Salty Strage Manager Mark		350 - - - - 400 -	-80
	2					450	-90 -100
	*					500-	-110
						600-	-120
						650-	-130
						700 -	-140
						750 -	-150

Sandstone, light-gray, very fine; and claystone, gray  Coal  Sandstone, light-gray, very fine; siltstone, gray  Coal  Sandstone, light-gray, very fine; siltstone, gray  Coal  Sandstone, light-gray, very fine; siltstone, gray  Coal	ORDED BY CHRIS MURPHY GEOLO	GIST YES RECORDED	BWILLIAM J	ACKSON RECOR	DING SPEED	20
Sandstone, brown and gray, coarse to fine; siltstone, gray; and claystone, gray  Coal  Sandstone, light-gray, very fine; siltstone, gray; and claystone, gray; and claystone,	LI THOLOGY	T.C. 2 SEI	NS SETTING	TC2 RANGE _50	SENS SETTING	
Sandstone, brown and gray, coarse to fine, siltstone, gray; and claystone, gray  Coal  Sandstone, light-gray, very fine; and claystone, gray  Coal  Sandstone, light-gray, very fine; and claystone, gray  Coal  Sandstone, light-gray, very fine; and claystone, gray  and claystone, gray  Coal  Sandstone, light-gray, very fine; siltstone, gray; and claystone, gray; and						lu
Sandstone, brown and gray, coarse to fine, siltstone, gray; and claystone, gray  Coal  Sandstone, light-gray, very fine; and claystone, gray; and						50-
Coal Sandstone, light-gray, very fine; and claystone, gray  Coal Sandstone, light-gray, very fine; and claystone, gray  Coal  Sandstone, light-gray, very fine; and claystone, gray  Coal  Sandstone, light-gray, very fine; siltstone, gray; and claystone, gray; an	Sandstone, brown and gray,	, ,		J. Adding C. Price Co.		0
Sandstone, light-gray, very fine; and claystone, gray  Coal  Sandstone, light-gray, very fine; and claystone, gray  Coal  Sandstone, light-gray, very fine; siltstone, gray; and claystone, gray; and				And Colombia		50-
Coal  Sandstone, light-gray, very fine; and claystone, gray  Coal  Sandstone, light-gray, very fine; siltstone, gray; and claystone, gray; and	Sandstone, light-gray, very fine; and claystone,			المحام المراس من المراس من المراس الم		100-
very fine; and claystone, gray  Coal  Sandstone, light-gray, very fine; siltstone, gray; and claystone, gray; and claystone, gray and blue area.						150
Sandstone, light-gray, very fine; siltstone, gray; and claystone,	very fine; and claystone,	LANGE OF THE PARTY			1	200
very fine; siltstone, gray; and claystone,	Coal			J. J		250
gray and Drue-gray	very fine; siltstone, gray; and claystone,			Now Appear		
	gray and blue-gray	Ž.				300

LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Sandstone, light-gray, very fine; and claystone, gray and blue-gray	M/Man Man Man Man Man Man Man Man Man Man			Norman Pray Andrews		350- - - - 400-	-80
Coal	No.			Service Comments	7 FEET UPT.	- - 450-	-90
	72			3		500-	-100
				. 4		550- - - -	-110
						600 - - - -	-120
						650-	-130
						700 - - - -	-140
						750 - - - -	-150
The second of th		Problems 12	100		A STATE OF THE PARTY OF THE PAR	800-	

le No: US-79141 Map: Trenton NE  v: 2247 FT Location: 7154 R 1020  osured: 200 FT FNL 10 FT FWL	Sec 14 Tract BBBC Dril	led depth5 Air 🛛 Water 🗌 Cored: Yes	20 F
marks:CORDED BY WILLIAM JACKSON_GEOLOG	MATLING OFFICE OF THE TANK	JACKSON RECORDING SPEED 20	
LITHOLOGY	T.C. 2 SENS. SETTING SENSE SETTING SENS. SENS. SENS. SETTING SENS. SENS. SETTING SENS. SENS. SETTING SENS.	DENSITY RESISTIVITY SENS.SETTING 100 LOGGED DEPTHS	FEET HETERS
Sandstone, brown, very fine; and claystone, brown  Coal  Coal, with clay parting  Sandstone, gray, very fine; and claystone, gray, very fine; siltstone, gray; and claystone, gray to blue gray  Coal, with clay parting  Sandstone, gray, very fine; and claystone, gray, very fine; and claystone, gray to blue gray			50 - 0

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Sandstone, gray, very fine; siltstone, gray; and claystone, gray	A CANANA	MWWwwww				350 - - - - - 400 -	80
Coal Sandstone, gray, very fine; siltstone, gray; and	\$ \$	MANAMANA				- - 450-	-90
Coal, with claystone parting	Cont (man			2	mother with	500-	-100
						550-	-110
						600-	-120
						650 <del>-</del>	-130
		)				700 -	-140
						750 -	-150
				9.12		6008	

ORDED BY WILLIAM JACKSON GEOLOGIS				
LITHOLOGY	GAMMA S P T.C. 2 SENS. SETTIN RANGE 100  LOGGED DEPTHS 311 FT F	DENSITY TC_2 RANGE_50 LOGGED	RESISTIVITY SENS SETTING DEPTHS	FEET
Sandstone, brown, fine; and claystone, gray  Coal, with claystone parting Sandstone, gray, very fine; and claystone, gray  Coal  Sandstone, gray, very fine; and claystone, gray  Coal  Coal  Coal			98	500 500 250 250

LITHOLOGY	GAMMA	<b>\$</b> . P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
					134	350-	
						-	-80
						400 <del>-</del>	
						-	
							00
							- 90
						450 - -	
						+	
						7	-100
						500-	
						1	
						1	- 110
						550-	-110
						1	
						4	
\- <u>-</u>						600-	- 120
						+	
						1	
						650-	-130
						-	
						1	
						+	
						700 -	-140
						-	
						750 -	-150
						1	
						-	•
 ***************************************	 					800	

Hole No: US-79143 Map: Trenton NE Date: 8/27/79 StateNorth Dakota County: Williams Elev: 2260 FT Location: T1548 R102 , Sec 19 Tract CCCC Drilled depth 520 FT Measured: 250 FT FSL 5 FT FWL FT. Hole size: 5 5/8 IN Air X Water Cored: Yes No X Remarks: Density logged without source. RECORDED BYWILLIAM JACKSON _ GEOLOGIST RECORDED BWILLIAM JACKSON RECORDING SPEED 20 YES GAMMA SP DENSITY RESISTIVITY SENS SETTING SENS SETTING TC _ 2_ RANGE 200 RANGE _50 100 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 513 FT. FT. Sandstone, brown, very fine; and claystone, brown Coal 50--20 Sandstone, brown and gray, 100very fine; and claystone, - 30 gray 150-40 Coal 200-Sandstone, gray, very fine; - 50 and claystone, gray and blue-gray 250 -Coa1 60 Sandstone, gray, very fine; 300 and claystone, gray and blue-gray -70 Coal

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
		MAYYMA		V-market		350-	
Sandstone, gray, very fine; and claystone, blue-gray	Mary Mary	Myrothjone		were for the formation of	Now The second	400-	80
Coal		JAMAMAMAMAMAA .		Tan James	A AND MANAGEMENT	450-	-90
Sandstone, gray, very fine; and claystone, gray and blue-gray				The state of the s	Janke Thank Market 19	-	-100
	, <del>\$</del>	ŧ				500-	
				{		550-	-110
						600-	- 120
	·				-	650 -	-130
						700 -	-140
						750 -	
						-	-150
		16				800-	

note No: US-79144 Map: Trenton NW Date: 8/28/79 State: North Dakot@ounty: Williams Flev: 2160 FT Location: T153 R 102 W, Sec 6 Tract CCCC Drilled depth 500 FT Measured: _600 FT FSC 50 FT FWL __ FT Hole size: 5 5/8 IN Air X Water _ Cored: Yes _ No X Remarks: <u>Caliper log missing</u>. DK CX RECORDED BWILLIAM JACKSON RECORDING SPEED_ RECORDED BY WILLIAM JACKSON GEOLOGIST YES RESISTIVITY SP DENSITY GAMMA DEPTH SENS SETTING T.C. __ SENS SETTING RANGE 2K RANGE ___ 500 100 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 494 FT. 496 FT 50-Sandstone, gray, very fine; 50and claystone, blue-gray -20 100--30 Coal 150 -Sandstone, gray, very fine; and claystone, blue-gray 200 -Coal 250 -Sandstone, gray, very fine; and claystone, gray - 60 Coal 300 Sandstone, gray, very fine; and claystone, gray

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Coal		photo photography photography		What have the second se		350-	80
Sandstone, gray, very fine; and claystone, gray		And the second participation of the				400 -	90
		Carly Market Market	<b>医基层数</b>			450-	
	£					500-	IIO
	tuninininininininininininininininininini	destinate de la		Teeleelouteta		550-	120
						650	
						-	
						750 -	
						800	150

nole No: US-79145 Map: Trenton NW Date: 8/28/79 State North DakotaCounty: Williams Elev.: 2335 FT Location: T154 R R 103 , Sec 31 Tract AAAA Drilled depth 520 FT Measured: 12 FT RNK 30 FT FEL FT. Hole size: 5 5/8 IN. Air X Water Cored: Yes No X Remarks:__ NØ RECORDED BY WILLIAM JACKSON GEOLOGIST RECORDED BYWILLIAM JACKSON RECORDING SPEED_ YES RESISTIVITY DENSITY GAMMA SP DEPTH SENS.SETTING SENS SETTING T.C. ___2 T.C_ RANGE 200 500 RANGE _ 2K_ 500 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 520 FT. 514 FT. 5 516 FT. 50+0 Sandstone, gray, fine; and claystone, brown and gray 50 Coal 100-- 30 150 -Sandstone, gray, very fine; and claystone, gray and - 40 blue-gray 200-- 50 Coal 250 -Sandstone, gray, very fine; siltstone, black to gray; and claystone, gray and bluegray 300 70

LITHOLOGY	GAMMA	S. P.	STRIP LOG	DENSITY	RESISTIVITY	FEET	METERS
Coal	My Mary My vome	A Sell soul food both and food and food food food food food food food fo				350-	-80
Sandstone, gray, very fine; siltstone, gray; and claystone, gray		MANAGEMENT TO THE WAY WAY TO THE STATE OF TH		W. J. W. W.	MANNAMA ANAMA	450	-90 -100
					45 55	550-	-110
						600-	- 120
	•					650	-130
						700 -	-140
						750 -	-150

hole No: US-79146 Map: Trenton NE Date: 8/29/79 State: North Dakot@ounty: Williams Elev.: 2300 FT Location: T 155 R102 W, Sec 27 Tract BCCC Drilled depth Measured: 2500 FT RXX 10 FT FWL FT Hole size: 5 5/8 IN Air X Water Cored: Yes No X Remorks: Density logged without source. RECORDED BY WILLIAM JACKSON RECORDED BWILLIAM JACKSON RECORDING SPEED _20 GEOLOGIST MIN YES DENSITY GAMMA RESISTIVITY DEPTH T.C. ____2 SENS SETTING SENS SETTING RANGE __ 200 TERS RANGE _50_ 100_ LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 492 FT. 50+0 -10 Sandstone, brown and gray, very fine; and claystone, gray Coal, with claystone partings -20 Sandstone, gray, very fine; and claystone, gray 1001 - 30 150-Sandstone, light-gray, very fine; siltstone, gray; and claystone, gray 200-Coal, with claystone parting - 50 Sandstone, gray, fine; and claystone, gray 250-60 Coa1 300 Sandstone, gray, fine; and claystone, gray

	LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
-	Sandstone, light-gray, very fine; siltstone, gray; and claystone, gray		the control of the control		JAMAN STANLAND STANLA	The state of the s	350    400	-80
	,		WANTER TO THE TANK OF THE TANK		Mary Control of the C	Marian WWW WA Kingh	450-	-90
			Man		Ž	₹	500-	-100
		7			<b>₹</b>	QV.	550-	-110
	~						600-	-120
		•					650 -	-130
	,						700 -	-140
							750 -	-150
		<u> </u>					800-	]

ORDED BYWILLIAM JACKSON _ GEOLOGIS	ST NR RECORD	ED BWILLA	M JA	ACKSON REC	cording speed2	Ω
	GAMMA	S P SENS SETTING 500	90	DENSITY TC 2 RANGE 2K	RESISTIVITY SENS SETTING	DEP
LITHOLOGY	LOGGED		9	LOGG	ED DEPTHS FT 493 FT	FEET
	1		1			50
Sandstone, gray, fine to very fine; and claystone, brownish-red and gray						50
Coal						250
Sandstone, gray, fine to very fine; siltstone, gray; and claystone, gray					Jan	300

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Sandstone, gray, very fine;		Markey Long Company of the Company o				350   400	-80
sandstone, gray, very rine, siltstone, gray; and claystone, gray		at which property and the second					-90
						550-	-110
						600-	- 120
						650-	-130
						700 -	-14
					÷	750 -	-150
						800	

Elev.: 2298 FT Location: T 1538 R 104W  Measured: 2300 FT. FSt 1300 FT. FEL  Remarks:	Date: 8/30/79 StateNorth Dakota County: Williams  , Sec _25 Tract _DABB _Drilled depth 500 FT FT. Hole size: 5 3/4 IN Air [X] _Water Cored: Yes No [X]
RECORDED BY WILLIAM JACKSON GEOLOGIS	T.C. 2 SENS SETTING PANGE 200 LOGGED DEPTHS
Sandstone, brown and gray, fine to very fine; and claystone, brown and gray  Coal  Sandstone, gray, very fine; and claystone, gray	496 FT 494 FT 55 500 FT 494 FT 4 5 50 - 0 100 - 30 100 - 30 100 - 30 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 - 60 150 -

LITHOLOGY	3MMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Coal	A CONTRACT OF THE STATE OF THE	MANNAN (MAN			The state of the s	350-	-80
Sandstone, gray, very fine; siltstone, gray; and claystone, gray	Mary Mary	Make representative of the food of the second				400-	-90
		-two lands		W.Y.		500-	-100
						550-	-110
				ŀ		600-	-120
4						650 -	-130
						700 -	-140
						750	-150
					NAMES ASSESSED ASSESSED.	800	_

Hole No: US-79149 Nap: Red Bank Creek Date: 9/5/79 State: Montana County: Roosevelt Elev: 2104 FT Location: T 28 7 R 59 8, Sec 22 Tract BBBB Drilled depth Measured: 400 FT KXX 4 FT FW FT. Hole size: 5 5/8 IN Air Water X Cored: Yes No X Remarks:_ NOX RECORDED BY WILLIAM JACKSON GEOLOGIST RECORDED BWILLIAM JACKSONECORDING SPEED_ YES GAMMA DENSITY SP RESISTIVITY DEPTH SENS SETTING T.C.__2_ SENS SETTING RANGE 2K RANGE _ 200 500 100 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 533 FT. 5 536 FT. 540 FT 533 FT 50+0 -10 Regolith, brown Sandstone, gray, very fine; and claystone, gray. 50--20 Coal 100-150-Sandstone, gray, very fine; siltstone, gray; and claystone, gray 200-- 50 250-- 60 Coal 300 - 70 Coal

LITHOLOGY	GAMMA	<b>S</b> . P.	STRIP LOG	DENSITY	RESISTIVITY	FEET	METERS
Sandstone, gray, very fine; siltstone, gray; and claystone, gray		Albangalan Markatan Indonesia parangan ang dengang den				350-	- 80
Limestone		waren had but had				450-	-90
Coal		W/W/W/W				500-	-100
		- 4				550- -	-110
\						600-	-120
						650 -	-130
				141		700 -	-140
						750 -	-150
						800-	1

	OLOGIST YES RECORDED BYWILLIAM JACKSONRECORDING SPEED 20	
LITHOLOGY	T.C   SENS SETTING	EET
	591 FT FT 595 FT FT	<u>L</u>
Sandstone, gray, medium-		50
fine to very fine; and siltstone, gray; and claystone, gray		200

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Coal				L/ American Manager Manager And Da		350-	-80
Sandstone, gray, very fine; siltstone, gray; and claystone, gray				purish rank from the many second		450-	-90
Coal Sandstone, gray, very fine; and claystone, gray				transport Aller	FRET LGFT	500-	-100
						550- -	-110
~	Ž			Jacobson Dec		600-	-120
	2					650-	-130
						700 -	-140
						750 -	-150
						800	

	GIST YES RECORDED BYWILLIAM JACKSONRECORDING SPEED 20
LITHOLOGY	T.C. 2 SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SENS SETTING SEN
T	LOGGED DEPTHS LO
	50
Condetence become and array	
Sandstone, brown and gray, very fine	50
Coal	loc
Sandstone, brown, very fine; and claystone, gray	150
Coal	
	200
Sandstone, gray, very fine; siltstone, gray and	250

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
				Montal		350	- 80
Sandstone, gray, very	Www.Ayin	hadding had				400 -	
fine, and claystone, gray and blue-gray	1			A A MM	7	450-	90
						500-	-10
				o I		550-	-11
						600-	- 12
					,	650 -	-13
						700 -	-14
						750 - -	-15
		<u>.</u>				800-	

DRDED BY WILLIAM JACKSON GEOLO	YES	IAM JACKSONECORDING SPEE	
LITHOLOGY	GAMMA S P T.C. 2 SENS SETTIN RANGE 200 500 LOGGED DEPTHS	RANGE 50 100	TING LE
Sandstone, gray and brown, fine to very fine, siltstone gray, and claystone, gray		569 FT 562	50
and brown  Coal			150 -
Sandstone, gray, very fine; and claystone, gray and blue gray			200-
Sandstone, gray, very fine; siltstone, gray; and claystone, gray			250 - - - - - - - - - - - - - - - - - - -

LITHOLOGY	GAMMA	\$. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Coal		The sprace was properly to the second of the		AND THE PROPERTY OF THE PROPER		350 -	-80
Coal Coal		MATHOUN WATER TO WE WATER				450-	-90
Sandstone, gray, very fine; and claystone, gray		Many of property of the second		May be shown to be shown the same of the showing the s		500-	-100
		WAY!		Wish with a	FIG.	550-	-110
	<b>3</b>			T.		600-	-120
						650-	-130
						700 -	-140
						750 -	-150
						800-	

Hole No: US-79153 Map: Three Buttes Date: 9/8/79 State: Montana County: Roosevelt Elev: 2225 FT Location: T 27 X R 57 W, Sec 6 Tract ACCC Drilled depth 380 FT. Measured: 2575FT FSL 2290 FT RWX FT Hole size: 5 5/8 IN Air Water X Cored: Yes No X Remarks:_ XX RECORDED BY WILLIAM JACKSON GEOLOGIST RECORDED BYWILLIAM JACKSON RECORDING SPEED 20 MIN. YES SP RESISTIVITY GAMMA DENSITY T.C. ___2 SENS.SETTING SENS. SETTING RANGE 200 RANGE 2K 100 500 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 361 FT. FT. 364 FT. 368 FT. 50十 0 Sandstone, gray, fine; 50 and claystone, brown and -20 gray 100--30 Coal Sandstone, gray, very fine; 150 and claystone, gray Coa1 200 50 250 Sandstone, gray, very fine; siltstone, gray; and claystone, gray 60 300-.70 Coal

LI	ITHOLOGY	GAMMA	S.P.	STRIP LOG	DENSITY	RESISTIVITY	FEET	METERS
Coal	,						350-	- 80
							450 —	- 90
		•••		-			500-	-100
							550-	-110
							600-	-120
							650	
							750 -	
							800	-150

LITHOLOGY  RANGE 200 500  LOGGED DEPTHS 396 FT. 393 FT. 50  LOGGED DEPTHS 396 FT. 393 FT. 50  CONTRACTOR SENS SETTING PRANCE 50 100  RANGE 50	Sandstone, gray, fine to coarse; and claystone, brown and gray  Coal  Coal  Sandstone, gray, fine; siltstone, gray, gray and claystone, gray gray	CORDED BY <u>WILLIAM JACKSON</u> GE	YES	_
Sandstone, gray, fine to coarse; and claystone, brown and gray  Coal  Coal  Sandstone, gray, fine; siltstone, gray; and claystone, gray  Glaystone, gray  Sandstone, gray  Sandstone, gray, fine; gray  Sandstone, gray	Sandstone, gray, fine to coarse; and claystone, brown and gray  Coal  Coal  Sandstone, gray, fine; siltstone, gray; and claystone, gray; and claystone, gray	LITHOLOGY	T.C. 2 SENS SETTING TO	FEET
Coal  Coal  Sandstone, gray, fine; siltstone, gray; and claystone, gray	Coal  Coal  Sandstone, gray, fine; siltstone, gray; and claystone, gray  250			50
Coal  Coal  Sandstone, gray, fine; siltstone, gray; and claystone, gray	Coal  Coal  Sandstone, gray, fine; siltstone, gray; and claystone, gray  250	coarse; and claystone,		50
Sandstone, gray, fine; siltstone, gray; and claystone, gray	Coal  Sandstone, gray, fine; siltstone, gray; and claystone, gray  250	Coal		
Sandstone, gray, fine; siltstone, gray; and claystone, gray	Sandstone, gray, fine; siltstone, gray; and claystone, gray	Coal		
		siltstone, gray; and		<b>?5</b> 0

LITHOLOGY	GAMMA	S.P.	STRIP LOG	DENSITY	RESISTIVITY	FEET	METERS
Coal Sandstone; and claystone, gray						350-	- 80
						450-	-90
						500-	-100
						550-	-110
						600-	- 120
	4.0°					650-	-130
	**					700 -	-140
						750 -	-150
						800	

Hole No: US-79155 Map: Intake Date: 9/13/79 State: Montana County Dawson Elev: 2380 FT Location: T18 % R 56 %, Sec 10 Tract CCCC Drilled depth Measured: 500 FT FSE 480 FT FWE FT Hole size: 5 5/8 IN Air Water & Cored: Yes No Remarks: Density logged without source. YES RECORDED BWILLIAM JACKSON RECORDING SPEED RECORDED BY WILLIAM JACKSON GEOLOGIST MIN. RESISTIVITY GAMMA SP DENSITY DEPTH SENS SETTING T.C. __ SENS SETTING RANGE 50 RANGE _200_ 100 500 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS FT. 5 656 FT 653 660 FT 653 FT 50+0 Sandstone, gray, fine to coarse; and claystone, brown and gray -20 Coal Sandstone, gray, fine; siltstone, gray; and claystone, gray and blue-100-- 30 gray 150 Coal 200 -- 50 Sandstone, gray, fine; 250 siltstone, gray; and claystone, blue-gray - 60 300 70

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
	Ŧ.	W. W.				350-	- 80
		de la Maria de la Compania del Compania de la Compania de la Compania de la Compania del Compania de la Compani				400 - - -	
Coal, with claystone parting		And the state of t			) market (A)	450-	-90
		Jernation distributed				500-	-100
Sandstone, gray, fine; siltstone, gray; and claystone, gray and blue- gray		Mary Control of the State of th				550-	-110
Coal	NAVA MA	dustry monthstaggy months and the			J. Minnight	600-	- 120
Coal		Why Why May		A Company of the Comp	Junganan Jeg Tar	650-	-130
	3			) June 1	- Rect.	700 -	-140
						750 -	-150
						800-	

hole No: US-79156 Map: Intake Date: 9/19/79 State: Montana County: Dawson Elev.: 2385 FT Location: T 19 R R 56 X, Sec 34 Tract DDAD Drilled depth 600 FT Measured: 753 FT FSL 22 FT KWK. FT. Hole size: 5 5/8 IN Air Water & Cored: Yes No X Remarks: Density logged without source. ND RECORDED BY WILLIAM JACKSON GEOLOGIST RECORDED BWILLIAM JACKSON RECORDING SPEED 20 YES RESISTIVITY GAMMA SP DENSITY DEPTH TC_2_ SENS SETTING T.C. __2 SENS SETTING RANGE 200 500 RANGE 50 100 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 593 FT. 595 FT. 593 FT. 599 FT. 50+ 0 0+10 Sandstone, gray and brown, 50 very fine; siltstone, gray; -20 and claystone, gray 100 Coal Coa1 150 --40 Sandstone, gray, fine; siltstone, gray; and claystone, blue-gray 200 250 300 Coal Sandstone, gray-white, very fine; siltstone, gray; and - 70 claystone, gray

	LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
	Claystone				<b>3</b>		350-	
	Coal		The second of th		ara, parate		400-	-80
	Sandstone	Man and a second	man de la companya de		a market and a	i	-	-90
-	Coal, with claystone parting	*	My William Control		MANA DE LA COMPANIA D		450-	
	Claystone	*	Andrew Property and the state of the state o		Managhana		500-	-100
	Siltstone						-	-110
-	Sandstone		A Sanda Lander Control Control Control		ماريال		550-	
	\	2	<b>Ž</b>			7	600-	-120
					<u> </u>		650-	-130
-							700 -	-140
-							750	-150
							800	1

hole No: US-79157 Map: Allard Ranch Date: 9/20/79 State: Montana County: Dawson Elev: 2218 FT Location: T 19 R 56 R, Sec 14 Tract CAAA Drilled depth 600 FT Measured: 1340 FT FSL 1290 FT FWL FT. Hole size: 5 5/8 IN. Air Water X Cored: Yes No X Remarks: Logged through pipe, no source on density. NO RECORDED BY WILLIAM JACKSON GEOLOGIST RECORDED BY WILLIAM JACKS ONE CORDING SPEED _ 20 YES GAMMA SP DENSITY RESISTIVITY DEPTH SENS SETTING 500 T.C. _ SENS SETTING RANGE 200 RANGE _50 100 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 595 602 FT. 50 -Claystone, brown Coal 50 -20 100 150 Sandstone, light-gray, very fine grained; siltstone, gray; some carbonaceous claystone, 200 gray 250 60 300 -70 Coal

	LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
	l, with claystone parting					5	350 - - -	
gra	ined and claystone, gray	To the second se	the state of the s				400 -	- 80
	dstone, gray, very fine ined; siltstone, gray;		Herestory was		A James Andrews		450-	- 90
	claystone, gray		AND THE PROPERTY AND THE PROPERTY AND		The second second		500-	-100
Coa	1		· WWWWW				-	
	dstone, gray, very fine ined; and claystone,				- AND WALLAND	} }	550-	-110
		<b>₩</b>	Ž.		<b>&amp;</b>	\$.	600-	-120
					f		650-	-130
							700 -	-140
							-	
							750 -	-150
							800	1

hale No: US-79158 Map: Intake Date: 9/22/79 State: Montana County: Dawson Elev: 2500 FT Location: T19 X R 56 X, Sec 32 Tract CBAB Drilled depth 600 FT Megsured: 2320 FT FSL 1100 FT FWL FT Hole size: 5 5/8 IN Air Wuter & Cored: Yes No X Remarks: Logged through pit. XX RECORDED BY WILLIAM JACKSON GEOLOGIST RECORDED BWILLIAM JACKSONECORDING SPEED. YES RESISTIVITY SP DENSITY GAMMA DEPTH SENS SETTING T.C. __ SENS.SETTING T.C ____ RANGE 2K LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 597 FT. 594 FT. 600 FT. 50+ 0 Sandstone, gray and brown, very fine; siltstone, gray; and claystone, gray and brown Coal, with claystone parting 100 - 30 Sandstone, gray, very fine; siltstone, gray; and claystone, 150 gray 200 -Coal, with claystone parting 250-Sandstone, gray, very fine; siltstone, gray; and claystone, gray 300 70

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Sandstone, gray, very fine; siltstone, gray; and						350-	
Coal	A North			al Latin	- 3	400-	-80
Sandstone, gray, fine; siltstone, gray; and claystone, blue-gray and gray	Toward And And And And And And And And And An			Monopoly		450-	-90
	And Andrews	(ess)	2 A	12 m		500-	-100
Coal, with claystone partings						550-	110
siltstone, gray; and claystone, gray			24.7		_}}	600-	-120
						650	-130
						700	140
						750	150
						800	

Hole No: US-79159 Map: Intake NW Date: 9/23/79 State: Montana County: Dawson Elev: 2631 FT Location: T 19 R 55 K, Sec 24 Tract CBAA Drilled depth 600 FT. Measured: 2330 FT FSL 900 FT FWL FT. Hole size: 5 5/8 IN Air Water X Cored: Yes No X Remarks:_ MM RECORDED BY WILLIAM JACKSON GEOLOGIST RECORDED BY WILLIAM JACKSONECORDING SPEED -YES RESISTIVITY GAMMA SP DENSITY DEPTH SENS SETTING SENS SETTING T.C. __2_ RANGE _200_ RANGE _ 2K_ 500 100 LITHOLOGY ۵. LOGGED DEPTHS LOGGED DEPTHS 596 FT 593 600 FT 50+ 0 Sandstone, gray and brown, 50very fine; and claystone, -20 gray 100-Coal . Sandstone, gray, very fine; siltstone, gray; and 150 claystone, gray and bluegray 200 Coal, with claystone parting 250 Sandstone, gray, very fine; siltstone, gray; and claystone, gray 300 70 Coal, with claystone parting

LITHOLOGY	GAMMA	<b>\$</b> .P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Sandstone, light-gray, very fine; siltstone, gray; and claystone, gray and blue-gray	GAMMA	S.P.	STRIP STRIP LOG	DENSITY  A MANAGEMENT OF THE PROPERTY OF THE P	RESISTIVITY  A COMPANY OF THE PROPERTY OF THE	350 - 400 - 450 - 500 - 650 -	-110
						750	-150

nole No: US-79160 Map: Allard Ranch Date: 9/25/79 State: Montana County: Dawson Elev: 2681 FT Location: T 19% R 56 XX, Sec 30 Tract AACD Drilled depth 780 Measured: 1200 FT KXX 910 FT KXX FT Hole size: 5 5/8 IN Air Water & Cored: Yes No & Remarks: GEOLOGIST XXX RECORDED BY W. JACKSON RECORDED BY W. JACKSON RECORDING SPEED. YES DENSITY RESISTIVITY GAMMA SP DEPTH SENS.SETTING SENS SETTING RANGE _200 METERS RANGE 2K 500 100 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 774 774 FT. 50 -10 50 -20 100sandstone, brown and gray, very fine; siltstone, gray; ~ 30 and claystone, brown and gray 150 200 coal, with claystone parting 250 sandstone, brown and gray, very fine; siltstone, gray; and claystone, brown and gray 300 coal, with clystone parting, sandstone, brown and gray, 70 very fine; siltstone, gray, and claystone, brown and gray

	LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
	sandstone, light-gray, very fine grained; siltstone, gray; and claystone, gray				The second The tolky	A Laboratory of the second of	350   400	- 80
	coal		•			Jy Jyman Jy	450-	- 90
-	sandstone, gray, very fine grained; siltstone, gray; and claystone, gray				my It month	Jan Mary	500-	-100
					Manualan	Sept 1	550-	-110
		3			The Marie May	May May	600-	- 120
	coal sandstone, gray, very fine grained; siltstone, gray;				Why property	Manuscritica	650	-130
	and claystone, gray				Solven Park		700	-140
	coal				Z		750	-150
			<b></b>		3	<b>4</b> 65	800	-

Hole No: US-79161 Map: BLM NE 40 Date: 9/26/79 State: Montana County: Dawson Elev: FT Location: T 15k R 57 k, Sec 30 Tract DDDB Drilled depth Measured: 600 FT FSL 1200 FT RWX FT Hole size: 5 1/8 IN Air Water X Cored: Y Remorks: No elevation control available. RECORDED BY WILLIAM JACKSON GEOLOGIST YES RECORDED BWILLIAM JACKSON RECORDING SPEED GAMMA SP DENSITY RESISTIVITY T.C. ___2 SENS SETTING RANGE ____ 200 RANGE _ 2K LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 176 FT FT. 5 173 180 173 Siltstone, brown; clay, brown; gravel; and alluvial Claystone, brown; sandstone, brown Claystone, gray; and sandstone, gray Coal, with claystone partings Sandstone, gray; and claystone, gray; and siltstone, gray

LITHOLOGY	GAMMA	<b>8</b> . P.	STRIP,	DENSITY	RESISTIVITY	FEET	METERS
						350-	- 80
						450-	- 90
			-			500-	-10
						650-	- 12
						700	
	•					750 -	-15(

LITHOLOGY  T.C. 2 SENS SETTING 500 SENS SETTING 500 LOGGED DEPTHS 3 SENS SETTING 500 LOGGED DEPTHS 3 SENS SETTING 500 SENS SE	CORDED BY J. HANGAS GEOLOGIS	T YES RECOR	DED BY J. H	LANG	AS RECORD	DING SPEED 20	)
LOGGED DEPTHS 356 FT 354 FT 5 360 FT 354 FT 5 50  sandstone, brown and gray, very fine; claystone, gray, very fine; claystone, gray  coal sandstone, gray, very fine; claystone, gray		GAMMA T.C. 2	S P SENS. SETTI <b>NG</b>	06	DENSITY	RESISTIVITY SENS.SETTING	DEP
sandstone, brown and gray, very fine; claystone, brown and gray  coal  sandstone, gray, very fine; claystone, gray  coal  sandstone, gray, very fine; claystone, gray  coal  sandstone, gray, very fine; claystone, gray	LITHOLOGY	LOGGED	DEPTHS	RIP	LOGGED	DEPTHS	FEET
very fine; claystone, brown and gray  coal  coal  sandstone, gray, very fine; claystone, gray  coal  sandstone, gray, very fine; claystone, gray  coal  sandstone, gray, very fine; claystone, gray							50
coal sandstone, gray, very fine; claystone, gray  coal sandstone, gray, very fine; claystone, gray  very fine; claystone, gray  200 250	very fine; claystone, brown						50
coal sandstone, gray, very fine; claystone, gray  200 250			A Company		V		100
sandstone, gray, very fine; claystone, gray	claystone, gray		Not be to be				150
	sandstone, gray, very fine;		The second secon				200
	coal	<b>**</b>				3 3	250

*

LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
		<b>.</b>	<u> </u>	7	-A	350-	
				, i		400-	- 80
						450-	-90
						500-	-100
						-	-110
	-					550-	
						600-	-120
						650-	-130
						700 -	-140
						750 -	
						-	-150
						800-	

hole No: US-79163 Map: NE 40 BLM Date: 10/4/79 State: Montana County: Dawson Elev: FT Location: T15 X R 58 W, Sec 30 Tract DDBB Drilled depth 400 FT Measured: 1300 FT FSL 1250 FT FXXX FT Hole size: 5 5/8 IN Air Water X Cored: Yes No X Remarks: no elevation control MXRECORDED BY JON HANGAS RECORDING SPEED RECORDED BY JON HANGAS MIN. GEOLOGIST YES RESISTIVITY DENSITY GAMMA SP DEPTH T.C. _2 SENS SETTING SENS SETTING 100 RANGE _ 2K 500 RANGE _200_ LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 393 FT 400 FT. 396 FT. 393 50+0 0-10 -20 Sandstone, light-gray, very fine grained; siltstone, gray and greenish-gray; and 100claystone, brown to gray - 30 150 Coal 200-Coal - 50 Coal, with claystone parting 250-60 Sandstone, gray, very fine grained; and claystone, 300 gray 70

	LITHOLOGY	GAMMA	\$. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
	Sandstone, gray, very fine grained; claystone, gray						350 -	-80
1							450-	-90 -100
							550-	-110 -120
		• •					650	-130
1							700 -	
							800	

TECOR	DED BY WILLIAM JACKSON GEOLOG	TES DECORPORATION OF THE PROPERTY OF THE PROPE	
	LITHOLOGY	T.C. 2 SENS SETTING SENS SENS SETTING SENS SENS SETTING SENS SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SENS SENS SENS SETTING SENS SENS SENS SENS SETTING SENS SENS SETTING SENS SENS SETTING SENS SENS SETTING SENS SENS SENS SENS SENS SENS SENS SE	PT
	Sandstone, gray, very fine grained; siltstone, gray; and claystone, gray and brown		50-

51.

LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Coal Sandstone, gray, very fine grained; and claystone, gray						350-	- 80
				<b>t</b>		450-	-90
						500-	-100
						550-	-110
						600-	- I2O
						650 -	-130
						700 -	-140
						750 -	-150
						800-	}

Hole No: US-79165 Map: BLM NE-40 Date: 10/5/79 State: Montana County: Dawson Elev: FT Location: T 16% R 57%, Sec 6 Tract DDDD Drilled depth _____360<u>FT</u> Measured: 50 FT FSL 50 FT FXXX FT Hole size: 5 5/8 IN Air Water & Cored: Yes No & Remarks: no elevation control RECORDED BY WILLIAM JACKSON GEOLOGIST RECORDED BY JON HANGAS RECORDING SPEED 20 MIN YES GAMMA SP DENSITY RESISTIVITY DEPTH T.C. ____2 SENS SETTING SENS SETTING RANGE _ 2K RANGE __ 200 500 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 356 FT 354 FT. 5 360 FT. 354 FT 504 0 Alluvium Sandstone, gray; claystone, gray; and siltstone, gray 50-100-Sandstone, gray; claystone, - 30 gray; and siltstone, gray 150-40 Coal Claystone, gray; siltstone, 200gray; sandstone, gray; and limestone, gray Coa1 Sandstone, gray, claystone, gray; and siltstone, gray 250-Coal 60 Siltstone, gray, sandstone, gray; claystone, gray; and limestone, gray 300

LITHOLOGY	GAMMA	<b>3</b> . P.	STRIP.	DENSITY	RESISTIVITY	FEET	METERS
			೯ಚರ			350   400	-80
						450 —	-90
						500-	-100
						550-	-110
						600-	- 120
						650	-130
						700 -	-140
						750 -	-150

DED BY WILLIAM JACKSON GEOLOGIS	T YES RECOR	DED BYWILL	IAM J	JACKSON RECOR	DING SPEED 2	0
LITHOLOGY	GAMMA T.C	500	- 1	RANGE _2K	RESISTIVITY SENS SETTING 100	DEP
	1		STRI			l w
						50
Claystone, brown		;				0
Claystone, gray	The state of the s	WWWIII		My Www		50
Sandstone, gray; and claystone, gray	NA CANAL STATE OF THE STATE OF	whomman		Sandra	Whatalas	100
	THE MAN	ansavapphorn		<b>\</b>	A. A	
Sandstone, gray; claystone, gray; and siltstone, gray	Japan	Manhamah		Moreover	Marchy Janahy	150
	7	Mhrum			- E	200
	5					
	Claystone, brown  Claystone, gray  Coal  Sandstone, gray; and claystone, gray  Coal  Claystone, gray, and siltstone, gray  Coal  Sandstone, gray; claystone,	Claystone, brown  Claystone, gray  Coal  Claystone, gray; and claystone, gray  Coal  Claystone, gray; and siltstone, gray  Coal  Claystone, gray; and siltstone, gray  Coal  Claystone, gray; claystone,	Claystone, brown  Claystone, gray  Coal  Claystone, gray; and claystone, gray  Coal  Claystone, gray; and siltstone, gray  Coal  Claystone, gray; claystone,	Claystone, brown  Claystone, gray  Coal  Claystone, gray and siltstone, gray  Coal  Claystone, gray and siltstone, gray  Coal  Claystone, gray and siltstone, gray  Coal  Claystone, gray claystone,	Claystone, gray  Coal  Claystone, gray; and claystone, gray  Coal  Claystone, gray; claystone, gray; claystone, gray  Coal  Claystone, gray; claystone,	Claystone, gray  Coal Claystone, gray; and claystone, gray  Coal Claystone, gray; and claystone, gray  Coal Claystone, gray; clay

	LITHOLOGY	GAMMA	<b>5</b> . P.	STRIP,	DENSITY	RESISTIVITY	FEET	METERS
							350-	
							-	80
1							400 -	
							450-	-90
							-	-100
							500-	
							550-	110
							600-	-120
							650	-130
		•	;				700 -	-140
							750	
							:	Ligo
	The state of the s						800	1

Alluvium Sandstone, very fine; sandstone, very fine; claystone, gray, with siltstone  Coal Claystone, gray, with siltstone  Sandstone, siltstone; and claystone  Sandstone, siltstone; and claystone  Sandstone, siltstone; and claystone  Sandstone, siltstone; and claystone  Sandstone, siltstone  Sandstone, siltstone; and claystone  Sandstone, siltstone; and claystone	Alluvium  Sandstone, very fine; sandstone, very fine; claystone, gray, with siltstone  Coal  Claystone, gray, with siltstone  Sandstone, siltstone;  Sandstone, siltstone;  Sandstone, siltstone;  Sandstone, siltstone;	ORDED BY WILLIAM JACKSON GEOL	YES
Alluvium Sandstone, very fine; siltstone, brown to tan; and claystone; sandstone, very fine; claystone, gray, with siltstone  Coal Claystone, gray, with siltstone  Sandstone, siltstone; and claystone and claystone and claystone	Alluvium Sandstone, very fine; siltstone, brown to tan; and claystone; sandstone, very fine; claystone, gray, with siltstone Coal Claystone, gray, with siltstone Sandstone, siltstone;	LITHOLOGY	T.C. 2 SENS SETTING TO SENS SETTING RANGE 5
Alluvium Sandstone, very fine; siltstone, brown to tan; and claystone; sandstone, very fine; claystone, gray, with siltstone Coal Claystone, gray, with siltstone  Sandstone, siltstone; and claystone	Alluvium Sandstone, very fine; siltstone, brown to tan; and claystone; sandstone, very fine; claystone, gray, with siltstone Coal Claystone, gray, with siltstone Sandstone, siltstone;		220 FT 199 FT 5 FT 199 FT
		Sandstone, very fine; siltstone, brown to tan; and claystone; sandstone, very fine; claystone, gray, with siltstone  Coal Claystone, gray, with siltstone  Sandstone, siltstone;	

0.

LITHOLOGY	GAMMA	\$. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
					10	350-	
						-	- 80
						400-	
						450-	-90
	-					-	
						500-	-100
						_	
						550-	-110
						600-	- 120
<u>.</u>						-	
						650-	-130
						-	
				v		700 -	-140
						-	
					e	750 -	-150
						800-	

9200

LITHOLOGY		GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	
	-					· · · · · · · · · · · · · · · · · · ·	350-	
							-	- 8
							400-	
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\ <u></u>							600-	- 12
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							700 - -	-14
		-					-	
	*						-	
						1. 43	750 -	-15
						o	_	
							-	
							800-	

Hole No: US-79201 Map: Hedstrom Lake NWDate: 11/7/79 State: Montana County: Garfield Elev: 2640 FT Location: T17 X R 43 W, Sec 24 Tract AAAA Drilled depth 160 FT Measured: 10 FT FNL 10 FT. Hole size: 5 1/8 IN. Air Water Cored: Yes No X Remarks: RECORDED BYWILLIAM JACKSON GEOLOGIST RECORDED BWILLIAM JACKSON RECORDING SPEED _ 20 YES SP RESISTIVITY GAMMA DENSITY DEPTH T.C. ___2 SENS. SETTING SENS.SETTING T.C ___ RANGE __100 20 METERS RANGE LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 160 160 FT 160 FT FIT. Gamma 50+0 -10 Siltstone, brown; sandstone, brown, fine; and claystone, brown Coal 50 -20 Sandstone, brown; siltstone, brown; and claystone, 100brown - 30 Coal Siltstone, gray; sandstone, 150 gray; and claystone, gray -40 200 -- 50 250 60 300

LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
					* 14	350-	
							- 80
						400-	- 80
						-	
						_	- 90
						4"0-	
,						-	
							-100
			-			500-	
						-	
						550-	-110
						_	
						_	- 120
						600-	
						_	
						650 -	-130
						-	
						-	
						700 - -	-140
						-	
						750 -	-150
					9	-	1
						, -	1

Hole No: US-79201 Map: Hedstrom Lake NW Date: 11/7/79 State: Montana County: Garfield Elev.: 2640 FT Location: T 175 R 43 W, Sec 24 Tract AAAA Drilled depth 160 FT Measured: 10 FT FXL 10 FT. FEL FT. Hole size: 5 1/8 IN Air & Water Cored: Yes No X Remorks: . NØ RECORDED BYWILLIAM JACKSON GEOLOGIST RECORDED BWILLIAM JACKSON RECORDING SPEED __ 20_ MIN YES RESISTIVITY DENSITY GAMMA 2 SP DEPTH 100 SENS SETTING SENS. SETTING T.C. METERS 20 RANGE LITHOLOGY STRIP LOGGED DEPTHS LOGGED DEPTHS 160 FT. 160 FT. 160 50+0 0+10 S.P. Res. 50--20 100-- 30 150 -200-- 50 250-60 300 70

, LI	THOLOGY		GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
							ж	350-	
								400-	80
		į						450-	-90
								500-	-100
								550- -	-110
			_					600 <i>-</i>	-120
			•					650 - -	-130
	,							700 -	-140
							ō	750 -	-150
	***							800-	

RDED BY WILLIAM JACKSON GEOLOG	165	0
LITHOLOGY	GAMMA T.C. 2 SENS. SETTING RANGE 100 20 DENSITY RESISTIVITY SENS. SETTING RANGE 10	DE
	LOGGED DEPTHS  260 FT. 260 FT. 5 FT. 260 FT	1 1 1
	Gamma	5
Sand, brown, very fine; alluvial; siltstone, brown;		
claystone, brown; and sandstone, brown		
,		5
Siltstone, gray; claystone,		
gray, and sandstone, gray		
Coal		10
Sandstone, gray, claystone,		
gray; and siltstone, gray		
		15
Coal		
Sandstone, gray; claystone,		
gray; and siltstone, gray		20
		2
		3

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LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
					**	350-	
					٦	_	
						-	- 80
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						-	
	,					-	- 90
						450-	
						_	
						-	-10
						500-	
						-	-
							- 110
						550-	
						-	
•						600-	- 12
						-	
						-	
						650-	-13
						- 650-	
						-	
					14		
						700 -	-14
				,			
						1	
						750	
						750 -	-150
					т.	-	
			$\bot$			800-	

hole No: US-79202 Map: Hedstrom 1 SW Date: 11/8/79 State: Montana County: Garfield Elev: 2681 FT Location: T 17 R 43 , Sec 2 Tract CBBC Drilled depth Measured: 2430 FT FSL 25 FT FWL FT Hole size: 5 1/8 IN Air Water Cored: Yes No W MIN RECORDED BY WILLIAM JACKSON GEOLOGIST RECORDED BWILLIAM JACKSON RECORDING SPEET YES RESISTIVEY GAMMA 2 SP DENSITY DEPTH SENS.SETTNG T.C. __ SENS SETTING T.C. RANGE ____100 RANGE _ LITHOLOGY STRIP LOGGED DEPTHS LOGGED DEPTHS 260 260 260 FT. FT. 50+0 0-10 50-S. P. Res. 100 150 200 - 50 250 60 300 70

121%

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS	
					14	350-		1
						-		,
						-	- 80	
•						400-		
						1	- 90	
						450-		
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							-100	
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						650 -	-130	
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						-		
						700 -	-140	
						1		
						+		
						750 -	-150	
					e	=		
						=		
 						800		

Н	ole No. US-79203 Map. Hedstrom Lake	Date: 11/13/79 State: Montana County: Carfiel	d
ΕI	ev: 2720 FT Location: T 16 8 R 44	K,Sec Tract Drilled depth FT. Hole size: 5 1/8 IN. Air \( \bar{\chi} \) Water \( \bar{\chi} \) Cored: Yes	520 FT.
M	easured: 10 FT FSL 2490 FT KWX	FT. Hole size: 5 1/8 IN. Air X Water Cored: Yes	□ No □
	emarks:		
	LITITAM JACKSON	NS ION HANGAS 20	FT.
R	ECORDED BY WILLIAM JACKSON GEOLOG		MIN.
		GAMMA T.C. 2 SENS. SETTING RANGE 100 S.P. SENS. SETTING RANGE 10	DEPTH
	LITHOLOGY		ERS
		LOGGED DEPTHS LOGGED DEPTHS	FEE
-	7	320 FT. 319 FT. 5 FT. 319 FT.	60-
			00]
		Gamma	-
			1 1
F			0-10
1			1 1
İ	641		
	Siltstone and alluvium		1
-			60-20
			-
	Coal		1
			1
•			1
1			120-30
			1 1
			-
			1 1
-			180-40
	Clauster		
	Claystone, gray, and siltstone, gray		1
	8		-
			240-50
			1
			1
			-60
1			300-
	:		
	4		
			1 1
	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		700-70

	LITHOLOGY	GAMMA	S P	STRIP	DENSITY	RESISTIVITY	FEET	METERS
							360-	
ř-							-	- 80
			÷				420 -	
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							480-	
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							-	
							-	120
							600 -	
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	× -						-	130
							660-	
		·					-	-140
							-	
							720-	- 150
							-	
	3 V						-	
							780 -	- 160
						o,		-170
							840-	
	1.46	1					-	- 180
		1 -		11			900-	

5P 4 F 1.

ECORDED BY WILLIAM AJCKSON GEO	163		HAN		DING SPEED	20 F
LITHOLOGY	GAMMA T.C. 2 RANGE 100 LOGGE 320 FT	S.P. SENS. SETTING 20 D DEPTHS 319 FT.	STRIP LOG	DENSITY T.C RANGE LOGGED	RESISTIVITY SENS.SETTING 10 DEPTHS T. 319 FT	FEET
		S. P.			Res.	60-

	LITHOLOGY	GAMMA	S P	STRIP	DENSITY	RESISTIVITY	FEET	METERS
							360-	
,							-	- 80
	,						420	90
							480	
							540-	-110
							600 -	120
	``							- 130
							660-	
							-	-140
				=			720-	150
							780	160
						o		-170
						944	840	
							900	186

Hole No: US-79204 Map: Heitz School Date: 11/14/79 State: Montana County: McCone Elev: 2818 FT Location: T16 R R 46 W, Sec 20 Tract DDDD Drilled depth 340 FT Measured: 100 FT FSL 30 FT KWX FT Hole size: 5 1/8 IN Air Water Cored: Yes No X 20 - MIN RECORDED BY JON HANGAS RECORDING SPEED RECORDED BYWILLIAM JACKSON GEOLOGIST YES SP DENSITY RESISTIVITY GAMMA DEPTH SENS.SETTING T.C. _ SENS SETTING T.C _ 100 RANGE _ RANGE _ LITHOLOGY IE LOGGED DEPTHS LOGGED DEPTHS ME 340 FT. FT. 341 FT. 340 FT. 50+0 Gamma -10 Sand, Brown, Fine; and alluviam 50 -20 Claystone, gray; and sandstone, gray 100-150 Coal Sandstone, gray; and 200 claystone, gray . 50 250 -Coal 60 Limestone, gray; claystone, gray; sandstone, gray; 300 and siltstone, gray - 70

		 STRIP	DENSITY	RESISTIVITY	FEET	METER
				,	350-	
					-	
					1	00
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					-	
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\					600-	- 12
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					1	1
					650-	-13
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					-	-
					-	1
					-	
					700 -	-14
					_	
					_	-
					-	1
	-				750 -	-15
				c.	-	1
	1				-	1

Hole No: US-79204 Map: Hietz School Date: 11/14/79 State: Montana County: McCone Elev: 2818 FT Location: T 16 T R 46 W, Sec 20 Tract DDDD Drilled depth 340 FT. Measured: 100 FT FSL 30 FT. XXXX FT. Hole size: 5 1/8 IN. Air & Water Cored: Yes No X Remarks: RECORDED BY WILLIAM JACKSON GEOLOGIST YES RECORDED BY JON HANGAS RECORDING SPEED 20 GAMMA RESISTIVITY SP DENSITY TC____RANGE_ DEPTH T.C. ____2 SENS. SETTING SENS.SETTING TERS LITHOLOGY PTHS 2 2 340 FT. 5 LOGGED DEPTHS LOGGED DEPTHS 341 FT FT. 340 FT 50+0 S. P. Res. 50--20 100-7-30 150 --40 200-250 -- 60 300--70

LITHO	CLOGY		GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
								350-	
								_	- 80
								400 -	
								-	-90
								450-	
								-	-100
								500-	-100
								-	
								550-	-110
								-	
	-							600-	- 120
								-	
							4	650-	-130
								-	
								700 -	-140
		,						-	
								750 - -	-150
							c	-	
								800-	

Hole No: US-79205 Map: Heitz School Date: 11/14/79 State: Montana County: Prairie Elev: 2920 FT Location: T 15 x R 46x, Sec 32 Tract ADAA Drilled depth 300 FT Measured: 1310FT KXX 60 FT KXX FT. Hole size: 5 1/8 IN. Air X Water Cored: Yes No X Remarks:_ RECORDED BY JON HANGAS __ GEOLOGIST RECORDED BYWILLIAM JACKSON RECORDING SPEED __ YES DENSITY RESISTIVITY GAMMA SP DEPTH SENS SETTING SENS. SETTING T.C ... T.C. ___ RANGE 100 RANGE . LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 276 FT. FT. 5 FT. FT. Gamma 50+0 0 --10 Siltstone, tan to brown Claystone, brown; and siltstone, brown Coa1 50 - 20 Claystone, gray-green; sandstone, green; and claystone Coal 100-Coal 150-40 Siltstone, carbonaceous; claystone, gray; sandstone, gray 200-Claystone, green-gray; and 250 sandstone, gray 60 300 70

LITHO	OLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
						II.	350-	
							-	80
1							400-	
							-	-90
							450-	
							-	-100
-							500-	-
								-110
-							550	
								-120
-							600	
1					,		650	-130
							700	-
1							700	140
							750	
	ş					o	, 30	-150
							800	

Hole No: US-79206 Map: Combs Ranch Date: 11/15/79 State: Montana County: Prairie Elev: 3080 FT Location: T 14 K R 46 K, Sec 21 Tract ADAA Drilled depth 480 FT Measured: 1400 FT. FNL 95 FT. FEL FT. Hole size: 5 1/8 IN. Air X Water Cored: Yes No X Remarks:_ NI 20 MIN RECORDED BY WILLIAM JACKSON GEOLOGIST RECORDED BY JON HANGAS RECORDING SPEED _ YES SP GAMMA DENSITY RESISTIVITY DEPTH T.C. ____2 SENS SETTING SENS. SETTING RANGE __ 100 RANGE . LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 479 FT. 479 FT. 479 FT Gamma 50+0 Sand, fine -10 Claystone, gray; siltstone, gray; sandstone, brown Coal, carbonaceous; and shale Limestone, gray 50-20 Sandstone, gray; claystone, gray; and siltstone, gray 100-- 30 Coal, carbonaceous 150 -Coal, carbonaceous Sandstone, gray; siltstone, gray; and claystone, gray 200-- 50 Limestone, gray 250 -- 60 300 Coal Sandstone, gray; claystone, gray; and siltstone, gray

LITHOLOGY	GAMMA	<b>S</b> . P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Coal Claystone, gray; and siltstone, gray Coal Sandstone, gray; claystone, gray; and siltstone, gray Coal Siltstone, gray; sandstone, gray; and claystone, gray						450-	-80 -90
						550-	-110
						650-	-120 -130
					e.	750 -	-140 -150
						800-	

hole No: US-79206 Map: Combs Ranch Date: 11/15/79 State: Montana County: Prairie Elev: 3080 FT Location: T 14 X R 46 W, Sec 21 Tract ADAA Drilled depth 480 FT.

Measured: 1400 FT 758 95 FT XXX FT. Hole size: 5 1/8 IN Air X Water Cored: Yes No X RECORDED BY WILLIAM JACKSON GEOLOGIST RECORDED BY JON HANGAS RECORDING SPEED YES DENSITY RESISTIVITY GAMMA SP DEPTH SENS SETTING SENS.SETTING T.C. ___2 T.C. RANGE 100 RANGE -LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 479 FT. 5 479 FT. 479 FT. FT. 50+0 -10 Res. 5.P. 50--20 100 150 -200-250 -- 60 300-- 70

LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
						350   400	-80
						450-	-90 -100
						-	-110
	•					600-	-120
						650	
						750 - -	-150

DRDED BYWILLIAM JACKSON_ GEOLOGIST	YES RECORDED BY JON HANGAS RECORDING SPEED	20 cdF
	GAMMA T.C. 2 SENS SETTING CHARGE 100 SP RANGE 100 SP RANGE 5	DEPT
LITHOLOGY	LOGGED DEPTHS  300 FT 396 FT FT 396 FT	E F E E
	Gamma	50
Sand, brown, fine to very-fine, alluvial		0-
		50-
Claystone, carbonaceous, silt- stone, gray; sandstone, gray; and claystone, gray		100-
Coal, with claystone parting		150-
Claystone, gray; siltstone, gray; and sandstone, gray		
Coa1		200-
Sandstone, gray; claystone, gray; and siltstone, gray		250-
Coal		
		300-
		1

LITHOLOGY	GAMMA	<b>\$</b> . P.	STRIP	DENSITY	RESISTIVITY	FEET	
					_	350-	
						-	-8
						400-	
						-	- 9
						450-	
						-	-10
						500-	
						-	
						550-	
						-	
J						600-	-1
						650-	-13
						-	
				5		<b>7</b> 00 -	-14
					ą v	750 -	-15
						=	

T.C.	GAMMA 2 GE 190 LOGGED 300 FT.	S P SENS SE 20 DEPTHS 396		T.C.	1GE	RESISTIVIT SENS SETT 5 DEPTHS	FT.	FEET
RAN	LOGGED		FT.	STRIP	LOGGED	DEPTHS	FT.	E E
				1				50-
								-
		5. P.				Res.		0 -
								50-
		3				45		-
	\$					1	<b>&gt;</b>	100-
	2	3				1		150
,	3	<b>S</b>				5		
		5						200
	•	>				3		
	1							250
	}					Z Kari		

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LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
	THE PROPERTY AND ADDRESS.					350 -	
						400-	- 80
						450 - -	-90
						500-	-100
						550- - -	
\						600-	-120
						650-	-130
						700 -	-140
•					c c	750 -	-150
						800	

EC	ORDED BY WILLIAM JACKSON GEOLOG	IST	YES	RECOR	,		LLIA	M J	ACKSON RECORD		0 9	S FT
		Т.	GAN C	2	SENS		TING	907		RESISTIVITY SENS.SETTING	DE	PTH
	LITHOLOGY	RA	-	100 LOGGED	DEP	20 THS	_	RIP L	RANGE	DEPTHS	= 1	,   1
		+	-	388 FT.		388	===	ST	FI	388 F	T. L	-
				Ga		Ta		*******	Tanna - In Trans	in the trains	50	0+
				2	5							7
												7
		7						باساند	1 m/m 1 mm - 1 mm 1 mm 1 mm 1 mm 1 mm 1		1	5 -
	Siltstone, brown, alluvial; and gravel			₹								+1
				3	= :			8.2.2. 				1
	Claystone, brown; siltstone,			₹								7
	brown; and sand			3	5	-					50	2-
				1	2						1	1
	Claystone, greenish-gray			1								+
	Coal, shale, carbonaceous			-				111.11				+
	Sandstone, gray; and										100	"
	claystone, gray											+
	Coal			==								1
					2						150	o -
				3								-
				3								
				1								+
	Claystone, gray; and			£ 3				<u></u> .			200	2
	sandstone, gray			2								+:
				<b>1</b>								+
		-1-		3							250	5-
	Coal		-									4
	Sandstone, gray; and											+6
	claystone, gray			<b>1</b>								-
	Coal			*							300	>-
					2							]
	Claystone, gray; and sandstone, gray			*				تلتجت				+7
	, 824			\$					1			4

	3	350-
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200		1
	4	100
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		+
	4	50-
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		500-
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	5	550-
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	Ι ε	500-
		=
		1
	6	550-
		1
	7	00
		1
		1
	7	750-
		=

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CORDED BY WILLIAM JACKSON GEO	YES	RDED BYWILL	IAM				)M	11
V	T.C. 2 RANGE 100	S P SENS SETTING	106	11.6	RESISTIVI		DEPT	H
LITHOLOGY	LOGGE	D DEPTHS	d	RANGE	DEPTHS		EET E	1
	388 F	. 388 _{FT.}	ST		FT. 388	FT.	<u> </u>	
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		S.P.			Re.	0		
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		\$					1	
		3				3	150-	
		3					1	4
		3					]	
		3			25		200-	
		3			***		-	
					1		1 1	5
		5			3			
		4					250-	
		\$					1 +	•
			w				-	
		-			1		300-	
		3			5		-	7
		- 5			-		1 7	•

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
						350-	-80
						450-	-90
						550-	
\ <u>\</u>						650-	
		vi .				700	-140
					e.	750	-150

RDED BY WILLIAM JACKSON GEOLOG	TES	RECORDING SPEED 2  ENSITY RESISTIVITY
		SENS.SETTING
LITHOLOGY	LOGGED DEPTHS 299 FT. 299 FT. 5	LOGGED DEPTHS
•	Gamma	FT. 299 FT.
	3	,-
Sand, brown, fine, alluvial	3	
Claystone, gray-brown; and	3	
siltstone, brown		
		^,
Shale, carbonaceous; clayston		
gray; and sandstone, gray		
Coal		
Coal, shale, carbonaceous		
Claystone, gray; and		
sandstone, gray		
Coal		
Sandstone, gray; and		c
claystone, gray		

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	LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
-							350-	
							400 -	80
					•		450-	-90
							500-	-100
							550-	-110
							600-	-120
							650-	-130
							700 -	-140
						o	750 - -	-150
							800-	

Hole No: US-79209 Map: Little Sheep Mt. Date: 11/16/79 State: Montana County: Prairie Elev: 2975 FT Location: T 14 % R 47 XXX, Sec 27 Tract CBBC Drilled depth 300 FT Measured: 1280FT FSL 20 FT FWL FT Hole size: 5 1/8 IN Air X Water Cored: Yes No Remarks:__ YES RECORDED BY JON HANGAS RECORDING SPEED 200 MI RECORDED BY WILLIAM JACKSON GEOLOGIST GAMMA T.C. 2 DENSITY RESISTIVITY SP SENS SETTING ST.C ______ RANG DEPTH SENS SETTING RANGE 100 RANGE __ LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 299 FT. 5 299 FT. FT. 299 FT. 50+ S.P. Res. 50 100 150 200 250 300

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LI1	THOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	2000
							350-	
							_	
							-	- 80
							400-	
							_	
							-	-90
						• 1	450-	
							-	
						4	-	-10
				-		0 1	50 <b>0</b> -	
							-	
						1		-110
						9	550-	
							-	
							600-	- 12
							-	
							-	
							650 ~	-130
							-	
						9 7	700 -	-140
							-	
							750 -	-150
						· c	-	
							800-	

PRDED BY WILLIAM JACKSON GEOLOGIS	YES	
	GAMMA S.P. SENS. SETTING T.C2 SENS. SETTING ANGE100 S.P. SENS. SETTING RANGE SENS. SE SENS. SETTING RANGE SENS. SE SE SENS. SE S	TTING DEPT
LITHOLOGY	LOGGED DEPTHS	1 4
	412 FT. 408 FT. 5 FT. 40	8 FT.
N	Gamma	50-
5.0		
a ' 11		1 ]
Alluvium, brown		0-
Alidvium, brown		
Interbedded claystone, brown;		1 4
siltstone, brown, and sand-		1 4
stone, brown, very fine		
		50-
Interbedded sandstone, gray,	IND AND	1 +
fine to very fine; siltstone, gray; claystone, gray; and		1 +
carbonaceous shale		1 +
		1 4
Sandstone, gray, very fine to		100-
fine, with claystone laminae		1 +
		1 +
Sandstone, gray, very fine to		
fine; coal; carbonaceous		1 1
mudstone		150-
		1 1
Interbedded claystone, gray;		
and sandstone, gray		
Interbedded claystone, gray;		200-
and sandstone, gray		200
Coal		1 +
Coal		
Interbedded claystone, gray;		1 1
sandstone, gray; and siltstone,		250-
gray, with limestone, gray		1 4
		1 +
Interbedded siltstone, gray;		-
sandstone, gray, fine; and claystone, gray		-
craystone, gray		300-
		-
		1 -
0 1		1 -
Coal		1

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	LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
	Interbedded claystone, gray, sandstone, gray; and siltstone, gray  Coal Interbedded sandstone, gray; and claystone, gray						350	-80 -90 -100 -110
1						Ğ	750 -	-150

Elev.: 3210 FT Location: T13 & FMeasured: 12 FT FNL 225 FT.  Remarks:  RECORDED BY WILLIAM JACKSON GE	EOLOGIST YES RECORD  GAMMA T.C. 2  RANGE 100	S P SENS. SETTING	HA	NGAS RECOR DENSITY T.C RANGE	DING SPEED RESISTIVITY SENS SETTING 5	20 DEPT
	LOGGED 412 FT	DEPTHS 408 FT.	STRIP	LOGGED	DEPTHS T. 408 F	T. W.
		S. P.			Res.	50-

. 1	LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
							350-	-80
							450-	-90
							500-	-100
							550-	110
	,						600-	-120
							650-	-130
							700 -	
						*	750 -	

Silt, brown  Siltstone, tan; claystone, tan and gray, some carbonaceous, and sandstone, gray  Claystone, gray; and sandstone, gray  Claystone, gray; claystone, gray; and siltstone, gray  Sandstone, gray; claystone, gray; and siltstone, gray		GAMMA	DED BYWILLI		DENSITY	RESISTIVITY	DE
Silt, brown  Siltstone, tan; claystone, tan and gray, some carbonaceous, and sandstone, gray  Claystone, gray; and sandstone, gray  Coal  Sandstone, gray; claystone, gray; and siltstone, gray  Sandstone, gray; claystone, gray; and siltstone, gray	le le		SENS SETTING	007			- 1-
Silt, brown  Siltstone, tan; claystone, tan and gray, some carbonaceous, and sandstone, gray  Limestone, brown-gray  Claystone, gray; and sandstone, gray  Coal  Sandstone, gray; claystone, gray; and siltstone, gray				æ			m m
Siltstone, tan; claystone, tan and gray, some carbonaceous, and sandstone, gray  Limestone, brown-gray  Claystone, gray; and sandstone, gray  Coal  Sandstone, gray; claystone, gray; and siltstone, gray  20							50
tan and gray, some carbonaceous, and sandstone, gray  Limestone, brown-gray  Claystone, gray; and sandstone, gray  Coal  Sandstone, gray, claystone, gray; and siltstone, gray  20		G 37	mma				C
Claystone, gray; and sandstone, gray Coal  Sandstone, gray, claystone, gray; and siltstone, gray  20	tan and gray, some carbonaceous				्रामुख्य होत्य br>(		50
Sandstone, gray, claystone, gray; and siltstone, gray	Limestone, brown-gray						
Sandstone, gray; claystone, gray; and siltstone, gray	gray		\$				100
gray; and siltstone, gray					प्रदासातुरु राज्यताहर		15
25							20
		7					25

LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
					A.	350-	
						-	- 80
						400-	1
						_	
						-	- 90
						450-	
					XI	-	-10
						500-	
						_	
						550-	- 110
						-	
4.22						600-	- 12
						-	
	•					-	130
						650-	
						-	
						700 -	-14
						-	
					g	750 -	-15
					.,		
						800-	

		32020013	YES	RDED BWILL	TAM SAGE	DENSITY	RESISTIVIT	ΥT	
LITHO	OLOGY		T.C2 RANGE100	SENS SETTI	NG 8 T.C	NGE	SENS.SETTII 5 DEPTHS	NG	FEET 43
			26 <b>2</b> F		T. 5.	FT	263	FT.	50
				S. P.			Res.		100

u	2-	11	-	_	-	 

. (	LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
						*4	350 - -	
							-	-80
							400-	\$
							-	-90
						N.	450-	30
						1	-	
							500-	-100
	•						-	
							550-	-110
							-	
					<u> </u>		600-	- 120
	~				6		-	
							650-	-130
							-	
			•				-	
							700 -	-140
							-	
							750 -	-150
							-	
L		 					800-	1

CORDED BY WILLIAM JACKSON GEOLOG	T.C. 2 SENS SETTING 20  LOGGED DEPTHS  RECORDED BYWILLIAM LACKSON RECORDING SPEED 21  DENSITY RESISTIVITY TC SENS SETTING RANGE 5  LOGGED DEPTHS	DE P
	220 FT. 220 FT. 5 FT. 220 FT.	u.
Sandstone, gray, fine to very fine; siltstone, gray; and claystone, gray	Gamma	50
		300

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. 1	LITHOLOG	Υ	GAMMA	<b>S</b> . P,	STRIP	DENSITY	RESISTIVITY	FEET	METERS
							· 14	350-	
								1	- 80
								400-	
								450-	- 90
								-	
								-	-10
								500-	
								550-	-11
								-	
								600-	
		<u>.</u>							
								650-	-13
								650-	,,,
								700 -	-14
								750 -	-15
								800	

RECORDED BY WILLIAM JACKSON GI	OLOGIST NE RECO	RDED BWILLI	AM J	JACKSON RECORD	DING SPEED_	20	F
- 001	T.C. 2	S.P.	90	DENSITY T.C	RESISTIVITY SENS.SETTIN		-
LITHOLOGY		D DEPTHS	RIP L	LOGGED	DEPTHS	FEET	100
	220 _F	T. 220 FT.	ST	FI	220 1	T. 4	-
45						50-	-
				75. 54.4			
		5.P.			Res.	0-	-
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				0		-	- (
					**	1111	
						300-	1

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LITHOLOGY	GAMMA	S. P. ST. S. C. S.	DENSITY	RESISTIVITY	FEET
				. 1/	350-
					1
					-
					+
					400-
					100
					-
					-
					1 1
					450-
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					+
					500-
		-			
					+
					550-
					1+
					600-
					650-
					1
			1		
					700 -
					1
	- T				
					1 ]
					750 -
					-
					800

ECO	RDED BWILLIAM JACKSON GEOLOG	IST ,	NES	RE	CORD	ED	BVII	LIA	M JA	CKSON RECOR	DING SPEED	2	0	FM
10	ods	T.C	GAM	MA 2		SENS	S. P. S. SET	enine.	Lange To So	DENSITY T.C	RESISTIVIT	Y	DE P	200
	LITHOLOGY	RAN		LOG	GED FT.	DEPT	гнѕ	West.	RIP	A COURT OF THE PARTY OF THE PAR	DEPTHS T. 318	FT	FEET	
	732				3 m								50-	-
-					5							10.15		1
					5				\$ 000	Macroson and		10.3	1	
	Regolith, brown; sandstone,												0-	1
	gray, very fine; siltstone, gray; and claystone, gray												111	1
	gray, and crayscone, gray				4								111	
					*				748					-
	Coal				3							SEA.	50-	-
					3	=						ya di		
														1
	Coal				1	-							100-	1
					3				2					1
	Sandstone, gray, very fine;				j									
	siltstone, gray; and claystone, gray				1				Pa. 4				150-	-
					7				7					-
					3				· ·					-
					1				2.0				200-	1
	Coal					#			==				-	1
	Sandstone, gray, very fine;													1
	siltstone, gray; and				2				123					1
	claystone, gray				\$				12				250-	1
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									74				III.	1
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. LITH	OLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	N H H H
							350-	
							_	80
							400-	
						13	400	
		0 13					-	
		0 14 6.0					-	90
							450-	
							-	
							-	-10
							500-	1
							-	
								-111
							550-	
							-	
		115 19					-	- 12
							600-	
	,						-	
		110					1	
							650-	-13
							-	
							700 -	10
					4.		-	1
							-	
							750 -	-15
							-	-
		•						
							800-	1

Hole No: US-79213 Map: McCloud Date: 11/18/79 State: Montana County: Prairie Elev: 2904 FT Location: T 14X R 48 7, Sec 27 Tract DDDC Drilled depth 320 FT

Measured: 110 FT XXX 375 FT XXX FT Hole size: IN Air X Water Cored: Yes No X RECORDED BY WILLIAM JACKSON GEOLOGIST YES RECORDED BYWILLIAM JACKSON RECORDING SPEED 20 MIN DENSITY RESISTIVITY. GAMMA SP DEPTH T.C ____ SENS.SETTING T.C. _ RANGE 100 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 318 FT. 5 319 FT. 318 FT. FT. 50+0 S.P. Res 50-100-150-200-250 -300

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
					. 1/	350 - -	
						400-	80
						450 -	-90
						500-	-100
						550-	-110
						600-	-12
						650-	-130
				÷		700 -	-14
						750 -	-150
				7.4		800-	

RDED BY WILLIAM JACKSON GEOLOG	YES	0
LITHOLOGY	T.C. 2 SENS. SETTING T.C. 20 PANGE 10	DE
	LOGGED DEPTHS  242 FT 240 FT FT 240 FT	u.
	Gamma	51
Regolith, brown		
Coal		
		5
Sandstone, gray, very fine;		1
siltstone, gray; and		
claystone, gray		
Coal		10
Coal		15
Sandstone, gray, very fine;		
siltstone, gray; and claystone, gray		
, , , , , ,		20
Coal		
Coal		
	OSARI	25
		12:
		30

us- <u>79214</u>

	LITHO	LOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
T							. :/	350-	
-								400-	- 80
								- - 450-	-90
								500-	-100
								550-	- 11
								600-	- 12
								650-	-13
						4		700 -	-14
								750	-15
								800	

can

LITHOLOGY  RANGE 50 20  LOGGED DEPTHS 242 FT 240 FT 5  SENS SETTING RANGE 10  RANGE 10  LOGGED DEPTHS FT 240 FT	CORDED BWILLIAM JACKSON GE	GAMN	IA I	SP	T	DENSITY	RESISTIVI	TY	DEP
S.P. Res.	LITHOLOGY	RANGE	.OGGED DE	20 PTHS	1	RANGE	D DEPTHS		EET
		24	2 FT	240 FT.	ST	F	т. 240	FT	50-
									0
	-		S.	ρ. <del> </del>			Res.		50
				<b>5</b>					100
				\$					
			~	<b>}</b>					150
									200
			3		-		20 Jan		
									250
1 1 1									30

u	2-	
_	-	 •

. LI	THOLOGY	GAMMA	<b>S</b> . P.	STRIP LOG	DENSITY	RESISTIVITY	FEET	METERS
						'n	350-	
							400 - -	- 80
							450 -	-90
		,					500-	-10
	6.90						550- -	-11
	`~						600-	- 12
							650-	-13
							700 -	-14
		1					750 -	-15
							800-	

RDED BYWILLIAM JACKSON GEOLOGIS	TES
LITHOLOGY	GAMMA T.C. 2 SENS SETTING T.C. 2 SENS SETTING T.C. SENS SETTING RANGE 5  LOGGED DEPTHS 299 FT. 5 FT. 299 FT.
Regolith, brown  Sandstone, brown and gray, very fine; siltstone, brown and gray; and claystone gray  Sandstone, gray, very fine; siltstone, gray; and claystone, gray  Coal	Gamma
Sandstone, gray, very fine; siltstone, gray; and claystone, gray	
Coal, with claystone parting	

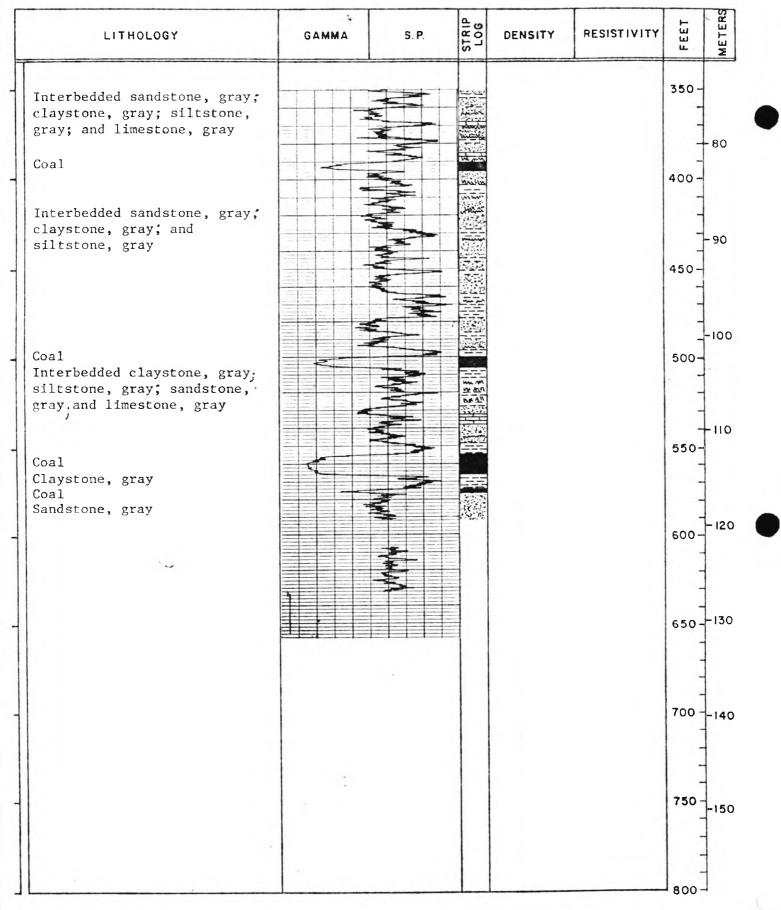
uş-<u>79215</u>

LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
					N.	350-	
						400 -	80
						450-	-90
						500-	-100
						550- - -	110
						600-	- 120
						650 -	-130
						700 -	
					,	750 -	-150

F77

hole No: US-79216 Map: Watkins SE Date: 11/29/79 State: Montana County: Prairie Elev: 3222 FT Location: T 15% R 47 W, Sec 30 Tract ACAB Drilled depth 600 F Measured: 1780 FT FSL 1650 FT. FWL FT. Hole size: 5 1/8 IN. Air Water Cored: Yes No YES RECORDED BY JON HANGAS RECORDING SPEED 20 RECORDED BY WILLIAM JACKSON GEOLOGIST GAMMA DENSITY RESISTIVITY DEPTH SENS SETTING _ SENS.SETTING T.C __ RANGE 100 RANGE ____ LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 591 FT. 592 FT. 5 FT. 592 FT Gamma 50 -Silt, brown, fine, sand; colluvium Interbedded claystone, brown; sandstone, brown; and siltstone, brown 50 Interbedded sandstone, gray; siltstone, gray; and claystone, gray Coal 100 150 Interbedded claystone, gray; sandstone, gray; and siltstone, gray 200 -250 Coal Interbedded sandstone, gray; 300 claystone, gray; and siltstone, gray Coal

03-____



RECORD	ED BY WILLIAM JACKSON GEOLO	GIST NR REC		JON I	IAN	IGAS RECORU			
		T.C. 2	S P SENS. SE	TTING		DENSITY T.C RANGE	RESISTIVITE SENS.SETT		DEPT
	LITHOLOGY		ED DEPTHS		RIP	LOGGED	DEPTHS		FEET
T		591	T 592	FT.	ST	FT	592	FT.	-
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									50
						~,			
		1-1-1-1-1	S.P.			/	Ces.		
									100
			1			£	7		
			3						
			5			2	3		150
			7			5			
			A A						
			3						200
						5			
							<b>₩</b>		250
			3			25			
							==		300
							2		
					1		3		1

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
					>	400 -	80
		RESET				500-	-110
						650	1
				¥		700	-140
						750	-150
		***				800	

	GAMMA T.C2	S P SENS SETTING	90		STIVITY
LITHOLOGY	RANGE 100 LOGGE	DEPTHS	RIP L	RANGE	THS
	337 FT	335 FT.	12	FT.	335 FT.
	G	-2mma			
			laake		
Sandstone, brown; siltstone,		1			
brown; and claystone, brown			日田		
4.1					
Claystone, gray; sandstone,					
gray; and siltstone, gray					
Coal		100			İ
Coal; and shale, carbonaceous					
odar, and share, carbonaceous					
Siltstone, gray; sandstone,					
gray; and claystone, gray					
					į
Coal			===		2
Coar					ľ
Claystone, gray; siltstone,					
gray; and sandstone, gray					1
					2
			<u>-1-1-</u> 1		
					1
					1
Coal				2.0 	[3
Sandstone, gray		2	<b></b>	•	
L.		135			16

LITHOLOGY	GAMMA	<b>8</b> . P.	STRIP, LOG	DENSITY	RESISTIVITY	FEET	METERS
						350-	
						400-	- 80
						450 	- 90
						500-	-100
						550-	-110
						600-	- 120
						650-	-130
					×	700 -	-140
						750	-150
						800-	

Hole No: US-79217 Map: Watkins SE Date: 11/30/79 State: Montana County: Prairie Elev: 2965 FT Location: T 15 & R 47 W, Sec 6 Tract CCCC Drilled depth 340 FT

Measured: 25 FT FSL 340 FT FWL FT. Hole size: 5 5/8 IN. Air X Water Cored: Yes No X YES RECORDED BYWILLIAM JACKSON RECORDING SPEED 20 FT. RECORDED BY WILLIAM JACKSON GEOLOGIST GAMMA T.C. 2 DENSITY RESISTIVITY SP DEPTH SENS SETTING T.C_ SENS SETTING METERS RANGE 100 20 RANGE _ LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 335 FT. 5 335 FT. 337 FT. 50+ C 0-11 50-S.P. Res. 100-150-200-250 -300

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1. t. K

7 "17

05-	_	2	4	_/	

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
					. A.	350-	
						400-	-80
						450-	-90
						500-	-100
						550-	-110
						600-	- 120
						650 -	-130
				a.		700 - -	-140
						750 - -	-150
						800-	

CORDED BY WILLIAM JACKSON GEOLOGI	YES	HANGAS RECORDING SPEED 20
LITHOLOGY	GAMMA T.C. 2 RANGE 100  LOGGED DEPTHS 262 FT 262 FT.	RANGE 10 LOGGED DEPTHS
Siltstone, brown,  siltstone, brown, interbedded with sandstone; and claystone, brown Claystone, gray, some carbonaceous; shale; and sandstone, gray  Coal  Interbedded siltstone, gray; and sandstone, gray  Coal Claystone, gray; and sandstone, Coal, with claystone parting Coal Interbedded siltstone, gray; and claystone, gray and claystone, gray	Gamma	50-

LITHOLOGY	GAMMA	S.P.	DENSITY	RESISTIVITY	FEET	
					350-	
					-	8
					400-	
					-	9
					450-	
					-	-10
		-		J.	500-	
					-	-1
	,				550-	
					-	-13
					600-	
					650~	
					650~	
					700 -	
					-	-14
					750 -	
						-15
					800-	

note No. US-79218 Map: Hietz School Date: 11/30/79 State: Montana County Prairie Elev: 2816 FT Location T 158 R 46 K, Sec 18 Tract BBBB Drilled depth . 260 FT Measured: 50 FT KXX 40 FT FWL FT Hole size: 5 1/8 IN Air W Warri Cored: Yes No W RECORDED BWILLIAM JACKSON GEOLOGIST YES RECORDED BY JON HANGAS RECORDING SPEED 20 GAMMA T.C. 2 RESISTIVITY SP DENSITY SENS SETTING TC ____ SENS SETTING RANGE 100 RANGE __ LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 262 FT. 5 262 FT 262 FT 50+0 S.P. Res. 50-100-150-200--50 250 300 -- 70

. LIT	HOLOGY	GAMMA	<b>S</b> . P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
						<i>p.</i>	350-	
							400 -	80
		1					45C	-90
							500-	-100
							- - 550- - -	-110
	e.						600-	-120
		•					650-	-130
							700 -	-140
							750 -	-150
							800	

note No: US-79219 Mop Watkins Date: 12/1/79 State: Montana County: McCone Elev: 2755 FT Location: T 16% R 46%, Sec 14 Tract AAAA Drilled depth 320 FT Medsured: 25 FT RXK 20 FT RXX FT Hole Size: 5 1/8 IN Air X Water Cored: Yes No X Remarks:____ RECORDED BY WILLIAM JACKSON GEOLOGIST YES RECORDED BY JON HANGAS RECORDING SPEED SP DENSITY RESISTIVITY GAMMA DEPTH SENS SETTING SENS SETTING T.C. T.C. ___2 RANGE 200 RANGE _ LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 315 FT 314 FT. 5 FT 314 FT Gamma 50+0 Regolith, brown Coal 50-Sandstone, gray, very fine; 100siltstone, gray; and claystone, gray - 30 150 --40 Coal 200 -Coal 250 Coal - 60 Coa 1 300

LITHOLOGY	GAMMA	<b>S</b> . P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
					14	350-	
						-	-80
						400-	
						-	-90
						450-	
						-	-100
						500-	
						-	110
						550-	1
							-120
						600-	
						650	-130
						630	
						700 -	140
							140
					,	750	
							-150
						800	

.17.

nole No: US-79219 Map Watkins . Date: 12/1/79 State Montana County: McCone Elev: 2755 FT Location: T 16% R 46%, Sec 14 Tract AAAA Drilled depth 320 FT Medsured: 25 FT RXX 20 FT RXX FT. Hole size: 5 1/8 IN Air X Water Cored: Yes No X Remarks:____ RECORDED BY WILLIAM JACKSON GEOLOGIST TES RECORDED BY JON HANGAS RECORDING SPEED DENSITY RESISTIVITY SP GAMMA SENS SETTING TC _____ SENS SETTING T.C. ___2_ RANGE 200 RANGE _ LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 315 FT 314 FT. 5 Gamma 50+ 0 Regolith, brown Coal 50--20 Sandstone, gray, very fine; 100siltstone, gray; and claystone, gray - 30 150 --40 Coal 200 -Coa1 250 Coal - 60 Coal 300

LITHOLOG	Υ	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
						. 14	350-	
							-	-80
							400-	
							-	-90
							450-	
							500-	-100
							-	
							550-	110
							-	
							600-	-120
							-	
							650-	-130
							-	
							700 -	-140
						,	750 -	
							750 -	-150
							800-	

RECORDED BY WILLIAM JACKSON GE			ANGAS_ RECOR	DING SPEED 20	
LITHOLOGY	T.C. 2  RANGE 200  LOGGED	$\frac{10}{10}$	RANGE	SENS SETTING	DEPTI
		314 FT. 5		T 314 FT	50-
	S		R e		150-

us-__79219

LITHOLOGY	GAMMA	\$. P.	STRIP LOG	DENSITY	RESISTIVITY	FEET	METERS
					`41	350-	
						_	- 80
						- 400 -	
						-	
					39	-	- 90
						450-	
					V)	-	
					d	=	-100
						500-	
						]	- 110
						550-	
						-	
	·					600-	- 12
"~							
						-	
						650-	-130
					9. 3	-	
						-	
					411	700 -	-14(
						-	- 1
						=	
						750 -	-150
						4	
						1	
						800	

ECORDED BY JON HANGAS GEOLOGI	IST YES RECORDED BY JON HANGAS RECORDING SPEED 2	Q N
LITHOLOGY	GAMMA T.C. 2 SENS SETTING RANGE 100 LOGGED DEPTHS 336 FT 293 FT.  GAMMA T.C. 2 SENS SETTING FRANGE 5  LOGGED DEPTHS FT 293 FT.	FEET -
Sandstone, brown, very fine; and claystone, brown Coal  Sandstone, gray, very fine; siltstone, gray; and claystone, gray	Gamma  The second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second secon	50
Coal Sandstone, light-gray, very. fine; and claystone, gray  Coal		150-
Sandstone, gray, very fine; siltstone, gray; and claystone, gray		250

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LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
					14	350-	
						-	- 80
						400-	
						=	<b>- 9</b> 0
						450-	
						500-	-100
						550	
						-	
						600-	-120
	br 1					-	
						650-	-130
						-	
						700 -	-140
				•		-	
						750-	-150
						-	
						800-	

LITHOLOGY    Camada   Same   Density   Sensitivity   Sensi	LITHOLOGY  T.C. 2 SENS SETTING OF THE STANDED TO SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF THE SENS SETTING OF T	RECORDED BY JON HANGAS	GEOLOGI	162	!
S.P. Res. 0-	336 FT 293 FT 5 FT 293 FT	LITHOLOGY		RANGE 100 SENS. SETTING RANGE 5	} Lu
S.P. Res. 0-	S. P. Res. 0-			336 FT 293 FT 5 FT 293 FT	
	200-			S.P.  Res.	0
					50

US- 19220

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	VETEDO
					***	350-	
-						-	80
						400-	
						-	
						450-	- 90
						- 500-	-10
						. ]	_,,
						1	
						600-	- 12
-						-	
						650-	-130
						700	
						700	-14(
					e	750 -	-150
						=	

Hole	No: US-79221 Map Glendive AMS	_ Date: <u>12/2/79</u> State: !	Monta	ana County: McCone	
Elev.:	2844 FT Location: T 17 X R 46 W	Sec 8 Tract AAAD D	rille	d depth34	
Meas	ured: 500 FT. KSK 10 FT. KKXX	FT. Hole size: 5 1/8	IN. A	Air Water Cored: Yes	
_	rks:				
05.00	RDED BY WILLIAM JACKSON GEOLOGIS	NG TON	HANG	GAS	FT.
RECO	RDED BY WILLIAM JACKSON GEOLOGIS	115	T 1		MIN.
		T.C. 1 SENS. SETTING	မှ မှ	DENSITY RESISTIVITY T.C SENS.SETTING	DEPTH
	LITHOLOGY	KRIVOE ===	-1 1	RANGE 5	T RS
		LOGGED DEPTHS 339 FT. 340 FT.	STRIP	LOGGED DEPTHS	FEET
		339 F1. 340 F1.	I o	FT. 340 FT.	60-
		Gamma			"
		<b>1</b>			1
		<b>5</b>		Maria Cara Cara Cara Cara Cara Cara Cara	1 . 1
1	Alluvium	3	24.22		0 10
		3			1 1
	Claystone, brown				
1					60-20
					1 1
			<u></u>		1 1
	Claystone, gray				1
+ 1					12030
	```				
	Coal				1 -
		\$			
+ 1	Claystone, gray				180-40
1 1	Coal	-	5.7		1 1
	COAT	<b>S</b>			
		2			1 1
- 1					240-50
	01				-
	Claystone, gray	*			1 1
			122		-
1				-6	300-60
		<b>                   </b>			
1 1			T.E		]
					360 -70

LITHOLOGY		GAMMA	S P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
						•	360-	
							-	1
							-	- 80
							420 -	
							-	
							-	90
							480-	
							-	100
							_	
							540	
							-	
							600 -	- 120
		•					-	
							-	- 130
`~							-	130
						(-6	660-	
							-	-140
							1	
							720-	- 150
							1	
							=	
							780	- 160
•							}	
		*				e	}	-170
							840-	
							-	
	1			1 1			1	- 180
 							tooe	

CORDED BY WILLIAM JACKSON GE	OLOGIST WE RECORDED BY JON HANGAS RECORDING SPEED  GAMMA S.P. DENSITY RESISTIVITY	
LITHOLOGY	T.C.   1   SENS. SETTING   7   T.C   SENS. SETTING   SENS. S	FEET
	S.P. Res.	120-

us-<u>79222</u>

	LITHO	DLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
							11	350-	
								-	-80
	1.							400 -	
									-90
								450-	
									-100
					-			500-	
									-110
								550-	
,								600-	-120
		Ų						-	
								650-	-130
								-	
							40	700 -	-140
								-	
								750 -	-150
							G.	-	
								800-	

RECORDED BY WILLIAM JACKSON GEOLOG	YES	ED BY JON		SPEED 20	
LITHOLOGY	GAMMA T.C. 2 RANGE 200 LOGGED 0 236 FT	SENS SETTING 500	POT RA	NS SETTING 100 PTHS	PE PT
Sandstone, gray, very fine grained; claystone, brown and gray; and limestone, gray  Coal  Sandstone, light-gray, very fine grained; sillstone, gray; and claystone, gray  Coal  Sandstone, light-gray, fine grained; sillstone, gray; and claystone, gray  Coal		MANA) MANAMANAMANAMANAMANAMANAMANAMANAMANAMAN			50-100-150-250-250-300-

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
					14	350-	
						_	
						-	
						-	-80
						400	
						400 -	
						_	
						_	-90
T.						_	790
					No.	450-	
						-	
				P		_	-10
						500-	
						-	
						-	
						-	
							-110
						550-	
						_	
						-	
						-	- 12
						600-	-
						-	
						_	
						650-	-130
						-	
						-	ł
						700 -	١
						-	-14
						-	
	1				,	-	
	4 .					-	
						750 -	-150
						-	
*						800-	

LITHOLOGY	T.C. 2 SENS	S SETTING O T.C.	NSITY RESIST	• • • • • • • • • • • • • • •
	171 FT	0	LOGGED DEPTH	
Sandstone, gray and brown, medium-fine to course-grained; and claystone, gray  Coal  Sandstone, gray, very fine grained; and claystone, gray				50

LITHOLOGY	GAMMA	<b>S</b> . P.	STRIP LOG	DENSITY	RESISTIVITY	FEET	METERS
					, n	350-	
			· 李德·明			E -	į.
							-80
						400-	
						-	
						13-	-90
				\$ 5,700		450-	
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		A. Daniel				11/2	1
					San Application	1 800 -	1

4169 Hole No: US-79169 Map: NE 40 BLM Date: 10/7/79 State: Montana County: Dawson Elev: FT Location: T 17X R 56 K, Sec 22 Tract BBBB Drilled depth 320 FT FT. FWL . Measured: 20 FT XXX FT. Hole size: 5 1/8 IN Air Wath 🛛 Cored: Yes 🗌 No 🗓 Remorks: no elevation control NX RECORDED BY WILLIAM JACKSON GEOLOGIST RECORDED BY JON HANGAS RECORDING SPEED YES GAMMA SP DENSITY RESISTIVITY DEPTH SENS.SETTING SENS. SETTING T.C. RANGE _50 RANGE __ LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS FT. 294 FT 290 FT. 50 50 -20 100 - 30 Sandstone, light-gray, very fine grained; and claystone, FEET gray 150 -40 200-- 50

250

300

60

70

Coal
Sandstone, light-gray, very
fine grained; and claystone,
gray
Coal

LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
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						800-	

Sandstone, brown and gray, fine to very-fine grained; and claystone, gray  Coal	ECORDED BY JON HANGAS GEOLG	GIST YES RECORDED BY JON HANGAS RECORD	
Sandstone, brown and gray, fine to very-fine grained; and claystone, gray  Coal  Coal	LITHOLOGY	T.C2 SENS SETTING STC2 RANGE50	
Sandstone, brown and gray, fine to very-fine grained; and claystone, gray		LOGGED DEPTHS $\frac{1}{\alpha}$ LOGGED 391 FT FT. $\frac{1}{10}$ 395 FT	DEPTHS W
Sandstone, brown and gray, fine to very-fine grained; and claystone, gray			50
Coal 250-			-
Coal 250-	fine to very-fine grained;		55 -
Coal 250-	Coal		200-
to the first of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the c	Coal		250
	Coal		

	LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
-	Sandstone, light-gray, very fine grained; and claystone, gray				AT A STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE		350-	-80
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1							650-	-130
							700 -	-140
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					,		800-	

					RESISTIVITY	
LITHOLOGY	T.C	E200_ LOGGED	S P SENS SETT 500 DEPTHS 153	ING O TC	SENS SETTING 100 DEPTHS	FEET
Sandstone, gray, very figrained; siltstone, gray; claystone, gray; and lim gray  Coal  Coal, with claystone par  Sandstone, light-gray, v fine grained; claystone,	estone,	The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s	Carly John John John John John John John John			50-
						250

LITHOLOGY	GAMMA	S.P.	STRIP LOG	DENSITY	RESISTIVITY	FEET	METERS
	elitare et al as de	and the later of the second sections.			* 45	350-	
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						650-	-130
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						-	
						700 -	-140
				4		-	
						-	
						750 -	
						-	-150
						800	

CORDED BY WILLIAM JACKSON GE	YES		ACKSON ECORDING SPEED	
LITHOLOGY			DENSITY RESISTIVIT SENS SETTI SENS SETTI 100 LOGGED DEPTHS 120 FT 113	NG DEP
				50
Sandstone, gray, fine-grand claystone, brown and Coal	gray			0
Sandstone, gray, fine-gray siltstone, gray; and clays gray  Coal				50
Sandstone, gray, fine-grained; and claystone, gray	May des	<b>*</b>		100
		<i>y</i>	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	150
				200
				250

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z
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						700 -	-14
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						750 -	
						-	-15
						_	
						-	

Hole No: US-79173 Map: NE 40 BLM Date: 10/9/79 State: Montana County: Dawson Elev: 2419 FT Location: T 19 X R 56 X, Sec 22 Tract CCDD Drilled depth 100 FT Measured: 10 FT FSL 1350 FT FWL FT Hole Size: 5 1/8 IN Air Ward X Cored: Yes No X Remorks: no elevation control NE RECORDED BY WILLIAM JACKSON RECORDED BY WILLIAM JACKS ON CORDING SPEED _ GEOLOGIST MIN. YES SP DENSITY RESISTIVITY GAMMA DEPTH SENS. SETTING 500 T.C ____2 T.C. _ SENS.SETTING 100 RANGE _ RANGE LITHOLOGY 0 LOGGED DEPTHS LOGGED DEPTHS ā 93 FT. 96 FT. 94 FT. 100 FT 50+0 0-1-10 50-Sandstone, gray, fine--20 grained; and claystone, brown and gray 100-- 30 150 --40 200 50 250 60 300 - 70

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
					11,	350-	
						400 -	- 80
						-	- 90
						450-	90
					·		-100
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						550-	-110
						-	- 120
		2				600-	
						650-	-130
						-	
						700 -	-140
						750 -	-150
						-	
				L		800-	

	YES		AM JACKSONECORDING SPEED 20
LITHOLOGY	GAMMA T.C2 RANGE200 LOGGED 356 FT.	500 DEPTHS	DENSITY RESISTIVITY SENS SETTING PANGE 2K 100 LOGGED DEPTHS 360 FT 353 FT
Sandstone, brown, fine-grain and claystone, brown Coal  Sandstone, gray, very fine grained; and claystone, gray  Coal  Sandstone, gray, very fine grained; and claystone, gray	ined;	Morris Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria Maria	

	LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
San	ndstone, gray, very fine ained; and claystone, gray						350 - - - - 400 -	- 80
		¥					450-	- 90
							500-	-100
							550-	-110
							600-	- 120
		· ·					650-	-130
					·		700 -	-140
							750 -	-150
							800-	

LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS FERS
Sandstone, gray, very fine grained; and claystone, gray		- The familiar states				400-	80
						500-	-110
		,					130
						750	0-150

Tale 'to: US-79175 Map: SE 8 BLM Date: 10/14/79 State: Montana County: Prairie easured: 750 FT FSL 700 FT XXXX FT Hole size: 5 1/8 IN Air Water X Cored: Yes No X Density logged through source. no elevation control _____ XXX RECORDED BWILLIAM JACKSONECORDING SPEED RECORDED BY WILLIAM JACKSON GEOLOGIST YES RESISTIVITY DENSITY GAMMA SP DEPTH SENS SETTING SENS SETTING T.C. ____2 RANGE 50 200 100 500 RANGE _ LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 400 493 496 FT 493 FT 50+0 Sandstone, brown, fine-grained; and claystone, brown and gray Coal 50 Coal Sandstone, gray, very fine 100 grained; and claystone, gray 150 Coal, with claystone parting 200 50 Sandstone, gray, finegrained; and claystone, gray 250 -Coal 300 Sandstone, gray, very fine grained; and claystone, gray 70

Regolith, brown; sandstone, brown, very fine grained; and claystone, brown  Coal  Sandstone, gray, fine-grained; and claystone, gray  Coal	CORDED BY WILLIAM JACKSON GEOLO	YES		TAM	JACKSONECORDING SPEED	
Regolith, brown; sandstone, brown, very fine grained; and claystone, brown  Coal  Sandstone, gray, fine-grained; and claystone, gray  Coal  Coal	LITHOLOGY	T.C2 RANGE200	SENS. SETTING 500	2	TC 2 SENSSETTING RANGE 2K 100	DE P
Regolith, brown; sandstone, brown, very fine grained; and claystone, brown  Coal  Sandstone, gray, fine-grained; and claystone, gray  Coal  Coal	<b>T</b>			STRI		l m
Sandstone, gray, fine-grained; and claystone, gray  Coal	brown, very fine grained;					50-
Sandstone, gray, fine-grained; and claystone, gray  Coal	Coal	And Johnson Annual State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the State of the	Barry Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Marine Mar			100
	grained; and claystone,	Rss	A Laboratory		Mayor Landy May	200
	Coal Coal, with claystone parting				Annual Control	250

LITHOLOGY	GAMMA	S.P.	STRIP LOG	DENSITY	RESISTIVITY	FEET
	43 T 100 M	p= = ==				7.0
						400
						450
1						
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						550
						•
						600
						600
						650
		4				700
						750
1962						

Hole No: US-79177 Map: SE 8 BLM Date: 10/17/79 State: Montana County: Prairie Elev: FT Location: T 11 R 56 , Sec 8 Tract CCDD Drilled depth 200 FT Measured: 200 FT FSL 1350 FT. FWL FT. Hole size: 5 1/8 IN. Air X Water Cored: Yes No X Remarks: Density logged without source. no elevation control MM RECORDED BYWILLIAM JACKSON RECORDING SPEED RECORDED BY WILLIAM JACKSON GEOLOGIST YES RESISTIVITY DENSITY GAMMA DEPTH SENS SETTING T.C. __ RANGE 200 RANGE 50 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS FT FT. S F.T. 50 + 0Sandstone, brown and gray, very fine grained and siltstone, brown and gray Coal, with claystone and siltstone parting -20 Sandstone, gray, fine-grained; and claystone, gray 100-- 30 Sandstone, gray, very fine . grained; and claystone, gray 150 -Coal Sandstone, gray, very fine grained; and claystone, gray 200-250 -- 60 300

5177

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
						350 - -	
						-	- 80
						400 -	
						-	-90
						450-	
						-	-100
						500-	
						1	-110
		•				550-	
						600-	- 120
							-
						650	-130
						700	-140
						750	-150
						800	-

Hole No: US-79178 Map: SE 8 BLM Date: 10/17/79 State: Montana County: Prairie Elev: FT Location: T 11 X R 56 7, Sec 33 Tract DAAA Drilled depth 320 Measured: 1700 FT FSL 20 FT FEL FT Hole size: 5 1/8 IN Air X Water Cored: Yes No X Remarks: no elevation control NN RECORDED BY WILLIAM JACKSON GEOLOGIST RECORDED BY WILLAIM JACKS CORDING SPEED YES GAMMA SP DENSITY RESISTIVITY DEPTH SENS. SETTING T.C. _ SENS SETTING 500 RANGE _2K_ 500 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 311 FT. 318 FT. 50 + 0Sandstone, gray, very fine grained; and claystone, brown and gray 50 Coal -20 100 40 Sandstone, gray, very fine grained; siltstone, gray; and claystone, gray 200 250 60 Coal Sandstone, gray, fine-grained, 300 siltatone, gray; and claystone gray 70

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
						350-	
						400-	80
						450-	-90
			-			500-	-100
						550-	-110
						600-	-120
						650-	-130
						700 -	-140
						750 -	-150
-						800	

Hote No: US-79178 Map: SE 8 BLM Date: 10/17/79 State: Montana County: Prairie Elev: FT Location: T 11% R 56 %, Sec 33 Tract DAAA Drilled depth 320 FT.

Measured: 1700FT FSL 20 FT. KWX FT. Hole size: 5 1/8 IN. Air X Water Cored: Yes Vo X Remarks: No elevation control. RECORDED BY WILLIAM JACKSON GEOLOGIST MIN. RECORDED BWILLIAM JACKSON RECORDING SPEED 20 YES DENSITY C 2 GAMMA SP RESISTIVITY DETH T.C. ___2 SENS. SETTING T.C_ SENS.SETTING RANGE _2K 500 500 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 314 FT. 311 FT. 318 FT 311 FT 50 T O Res. 07-10 507 100 - 30 150 -40 200 - 50 250 60 300 - 70

LITHIOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
					* 17	350-	
						400-	80
						450-	-90
						500-	-100
						550-	110
8.0						600-	- 120
						650 -	-130
						700 -	-140
						750 -	-150
						800 -	

Hole No: US-79179 Map: BLM SE 8 Date: 10/17/79 State: Montana County: Fallon Elev: FT Location: T10 % R 56 %, Sec 14 Tract CCBB Drilled depth 420 FT Measured: 1000 FT FSL 30 FT FWL FT. Hole size: 5 1/8 IN Air X Water Cored: Yes No X Remorks: no elevation control RECORDED BY WILLIAM JACKSON GEOLOGIST XXX RECORDED BWILLIAM JACKSON RECORDING SPEED 20 YES GAMMA SP DENSITY RESISTIVITY SENS SETTING T.C. __2_ DEPTH T.C _2 SENS SETTING RANGE 2K RANGE _200_ 500 LITHOLOGY METERS RIP LOGGED DEPTHS LOGGED DEPTHS 411 FT 408 415 FT. 408 FT. 50+0 Regolith Sandstone, gray, very fine; and claystone, gray 50--20 Coal 100-- 30 150 -40 Sandstone, gray, very fine; siltstone, gray; and claystone, gray 200--50 250 - 60 300 70

LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Coal Sandstone, gray, very fine; siltstone, gray Coal Sandstone, gray, very fine; siltstone, gray; claystone,	Ä					350-	-80
gray; and limestone, gray					4. 30 311	450	-90
						500-	-100
						550-	-110
						600-	-120
						650	-130
						700 -	-140
						750 -	-150
						800	

Recorded by WILLIAM JACKSON GEOLOGIS	FT. Hole size: 5 1/8 IN Air X Water Cored: Yes No  ST NO RECORDED BY JON HANGAS RECORDING SPEED 20 M
LITHOLOGY	GAMMA T.C. 2 RANGE 200  LOGGED DEPTHS 412 FT 409 FT. 55  T.C. 2 SENS SETTING T.C. 2 RANGE 2K SENS SETTING RANGE 2K SENS SETTING SENS SETTING T.C. 2 RANGE 2K SENS SETTING T.C. 2 RANGE 2K SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 2 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING T.C. 2 RANGE 1 SENS SETTING
Sandstone, brown and gray, very fine grained; and claystone, yellow and gray  Coal  Coal, with claystone parting  Sandstone, gray, fine-grained; and claystone, gray	50- 50- 50- 150- 200- 250- 250-

= 1-1.

LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Coal		<b>X</b>		<i>[</i> ]>		350 - -	
Sandstone, gray, very fine grained; and claystone, gray						 400 	80
						450 - -	-90
						500-	-100
						550-	110
~						600-	-120
-						650	-130
·						700	-140
						750	-150
						800	-

hole	No: US-79181 Map: SE 7 BLM	Date: 10/18	/79 State: I	Montana	County	Fallon		
Elev. Meas	FT Location: T 9 % R 57 W Sured: 1300 FT FNL 1100 FT FEL orks: no elevation control	Sec 16 Tra	ct ABCC D	rilled	depth	440	<u></u>	
-	DRDED BY WILLIAM JACKSON GEOLOGIS	ST VEC RECOR	DED BY JON	HANGAS	RECORDIN	NG SPEED 20	F MI	T.
	LITHOLOGY	GAMMA T.C RANGE200	S P SENS SETTING 250 DEPTHS	RIP LOG	ENSITY R	ESISTIVITY ENS SETTING 50 EPTHS	DEPTH	
	Sandstone, brown and gray, fine-grained; and claystone, gray  Coal, with claystone partings  Sandstone, gray, very fine grained; siltstone, gray; and claystone, gray  Coal  Sandstone, gray, very fine grained; siltstone, gray; and claystone, gray  Coal  Coal  Coal  Coal				The in the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the pro		50-	

LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Coal		1				350-	
Sandstone, gray, very fine grained; siltstone, gray, and claystone, gray  Coal		1				400	- 80
	<b>1</b>		<b>33</b>			450-	-90
	<b>.</b>				94	-	100
			-	Indiantententen		500-	-100
						550-	-110
×				-		600-	-120
						650-	-130
		a l		,		700	-140
						750	-150
74						800	

 ORDED BY JON HANGAS GEOLOGIS	STY	52		ORDE			ON	HA]	NGAS_ RECORDING SPEED_		M
LITHOLOGY	T.C.	GE			ENS.		ING		DENSITY RESISTIVITY TC SENS SETTIN RANGE 20 LOGGED DEPTHS	1 1 1 2	ا د
	+-	41	8 F	Т.	4(	02 F			FT. 402	1 1	+
										5	+0
											+
		6	ลา	177	a				+		7
Sandstone, gray and light-		2				T					2
brown, very fine grained; and claystone, gray											-
Coal, with claystone parting											-
coar, with claystone parting	5	3	\$					12.75		5	o – –
		F									-
		3									-
\		3		F						10	ე –
		3									_
		5						<u> </u>			-
Sandstone, light-gray, very fine grained; siltstone,		>	-	-						150	o -
gray; and claystone, gray		\$									-
		ξ ξ									-
		3								20	- - c
		4									-
		3						<b>.</b> w			-
Coal		\$						ښد لاده پښونښ		25	0 -
Sandstone, gray, very fine		1					3	i'a"			-
grained; siltstone, gray; and claystone, gray		\$						1			-
		A.W.								70	-
		3								300	- ر -
Coal, with claystone parting		3			79			O. (5)			-
		?		=	3.5			2727 3077			-

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Sandstone, gray, fine- grained; and claystone, gray Coal						350   400   450	80
						550	- - - - - - - - -
						650	0-12
							0 -1

Hole No: US-79182 Map: SE 8 BLM Date: 10/19/79 State: Montana County: Fallon Elev: FT Location: T 9 x R 57 x Sec 6 Tract AAAB Drilled depth 420 FT Measured: 200 FT XXX 330 FT XXX FT. Hole size: 5 5/8 IN. Air X Water Cored: Yes No X Remorks: no elevation control NX RECORDED BY JON HANGAS RECORDED BY JON HANGAS RECORDING SPEED GEOLOGIST YES GAMMA T.C. _____2 SP DENSITY RESISTIVITY DEPTH SENS SETTING 50 SENS.SETTING RANGE 200 LITHOLOGY RANGE LOGGED DEPTHS LOGGED DEPTHS 418 FT. 402 FT. 402 FT 50+0 Sp Res. -10 50--20 100-- 30 150 --40 200 -- 50 250 -- 60 300 - 70

LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
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						400-	80
					2	-	-90
						450-	
						500-	-100
						550- -	-110
						600-	- 12
	,					650-	-13
						700 -	-14
			A in	yes		750 -	-15
				100 T		800-	

hole No: US-79183 Map: SE 8 BLM Date: 10/19/79 State: Montana County: Fallon Elev: 3100 FT Location: T 9 R 58 , Sec 6 Tract ADC Drilled depth Measured: 2500 FT. KXX 1000 FT. KXX FT. Hole size: 5 5/8 IN. Air Wolf Cored: Yes No K Remarks: no elevation control RECORDED BY JON HANGAS RECORDED BY JON HANGAS RECORDING SPEED _ GEOLOGIST MIN YES SP DENSITY RESISTIVITY GAMMA DEPTH SENS.SETTING SENS, SETTING T.C ___ RANGE _ 100 METERS 20 RANGE LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 393 FT. 5 FIL 394 FT 50 + 0Gamma 0 Coal 50 20 100 Sandstone, gray, very fine - 30 grained; siltstone, gray; and claystone, gray 150 200 -- 50 Coal, with claystone parting 250 Coa1 60 Sandstone, gray, very fine grained; silstone, gray; and 300 claystone, gray 70

LITHOLOGY	GAMMA	\$. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
	The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s					-	-80
						450-	-90
						-	-100
						550-	-110
						600-	- 120
						650-	-130
						700	-140
						750 -	-150
						800	

ECORDED BY JON HANGAS	GEOLOG	ST YES RECORDED BY JON HNAGAS RECORDING SPEED	20
LITHOLOGY	,	GAMMA T.C. 2 SENS SETTING RANGE 100 20  LOGGED DEPTHS 394 FT. 393 FT. 5  GAMMA S P SENS SETTING RANGE LOGGED DEPTHS FT. FT.	FEET ABO
		S, P. Res.	50-
			50-
			200
			250

LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
		1431				350-	-80
						450	-90
						500-	-110
	•					- - 600 - -	-120
						650	
	**					750 -	-150
						800-	

LITHOLOGY  GAMMA T.C. 2 SENS SETTING RANGE 100  LOGGED DEPTHS 461 FT 386 FT.  DENSITY RESISTIVITY SENS SETTING RANGE 20  LOGGED DEPTHS FT 386 FT.	morks: no elevation control  CORDED BY JON HANGAS GEOLOGIST	FT. Hole size: 5 5/8 IN. Air M. Wurer Cored: Yes	
Sandstone, gray and tan, fine-grained; siltstone, gray, and claystone, gray  Coal  Sandstone, gray and tan, fine-grained; siltstone, gray, and claystone, gray  Sandstone, gray and tan, fine-grained; siltstone, gray, and claystone, gray  Coal  Sandstone, light-gray, very fine grained; siltstone, light-gray  Coal  Sandstone, light-gray, very fine grained; siltstone, gray  Coal  Sandstone, gray, very fine grained; siltstone, gray  Sandstone, gray, very fine grained; siltstone, gray  Coal	CORDED BY JON MANGAS GEOLOGIST	YES DENETTY DESIGNATIVE	
Sandstone, gray and tan, fine-grained; siltstone, light-gray and tan; and claystone, light-gray and claystone, gray, very fine grained; siltstone, gray, and claystone, gray  Coal  Sandstone, light-gray, very fine grained; siltstone, light-gray; and claystone, gray  Coal  Sandstone, light-gray, very fine grained; siltstone, gray  Coal  Sandstone, gray, very fine grained; siltstone, gray; and	1	T.C. 2 SENS SETTING 20 RANGE 100 20 RANGE 20 LOGGED DEPTHS  C SENS SETTING RANGE 20 RANGE 20 LOGGED DEPTHS	E T
Sandstone, gray, very fine grained; siltstone, gray, and claystone, gray  Coal  Sandstone, light-gray, very fine grained; siltstone, light-gray  Coal  Sandstone, light-gray, very fine grained; siltstone, light-gray; and claystone, gray  Coal  Sandstone, light-gray, very fine grained; siltstone, light-gray; and claystone, gray  Coal  Sandstone, gray, very fine grained; siltstone, gray; and		Gamma	50-
Coal Sandstone, light-gray, very fine grained; siltstone, gray, and claystone, gray  Coal Sandstone, light-gray, very fine grained; siltstone, light- gray; and claystone, gray  Coal  Sandstone, gray, very fine grained; siltstone, gray; and	grained; siltstone, light-gray and tan; and claystone, light-		0 -
and claystone, gray  Coal  Sandstone, light-gray, very fine grained; siltstone, light-gray; and claystone, gray  Coal  Sandstone, gray, very fine grained; siltstone, gray; and	Sandstone, light-gray, very		50-
Sandstone, light-gray, very fine grained; siltstone, light-gray; and claystone, gray  Coal  Sandstone, gray, very fine grained; siltstone, gray; and	and claystone, gray		100
Sandstone, gray, very fine grained; siltstone, gray; and	Sandstone, light-gray, very fine grained; siltstone, light-		150
Sandstone, gray, very fine grained; siltstone, gray; and			
grained; siltstone, gray; and	Coal		200 - -
	grained; siltstone, gray; and		≥50 - -

LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Sandstone, gray, very fine grained; siltstone, gray; and claystone, gray	The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s		CONTROL OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PAR			450	-90 -100
			3			550-	-110
						650 -	-130
		<b>3</b>				700 -	-140
•						750	-150

ECORDED BY JON HANGAS GE	EOLOGI	ST Y	NX ES		COR	DE	D 81	_J01	L HA						D _ 2	0
LITHOLOGY		T.C.	IGE		0	_	2(	ETTIN		T.C.	ENSI		RESI SENS	20 20		DEF
		461 FT.					DEPTHS 386 FT.		STRIP	LOGGED DEPTHS FT 386			6 °FT	Т. Ш		
																50
		S.F.			324151	Res.				0						
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LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	
					- M	350 - - - - 400 -	8
•						450	- 9
						500-	-10
						550-	- 11
						600-	- 13
						650	-13
						700	
						750 -	-15

Hole No: US-79185 Map: BLM SE 8 Date: 10/21/79 State: Montana County: Fallon Elev: FT Location: T 10 % R 57 %, Sec 4 Tract ACDA Drilled depth 420 FT Measured: 2000FT XXX 1500 FT RWX FT Hole size: 5 5/8 IN Air X Water Cored: Yes No K Remarks: no elevation control RECORDED BY JON HANGAS GEOLOGIST RECORDED BY JON HANGAS RECORDING SPEED ___ YES RESISTIVITY SP DENSITY GAMMA T.C. ___2 SENS SETTING T.C __ SENS SETTING RANGE ___100 50 RANGE _ LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS FT. 5 419 FT. 417 417 50+ 0 Gamma Sand Claystone, brown-gray Coal 50 Siltstone, gray 100 Sand, gray-brown, coarse 150 Coal Siltstone, gray 200 Coal Sand, fine, light-gray 250 Siltstone, brown-gray 300 Limestone, gray 70

LITHOLOGY	GAMMA	S.P.	STRIP LOG	DENSITY	RESISTIVITY	FEET	METERS
Sand, fine light-gray	3					350-	Y.
Siltstone Coal Limestone, gray Siltstone, brown, carbonaceous						400-	80
	1				4.2	450 -	-90
						500-	-10
	14.					550- 	-110
						600-	-12
						650 - -	-13
	,					700 -	-14
						750 - -	-15
						800-	]

hole No: US-79185 Map: BLM SE 8 Date: 10/21/79 State: Montana County: Fallon Elev: FT Location: T 10 % R 57 W, Sec 4 Tract ACDA Drilled depth 420 F

Measured: 2000 FT FXX 1500 FT XXX FT Hole size: 5 5/8 IN Air X Water Cored: Yes No Remarks: no elevation control RECORDED BY JON HANGAS RECORDING SPEED 20 RECORDED BY JON HANGAS ___ GEOLOGIST YES RESISTIVITY GAMMA SP DENSITY SENS.SETTING SENS. SETTING 50 T.C_ T.C. ___ RANGE 100 RANGE . LITHOLOGY ٥. LOGGED DEPTHS LOGGED DEPTHS æ 417 FT. 417 FT. 5 419 FT. FT 50 -5, P. Res. 50-100-150 -200-250-300

LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
	Geset Case Case Case Case Case Case Case Case					350-	80
						450-	90
						500-	-10
						550-	- 111
						600-	- 12
	*					650 -	-13
						700 -	-14
						750	-15
						800	

1 1 T 11 O 1 O 0 W	GAMMA SP DENSITY RESISTIVITY SENS SETTING	DEP
LITHOLOGY	RANGE 100 20 RANGE 20 LOGGED DEPTHS COMMENTS	FET
	301 FT. 302 FT. 5 FT. 302 FT	L.
		50
Sandstone, tan and gray, very fine; siltstone, gray; and claystone, gray		0.
		50
Coal, with claystone parting Sandstone, gray, very fine; and claystone, gray		00
Coal		50
Sandstone, gray, very fine; siltstone, gray; and claystone, gray	2	:00
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LI	THOLOGY	GAMMA	S. P.	STRIP LOG	DENSITY	RESISTIVITY	FEET	METERS
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							-	
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							-	1
							800-	

Hole No: US-79186 Map: Wibaux 3 NE Dote: 10/22/79 State: Montan County: Wibaux Elev: 3181 FT Location: T 119 R 59 W, Sec 4 Tract CBBB Drilled depth 300 FT Measured: 2500 FT. XXX 10 FT. FWL FT. Hole size: 5 5/8 IN. Air X Water Cored: Yes No X Remorks: _ RECORDED BY JON HANGAS RECORDING SPEED 20 JON HANGAS RECORDED BY ___ _ GEOLOGIST YES RESISTIVITY GAMMA 2 DENSITY SENS.SETTING T.C. ___ SENS. SETTING RANGE __ 100 METERS RANGE. LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 302 FT. 5 301 FT. 302 50+0 Res. S.P. ST FE 50 100 - 30 150 --40 200 50 250 60 70

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
					'a	350-	
						-	80
	17					400 -	
						-	-90
						450 - -	
						500-	-100
						-	
						550-	-110
						-	
						600-	- 120
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						650	-130
						700 -	
						-	-140
						750	-150
						-	1
						800	1

CORDED BY JON HANGAS GE	GIST YES RECORDED BY JON HANGAS RECORDING SPEED 2	0
	GAMMA S P DENSITY RESISTIVITY	DEF
LITHOLOGY	RANGE 100 20  LOGGED DEPTHS 394 FT. 384 FT. 5	FEET
	334 11. 304 11.	50
	Gamma	
Sandstone, brown, very fin		0
and claystone, gray		
Coal Sandstone, gray, very fine		
siltstone, gray; and		
claystone, gray	16000	50
Coal		
		100
Sandstone, gray, very fine		
siltstone, gray; and claystone, gray		150
gray		
Conl with alayatana name		200
Coal, with claystone part:		
Sandstone, gray, very fine siltstone, gray and gray-		
brown; and claystone, gray		
		250
Coal		
Sandstone, gray, fine; siltstone, gray and gray-		300
brown; and claystone,		500

LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Sandstone, gray, fine; siltstone, gray; and claystone, gray						400 - -	- <b>80</b> - <b>9</b> 0
						500-	-100 -110
						600-	-120
						700	
						750 -	-150

hole No: US-79187 Map: Wibaux 4 NW Date: 10/22/79 State: Montana County: Wibaux Elev: 2953 FT Location: T 12 X R 60 X, Sec 32 Tract CCDD Drilled depth Measured: 15 FT FSL 315 FT. FWL FT. Hole size: 5 5/8 IN. Air X Water Cored: Yes No X Remarks: Logged through 20 feet of drill stem at top of hole. 20 RECORDED BY JON HANGAS RECORDED BY JON HANGAS RECORDING SPEED. _ GEOLOGIST YES DENSITY RESISTIVITY GAMMA SP DEPTH T.C. __ SENS SETTING T.C_ SENS SETTING RANGE 100 RANGE LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 384 FT. 5 394 FT. 384 FT. 50+ 0 S.P. Res. 50--20 100-- 30 150 --40 200-- 50 250-- 60 300 -70

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY		METERS
				\[\{\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		350	
						400	80
						450	90
							100
						500-	
						550	- 110
<u> </u>						600-	- 120
	•					660	-130
						700	7-140
						750	-15(
						800	

hole No: US-79188 Map: BLM SE 8 Date: 10/23/79 State: Montana County: Fallon Elev: FT Location: T 10x R 61, Sec 32 Tract DDDD Drilled depth Measured: 300 FT FSL 15 FT KWX FT Hole size: 5 5/8 IN Air X Water Cored: Yes No X Remorks: no elevation control MX RECORDED BY JON HANGAS RECORDING SPEED 20 RECORDED BY WILLIAM JACKSON GEOLOGIST MIN. YES SP DENSITY RESISTIVITY GAMMA DEPTH 007 T.C. ___2 SENS SETTING T.C _ SENS SETTING RANGE 100 METERS RANGE . LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS  $\bar{\alpha}$ 377 FT. 373 FT FT. 373 FT 50+0 Gamma 0 Claystone, brown and gray; sandstone, gray, very fine Coal 50-Coal -20 Sandstone, gray, very fine; siltstone, brown and gray; and claystone, gray 100-- 30 Coal 150 -40 Sandstone, gray, very fine; siltstone, gray; and claystone, gray 200-- 50 Coal, with claystone parting Sandstone, gray, very fine; 250siltstone, gray; and claystone, gray 60 300 Sandstone, gray, very fine; siltstone, brown and gray; 70 and claystone, gray

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Sandstone, gray, very fine; and claystone, gray					.,	400-	-80
*						450-	-90 -100
						550-	-110
						650-	-120 -130
						700 -	
						750 -	-150
			_			800	1

LITHOLOGY		T.C	MMA 2	4						 			050	0711	ITY	0	
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					-5	7	fes	π				}				300	-

LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
						350 -	-80
						450-	- 90
						500-	-100
						550-	-110
						600-	-120
						650	-130
							-140
						750	-150

RECORDED BY WILLIAM JACKSON GEOL	162	0 FT.
LITHOLOGY	GAMMA T.C. 2 SENS SETTING RANGE 100  LOGGED DEPTHS 357 FT. 357 FT.  SENS SETTING RANGE 20  LOGGED DEPTHS FT. 357 FT.	PEET METERS HIABO
Sandstone, gray, very fine; siltstone, gray; and claystone, gray  Coal  Coal  Sandstone, gray, very fine; siltstone, gray; and claystone, gray  Sandstone, gray, very fine; siltstone, gray; and claystone, gray; and claystone, gray; and claystone, gray		50 - 2

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	us-	79189				<u> </u>
LITHOLOGY	GAMMA	<b>S</b> . P.	STRIP	DENSITY	RESISTIVITY	FEET
			ing on			350-
						450-
						550-
						650 -130
						700140
						750 -150

note No: US-79189 Map: BLM SE 8 Date: 10/23/79 State: Montana County: Fallon FT Location: T 10 R 60 , Sec 22 Tract AAAA Drilled depth 360 FT Measured: 150 FT KXX 20 FT KXX FT Hole size: 5 5/8 IN Air X Water Cored: Yes No X Remarks: no elevation control RECORDED BY WILLIAM JACKSON GEOLOGIST RECORDED BY JON HANGAS RECORDING SPEED 20 MIN. YES GAMMA 2 SP DENSITY RESISTIVITY DEPTH SENS SETTING 20 SENS SETTING T.C. __ RANGE 100 RANGE . LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 357 FT. 357 357 FT FT. 50+0 Sp. Res. 0-10 50--20 100-- 30 150--40 200--50 250 -- 60 300 70

350 400 400 450 100 500 110 550 130 700 -140	LITHOLOGY	GAMMA	<b>S</b> . P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
400 90 450 100 500 120 650 130 700 140						1	350 - -	•
450- -100 500- 110 550- 120 650-130							-	-80
-100 500- 110 550- 120 650-130							-	- 90
500- -110 550- 600-120 650-130							450-	
550- 600-120 650-130 700-140							1	-100
650 - 130 700 - 140							-	
650 - 130							1	-110
700 -140							600-	-120
700 -140								
							650	-130
							700	-140
750 - 150								
							750	-150
800							900	

Hole No: US-79190 Map: BLM SE 8 Date: 10/24/79 State: Montana County: Wibaux Elev.: 2844 FT Location: T 13 % R 59 %, Sec 34 Tract DDAA Drilled depth 420 FT Measured: 1200FT FSL 20 FT FWX FT Hole size: 5 5/8 IN Air X Water Cored: Yes No X RECORDED BY WILLIAM JACKSON GEOLOGIST RECORDED BY WILLIAM JACKSON RECORDING SPEED 20 YES DENSITY RESISTIVITY GAMMA SP DEPTH SENS.SETTING T.C. __2_ SENS SETTING RANGE 100 RANGE __ LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 417 FT. 5 418 FT 417 FT. 50+0 Gamma Sand, brown, fine Interbedded claystone, brown, carbonaceous; and siltstone, brown Coa1 50 -20 Siltstone, gray; and sandstone, gray Coal, with claystone parting 100 150 Interbedded sandstone, gray; claystone, gray; and siltstone, gray 200-Coal 50 Sandstone, gray; and claystone, gray Coa1 250 -Interbedded claystone, gray, sandstone, gray; and siltstone, gray 300 - 70 Coal

WILLIAM.

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Sandstone, gray Interbedded siltstone, gray, and claystone, gray					. 14	350 - - - - 400 - - - - 450 -	- <b>8</b> 0
						500-	-100
					7	550	-110
						650	-130
						700	-140
						750	-150 -
		A		1			, =

Hole No: US-79190 Map: BLM SE 8 Date: 10/24/79 State: Montana County: Wibaux

Elev: 2844 FT Location: T 136 R 59%, Sec 34 Tract DDAA Drilled depth 420 FT Measured: 1200 FT FSL 20 FT KWX FT Hole size: 5 5/8 IN Air X Water Cored: Yes No X Remarks:_ RECORDED BY WILLIAM JACKSON GEOLOGIST RECORDED BYWILLIAM JACKSON RECORDING SPEED_ MIN. YES GAMMA SP DENSITY RESISTIVITY DEPTH T.C. __2 SENS SETTING 20 SENS SETTING T.C. METERS RANGE 100 20 RANGE . LITHOLOGY FEE LOGGED DEPTHS LOGGED DEPTHS œ 418 417 FT. FT. S FT 417 FT. 50+0 S.P. Res. 0-10 50 -20 100-- 30 150 -200 - 50 250 60 300 - 70

LITHOLOGY	GAMMA	<b>S</b> . P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
		S Kaser .				400 - -	- 80
						450-	-100
						550-	- 120
						650	-130
						750	-140
						800	

Hole No: US-79191 Map: BLM SE 8 Date: 10/25/79 State: Montana County: Wibaux Elev: 3014 FT Location: T 13 x R 59 x, Sec 18 Tract CCDB Drilled depth 300 FT Measured: 1000 FT FSL 15 FT FEL FT Hole size: 5 1/8 IN Air X Water Cored: Yes No K Remarks:_ XX RECORDED BY WILLIAM JACKSON GEOLOGIST RECORDED BWILLIAM JACKSONRECORDING SPEED YES DENSITY RESISTIVITY GAMMA SP DEPTH SENS SETTING T.C. __ SENS SETTING T.C_ RANGE 100 20 METERS 20 RANGE . LITHOLOGY STRIP LOGGED DEPTHS LOGGED DEPTHS 299 FT. 301 FT. 301 FT Gamma 50 + 0 1-10 50 20 100-Sandstone, gray, very fine; - 30 and claystone, gray 150 -40 Coal 200 -Coal Sandstone, gray, very fine; - 50 and claystone, gray Coal 250 60 Sandstone, gray, very fine; siltstone, gray; and claystone, gray 300 70

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
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						-	- 80
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`~;							
						650	130
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						700	-140
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						750	
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						80	01

CORDED BY WILLIAM JACKSON GEO	DLOGIST NO REDUR	DED BYWILLIA	M JACK			20
	GAMMA T.C. 2	S P SENS. SETTING	O T.C.		RESISTIVITY SENS.SETTING	DEP
LITHOLOGY	RANGE 100	DEPTHS	RAN	GE	DEPTHS	ET
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LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	
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						+80	
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						600	-120
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							-130
						650-	-150
						-	
						700 -	-140
				-		-	-
						-	1
						750	-150
							-
							7
						800	1

Hole No: US-79192 Map: BLM SE 8 Date: 10/25/79 State: Montana County: Wibaux Elev: 2917 FT Location: T13 & R 58 X Sec 12 Tract AAAD Drilled depth _____ 320 FT Measured: 400 FT KXX 12 FT FWL FT Hole size: 5 1/8 IN Air X Water Cored: Yes No X MØ RECORDED BYWILLIAM JACKSON GEOLOGIST RECORDED BY WILLIAM JACKSON RECORDING SPEED __ 20 YES SP DENSITY RESISTIVITY GAMMA O TC_____ DEPTH SENS. SETTING SENS.SETTING T.C. ___2 RANGE 100 20 LITHOLOGY ш LOGGED DEPTHS LOGGED DEPTHS STRI 219 FT 320 FT. 320 FT. F'T Gamma 50+0 Regolith, brown Sandstone, gray, very fine, siltstone, gray; and claystone, gray 50--20 Coal Sandstone, gray, very fine; 100siltstone, gray; and - 30 claystone, gray Coal, with claystone parting 150 - 40 200 -Sandstone, gray, very fine; 50 siltstone, gray; and claystone, gray 250-Coal, with fine gray sandstone and gray claystone partings 60 Sandstone, gray, very fine; and claystone, gray 300-- 70

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		6.5	STRIP	DEMS'TY	RESISTIVITY	FEET	METERS
LITHOLOGY	GAMMA	S.P.	ST		- 41	L.	2
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Hole No: US-79192 Map: BLM SE 8 Date: 10/25/79 State: Montana County: Wibaux Elev: 2917 FT Location: T 13 X R 58 X, Sec 12 Tract AAAD Drilled depth 320 FT Measured: 400 FT XXX 12 FT FWL FT Hole size: 5 1/8 IN Air X Water Cored: Yes No X Remarks: ___ RECORDED BY WILLIAM JACKSON GEOLOGIST XX RECORDED BWILLIAM JACKSON RECORDING SPEED __ YES RESISTIVITY GAMMA SP DENSITY DEPTH SENS SETTING 20 T.C. __ SENS.SETTING T.C. RANGE 100 METERS RANGE LITHOLOGY FEET RIP LOGGED DEPTHS LOGGED DEPTHS 319 FT. 320 FT. 5 320 FT FT. 50 + 0 0+10 Res. 5. P. 50--20 100-- 30 150 -40 200 - 50 250 60 300 70

LITHOLOGY	GAMMA	STRIP LOG	DENSITY	RESISTIVITY	FEET	METERS
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					-	90
					450	
					500-	-100
					550-	-110
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					600-	-120
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					650-	-130
					-	1
					700 -	-140
,					-	1
					750	-
						-L'20
					800	1

T.C. ANNOE 100 SENS SETTING AND 20 LOGGED DEPTHS 432 FT 305 FT 20 LOGGED DEPTHS 432 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT 305 FT	ORDED BY WILLIAM JACKSON GEOLOGIST					RDE			ALLT.	IAM					SPEE		
Siltstone, tan, sand, tan, and claystone, tan Claystone, gray Coal Interbedded claystone, gray; siltstone, gray; sandstone, gray; siltstone, gray; siltstone, gray; siltstone, gray; sandstone, gray; and carbonaceous shale Coal Interbedded sandstone, gray; siltstone, gray; and carbonaceous shale Coal  Interbedded sandstone, gray; siltstone, gray; and claystone, gray; and claystone, gray; and claystone, gray  Coal Interbedded claystone, gray; sandstone, gray sandstone, gray; and siltstone, gray; and siltstone, gray; and siltstone, gray	le le le le le le le le le le le le le l	T.C.	GE	2 1 LO	00 GGE	D D	ENS	SE 20 HS		RIP L	T.C RA	NGE _		SEI	NS SETT		EET 430
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Siltstone, tan, sand, tan, and claystone, tan Claystone, gray (Coal Interbedded claystone, gray; siltstone, gray; and sandstone, gray; sandstone, gray; siltstone, gray; siltstone, gray; siltstone, gray; siltstone, gray; and carbonaceous shale Coal Interbedded sandstone, gray; and claystone, gray; and claystone, gray  Coal Interbedded claystone, gray; siltstone, gray  Siltstone, gray  Coal Interbedded claystone, gray; sandstone, gray; and siltstone, gray; and siltstone, gray; and siltstone, gray	STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE			6	37	777	m ca										
siltstone, gray; and sandstone, gray  Coal, carbonaceous shale Interbedded claystone, gray; sandstone, gray; siltstone, gray; and carbonaceous shale Coal  Interbedded sandstone, gray; siltstone, gray; siltstone, gray; and claystone, gray  Coal  Interbedded claystone, gray; sandstone, gray; sandstone, gray; and siltstone, gray; and siltstone, gray	and claystone, tan Claystone, gray		i i	<u>ک</u> ک							गहरमाना क						0
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Siltstone, gray; and claystone, gray  Coal  Interbedded claystone, gray; sandstone, gray; and siltstone, gray  25	Interbedded claystone, gray; sandstone, gray; siltstone, gray; and carbonaceous shale		•							33.3/13/							100
Interbedded claystone, gray; sandstone, gray; and siltstone, gray	siltstone, gray; and			AND A MEN						3333 3 8	STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE						150
sandstone, gray; and siltstone, gray	Coal		8	3						9	in likeur						200
Shale, carbonaceous	sandstone, gray; and									13. 13. 14. 45. 13	diseration is i						250
	Shale, carbonaceous										1.3.1840.21 Id				+4		
	Interbedded claystone, gray; siltstone, gray; and sandstone, gray			No.							111						

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	LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
sa	nterbedded claystone, gray; andstone, gray; and altstone, gray					· 44	350 - - - - 400 -	-80
				===			450-	-90 -100
1				-			550-	-110
							600-	
							650 - 700 -	
						15	750 -	-150
							800	•

RECORDED BY WILLIAM JACKSON G	EOLOGIST	NO RECOR	RDED BYWIL	LIAM.	JAC KSON	ECORDING	SPEED_2	0
LITHOLOGY	Т.0	GAMMA c. 2 NGE 100	S.P. SENS. SETTI 20	_   -	RANGE _	SEN	SISTIVITY NS.SETTING 20	DE
	3 T 10	LOGGEI	DEPTHS 305	T. S.	Lo	FT.	305 FT	L L
								50
								1
		<i>S.</i>	P.			Res.	Project Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of th	5
							<b>*</b>	
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			3	993 493	252.183	3		15
						िर	3	
					88	$  $ $\xi$		20
			15	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	K.	3	<b>,</b>	
			\$	19 (St. 1)				25
				2		1		=1

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
					11	350-	
						-	
						-	- 80
						400 -	
						-	-90
						450-	
						-	
						500-	-100
						-	
						-	-110
						550-	
						-	
						600-	-120
						-	
	•				,	-	
						650-	-130
						-	
						700 -	-140
						-	1
						-	
					e	750 -	-150
					6	-	
						800	1

Hole No: US-79194 Map: Wibaux 2 NE Date: 10/31/79 State: Montana County: Wibaux Elev: 2769 FT Location: T14 R R 59 W, Sec 18 Tract AABA Drilled depth Measured: 10 FT KXX 1010 FT KXX FT Hole size: 5 1/8 IN Air Water Cored: Yes No X Remarks:____ KOK RECORDED BY WILLIAM JACKSON GEOLOGIST RECORDED BY WILLIAM JACKSONECORDING SPEED_ YES DENSITY RESISTIVITY GAMMA SP DEPTH SENS. SETTING T.C __ SENS SETTING T.C. ___2 METERS RANGE 100 20 RANGE . LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS STRI 355 FT. 350 FT 350 FT. Gamma 50 + 0Regolith, brown 50--20 Sandstone, gray, very fine; siltstone, gray; and claystone, gray 100-**1-30** Coal 150 -40 Sandstone, gray, very fine; siltstone, gray; and 200claystone, gray 50 250 -Coal 300-70

LITHOLOGY	. GAMMA	S.P.	STRIP LOG	DENSITY	RESISTIVITY	FEET
			276			
	1					
						400
						450
						500
						550
						550
						•
\ ~						600
						650
						700
				40- 20-		
						750
					Ċ	
						200

4.11 Hole No: US-79194 Map: Wibaux 2 NE Date: 10/31/79 State: Montana County: Wibaux Elev: 2769 FT Location: T 14% R 59%, Sec 18 Tract AABA Drilled depth 380 FT.

Measured: 10 FT. KXX 1010 FT. KXX FT. Hole size: 5 1/8 IN. Air XX Water Cored: Yes No XX Remarks:_ RECORDED BY WILLIAM JACKSON GEOLOGIST YES RECORDED BYWILLIAM JACKSONRECORDING SPEED 20 MIN RESISTIVITY GAMMA DENSITY SP DEPTH 106 SENS.SETTING T.C. _2 SENS. SETTING RANGE 100 20 RANGE . LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS H 355 FT. 350FT. 5 FT. 350 FT. 50+0 Res. S. P. 50-100--30 150--40 200-250-- 60 300 --70

9, 1

LITHOLOGY	G A	MMA	<b>S</b> . P.	STRIP	DENSITY	RESISTIVITY	FEET	0 0 1 1 1 2
	•						350-	
								80
							400 -	+
							-	
						14	450-	90
							-	-
								-10
							500-	-
								-110
							550-	
							-	
-							600-	- 12
							-	
							650-	-130
							-	
							700 -	-14
							-	
							750 -	-150
			39			4'	-	
							800-	

COR	DED BY WILLIAM JACKSON GEOLOGIS	T YES R	ECOR	DED B	YWILI.	<b>IAM</b> J	ACKSON RECOR	DING SPEED	20	1.1
		GAMMA T.C2		S SENS	SETTIN	G 907	DENSITY T.C			DE P
	LITHOLOGY		GGED	DEPTH	ıs	RIP		DEPTHS		FEET
T		380	FT.		3 FT	1 5	FT	583	FT	-
		G	am	ma						50-
	- []	3								
	Sand, brown and alluvial	3				1				0
	Siltstone, brown and sandstone	3	4-		-	-				
	brown	3								
	Claystone, gray; and sandstone	3				22.25				50
	gray Coal	3								
1		3				7.7				
	Claystone, gray, and sandstone, gray	32								100
	-	3								
	Limestone, gray; sandstone,	\$				124				
	gray; claystone, gray, and siltstone, gray					-				
1	Shale, carbonaceous and coal	3								150
	·					3.17				
	Sandstone, gray and siltstone,	3								
1	gray						,			200
1	Limestone Coal	4								
1	COAI	< 2				39.30	2			
	Sandstone, gray; siltstone,	3								250
1	gray, and claystone, gray	3				u				
		1					٠			
	Coal, with siltstone parting	1								
	, , , , , , , , , , , , , , , , , , , ,	1								300
		1				===				
	Sandstone, gray and siltstone, gray	3					9			
	5 L LA 1	1		1		Puy	····			1

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LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Coal Claystone, gray; sandstone, gray, and siltstone, gray						350-	- 80
Claystone, black,						400-	30
carbonaceous						450-	- 90
Limestone, gray Claystone, gray; sandstone, gray; and siltstone, gray						500-	-100
	3					550- -	-110
						600-	-120
						650-	-130
						700 -	-140
					6	750 -	-150
						800	

LITHOLOGY  RANGE  LOGGED DEPTHS FT  SO  SO  SO  SO  SO  SO  SO  SO  SO  S	ECORDED BY WILLIAM JACKSON G	GAMMA	SP		DENSITY	RESISTIVITY	DEDT
5. P. Pe. S. O-	LITHOLOGY	RANGELOGGE	DEPTHS	RIP L	RANGE	DEPTHS	EET
100-			F 1.	S			7
100-		5	Ρ.		R	e.s.	
150-							
150-							50-
200-							1
200-					5		
250-		2					-
250					•	>	200-
					W.		250-

	/ITY E	FEET
	350-	-8
	450-	50-
	500-	
	550-	
	650-	550
•	700 -	7001
	750 - -	7501

CORDED BY WILLIAM JACKSON GEOLOG	SIST YES RECORDED BYWILLIAM JACKSON RECORDING SPEED _ 2	0
LITHOLOGY	GAMMA T.C. 2 SENS SETTING ST TC SENS SETTING RANGE 100  SP DENSITY RESISTIVITY SENS SETTING RANGE 10	DEF
	LOGGED DEPTHS  416 FT. 417 FT. 5 FT. 417 FT.	w
	Gamma	50
	GAMMIC	
200	9/55	0
Regolith, brown		
		50
		50
-		100
		150
Sandstone, gray, very fine;		
siltstone, gray; and claystone, gray		
		200
		200
Coal		
0001		
		250
Coal		
		1

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LITHOLOGY	GAMMA	S. P. STRIP	DENSITY	RESISTIVITY	FEET	METERS
Coal  Sandstone, gray, very fin siltstone, gray; and claystone, gray	e;			- 14	350 - - - 400 - - - 450 -	
					550-	130
					650 -	-130 -140
		,		G	750	-

19- E1 Hole No: US-79196 Map: BLM NE-40 Date: 11/3/79 State: Montana County: Dawson Elev: FT Location: T 15% R 58 W Sec 22 Tract BBBB Drilled depth 420 FT Measured: 100 FT FNL 10 FT FWL FT. Hole size: 5 1/8 IN Air Water & Cored: Yes No Remarks:_ YES RECORDED BWILLIAM JACKSON RECORDING SPEED RECORDED BY WILLIAM JACKSON GEOLOGIST GAMMA 2 DENSITY RESISTIVITY DEPTH SENS SETTING SENS.SETTING RANGE _100 RANGE LITHOLOGY FT. dia Lis LOGGED DEPTHS LOGGED DEPTHS 416 FT. 417 417 FT. 504 0 -10 50-S.P. Res. 100-- 30 150-200--50 250-- 60 300-

LITHOLO	GY	GAMMA	8. P.	STRIP,	DENSITY	RESISTIVITY	FEET	METERS
e t							350 -	80
•							450-	-90
							500-	-100
							550-	-110
							600-	- 120
							650-	-130
							700 -	-140
						o	750 -	-150
							800	

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CORDED BY WILLIAM JACKSON GEOL	YES	
LITHOLOGY	RANGE 100 20 RANGE 5	FEET
Sandstone, gray, very fine; siltstone, gray; and claystone, gray  Coal, with claystone partin	Gamma	0
Sandstone, gray, very fine; siltstone, gray; and claystone, gray  Coal	2 Control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the cont	50 -
Sandstone, gray, very fine; siltstone, gray; and claystone, gray		00-

. LITHO_OGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Coal Sandstone, gray, very fine; and claystone, gray					i,	350 -	-80
						400-	-90
						450-	
						500-	-100
						550	-110
						600-	- 120
						650	-130
				a.		700	140
					5	750 -	150
A .					6	1	

Hole No: US-79197 Map: Mt. Sheep Butte Date: 11/5/79 State: Montana County

hole No: US-79197 Map: Mt. Sheep Butte Date: 11/5/79 State: Montana County: McCone Elev: 2743 FT Location: T 18 R 46 W, Sec 8 Tract BBBB Drilled depth 400 FT Measured: 75 FT RXX 40 FT FWL FT. Hole size: 5 1/8 IN Air X Water Cored: Yes No X YES RECORDED BWILLIAM JACKSON RECORDING SPEED ___ MM RECORDED BY WILLIAM JACKSON GEOLOGIST RESISTIVITY GAMMA DENSITY 106 DEPTH T.C. _ SENS. SETTING SENS.SETTING RANGE 100 RANGE -LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS 396 FT. 395 395 FT. FT. 5 FT. 50+0 5. P. Res. 50-- 20 100-150 --40 200-250-- 60 300-- 70

LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
	<b>           </b>				, t	350 - - - 400 -	-80
						450-	-90
			*	•		500-	-100
						550-	-110
						600-	-120
	. 0					650	-130
						700 -	-140
						750 -	-150
					G	800	

	ST YES RECORDED BWILLIAM JACKS	SON RECORDING SPEED 20
	TC 2 SENS SETTING STC	RESISTIVITY SENS.SETTING
LITHOLOGY	RANGE   100   20   RANGE   100   20   RANGE   100   20   RANGE   100	LOGGED DEPTHS
	Gamma	FT. 355 FT 50
Siltstone, brown; and		
sandstone, brown		
		50
Claystone, gray; sandstone,		
gray; and siltstone, gray		
Coal		
		100
	100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 May 100 Ma	
Sandstone, gray, siltstone,		150
gray; and claystone, gray		
		200
Coal		
Claystone, gray; limestone, gray; claystone, gray;		
siltstone, gray, and sandsto		250
gray		
Coal		o,
i		

L. .

LITH	OLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
						* 14	350-	
		5					400 -	80
							450-	-90
				-		4.700	500-	-10
			C.			2. 1. 47	550-	130
							600-	- 12
							650-	-13
							700	-14
					. (m. ) (d. ) (d. ) (d. ) (d. )		750	-15
							800	

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RECORDED BY WILLIAM JACKSON GEO	YES	RDED BYWILLIAM	No has an	DING SPEED	20
LITHOLOGY	GAMMA T.C2 RANGE100	S.P. SENS. SETTING	DENSITY T.C RANGE	RESISTIVITY SENS.SETTING	17
	LOGGE 359 FT	355 FT.			#
					99-
					9-
			anna cana		99-
	S,	P. ***	R	es.	-
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	# 1			3	
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					90-
				3	
		3			150-
			3	2	
				5	.00
				5	

LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
						350 - -	
						400 - -	-80
						- - 450-	-90
				to hory	, M ₁ , M ₁		-100
						500-	
				u de		550-	-110
						600-	-120
						650-	-130
						700 -	-140
						750 -	-150
Day & E. A. L. Street					1.2	800-	

Hole No: US-79199 Map: Hedstrom Lake Date: 11/6/79 State: Montana County: Garfield Elev: 2747 FT Location: T 16 & R 45 W, Sec 6 Tract BBBB Drilled depth 340 FT Measured: 35 FT KKK 50 FT FWL ____ FT. Hole size: 5 1/8 IN. Air [] Water [X] Cored: Yes [] No [X] Remorks:_ XXXX RECORDED BY WILLIAM JACKSON GEOLOGIST RECORDED BWILLIAM JACKSON RECORDING SPEED 20 MIN. YES DENSITY RESISTIVITY GAMMA SP DEPTH SENS. SETTING SENS.SETTING T.C. _ 200 RANGE _ RANGE _ LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS N K FT. 315 FT. 312 FT. 315 FT. 5 50+0 Gamma 0-1-10 Regolith, brown Sandstone, brown, very fine; and claystone, brown Coal 50 -20 Sandstone, gray, very fine, siltstone, gray; and claystone, gray 100-- 30 Coal, with claystone parting 150 -200 -Coal - 50 Sandstone, gray, very fine; 250 siltstone, gray; and claystone, gray 60 300 70

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
					ц	350-	
						-	
							-80
						400-	
						-	
						_	-
						450	-90
						450-	
							-100
						500-	
							-110
						550-	
						-	
						=	- 120
`~						600	,,,,
						-	
						-	
						650-	-130
4)						+	
						-	
						700 -	-140
						+	, ,
						750 -	-150
					4	1	
						=	
						800	

ECOR	DED BY WILLIAM JACKSON	GEOLOGIS	ST YES	RECO	RDEC	BWILI	LIAM	JA	ACKSON RECO	RDI	NG S	PEED		20 🕻
,	**************************************		GAI T.C.	MMA 2	SE	S P NS SETT	ING (	90	DENSITY T.C			TIVI <b>T</b> SETTI		DEP
	LITHOLOGY		RANGE	LOGGE		20			RANGE		DEBT	5 .ue		ET
				312 F		315	FT.	STR		- T		315	FT.	7.5
							T							50-
														0
														50
														100
				6	, P.					0				100
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LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
					4	350-	
						-	
						-	- 80
						400-	
						4.50	-90
						450-	
						500-	-100
							-110
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						600-	- 120
\ <u>~</u>						- 000	
						650-	-130
140				A		700 ~	-140
•						750 -	
					o	130	-150
						-	
		-				800	

	GAMMA				
LITHOLOGY	T.C. 2 RANGE 100 LOGGED	DEPTHS	RIP LOG	RANGE SENS.SETTING LOGGED DEPTHS	EE T
	 331 FT.	332 FT.	ST		1
	S.P.			Res.	50
				2	-000
				3	- - 250 -

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
					,*\	350-	
						-	
						_	-80
					4	-	
						400-	
	.,					-	
							-90
						450-	
						7	
							-100
į.						500-	
						1	
						-	
		1.5				550-	-110
						-	
(4)						4	
						600-	-120
						-	
						-	170
						650	-130
						+	
						=	
						700 -	-140
				Ī	h l	-	
			11			1	
						750 -	-150
					c	=	.50
						-	
						800	

RECORDED BY WILLIAM JACKSON G	GAMMA SP DENSITY RESISTIVITY	, ,
LITHOLOGY	T.C. 2 SENS SETTING TO TANGE 100 SENS SETTING RANGE 5	G
<b>Parameter</b>	1 000 070 111	FT.
Silt, tan Sandstone, brown; siltst brown; and claystone, br  Sandstone, gray; siltsto gray; and claystone, gra  Coal Sandstone, gray; siltsto gray; and claystone, gray  Coal  Coal		15
Shale, black, carbonaceon sandstone, gray; siltstone gray; and claystone, gray		2:

LITHOLOGY	GAMMA	<b>S</b> . P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
!					,	350-	
						400-	80
						450-	- 90
			-			- - - -	100
						550-	110
						600-	- 120
						650-	-130
						700	
					ö	750 -	-150

COOKSES STREET	JACKSON GEOL	GAMMA	SP	_		RESISTIVITY	20
LITHOLOG	3 Y	T.C2 RANGE100	SENS SETTING	٦	RANGE	SENS SETTING 5	DE P
		LOGGED 280 FT	DEPTHS 270 FT.	STRIP	LOGGED FT.		FEET
							50
							0.
							50-
		S. P.			00		
					Re	3. 111111	
						}	100-
`~							
	5				5	3	- 150-
							-
		2	RESET		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		
			5				200-
		3					-
			<b>X</b>				250-
							- - 300
					10.30		
							-
			1				350-

LITHOLOGY	GAMMA	S. P.	STRIP.	DENSITY	RESISTIVITY	FEET	METERS
						350-	
						400 -	80
						450-	-90
						500-	-100
						550-	
						600-	-120
	,					650-	-130
						700 -	-140
				14	e	750 -	-150
						800-	

Hole	No: US-79224 Map: Glendive AMS	Date: 12/3/79 State: Montana County: McCone	
Elev	v: <u>FT</u> Location: T <u>18 <b>%</b> R 48</u>	Sec 30 Tract AAAA Drilled depth 4	00 FT.
Mea	sured: 100 FT. RSK 20 FT. EXKL	SE, Sec 30 Tract AAAA Drilled depth 4  FT. Hole size: 5 1/8 IN. Air X Water Cored: Ye	s No 🖾
e m	orks:		
	WILLIAM JACKSON	NO TON HANGLE	o FT.
REC	ORDED BY WILLIAM JACKSON GEOLOG	GIST YES RECORDED BY JUN HANGAS RECORDING SPEED 2	OMIN
		GAMMA S.P. DENSITY RESISTIVITY T.C2 SENS. SETTING 8 T.C SENS. SETTING	DEPTH
	LITHOLOGY	RANGE _50 391 RANGE	
		LOGGED DEPTHS & LOGGED DEPTHS	FEET METERS
-		FT. FT. 5 FT. F	
			60-
		Gamma	
			1 1
			11
-			0-10
i	Alluvium, and siltstone		1 1
			1 1 .
	Siltstone, brown to gray		1
			1 +
	Conl		60-20
	Coal		
			1 +
-			120-30
	~		
			11
	Claystone, gray, and		11
	siltstone, gray		180-40
	Coal		180-140
	COAL		
			1 1
	Claystone, gray and siltstone, gray		11
-	Coal		240-50
			1 +
	Siltstone, gray and		1 1
	claystone, gray		
	Coal		-60
	Cilhana		300
	Siltstone, gray; and claystone, gray		
	, , , , , , , , , , , , , , , , , , , ,		1 1
			1 1
			170

LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
					•	360-	
			W.V.3			-	- 80
						420 -	
						-	-90
						480-	
							-100
						-	
						540-	-110
						-	
						600 -	- 120
						-	
						-	- 130
						660-	
						-	-140
						720-	
							- 150
							160
						780 -	160
					è	-	-170
						840-	-110
							-180
			11			900	

If Section is correct, the elisa N 2638 Hole No: US-79225 Map: Richey BLM Date: 12/6/79 State: Montana County: Dawson Elev: 2938 FT Location: T 21 k R 52 k, Sec 14 Tract DDDD Drilled depth 440 FT. Measured: 35 FT FSI 30 FT FXX FT Hole size: 5 1/8IN Air X Water Cored: Yes No X Remorks:_ RECORDED BY WILLIAM JACKSON GEOLOGIST RECORDED BY WILLIAM JACKS QN CORDING SPEED YES RESISTIVITY SP DENSITY GAMMA DEPTH 007 SENS SETTING SENS SETTING T.C. _ RANGE 100 RANGE 2K 500 100 LITHOLOGY LOGGED DEPTHS LOGGED DEPTHS  $\bar{\alpha}$ 439 F.T. 434 FT 431 FT. 431 FT 50+0 -10 Regolith, brown; and claystone, brown 50-Coa1 Sandstone, gray, very fine 100grained; and claystone, gray - 30 150 -Coa1 Coal 40 Sandstone, light-gray, finegrained; siltstone, gray; and 200 claystone, gray - 50 Coal

569

Coal

Coal

Sandstone, gray, very fine grained; siltstone, gray; and

claystone, gray

250

300

IS-____

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
				N.A.J.		350-	
Sandstone, gray, fine- grained; and claystone, gray	<b>1</b>			Mark Andrew		400	-80
	, 5- 5- 1- 1- 1- 1- 1- 1- 1- 1- 1- 1- 1- 1- 1-			<u> </u>		450-	-90
						- ε no -	-100
						550-	-110
						600-	-120
						650-	-130
						700 -	-140
						750	-150
						800	1

	orks:									
REC	ORDED BY JON HANGAS GEOLOGIS	T YES R	ECOR	DED BY.	JON_I	HANG	AS REC	ORDING	SPEED_	20
		GAMMA	T	SP		0 -	DENSITY	RES	SISTIVITY	DEP
	LITHOLOGY	T.C2 RANGE		SENS SET	HING		C ANGE		IS SETTIN	-
	ETTROEGGT		-	DEPTHS		RIP	LOGG	ED DEF	PT HS	ш ш
		397	FT.	392	FT.	12		FT.	392	FT. L
			Far	nma						50-
				-	+					-
					$+ \parallel$					-
										0-
	Siltstone, light-brown			_==		= 4				
										-
										-
	Siltstone, brown; claystone,		+							-
	brown; and sandstone, brown		-							50-
			+++	-						1
	Claystone spayt siltature									
	Claystone, gray; siltstone, gray; and sandstone, gray			4						
	Coal									100-
			-		8	000000 000006				1.00
	Coal		-							
			15							
				-						1
			-		1					150
	-				11. 11.					
					1000					
			-	18.	-					200
	Sandstone, gray; claystone,		++		_					
	gray; and siltstone, gray		1							
				-	_					
										250
		=======================================		5						230
				7				G		
			++						-1	
			+							
			++							300
			++							
	Coal Claystone, gray; sandstone,		-		=					
	gray; and siltstone, gray			-						
	, , , , , , , , , , , , , , , , , , , ,			-	-	100				

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US	5-	_/	7	4	4	O		
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LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Sandstone, gray; claystone, gray; siltstone, gray					• 4	350 - - - - 400	- 80
						450-	-90 -100
						500-	-110
		4				600-	120
	·					650	-130
						700 -	-140
					4	750	-150

CORDED BY JON HANGAS	GEOLOGIST YES RECO	RDED BY _JO	L HAN	IGAS_ RECORT	DING SPEED	20
LITHOLOGY	GAMMA T.C2 RANGE100	S P SENS SETTING 10	106	DENSITY	RESISTIVITY SENS.SETTING 5	DEPT
	LOGGE 397 F	D DEPTHS T. 392 FT.	STRIP	LOGGED F.T.	DEPTHS	L L
						50-
						0-
						-
		5.P.			Res.	50-
		3				
		}			3	
						100-
		}			1	-
	=	12			4	1
					\$	150-
		3	l		3	-
		A .			5	
	*				1	200-
			-		45	1 +
		<b>&gt;</b>				
						250-
					5 1	1 -
		3			3	
		3			2	300-

LITHOLOGY	GAMMA	S. P.	STRIP LOG	NSITY	RESISTIVITY	FEET	METERS
						350-	-80
						450-	- 90
						00-	-100
						550-	-110
						600-	-120
	•					650 - -	-130
						700 -	-140
7					¢.	750 -	-150

RECORDED BY WILLIAM JACKSON GEOLOGIST YES RECORDED BYWILLIAM JACKSON RECORDING SPEED 20  GAMMA SP DENSITY RESISTIVITY DER						
LITHOLOGY	GAMMA T.C. 2 SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS SETTING SENS	FEET				
Regolith, brown  Sandstone, gray, very fine; and claystone, gray  Coal  Sandstone, gray, very fine; and claystone, gray		50				
Coal		200-				
Sandstone, gray, very fine;		250-				

LITHOLOGY	G A M M A	S.P.	STRIP LOG	DENSITY	RESISTIVITY	FEET	METERS
Sandstone, gray, very fine; siltstone, gray; and claystone, gray					The second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second secon	-	-80
Coal, with claystone partings		Myretrevery by marty				450-	- 90
Sandstone, gray, very fine; and claystone, gray	May John John	ماريح دريالاسترابالاليها	素を選及を表数		And wind with	500-	-100
				W.W.W.W.W.		550-	-120
						650	
						700 -	-140
					g	750 -	-150 ,
						800-	

CORDED BY WILLIAM JACKSON GEOLO		BY JON HAN		
LITHOLOGY	GAMMA T.C. 2 SEN RANGE 100 LOGGED DEP 399 FT.	S P IS SETTING 1000 PTHS 289FT	range 2K SEN	1 1
Sandstone, gray, very fine; siltstone, brown and gray; and claystone, gray				50-
Coal Sandstone, gray, very fine; siltstone, gray; and claystone, gray				300

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LITHOLOGY	GAMMA	S, P.	STRIP	DENSITY	RESISTIVITY	FEET	1
		huhh			1	350	
		É		· 🗦	- 14 · · · · · · · · · · · · · · · · · ·		- 80
				}		450-	90
						500-	-10
		t.				550-	-11
~~						600-	-12
						650-	-13
						700 -	-14
					o	750 -	-15
						800-	

ORDED BY WILLIAM JACKSON GEOLOGI	RECORDED BY JON HANGAS RECORDING SPEED 20
LITHOLOGY	GAMMA T.C. 2 SENS SETTING RANGE 100 1000  LOGGED DEPTHS 472 FT. 470 FT. 470 FT. 470 FT.
Silt, brown, alluvial  Sandstone, brown, very fine; and siltstone, brown  Siltstone, gray; claystone, gray; and sandstone, gray	50
Shale, carbonaceous Claystone, gray; siltstone, gray; and sandstone, gray	25

	LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
	Coal Siltstone, gray; claystone, gray; and sandstone, gray Coal Sandstone, gray; and claystone, gray Coal Claystone, gray; sandstone, gray; and siltstone, gray					- The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the	450 -	- <b>80</b> - <b>90</b>
							550-	-110
1							650	-130
							700	-140
							750 -	-150

ks:	NO.						
RDED BY WILLIAM JACKSON GEOLOGI	YES		HAN			NG SPEED2	10
		S P ENS. SETTING	507	DENSIT	Is	RESISTIVITY SENS.SETTING 100	DE
LITHOLOGY	RANGE 100 LOGGED D	EPTHS	RIP	RANGE 21		DEPTHS	
	288 FT.			392	FT.	286 FT	
		шшш3				HARC	5
		1				<b>**</b> **********************************	
		<u> </u>					
162							
Alluvium, brown			9.0				
			A 34				5
		,	~~~~			-  -  - <del> </del>	
Sandstone, gray, very fine; siltstone, brown and gray;							
and claystone, gray					-	- <del>}</del>	
			200			1	10
	<b>F</b>			1		£	
						-5	
	F				2	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	1
	3				5		1.
Coal	3	*				75	
Sandstone, gray, very fine;					5		
siltstone, gray; and claystone, gray			375.0		\$	1	2
, , ,			****		5		
			57		>	- N	
			-	1		-	
					3		2
Coal						<b>]</b>	1
			<b>建</b>		₹		1
Sandstone, gray, very fine; siltstone, gray; and			7		3		3
claystone, gray					ξ:		
			12.0		2		
		3-1-1	1.00				

LITHOLOGY	GAMMA	\$.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
				*/\^\\\\		400-	-80
	•					450-	-90
						550- - -	-110 -120
	·					650-	
						700 -	-140 -150
						800-	

- - 2

CORDED BY JON HANGAS GEOLOGIS	GAMMA S P	TING 9	GAS RECORDING SPEED  DENSITY RESISTIVITY T.C SENS.SETTING	Torn
LITHOLOGY	RANGE 100 1000 LOGGED DEPTHS 489 FT 487	-   -   -	RANGE 2K 250 LOGGED DEPTHS 494 FT. 487 F	F E E -1
Regolith, brown	The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s			50-
Sandstone, gray, very fine; siltstone, yellow-brown, gray; and claystone, gray	Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Ma		The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s	100-
0.1	1			
Coal Sandstone, gray, very fine; siltstone, gray; and claystone, gray	MAN JAMA		Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Manual Ma	200
Sandstone, gray, very fine; siltstone, gray; and claystone,	My My Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Market Mar		The many way to the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of th	250

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Sandstone, gray, very fine; siltstone, gray; and claystone, gray	In What was I want of the	of Mirkellan Spring		homomorphis	The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s	400 -	80
Coal		واستوريد الماكانية والمهممة فيريس		( freedom)		450	-90
	A. S.	<b>\$</b>			12	500-	-100
						550-	-110
						600-	-120
						650	-130
				,		700 -	-140
Ĭ.					2-1	750 -	150
				**		800	

CORDED BY WILLIAM JACKSON GEOL	LOGIST YES RECOR	RDED BY JON	HAN	The second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second secon	DING SPEED 20	)
LITHOLOGY	GAMMA T.C 2 RANGE _ 100	S P SENS SETTIN 500 DEPTHS	RIP LOG	DENSITY T.C 2 RANGE 2K LOGGED	RESISTIVITY SENS.SETTING 250 DEPTHS	DE P1
	298 FT	396 F		400 FT	396 FT	50-
Alluvium, brown				1 1 1 222 2 X X		0 -
Sandstone, gray, very fine to fine; siltstone, gray; and claystone, gray		<b>\</b>				50-
~						150
Coal  Sandstone, gray, very fine siltstone, gray; and claystone, gray						200
Coal						250
Siltstone, gray, very fine siltstone, gray, and	; <b>1</b>	1				300

LITHOLOGY	GAMMA	S.P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
					N Young	350-	0
	<b>₩</b>					450-	)
			Ť		red Cortyt	500-	0
			197 207 207 - 2		anolevalo.	63   ] 68   ]	The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s
						600-12	
				- doubletva	decone, er Lecone, er	700 -140	
					I.	750 - -150	5
				y way		800	

CORDED BY JON HANGAS GEOLOGI		RDED BY JON	HAN	GAS RECORD		<u>)</u> v
LITHOLOGY	GAMMA T.C. 2 RANGE 100 LOGGEI 492 FT	DEPTHS	RIP L	RANGE <u>2K</u> LOGGED	RESISTIVITY SENS SETTING 1,00 DEPTHS 490 FT	FEET
Siltstone, light-brown  Claystone, light-gray; sandstone, gray; and siltstone gray  Shale, carbonaceous; siltstone gray; and sandstone, gray  Shale, carbonaceous; sandstone gray; and siltstone, gray	e .					50-

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Coal	N. T.			5.0		350-	
Claystone, gray; sandstone, gray; and siltstone, gray	The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s			Marine Marine	MANITA MANITA	400 -	- 80
Coal						450-	-90
Claystone, gray; sandstone, gray; and siltstone, gray	Wy Wy				JAN,	500-	-100
						550-	-110
						600-	-120
						650 -	-130
						700 -	-140
					c	750 -	-150
						800-	

Coal

LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
Sandstone, gray, very fine; siltstone, gray; and claystone, gray	CAMPAN MARKANIA					350 - - - - 400 -	-80
Coa1	To be proposed to the second to					450 -	-90
Sandstone, light-gray, very fine; siltstone, gray; and claystone, gray	The half had he	<b>B</b>			May Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Co	500-	-100
Coal	W W W W				National Jackson	550-	-110
Sandstone, light-gray, very fine, siltsrone; gray; and claystone, gray	AN VINT MAN					600-	-120
Coal						650 -	-130
	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		33 183	, ,		700	-140
						750    800	-150

ECORDED BY RUSSELL PATTERSON	163	RDED BYRUSSELL I			20
LITHOLOGY	GAMMA T.C. 2 RANGE 200 LOGGED 891 FT.	D DEPTHS	DENSITY TC 2 RANGE 2K LOGGED 895 FT	RESISTIVITY SENS.SETTING 100 DEPTHS	FEET
Regolith, brown					50-
Sandstone, light-gray,	My Market May May May May May May May May May May				150
medium to fine; siltsto gray; and claystone, gray	one,				200
	The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s				250
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LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET	METERS
						350	
Sandstone, gray, very fine; siltstone, gray; and claystone, gray						400 -	80
	Total Market					450-	-90
Coal gandstone, light-gray, very fine; and claystone, gray	5			31 (4		50 <b>0</b> -	
Coal	a Wilwa	<b>M</b>			, , , , , , , , , , , , , , , , , , ,	550- -	-110
Coal ~	My My My M			7 - M		- 600 -	-120
Coal Coal Claystone, gray; sandstone, light-gray; and claystone,	Mary Jan					650-	-130
gray Coal Coal	The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s		324	W CW		700 -	-140
Coal Sandstone, light-gray, fine; siltstone, gray; and claystone, gray						750 -	-150
Coal						800-	

		19235	a .			<b>-</b>
LITHOLOGY	GAMMA	S. P.	STRIP	DENSITY	RESISTIVITY	FEET
coal	3				27 =	800
Sandstone, gray, very fine; siltstone, gray; and claystone, gray	A Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Comp					850
	7					900
	1 1 1 1 1			E_ifilm.ia. Pa	i sussitiationis.	950
						1000
						10'50
						1100
						1150
						1200

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### Coal Analysis Report

Sample No-US-793-CA Core Sample 227 9 2"-233 1" Lab. No. 79-C-25

Date June, 1979

	As Received &	Air Dried	Moisture Free %	Moisture & Ash Free %
Total Moisture	20.69			
Air Dried Loss	13.08			
Proximate Analysis				
Moisture (residual)		7.07		
Volatile Matter	30.48	35.07	37.74	41.93
Fixed Carbon	40.76	48.57	52.27	58.08
Ash	8.07	9.29	10.00	
Ultimate Analysis				
Hydrogen	4.70	5.41	4.98	5.53
Carbon	45.51	52.36	56.34	62.60
Nitrogen	0.793	0.912	0.981	1.090
Oxygen	26.94	30.99	26.59	29.54
Sulfur	0.904	1.04	1.12	1.24
British Thermal Units	9,783	11,255	12,111	13,457
Sulfur Forms				
Sulfate	0.018	0.0207	0.0223	0.025
Pyrite	0.654	0.752	0.809	0.899
Organic	0.233	0.268	0.288	0.320
Hardgrove Grindability Index		43		

Note: 0 entered where percentages less than 0.01

### Coal Analysis Report

Sample No. US-793-CB Core Sample 233 1 3/4" -235 (a.b. No. 79-C-26 3/4" June, 1979

	As Received	Air Dried	Moisture Free %	Moisture & Asl Free %
Total Moisture				
Air Dried Ioss				
Proximate Analysis				
Moisture (residual)		10.20		
Volatile Matter		32.86	36.59	39.70
Fixed Carbon		49.91	55.58	60.30
Ash		7.03	7.83	
Ultimate Analysis				
Hydrogen		5.57	4.94	5.36
Carbon		57.04	63.52	68.92
Nitrogen		0.858	0.955	1.036
Oxygen	-	28.03	21.12	22.92
Sulfur		1.47	1.64	1.78
British Thermal Units		11,276	12,334	13,382
Sulfur Forms				
Sulfate		0.0266	0.0252	0.027
Pyrite		1.03	1.15	1.248
Organic		0.413	0.459	0.498
Hardgrove Grindability Index		48		

Note: 0 entered where percentages less than 0.01

# Coal Analysis Report

Sample No.US-793-CC Core Sample 235 3/4"-235 3 3/4"b. No.78-C-27

Date June, 1979

	As Received	Air Dried	Moisture Free	Moisture & Ash Free %
Total Moisture				
Air Dried Loss				
Proximate Analysis				
Moisture (residual)		4.91		
Volatile Matter	100	31:62	33.25	43.25
Fixed Carbon		41.52	43.66	56.76
Ash	economic de la conferencia de la	21.95	23.08	
Ultimate Analysis				
llydrogen	1 3 =	4.75	4.42	5.75
Carbon	7 5 2 1	43.14	45.37	58.98
Nitrogen		0.494	0.520	0.676
Oxygen		27.93	24.78	32.21
Sulfur		1.74	1.83	2.38
British Thermal Units		9,243	9,720	12,636
Sulfur Forms				
Sul fate		0.0424	0.0446	0.058
Pyrite		1.11	1.17	1.521
Organic		0.5870	0.617	0.802
Hardgrove Grindability Inde:	×			

Note: All decimal numbers are percentages.

### Coal Analysis Report

Core Sample 36'-37.8' Lab. No. 79-C-29

Sample No.US-794-CB

Note: All decimal numbers are percentages.

Note: 0 entered where percentages less than 0.01

6N-26E-24

Date June, 1979				
	As Received	Air Dried	Moisture Free	Moisture & Ash Free %
Total Moisture				
Air Dried Ioss				
Proximate Analysis				
Moisture (residual)		7.33		
Volatile Matter		33.20	35.83	42.59
Fixed Carbon		44.75	48.29	57.41
Ash		14.72	15.88	
Ultimate Analysis				
Hydrogen		5.43	4.98	5.92
Carbon		45.12	48.69	57.88
Nitrogen		0.799	0.862	1.024
Oxygen	••••	32.01	27.51	32.70
Sulfur		1.92	2.07	2.46
British Thermal Units		10,064	10,860	12,910
Sulfur Forms				
Sulfate		0.0322	0.0347	0.041
Pyrite		1.38	1.49	1.771
Organic		0.498	0.537	0.638
Hardgrove Grindability Index				

#### Coal Analysis Percut

Sample No. US-795-C Core Sample 60'-69' Lab. No. 79-C-30

8N-26E-28

Dite June, 1979				
ž.	As Received	Air Dried	Moisture Prec	Moisture & Ash Free %
Total Moisture				
Air Dried Loss	***************************************			
Proximate Analysis				
Moisture (residual)		4.51		
Volatile Matter		34.97	36.62	44.46
Fixed Carbon		43.68	45.74	55.54
Ash		16.84	17.64	
Ultimate Analysis				
Hydrogen		5.06	4.77	5.79
Carbon		55.37	57.99	70.41
Nitrogen		0.946	0.992	1.20
Oxygen		21.17	17.97	21.82
Sulfur		0.61	0.64	0.777
British Thermal Units		10,611	11,112	13,492
Sulfur Forms				
Sulfate		0.0159	0.0167	0.020
Pyrite		0.147	0.1536	0.187_
Organic		0.471	0.494	0.600
Hardgrove Grindability Index		45	e	

Note: All decimal numbers are percentages.

#### Coal Analysis Report

Sample No. <u>US-796-CA</u> Core Sample 209'-211'8"

71-261-4

Lab. No. 79-C-31

Date June, 197	9			
	As Received	Air Dried	Moisture Free	Moisture & Ash Free %
Total Moisture	31.73			
Air Dried Loss	26.13			
Proximate Analysis				
Moisture (residual)		5.30		
Volatile Matter	27.13	36.72	38.78	44.45
Fixed Carbon	32.22	45.90	48.47	55.56
Ash	8.923	12.08	12.76	
Ultimate Analysis				
Hydrogen	4.02	5.44	5.12	<b>5.</b> 87
Carbon	42.26	57.21	60.41	69.25
Nitrogen	0.692	0.937	0.989	1.134
Oxygen	17.63	23.87	20.23	23.19
Sulfur	0.340	0.46	0.49	0.56
British Thermal Units	8,003	10,834	11,440	13,114
Sulfur Forms				
Sulfate	0.007	0.0093	0.0098	0.011
Pyrite	0.087	0.118	0.125	0.143
Organic	0.246	0.333	0.351	0.402
Hardgrove Grindability Index		46	v*	

[•] Note: 0 entered where percentages less than 0.01

### Coal Analysis Report

Sample No.US_796_CC	Core Sample	216'5"-218'	Lub. No. 79-C-33	
Date June, 1979				
	As Received	Air Dried	Moisture Free	Moisture & Ash Free %
Total Moisture	17.09			
Air Dried Loss	10.94			
Proximate Analysis				
Moisture (residual)		5.79		
Volatile Matter	34.98	39.28	41.69	44.87
Fixed Carbon	41.99	48.26	51.23	55.13
Ash	5.940	6.67	7.08	
Ultimate Analysis				
llydrogen	5.15	5.78	5.45	5.87
Carbon	53.13	59.66	63.33	68.16
Nitrogen	0.843	0.947	1.005	1.082
Oxygen	23.29	26.15	22.29	2.399
Sulfur	0.704	0.79	0.84	0.904
British Thermal Units	10,371	11,645	12,361	13,303
Sulfur Forms				
Sulfate	0.014	0.0161	0.0171	0.018
Pyrite	0.411	0.461	0.490	0.527
Organic	0.279	0.313	0.332	0.357
Hardgrove Grindability Index		40		

Note: All decimal numbers are percentages.

### Coal Analysis Report

Core Sample 93'6"-103' Lab. No. 79-C-16

Sample No. US-7911-C

75-40E-29

Date June, 1979				
0 ; 0	As Received	Air Dried	Moisture Free	Moisture & Ash Free %
Total Moisture	26.24			
Air Dried Loss	19.96			
Proximate Analysis				
Moisture (residual)		5.91		
Volatile Matter	36.37	45:44	48.29	52.81
Fixed Carbon	30.95	40.6	43.15	47.19
Ash	6.44	8.05	8.56	
Ultimate Analysis				
Hydrogen	4.51	5.64	5.30	5.80
Carbon	43.35	54.16	57.56	62.95
Nitrogen	0.559	0.698	0.742	0.811
Oxygen	24.27	30.32	26.64	29.13
Sulfur	0.904	1.13	1.20	1.312
British Thermal Units	8,551	10,684	11,355	12,418
Sulfur Forms				
Sulfate	0.034	0.0422	0.0449	0.049
Pyrite	0.322	0.402	0.4270	0.467
Organic	0.549	0.6860	0.729	0.797
Hardgrove Grindability Index		44		

Note: 0 entered where percentages less than 0.01

# Coal Analysis Report

Sample No.US-7911-C Core Sample 103-113' Lab.No. 79-C-17

Date June, 1979				
	As Received	Air Dried	Moisture Free %	Moisture & Ash Free %
Total Moisture	24.10			
Air Dried Loss	14.35			
Proximate Analysis				
Moisture (residual)		8.88		
Volatile Matter	37.92	44.27	48.58	50.57
Fixed Carbon	34.91	43.27	47.49	49.43
<b>∆</b> sh	3.07	3.58	3.93	
Ultimate Analysis				
Hydrogen	5.19	6.06	5.57	5.80
Carbon	44.83	52.34	57.44	59.79
Nitrogen	0.666	0.777	0.853	0.888
Oxygen	31.72	37.03	31.98	33.29
Sulfur	0.180	0.21	0.23	0.239
British Thermal Units	9,169	10,705	11,748	12,228
Sulfur Forms				
Sulfate	0.002	0.0018	0.0020	0.002
Pyrite	0.001	0.0011	0.0012	0.001
Organic	0.177	0.207	0.227	0.236
Hardgrove Grindability Index		40		

Note: All decimal numbers are percentages.

#### Coal Analysis Report

Sample No. US-7911-C Core Sample 113'1"-123'1" Lab. No. 79-C-18

Date June, 1979

*	As Received	Air Dried	Moisture Free &	Moisture & Ash Free %
Total Moisture	11.21			
Air Dried loss	.713			
Proximate Analysis				
Moisture (residual)		9.50		
Volatile Matter	43.30	43.61	48.19	50.54
Fixed Carbon	41.32	42.69	47.17	49.47
<b>N</b> sh	4.17	4.20	4.64	
Ultimate Analysis				
Hydrogen	6.07	6.11	5.59	5.86
Carbon	52.64	53.02	58.59	61.44
Nitrogen	0.826	0.832	0.919	0.964
Oxygen	35.35	35.60	30.01	31.47
Sulfur	0.238	0.24	0.27	0.283
British Thermal Units	10,444	10,519	11,623	12,189
Sulfur Forms				
Sulfate	0.005	0.0047	0.0052	0.005
Pyrite	0.009	0.0092	0.0102	0.011
Organic	0.224	0.226	0.250	0.262
Hardgrove Grindability Index		40	e.	

[•] Note: 0 entered where percentages less than 0.01

# Coal Analysis Report

Sample No. US-7911-C	Core Samplq23'1"-125'5"	Lab. No. 79-C-19
DateJune, 1979		

Ash

	As Received	Air Dried	Moisture Free	Moisture & Free %
Total Moisture	24.35			
Air Dried Loss	15.90			
Proximate Analysis				
Moisture (residual)		7.79		
Volatile Matter	31.24	37.15	40.29	42.49
Fixed Carbon	40.39	50.28	54.53	57.51
Ash-	4.020	4.78	5.18	
Ultimate Analysis				
llydrogen	4.61	5.48	5.00	5.27
Carbon	38.14	45.35	49.18	51.87
Nitrogen	0.751	0.893	0.968	1.021
Oxygen	36.31	43.18	39.32	41.47
Sulfur	0.269	0.32	0.35	0.369
British Thermal Units	9,346	11,113	12,052	12,710
Sulfur Forms				
Sulfate	0.007	0.0082	0.0089	0.009
Pyrite	0.007	0.0080	0.0087	0.009
Organic	0.256	0.304	0.330	0.348
Hardgrove Grindability Index		53	15	

Note: All decimal numbers are percentages.

# Coal Analysis Report

Sample No.US-7911-C Core Sample127'5"-133'1" Lab.No.79-C-20

Date June, 1979

	As Received	Air Dried	Moisture Free %	Moisture & Ash Free %
Total Moisture	24.47			
Air Dried Loss	12.27			
Proximate Analysis				
Moisture (residual)		10.87		
Volatile Matter	35.78	40.78	45.75	48.66
Fixed Carbon	35.07	43.01	48.26	51.33
Ash	4.68	5.34	5.99 ~	
Ultimate Analysis				
Hydrogen	5.10	5.81	5.16	5.49
Carbon	44.98	51.27	57.52	61.18
Nitrogen	0.744	0.848	0.951	1.012
Oxygen	31.78	36.23	29.81	31.71
Sulfur	0.439	0.50	0.56	0.596
British Thermal Units	8,888	10,131	11,367	12,091
Sulfur Forms				
Sulfate	0.008	0.0086	0.0096	0.010
Pyrite	0.090	0.103	0.116	0.123
Organic	0.340	0.388	0.435	0.463
Hardgrove Grindability Index		47	n	

Note: All decimal numbers are percentages.

#### Coal Analysis Report

Sample No. US-7911-C Core Sample 133'1"-138'2" Lab. No. 79-C-21

Date June, 1979

	As Received	Air Dried	Moisture Free	Moisture & Ash Free %
Total Moisture	30.27			
Air Dried Loss	11.41			
Proximate Analysis				
Moisture (residual)		15.87		
Volatile Matter	32.82	37.05	44.04	47.52
Fixed Carbon	31.44	40.91	48.63	52.48
Ash	5.47	6.17	7.33	
Ultimate Analysis				
Hydrogen	5.33	6.02	5.06	5.46
Carbon	40.66	45.90	54.56	58.88
Nitrogen	0.753	0.850	1.01	1.090
Oxygen	35.29	39.84	30.59	33.01
Sulfur	1.080	1.22	1.45	1.565
British Thermal Units	8,877	10,020	11,910	12,852
Sulfur Forms				
Sulfate	0.235	0.265	0.0315	0.034
Pyrite	0.458	0.517	0.614	0.663
Organic	0.600	0.677	0.805	0.869
Hardgrove Grindability Index		41	e	

Note: 0 entered where percentages less than 0.01

# Coal Analysis Report

Sample No. US-7916-C Core Sample 229 '7"-235' Lab. No. 79-C-22

85-396-5

Date June, 1979				
	As Received	Air Dried	Moisture Free %	Moisture & Ash Free %
Total Moisture	18.35			
Air Dried Loss	.8090			
Proximate Analysis				
Moisture (residual)		16.04		
Volatile Matter	34.47	35.45	42.22	44.87
Fixed Carbon	42.36	43.55	51.87	55.13
Ash	4.82	4.96	5.91	
Ultimate Analysis			1977-247	
Hydrogen	5.04	6.09	5.13	5.45
Carbon	46.49	56.20	66.94	71.14
Nitrogen	0.717	0.867	1.03	1.09
Oxygen	26.14	31.60	20.66	21.96
Sulfur	0.232	0.28	0.33	0.351
British Thermal Units	8,819	10,660	12,697	13,494
Sulfur Forms				
Sulfate	0.004	.0051	0.0061	0.006
Pyrite	0.017	0.0207	0.0247	0.026
Organic	0.210	0.254	0.303	0.322
Hardgrove Grindability Index		32	e	

Note: All decimal numbers are percentages.

* Note: 0 entered where percentages less than 0.01

### Coal Analysis Report

Sample No. US-7916-C	Coré Eample	235!-247!	1.ab. No.79-C-23	
Date June, 1979				
	As Received	Air Dried	Moisture Pree %	Moisture & Ash Free %
Total Moisture	26.62			
Air Dried Loss	17.27			
Proximate Analysis				
Moisture (residual)		8.56		
Volatile Matter	31.83	38.47	42.07	43.86
Fixed Carbon	38.46	49.23	53.84	56.13
Ash	3.09	3.74	4.09	
Ultimate Analysis				
Hydrogen	4.62	5.59	5.07	5.29
Carbon	39.74	48.04	52.54	54.78
Nitrogen	0.723	0.874	0.956	0.997
Oxygen	34.44	41.63	37.21	38.80
Sulfur	0.108	0.13	0.14	0.146
British Thermal Units	9,138	11,045	12,079	12,594
Sulfur Forms				
Sulfate	0.007	0.0084	0.0092	0.010
Pyrite	0.001	0.0011	0.0012	0.001
Organic	0.100	0.121	0.132	0.138
Hardgrove Grindability Index		35		

Note: 0 entered where percentages less than 0.01

# Coal Analysis Report

Sample No. <u>US-7916-C</u> Core Sample253'2"-258'9" Lab. No. 79-C-24

Date June, 1979

•	As Received	Air Dried	Moisture Free	Moisture & Ast Free %
Total Moisture	28.01			
Mir Dried Loss	11.70			
Proximate Analysis				
Moisture (residual)		14.02		
Volatile Matter	33.37	37.79	43.95	46.32
Fixed Carbon	34.70	43.75	50.88	53.63
<b>∧</b> sh	3.92	4.44	5.16	
Ultimate Analysis				
Hydrogen	5.26	5.96	5.12	5.40
Carbon	46.89	53.10	61.76	65.10
Nitrogen	0.745	0.844	0.982	1.035
Oxygen	30.41	34.44	25.56	26.94
Sulfur	1.078	1.22	1.42	1.497
British Thermal Units	9,143	10,354	12,042	12,692
Sulfur Forms				
Sulfate	0.006	0.0066	0.0077	0.008
Pyrite	0.183	0.207	0.240	0.253
Organic	0.901	1.02	1.19	1.254
Hardgrove Grindability Index		35	,	

Note: 0 entered where percentages less than 0.01

### Coal Analysis Report

Core Sample 124'-134.4' Lab. No.79-C-34

85-41E-2

Date June, 1979				
-	As Received	Air Dried	Moisture Free	Moisture & As Free %
Total Moisture	27.60			
Air Dried Loss	19.64			
Proximate Analysis				
Moisture (residual)		7.37		
Volatile Matter	35.62	44.33	47.86	49.90
Fixed Carbon	33.73	44.51	48.05	50.10
Ash	3.05	3.79	4.09	
Ultimate Analysis				
Hydrogen	4.40	5.48	5.03	5.24
Carbon	37.51	46.68	50.39	52.54
Nitrogen	0.828	1.03	1.11	1.157
Oxygen	34.31	42.70	39.03	40.69
Sulfur	0.257	0.32	0.35	0.365
British Thermal Units	8,636	10,747	11,602	12,096
Sulfur Forms .				
Sulfate	0.066	0.0820	0.0894	0.093
Pyrite	0.048	0.0597	0.0644	0.067
Organic	0.143	0.178	0.192	0.200
Hardgrove Grindability Index		49		

Note: All decimal numbers are percentages.

Sample No.US-7941A

### Coal Analysis Report

Sample No. US-7981-C Core Sample 55.7'-60.9' Lab.No.79-C-36

28N-55E-11

Date June, 1979				
	As Received	Air Dried	Moisture Free	Moisture & Ash Free %
Total Moisture	43.87			
Air Dried Loss	20.66			
Proximate Analysis				45
Moisture (residual)		17.72		
Volatile Matter	29.08	36:65	44.54	51.21
Fixed Carbon	18.55	34.92	42.44	48.79
Asili	8.50	10.71	13.02	
Ultimate Analysis				
Hydrogen	4.38	5.52	4.32	4.97
Carbon	29.36	37.00	44.97	51.70
Nitrogen	0.636	0.801	0.974	1.120
Oxygen	36.16	45.58	36.25	41.68
Sulfur	0.304	0.39	0.47	0.540
British Thermal Units	6,398	8,064	9,801	11,268
Sulfur Forms				
Sulfate	0.012	0.0147	0.0179	0.021
Pyrite	0.069	0.0872	0.106	0.122
Organic	0.228	0.288	0.350	0.402
Hardgrove Grindability Index		59	*	

^{*} Note: 0 entered where percentages less than 0.01

# Coal Analysis Report

30N-58E-1

Cara Samala		7 do 840 79=C=35	
Core sample		tam, NO. 73-0-33	
As Rece <b>ive</b> d	Air Dried	Moisture Free	Moisture & Ast Free %
44.89			
20.12			
	19.85		
31.69	39.67	49.49	55.00
17.01	32.45	40.49	45.00
6.41	8.03	10.02	
•			
4.78	5.98	4.71	5.23
32.37	40.52	50.56	56.19
0.568	0.711	0.887	0.986
35.47	44.41	33.39	37.110
0.280	0.35	0.44	0.489
6,251	7,826	8,764	10,852
0.030	0.0378	0.0472	0.052
0.0174	0.0218	0.0272	0.030
0.232	0.290	0.362	0.402
	As Received  44.89  20.12  31.69  17.01  6.41  4.78  32.37  0.568  35.47  0.280  6,251  0.030  0.0174		As Received Air Dried Moisture Free

Note: All decimal numbers are percentages.

### References

- American Society for Testing and Materials, 1967, Laboratory sampling and analysis of coal and coke (ASTM Designation D 271-64), in Gaseous fuels; coal and coke: pt. 19, p. 16-47.
- U.S. Bureau of Mines, 1967, Methods of analyzing and testing coal and coke: U.S. Bureau of Mines Bulletin 638, 69 p.

